



**YOUR TRUST  
OUR PROTECTION**



Early Streamer Emission  
Lightning **Protection** System

## PARATONEX LIGHTNING PROTECTION SYSTEMS

PARATONEX a pioneer in the design and manufacture of Lightning Rods, Surge Protection Device and Grounding Products. PARATONEX product ranges are of External protection (ESE Lightning rod and Faradisation), Internal protection (Surge protection device) and grounding/earthing products. With years of experience in the sector of lightning protection systems and after thoroughly studying the problems associated with lightning overtime, our company was established with modern lightning protection technologies. PARATONEX Lightning Protection products are available at the affordable cost and at the same time it offers higher quality than most other companies.



## 5 POINT PLAN OF PROTECTION

CAPTURE  
THE DIRECT  
LIGHTNING  
STRIKE

DISSIPATE  
ENERGY INTO  
THE  
GROUNDING  
SYSTEM

CREATION  
OF A  
BONDED  
EARTHING  
SYSTEM

PROTECTION  
OF INCOMING  
AC POWER  
FEEDERS

PROTECTION  
OF SIGNAL,  
DATA AND  
COMMUNICATION  
LINES

## RESEARCH & DEVELOPMENT

As one of the leading companies in the field of lightning protection, PARATONEX has invested heavily in field and laboratory testing as part of its ongoing commitment to research and development.

Throughout the product development of the PARATONEX, the proto-type models were subjected to intense testing under high voltage conditions. Following further refinements, the PARATONEX ESE air terminals were subjected to final testing by an independently accredited test laboratory which completed testing in full compliance with the French National standard NF C 17-102: 2011. The final testing of PARATONEX ESE terminals showed effective performance as defined in the standard.

## PARATONEX 5 POINT PLAN OF PROTECTION

PARATONEX is trusted world leader for providing high quality direct strike lightning protection, surge protection and grounding solutions. By recognizing the importance of an integrated lightning protection strategy, PARATONEX has incorporated several major concepts into a Five point plan of protection:

1. Capture the direct lightning strike
2. Dissipate energy into the grounding system
3. Creation of a bonded earthing system
4. Protection of incoming AC power feeders
5. Protection of signal, data, telecommunication & communication lines

PARATONEX operates in every region of the world and supports the global market with an extensive distribution network, helping to ensure that PARATONEX products are available for any project, regardless of size or location.

## PARATONEX ESE AIR TERMINAL

PARATONEX ESE air terminals are externally mounted, proactive, structural lightning protection devices and are designed to activate in the moments directly preceding an imminent direct strike. The installation of a PARATONEX ESE air terminal combines the best advantages of two systems: the direct path to ground of a conventional lightning protection system, and state of the art ESE technology employed in the PARATONEX ESE internal design. These combined advantages ensure that the PARATONEX ESE provides a secure zone of protection.

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

This development of an upward streamer earlier in time and space ensures that the PARATONEX ESE terminal will be the target of the developing lightning strikes. The selection of the PARATONEX ESE model, placement, and mounting height above the protected area is to be done as per the project requirements.

## TESTING

PARATONEX ESE Terminal has been extensively tested at an independent high-voltage laboratory in accordance with the revised 2011 requirements of French standard NF C 17- 102. The testing, as defined in the standard, was designed to simulate naturally occurring conditions and allow comparison of the performance between differing types of lightning protection systems. The test simulates natural field condition where a field impulse (from the downward leader approaching ground, simulated by a Impulse Generator with along front time) is superimposed onto a permanent field (from the charge between cloud and ground, simulated in the laboratory by a DC generator) The corona at the tip of the rod is measured by a photo multiplier that enables the the determination of triggering time of both the simple rod air terminal (SRAT) and the ESEAT. The average value is then determined for both a simple rod and the ESEAT. T (SRAT) is then subtracted from T (ESEAT) to achieve the  $\Delta T$  advantage for the Orbital ESE Air Terminals.



# Area of Protection

The protection radius ( $R_p$ ) of a PARATONEX ESE terminal is calculated using the following formula as defined in

NF C 17-102 (September 2011), namely:

$$R_p(h) = \sqrt{2rh - h^2 + \Delta(2r + \Delta)} \text{ for } h \geq 5 \text{ m}$$

and

$$R_p = h \times R_{p5} / 5 \text{ for } 2 \leq h < 5 \text{ m}$$

where  $h$  = Height of the mast to the area being protected (m)

$R_{p5}$  = value of  $R_p$  from Eqn. (1) when  $h = 5$  m

$r$  = 20 m for protection level I (Very High protection)

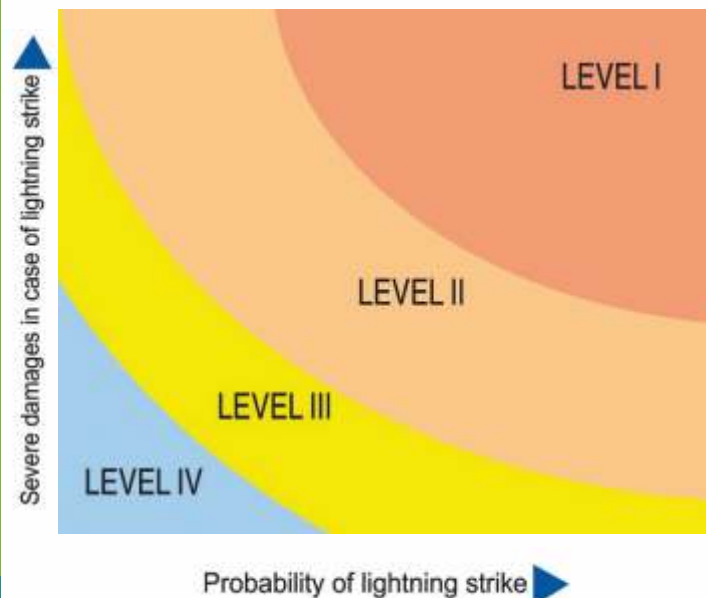
30 m for protection level II (High protection)

45 m for protection level III (Medium protection)

60 m for protection level IV (Standard protection)

and  $\Delta T$  = Triggering time advance of PARATONEX ESE Terminal

Protection level is thus related to the accepted probability of a lightning strike to a structure. A lower protection level will be able to intercept lightning with a high associated current, but a flash with a low current could avoid the lightning protection system and strike the structure. Protection level assumes lower protection radius for the air terminals, hence the system would also intercept lower current lightning.



# RISK ASSESSMENT

The procedure for calculating the risk factor is described in Lightning Protection standards. The result determines the need for installing a Lightning Protection system and its degree of security. The risk assessment compares the expected lightning incidence with the assumed probability of lightning strike on the structure. The rate between these two factors indicates if the lightning protection system is needed and the security grade. This value depends on several tabulated factors, such as the type of structure and its content, although sometimes other considerations could be taken into account, improving the protection level over the risk calculations.

The need for the level of protection often depends on subjective criteria since the protection level depends on the “acceptable number of strikes on the structure”, which can always be limited to adopting Level, the safest and most effective.

## STANDARDS CONSIDER THAT LIGHTNING PROTECTION IS NEEDED IN THE FOLLOWING CASES :

- Any installation or machinery that is used for working
- Large concentrations of people
- Need of continuity in production or public services
- Areas with high lightning density
- Very high or isolated buildings
- Buildings containing explosive or inflammable materials
- Building containing irreplaceable heritage

# SIRA 30 ESE AIR TERMINAL

## TECHNICAL FEATURES

- Non-Electronic ESE
- Designed & tested as per NF C 17-102 (2011) standard
- $\Delta T = 30 \mu\text{Sec}$  (Triggering Time Advance Delta T)
- 100 KA (10/350  $\mu\text{Sec}$ ) lightning current & 200 KA peak current tested in HIZAL (Turkey, Europe) lab
- No use of battery or external power source
- 304L (Inox) Stainless Steel design— suitable for any environmental conditions
- Suitable for use with a variety of down conductors— tape/strip, round conductor, isolated / insulated cables etc
- 20 years warranty

### Protection radius as per NF C 17-102 (2011)

Mast Height h (m)	Level I (Very High)	Level II (High)	Level III (Medium)	Level IV (Standard)
2	20	22	25	29
3	29	34	39	43
4	38	44	51	57
5	48	55	63	71
6	48	55	64	72
8	49	56	65	74
10	49	57	66	75
20	50	59	70	81
30	50	59	72	85
40	50	59	72	85



# SIRA 60 ESE AIR TERMINAL

## TECHNICAL FEATURES

- Non-Electronic ESE
- Designed & tested as per NF C 17-102 (2011) standard
- $\Delta T = 60 \mu\text{Sec}$  (Triggering Time Advance Delta T)
- 100 KA (10/350  $\mu\text{Sec}$ ) lightning current & 200 KA peak current tested in HIZAL (Turkey, Europe) lab
- No use of battery or external power source
- 304L (Inox) Stainless Steel design— suitable for any environmental conditions
- Suitable for use with a variety of down conductors— tape/strip, round conductor, isolated / insulated cables etc.
- 20 years warranty

### Protection radius as per NF C 17-102 (2011)

Mast Height h (m)	Level I (Very High)	Level II (High)	Level III (Medium)	Level IV (Standard)
2	31	35	39	43
3	47	52	58	63
4	63	69	78	85
5	79	86	97	107
6	79	87	97	107
8	79	88	98	108
10	79	88	99	109
15	80	89	101	111
20	80	89	102	113
45	80	89	105	119
50	80	89	105	120
80	80	89	105	120
100	80	89	105	120





## LIGHTNING STRIKE RECORDER

PARATONEX Lightning Strike Recorder is designed to count and record the lightning strikes captured by lightning protection systems such as ESE lightning rods, simple capturing rods and the cage method. The lightning counter is necessary to determine whether the lightning rod received any lightning strikes.

The counter is connected to the down conductor of the lightning arrester and therefore it detects the electromagnetic field caused by lightning discharge current, and it counts each strike and shows it by way of the number display.

With the help of the lightning counter the customer can follow the number of lightning strikes arrested by your system. It does not require any additional power supply for its operation.

## FEATURES

- IP 65 rated enclosure suitable for external application.
- Ease of installation, can be retro-fitted to any lightning protection system.
- Non-intrusive and fast acting proximity circuit detects lightning transient currents.
- Non resettable electro-mechanical counter.
- Can be mounted at any location along the down conductor.

MODEL	PTX6
Description	Lightning Striker Counter
Display Model	Electromechanical display (non re-settable)
Current sensitivity (8/20 $\mu$ s)	> 250A
Lightning Current (10/350 $\mu$ s)	100 KA
Current Sample Mode	Inductive Probe (Built-in)
Operating temperature ( $^{\circ}$ C)	6 digits
Indicator	-20~+85
Enclosure material	Plastic
Degree of protection	IP 65 (IEC 529)
Dimension of counter (cm)	16 (L) x 9 (W) x 6 (H)

## LIGHTNING EVENT COUNTER TESTER



- Model : PTX6 TESTER
- Handy & Re-usable
- Can test multiple counters
- Battery operated

