



Advanced Lightning Protection

MAP WORLDWIDE SERVICES[®]

Standard Bearers of Excellence

ISO 9001:2008 & 14001:2004 COMPANY



Precision Power Pty Ltd (PP), a company based in Australia has strong footprints in South-East Asia and Far East and are acknowledged experts in Lightning Protection since 1982. **PP personnel and their Associates MAP Worldwide Services (MAP)** have vast experience in design, supply, installation and certification of Lightning Protection System in some of the most lightning prone areas. Apart from providing Advanced Terminals and Accessories, we offer services for :

- Carrying out Risk Assessment
- Designing Optimum Area of Protection
- Preparation of BOQ
- Training to Engineers of contractors and customers.

PP and **MAP** have commissioned Lightning Protection System in key segments, such as

- Airports
- Ropeways
- Places of Worship
- Heritage Structures
- Bungalows, Villas & Resorts
- Defence & Telecom Installations
- Sporting and Recreation Centers
- Power Generation and Distribution
- Industrial facilities, Oil, Gas & Petrochemicals
- High-rise Buildings-Commercial, Hotels, Hospitals & Residential etc

FORMATION OF LIGHTNING

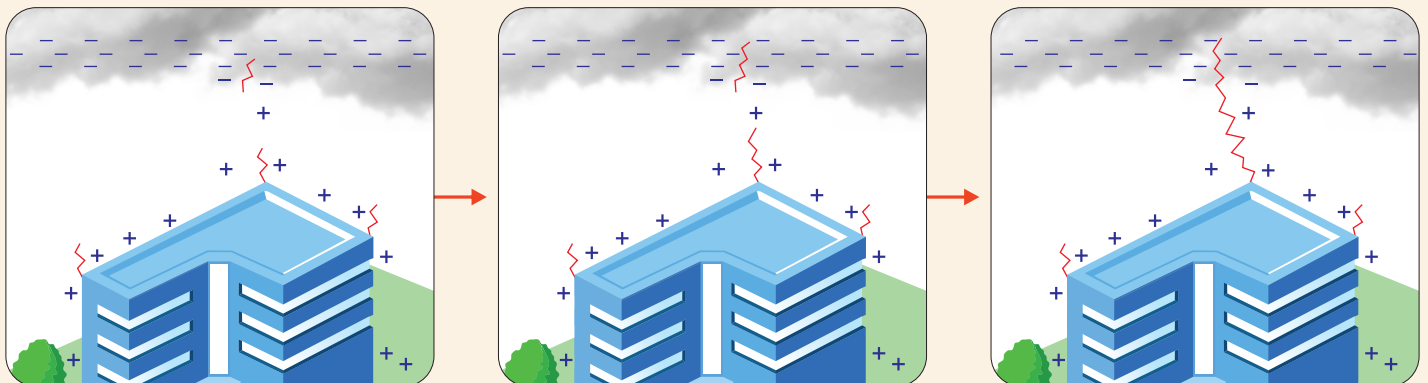
During a thunderstorm, the Earth's surface has a charge opposite to the clouds. As opposites attract, the charge at the bottom of the thunder cloud surges to link up with the charge of the Earth's surface.

Once the charge, at the bottom of the cloud gets large enough, a flow of this charge rushes towards the Earth. This is known as stepped leader. The charges of the Earth are attracted to this stepped leader, so a flow of charge moves into the air. When the stepped leader and the charge from the earth meet, a strong electric current carries this charge up into the cloud. This electric current is known as the return stroke and humans can see it as lightning.

As the storm moves over the ground, the strong charge in the cloud attracts opposite charges in the ground. These charges move up into the tallest objects like trees, telephone poles, and houses etc. A "stepped leader" descends from the cloud seeking out a path toward the ground. This phase of a lightning strike is too rapid for human eyes.

As the cloud charge gets close to the ground, an opposite charge, called a streamer, reaches up to the cloud charge. The channels connect and we see the lightning stroke. We may see several strokes using the same path, giving the lightning bolt a flickering appearance, before the electrical discharge is complete.

Formation of Lightning



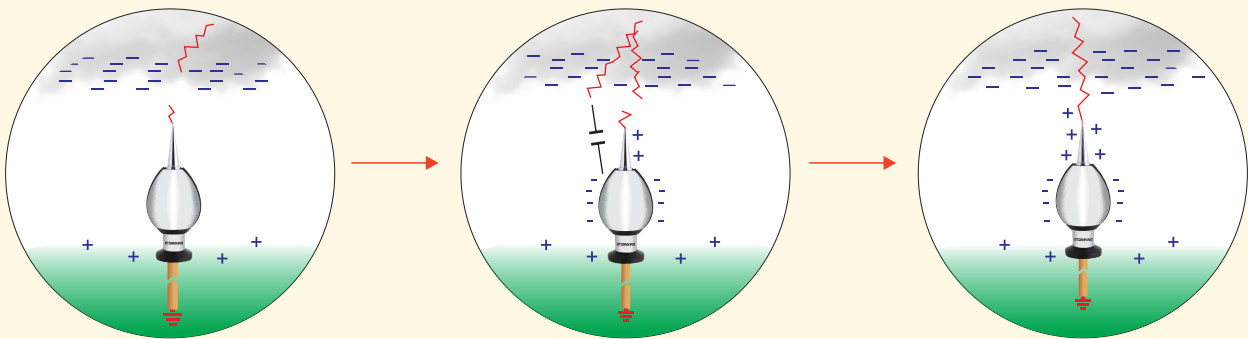
ADVANTAGE STORMKING

The central finial of Stormking ESE Terminal is connected via a downconductor/s to the ground earth. Hence, during a thunderstorm, the central finial tip acquires the same charge as the Earth.

The dual 'Floating' panels of the Stormking Terminal are electrically insulated and isolated from the central finial. Hence, during a thunderstorm, when the stepped leader (or down leader) begins its approach towards the ground, there is a rapid increase in the cloud charge. Due to capacitive coupling phenomenon, the twin panels develop the same charge as the clouds.

At this point, the finial and panels have opposite charges, and due to the dual thrust design an arc is triggered across the air gap between the finial and panels. This gives rise to an upstreamer, which is stronger and faster than the objects on the ground.

This early streamer results in a larger or enhanced area of protection as compared to a conventional rod. The Stormking Terminal launches an upward streamer every time during a thunderstorm and captures the lightning by providing a preferred point for lightning to pass through the low impedance downconductor to a dedicated earthing. Hence, Stormking Terminals provide an enhanced protection to the structures, equipments, machinery and human lives.



Stormking Terminals are Characterised by

Superior Design

Stormking terminals have dual thrust design, which results in faster and stronger upward streamer increasing the efficiency of Lightning Protection System.

Superior Material

Stormking terminals are made from copper and brass. The outer panels are made from Copper while central rod is made of solid brass and both are coated with chrome.

Superior Quality

The copper and brass used are high grade pure metals. Plus they are coated with chromium for added protection against pollutants and corrosive atmosphere.

Superior Performance

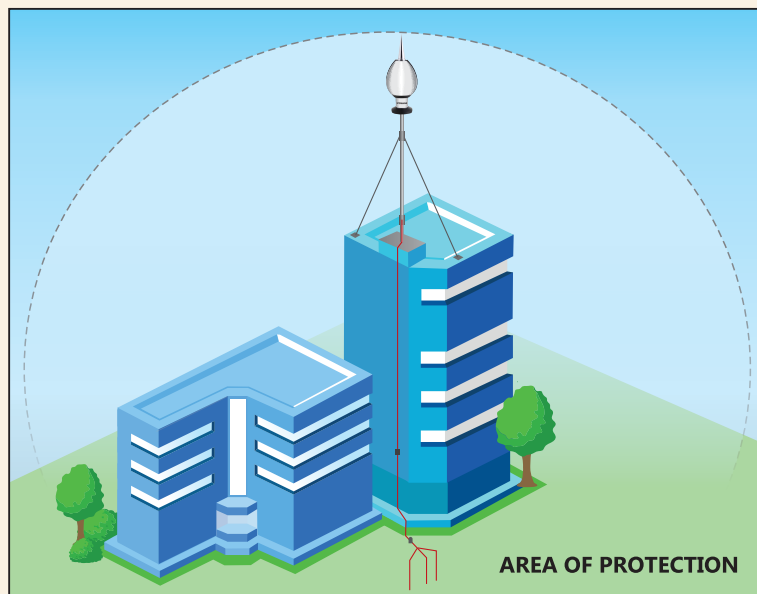
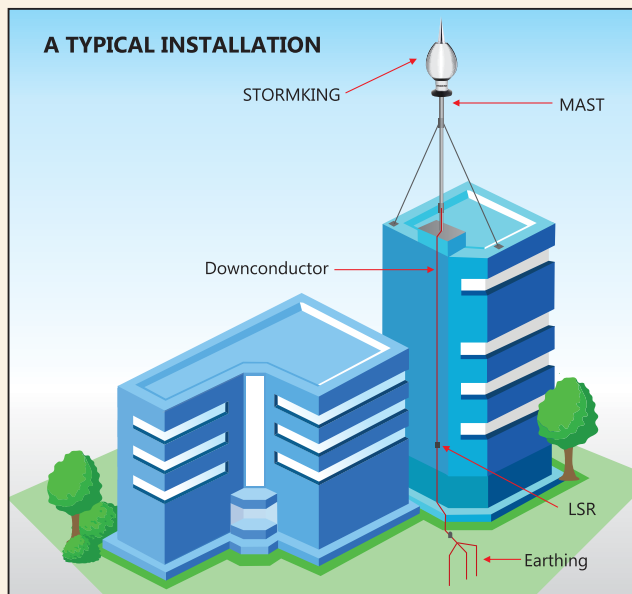
The triggering of upstreamer is non-electronic hence constant, superior performance. No battery or external power is required to activate the terminals.

The above superior features results in superior protection.

The performance has been certified by an independently accredited test laboratory and is in full compliance with National French Standard **NFC 17-102:2011**. The testing of Stormking ESE Terminals showed effective performance as defined in the National French Standard. The Stormking ESE Terminals have also been tested and certified for high current carrying capacity as per IEC 60-1 : 1989 Standards.

The objective of testing under **NFC 17-102:2011** is to obtain a statistical result between a single franklin rod and the ESE terminal whereby a time difference is obtained between the two and by definition, a triggering time advance ΔT is calculated. Safety margins are applied to the measured values in order to provide a conservative measured result.

The objective of testing under IEC 60-1 : 1989 is to ensure that the terminal withstands high currents involved when a lightning current passes through the terminal, which then conveyed to the ground via low impedance downconductor/s.



Protection Performance :

The protection radius (R_p) of a Stormking ESE terminal is calculated using the following formula as defined by the French National Standard NFC 17-102:2011

$$R_p = \sqrt{h(2D-h) + \Delta T(2D + \Delta T)} \text{ for } \geq 5\text{m}$$

where :

- ΔT as established during the test.
Stormking-ESE-30 = ΔT (μs) 30
Stormking-ESE-50 = ΔT (μs) 50
Stormking-ESE-60 = ΔT (μs) 60
- h = actual height of Stormking terminal above the area to be protected (m).
- D (in m) depends on the selected level of protection, protection levels are specified in Annex A of the standard NF C 17-102:2011
 $D=20\text{m}$ for protection Level I
 $D=30\text{m}$ for Protection Level II
 $D=45\text{m}$ for protection Level III
 $D=60\text{m}$ for protection Level IV

Model No.	Height of Terminal above highest point of structure in Mtr.						
	2	4	5	6	10	15	20
Protection Level –I							
Stormking ESE-30	19	38	48	48	49	50	50
Stormking ESE-50	27	55	68	69	69	70	70
Stormking ESE-60	31	63	79	79	79	80	80
Protection Level –II							
Stormking ESE-30	22	44	55	55	57	58	59
Stormking ESE-50	30	61	76	76	77	79	79
Stormking ESE-60	35	69	86	87	88	89	89
Protection Level-III							
Stormking ESE-30	25	51	63	64	66	69	71
Stormking ESE-50	35	69	86	87	88	90	92
Stormking ESE-60	39	78	97	97	99	101	102
Protection Level-IV							
Stormking ESE-30	29	57	71	72	75	78	81
Stormking ESE-50	38	76	95	96	98	100	102
Stormking ESE-60	43	85	107	107	109	111	113

MOUNTING ACCESSORIES

We offer a complete range of high quality accessories for installation of a complete Lightning Protection System.

Mounting Mast

A wide selection of mast in G.I., Stainless Steel and FRP with cross over coupler available in Guyed, Free standing and Cantilevered Configuration.

Downconductors

- 1) Single Core Copper Cable with minimum cross section area of 70 sq.mm specially designed for lightning current.
- 2) LIC (Low Induction Conductor), a high integrity low impedance cable which is particularly effective on structures containing high density human occupancy and those which contain sensitive electronic equipment, volatile liquids and other sensitive applications.

Lightning Strike Recorder, also known as a Lightning Strike counter, records the number of lightning strikes captured by the Terminal. The LSR is designed for easy mounting at any location along the route of downconductor.

The LSR has a mechanical 6 digit display secured within a polycarbonate IP 67 rated enclosure. It has a current sensitivity of 1000 A @ 8/20 μ s impulse and operates by sensing current by means of an inductive pick-up loop. The LSR is non-electronic, self powered and DOES NOT need any external power source or battery.

Earthing

Maintenance free Earthing for maintaining constant ohmic values. The system comprises of Copper Bonded Earth Rods as conductors, copper tapes and connecting clamps along with Earth Enhancing Compounds GRESLO® / GRESLO PLUS + / TERRAS. These compounds are applied around conductors to reduce soil resistivity and lower earth impedance.

The constant resistivity maintained by our Maintenance free Earthing ensures perfect and fail-proof working condition of Lightning Protection System.

Transient Earth Clamp

The Transient Earth Clamp when connected between different earthing systems remains as an "open circuit" under normal operating conditions. Under transient conditions, the TEC provides equipotential bonding by forming a "closed circuit" between different earthing systems.

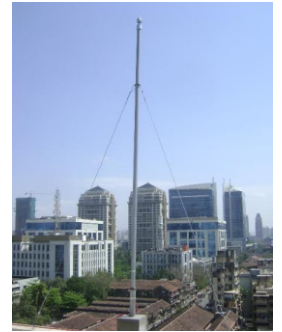
MAP® Maintenance Free Earthing has been tested & Certified by CPRI and it conforms to IS:3043-1987 & IS/IEC 62305-3:2010 standards.

ADVANTAGES OF ADVANCED LIGHTNING PROTECTION SYSTEM.

- Protection Radius increases as height of structure increases.
- Single or Multiple Terminals sufficient to cover large area.
- Selection of Downconductor route possible. Mostly single Downconductor is sufficient.
- Chances of Failure of the Downconductor (D.C.) decreases as D.C. is without any joints.
- Minimum Earthing Pits are required.
- Strike Recorder available to evaluate the working of the system.
- Total System is maintenance free.
- Cost effective solution with enhanced area of protection.
- Aesthetically pleasing to the eye.
- Fully tested and in compliance to NF C 17-102:2011 & IEC 60-1:1989 Standards.

RISK ASSESSMENT AND DESIGN

We carry out a risk assessment of your property taking into consideration the location, type of structure, usage, people density, etc. This is carried out by a specially designed software. Based on risk assessment, the level of protection required is determined and a design for area of protection is created.



Precision Power

-Solutions to Power Problems



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Disclaimer : Due to continuous improvement and development of products, specifications provided in the brochure are subject to change without notice. All drawings, illustrations and details provided are to be used for guidance purpose only. Lightning is a natural phenomenon which occurs in the atmosphere, hence lightning protection is basically risk reduction. Therefore, 100% protection can neither be claimed nor provided.