

Precision Power
-Solutions to Power Problems



**STORMKING
ESE**

**SENTINELS
ACT**

Lightning Protection Systems



INSTALLATION GUIDE

IMPORTANT

- The Air Terminal should ideally be installed on the uppermost part of the structure. It should be at the highest point of the area to be protected.
- The peak of the Air Terminal should be at least 2 meters above the highest point of the area to be protected, including aerials, roofs, tanks, etc.
- Technicians carrying out the installation work should take proper precautionary measures by wearing protective helmet, safety belt, safety shoes etc.
- INSTALLATIONS SHOULD BE CARRIED OUT WHEN WEATHER IS CLEAR, DO NOT INSTALL DURING THUNDERSTORM/LIGHTNING.

Check list of Lightning Protection

Major Components :

1. Air Terminal : Stormking ESE/ Sentinels ACT
2. Mast: G.I /SS/ FRP in different configurations :
(a) Supporting Guyed (b) Cantilever
(c) Freestanding.
3. Downconductor : Copper cable / Strip / Low Induction Conductor (LIC)
4. Maintenance Free Earthing: 250 μ copper bonded rod and Ground resistance lowering compound (GRESLO/GRESLO PLUS⁺ / TERRAS)

On receipt of the material, check if the aforesaid items are in accordance with your order placed. Kindly also verify that supplied material is in good condition and not damaged while shipping.

Installation Steps :

Please follow the step-wise instructions for accurate installation of the Air Terminal.

1. Installation of grounding.
2. Installation of downconductor.
3. Termination of both ends of downconductor.
4. Fixing of air terminal on mast.
5. Raising and fixing of mast.
6. Installation of recorder.

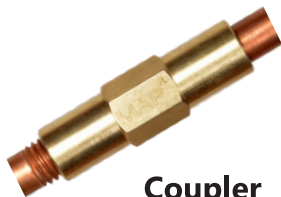
Grounding

- 1 Drill or auger a 75 mm-150mm (approx.) diameter hole to a depth of 150 mm less than the length of the copper bonded earth rod to be installed.
- 2 Saturate the hole by dousing with water.
- 3 Place the earth rod into a central position in the hole and drive the rod 300mm if possible into the soil at the bottom of the hole.
- 4 Mix **GRESLO®/GRESLO PLUS+/TERRAS** in the proportion of 1 Litre of water per Kg. of compound. This proportion will vary as per soil conditions.
- 5 Immediately pour the mixture directly into augured hole.
- 6 Repeat steps 4 and 5 in accordance with recommended number of applications of **GRESLO® / GRESLO PLUS+ /TERRAS**.
- 7 Backfill the empty space in the hole with excavated soil/garden soil.
- 8 Fix earth rod connector on the copper bonded earth rod
- 9 Lightning Protection needs a total of 6 meters deep earth pits.
- 10 After installation of earthing material, interconnect all the earthing pits using copper cable or copper strip of minimum 25mm x 3mm.
- 11 The interconnection, copper strip / cable conductor should be at least 300mm deep in the ground.

Major Components for Earthing :



Earth Rod



Coupler



Earth Rod Connector



Greslo

OR



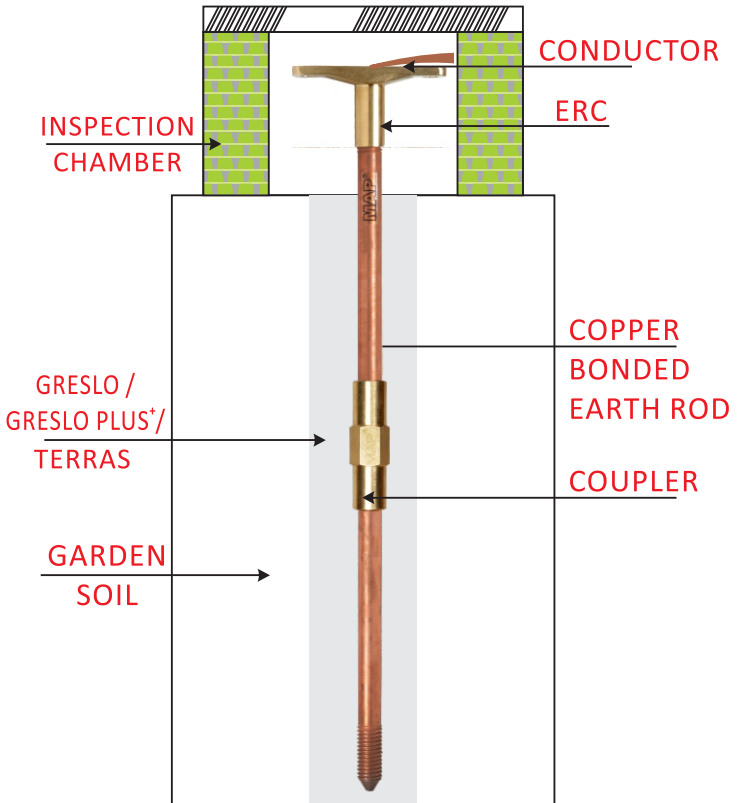
Greslo Plus⁺

OR



Terras

Installation Diagram

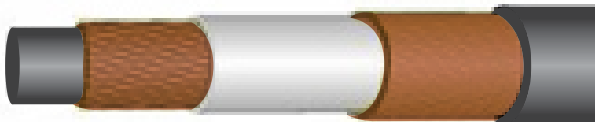


Downconductor

- The downconductor may be single core flexible copper cable/tapes/ tape braid/ stranded wire/ solid round. The minimum cross section of the downconductor should be 70 mm^2 .
- Low induction conductor (LIC) can be used as downconductor.



70Sq.mm Copper Cable



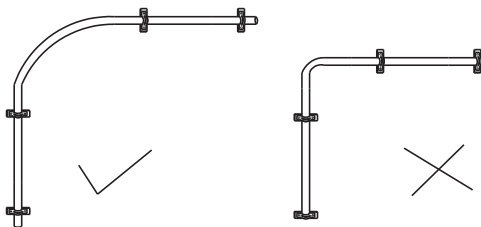
LIC (Low Induction Conductor)

- Use of LIC cable is recommended when the conventional downconductor does not function effectively and isolation of system is unlikely. LIC cable is highly beneficial when an internal route is available and separation distance is insufficient from other cables / utilities.

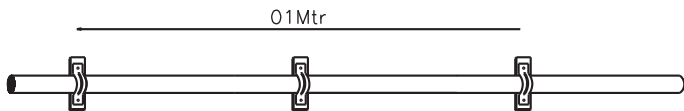
- At least 1 downconductor is needed for each Air Terminal as per **NFC 17-102:2011 Standards**.
- Minimum two downconductors are required when:
 1. The horizontal length of the conductor exceeds its vertical length.
 2. The height of the structure is greater than 28Mtr.

Routing, Fixing & Termination of Downconductor

- The downconductor should be installed from the Air Terminal to the ground in such a way that its path is as direct as possible. The routing should be as straight as possible, following the shortest path, avoiding sharp bends.
- The bend radius for conventional downconductor should not be less than 20 cm and minimum 50cm for LIC cable.



- When the downconductor cannot be installed on the external surface of the structure, it should be installed inside a dedicated, non-flammable and isolated duct.
- Downconductor should be fixed to the surface using saddles with at least 2 saddles per meter.



- Compression lug should be fixed to both ends of conventional copper cable downconductor – One end should be joined to the earthing and the other end to the upper termination of Air Terminal
- In case LIC cable is used, kindly follow upper & lower termination method as illustrated below.

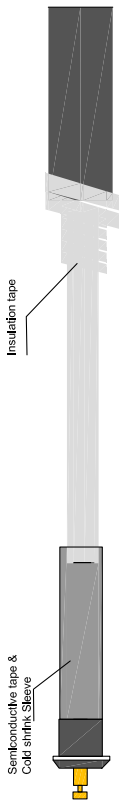
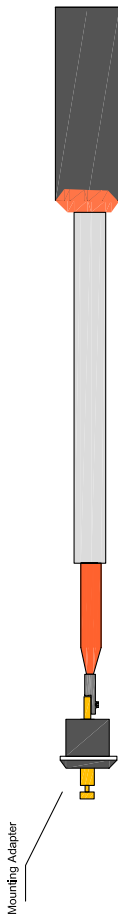
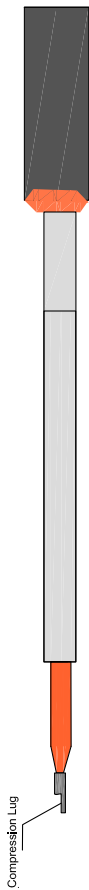
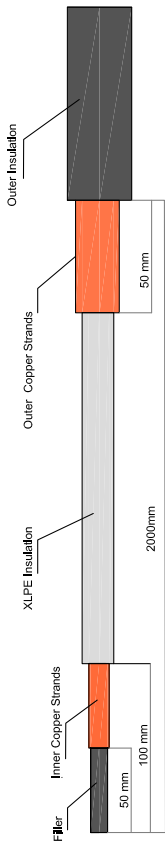
Upper Termination of LIC

The upper termination requires the following components :

- Compression lug
- Semi conductive tape
- Insulation tape
- Cold shrink tube

Method :

- 1 Remove the outer insulation upto 2000mm length.
- 2 Cut outer copper strands 50 mm less than outer insulation and expose the XLPE insulation.
- 3 Cut XLPE insulation 100mm from end and expose inner copper strands.
- 4 Remove 50mm inner filler from inner copper strands.
- 5 Bunch inner copper strands and fix copper lug using compression tool.
- 6 Insulate compression lug using semi conductive tape and then cover it using cold shrink tube.
- 7 Fold the outer copper strands towards outer insulation and cover it using insulation tape.



LIC Cable upper termination

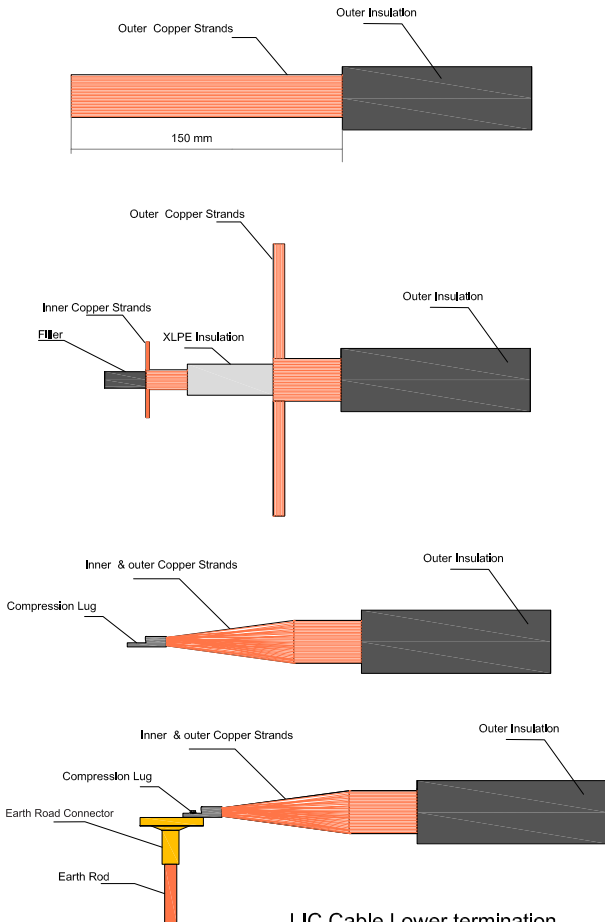
Lower Termination of LIC

The lower termination requires the following components:

- Denso Tape
- Crimp Lug
- Earth Rod Connector

Method :

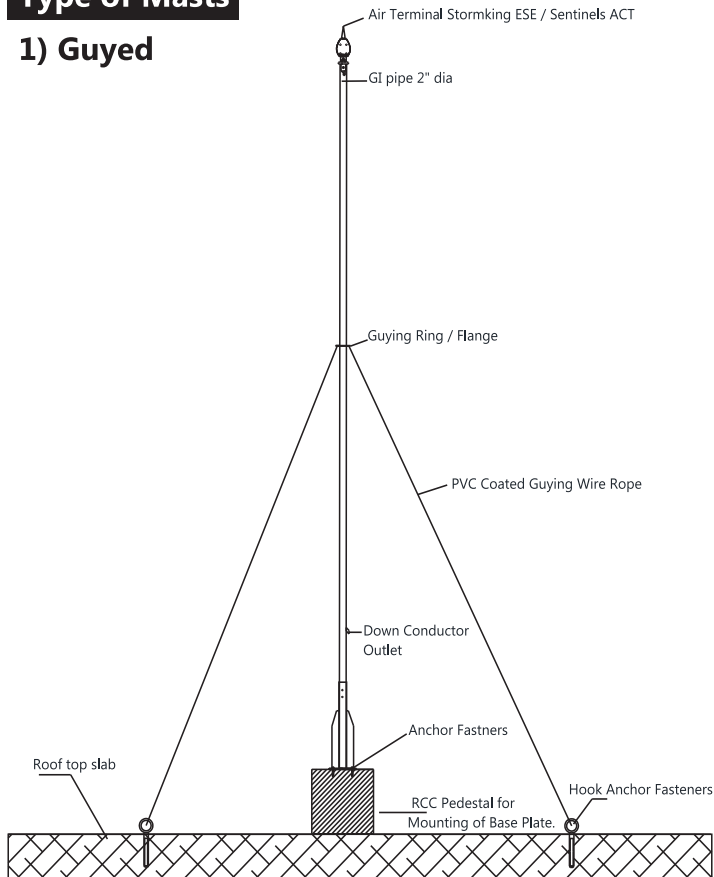
- 1 Remove the outer insulation upto 150mm length.
- 2 Fold outer copper strands towards the outer insulation and expose the XLPE insulation.
- 3 Cut XLPE insulation upto 70mm from end and expose inner copper strands.
- 4 Remove 50mm inner filler from inner copper strands.
- 5 Bunch inner copper strands & outer copper strands and fix copper lug using compression tool.
- 6 Join the copper lug connected to the cable with the earth rod connector using nut & bolt.
- 7 Cover lug connection and earth rod connector joint using denso tape.



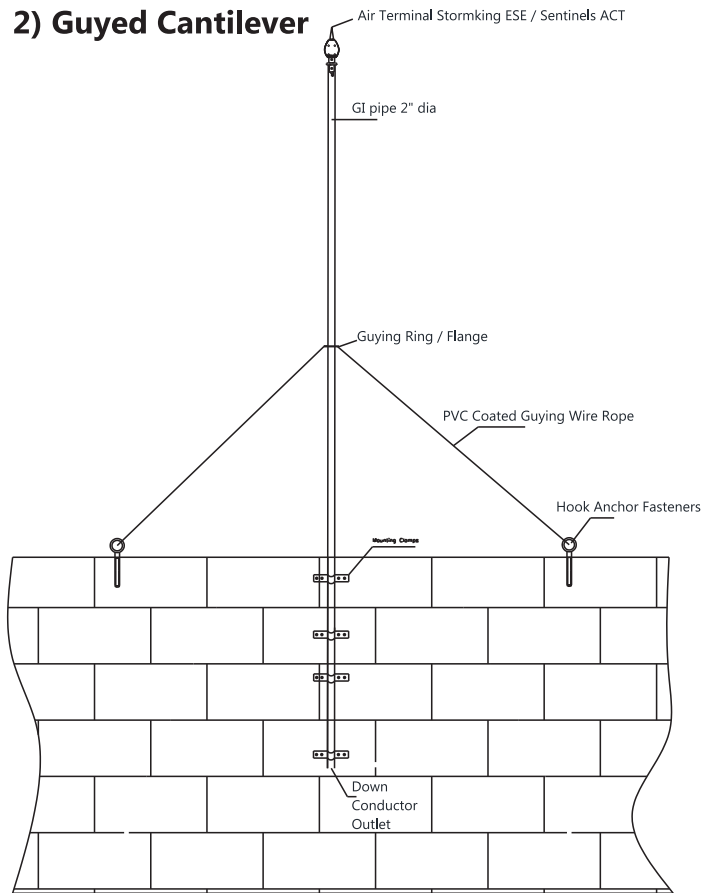
LIC Cable Lower termination

Type of Masts

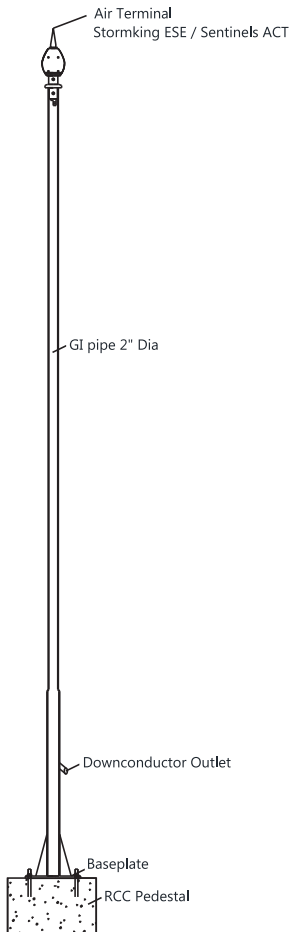
1) Guyed



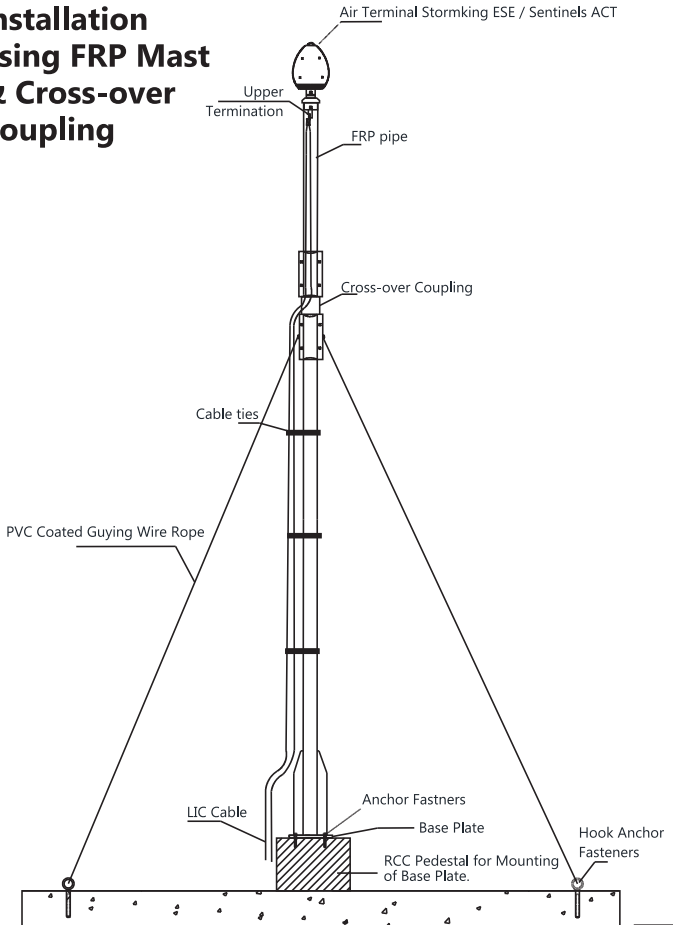
2) Guyed Cantilever



3) Free Standing



Installation using FRP Mast & Cross-over Coupling



Mast

- Mast should be installed at the highest point of structure. It should be at least 2 meters above the highest point of the area to be protected.
- Select suitable mast from different mast types available i.e. Supporting Guyed/Cantilever/Free Standing/ FRP (Please refer to diagrams).
- After selection of mast, pass the downconductor through the entire length of pipe till it surfaces out from the top end of the mast.
- Fix the downconductor lug to the Stormking ESE / Sentinels ACT Terminal using the bolt provided for the lug connection.
- Connect lug to bottom of air terminal adapter using bolt arrangement
- Fix adapter on top end of mast.
- Pull the downconductor from the lower exit to ensure adequate tension for holding the terminal in place.
- Fix guying wire rope in guying ring using U bolt clamp.
- Raise the mast in vertical position. Fix base plate of mast using expansion bolts.
- Fix guying wire rope at least 2 meters away from mast in three different directions.
- Use anchor hook to fix the guying wire.
- Guying should hold the mast in proper position during high wind velocity.

LIGHTNING STRIKE RECORDER (Optional)

- The L.S.R. should be placed alongside the downconductor route which makes it accessible/visible for strike readings.
- It should be installed approximately 1.5m from ground level.
- The plastic saddles are for holding the L.S.R. in place. The S.S. saddle should be tightened adequately so that it is firmly holds to the downconductor.
- The L.S.R. can be enclosed in a security enclosure however; the display should be kept visible to check the recorded strikes.



Warranty/Disclaimer

The warranty covers any manufacturing, material defects and workmanship for a period of 5 years from the date of dispatch of material. Even though, we offer 100% warranty on the quality of our products, 100% protection against direct lightning strike is not feasible as lightning discharge process is a natural atmospheric occurrence with statistical variation in behavior and energy levels. Hence, the manufacturer's liability is limited to repair or replacement of the faulty product with an equivalent product. The option to repair or replace the product will be at the manufacturer's sole discretion. The repaired or replaced product will be warranted under the terms and conditions which will be valid only for the remaining warranty period from the date of original supply. This warranty does not indemnify the purchaser of the product for any consequential claim for damages, loss of operations, service or profit. This warranty only covers products supplied by Precision Power and its authorized distributors.

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