***The Air Termination Network (ATN) is a vital part of any structural Lightning Protection System.***

The ATN is the part that arrests the lightning strike. An ATN can be designed through multiple methods: the "mesh", the "protective angle method" and/or the "rolling sphere" or a combination. The adoption of which method(s) to use is very much determined by the nature of the structure to be protected.

*An ATN may consist of:*

- Conductors laid in a mesh over the structure
- Vertical Air Terminals (or Lightning Masts)
- A combination of the two (particularly useful when protecting roof mounted plant)

***Kingsmill offer a complete range of Air Termination Network materials:***

**AT:14** Conventional Small Air Terminals

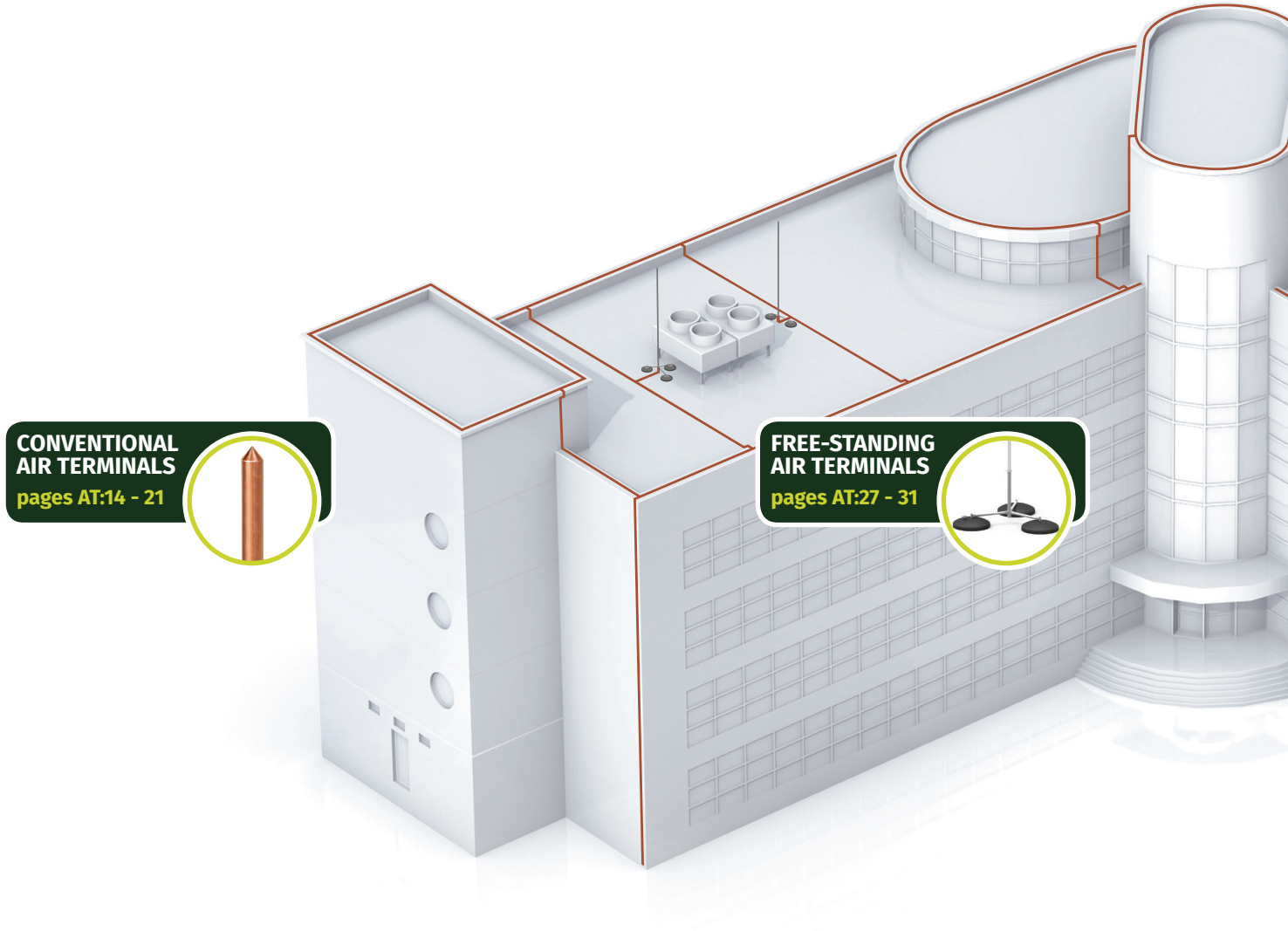
**AT:22** Lightweight Lightning Masts

**AT:27** Free-Standing Air Terminals

**AT:32** Insulated Lightning Conductor Cable used in conjunction with associated Air Terminals and supports

**AT:50** Catenary Wire Systems

**AT:51** Isolated Systems using Insulated Spacer Bars and Masts

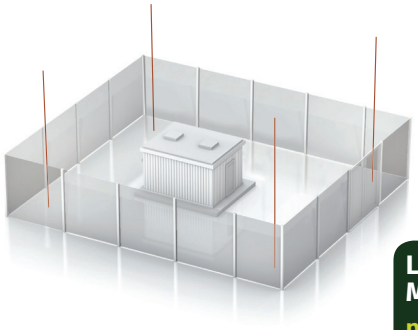


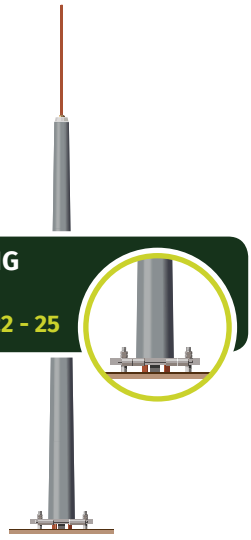
# AIR TERMINATION NETWORK

The ATN can be fixed to the building - this is the most common form.

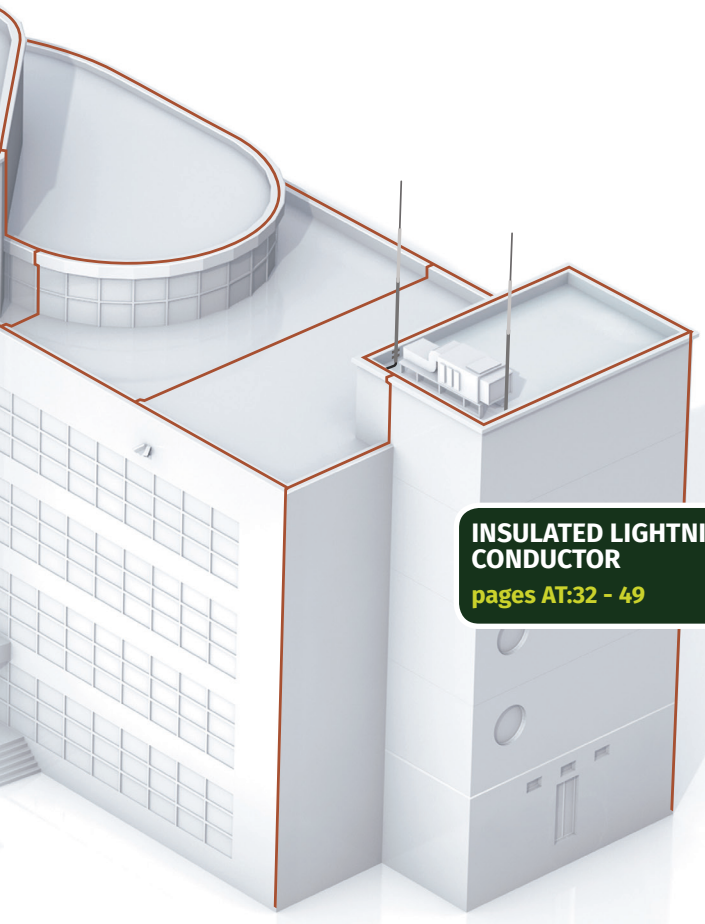
Alternatively, it can use elements of the structure to conduct lightning, eg Reinforcing Bar or steelwork. However, special conditions relate to the use of such “fortuitous conductors” in BS:EN 62305.

Finally, it can be an Isolated System where separation distances need to be maintained between the Lightning Protection System and the structure being protected, in order to avoid “flashover” to that structure (for example, stores containing explosive material).

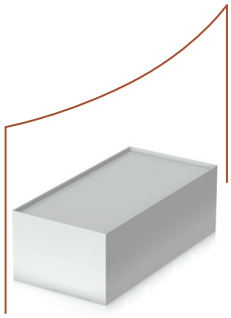




**LIGHTNING MASTS**
pages AT:22 - 25



**INSULATED LIGHTNING CONDUCTOR**
pages AT:32 - 49



**CATENARY WIRE SYSTEMS**
page AT:50

**ISOLATED SYSTEMS**
pages AT:51 - 52

# Roof Mesh Conductor Systems

***Kingsmill offer a choice of conductors and fittings for use in the construction of a roof mesh.***

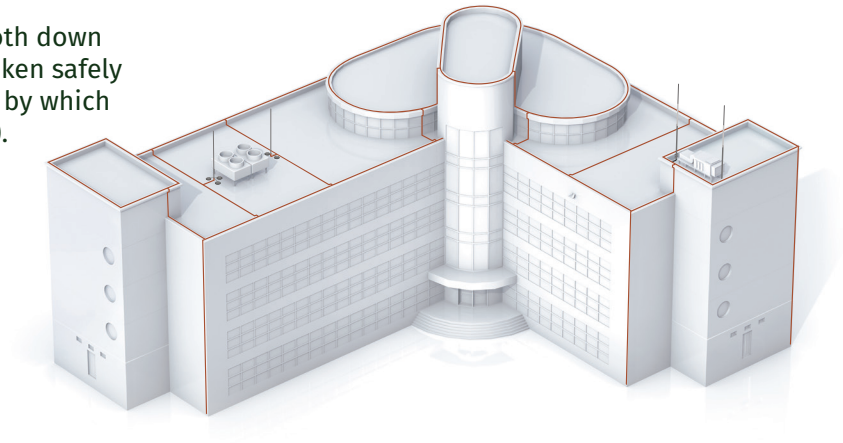
These are shown in the sections - CONDUCTORS and FITTINGS.

Our range includes solid circular, rectangular tape and stranded conductors, as well as PVC coated. Thus giving the designer the flexibility to blend the Lightning Protection network into the building facade.

Conductors are an important element of a Lightning Protection System. They can be used by themselves in a mesh or in combination with Air Terminals.

Conductors are also the main element in both down conductor (the path by which lightning is taken safely to the earth system) and earthing (the path by which the lightning current is discharged to earth).

Given the importance of conductors (and their fittings) to the three elements of an effective lightning protection scheme, we have dedicated two sections to these products: CONDUCTORS and FITTINGS.

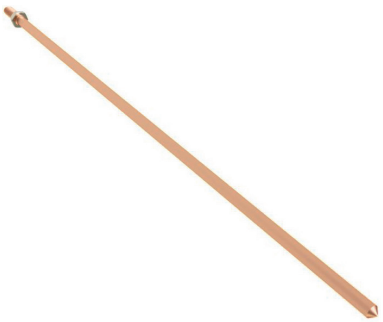


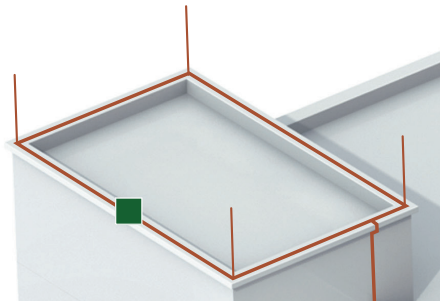
# Conventional Small Air Terminals

Available in both copper and aluminium, Conventional Small Air Terminals offer a quick and easy solution for Air Terminals of 0.5m to 3.0m in height.

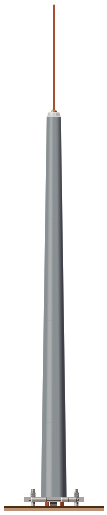
They are suitable for use with flat and circular conductors.

Flat parapet, ridge saddle and wall-mounting bases are available.





# Lightweight Lightning Mast



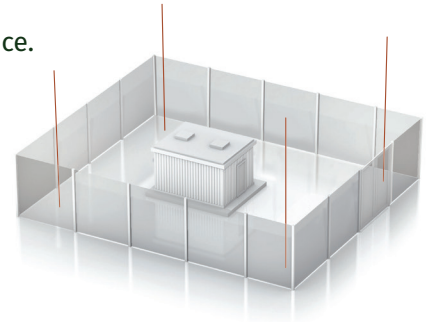
The Lightweight Lightning Mast is our premier product, offering height combinations from 5m to 20m. Its conical shape adds considerable strength and thus resistance to deflection/whipping in the wind.

It is easy to fix. In fact, the building itself can become the foundation for the mast, alleviating the need for heavy and unsightly concrete blocks and tripods.

The hinged base design allows easy inspection and maintenance.

The mast can be supplied in different colours and graphics to blend in with building architecture and landscaping designs.

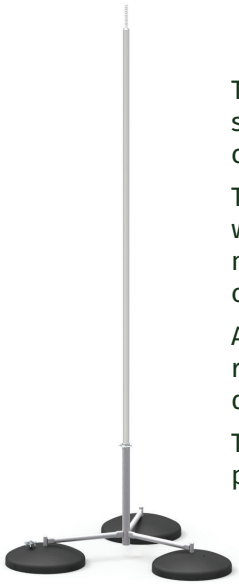
When aesthetics are important - this is the product for you.



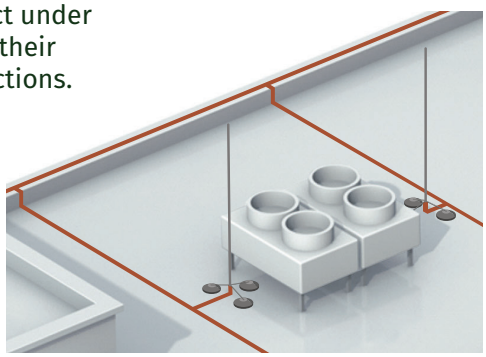
Due to its composite material the Lightweight Lightning Mast is non-corrosive. This allows for a longer life than conventional metal masts. It is also an insulator, reducing touch potential problems.

The mast can also be combined with aerial wires to form part of a catenary wire system.

# Free-Standing Air Terminals



The top of Free-Standing Air Terminals could deflect under some wind conditions. This is due to the nature of their construction and having smaller diameter mast sections.



These terminals require to be weighted down with concrete blocks and tripod structures. This may be problematic in terms of weight loading on some roofs, particularly when retro-fitting.

A reasonable amount of clear roof space is required to accommodate both the separation distance and tripod base.

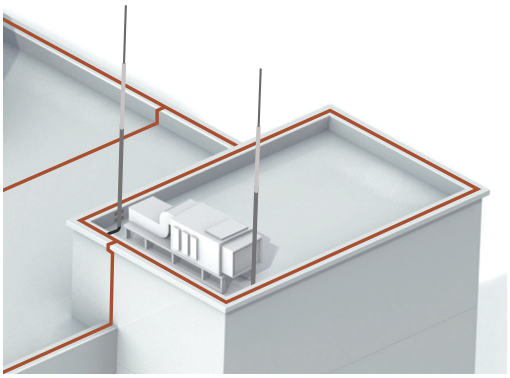
These terminals are a simple solution to protecting roof mounted plant, when aesthetics are of less importance.

# Insulated Lightning Conductor

Insulated Lightning Conductor is ideal for use where there is insufficient roof space to install Conventional and Free-Standing Masts/Air Terminals while maintaining the required separation distance from the object being protected.

Insulated Lightning Conductor Air Terminals are constructed from:

- Aluminium interception Air Terminal/ Rod 0.5m to 1m
- GRP mast section varying from 2m to 3m for wall fixing installations and 1.5m when used with a stainless steel Mast and Base
- Stainless steel Mast section to give mast height and supporting strength
- Stainless steel Base



When used in conjunction with Kingsmill Insulated Lightning Conductor cable, the Air Terminal can be placed closer to objects that require protection. The cable simulates a separation distance of ≤0.75m in air and ≥1.5m in solid material.

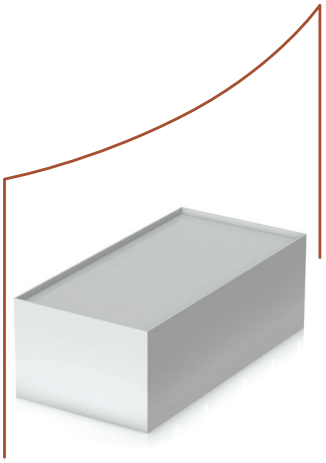
Kingsmill Insulated Lightning Conductor cable is used for maintaining separation distance between the electrically conductive parts of the structure (to be protected) and the Lightning Protection System.

# Catenary Wire Systems

Kingsmill can offer Catenary Wire Systems and application designs.

Each system tends to be unique in terms of both material selection and protection area.

***Please contact Kingsmill sales support staff with your project requirements.***

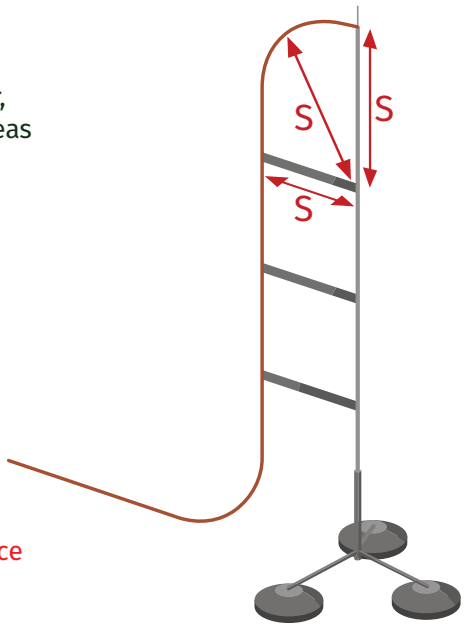


# Isolated Systems

## Isolated Systems using Insulated Spacer Bars and Masts

Kingsmill can offer bespoke Isolated Lightning Protection Systems, where the Lightning Protection Conductor Network is installed in such a way that the lightning current does not come into contact with the object/structure being protected.

NOTE: such systems are designed for use with 8mm diameter conductor, due to the ability to bend such material through 360° (all planes) whereas a tape can only be bent through one plane.




*Example of an isolated system using mast and insulated bars to maintain the separation distance from the object being protected.*

S = separation distance

# Product Choice

The choice over whether a mesh of roof conductors, vertical air terminals, or fortuitous elements of the building etc are used, is dependent on the Lightning Protection Designer and the nature of the structure itself. There is no such thing as a standard Lightning Protection Kit. Each building needs to be examined in its own right and a system designed to suit that particular structure and its use or purpose.

The type of conductor used - aluminium, copper, composite or PVC covered - has a bearing on which fittings to use, as does the shape and size of the conductor. Conductors can be supplied in a rectangular and solid circular section.

## Air Terminals/Masts

Kingsmill offer a comprehensive range of Air Terminals:

- Lightweight Lightning Mast (5m to 20m in height)
- Free-standing Air Terminals (1m to 10m in height)
- Conventional Small Air Terminals (0.5m to 3m in height)
- Air terminals for use with Insulated Lightning Conductor cable (3m to 7m in height)

This give the architect, designer, contractor and client flexibility over height, as well as installed aesthetics of the system.

*Each system has its features and benefits which are summarised below:*

| Product | Height | Aesthetics | Life span | Corrosion resistance | Ease of installation | Foundation type | Issues to consider on roof | Stability in wind | Installation / maintenance |
|---|---|---|---|---|---|---|---|---|---|
| **Lightweight Mast**  | 5m - 20m | Excellent/can be customised to blend into architectural or landscape setting ★★★★★ | 45+ years | Excellent ★★★★★ | Simple, quick, lightweight ★★★★★ | Direct fix to structure<br>Direct burial<br>Fix to foundation block | Civil contractor to cast in foundation bolts | Excellent - conical design improves strength<br>Resists wind deflection ★★★★★ | Lowers to ground on hinged base |
| **Free-standing Air Terminal**  | 3m - 10m | Average aesthetics ★★ | 30 - 40 years | Good ★★★★ | Heavy, requires concrete blocks and guy wires for tall versions ★★ | Free-standing base | Weight of concrete blocks/ tripod base and guys take up space | Subject to deflection in wind and storm conditions ★★★ | |
| **Conventional small air terminals**  | 0.5m - 3m | Average aesthetics ★★★ | 30 - 40 years | Good ★★★★ | Lightweight, easy fixing ★★★★ | Small base | | Can be broken if hit by an object ★★ | |
| **Air Terminals used with Insulated Lightning Conductor cable**  | 3m - 7m | Average aesthetics ★★ | 30 - 40 years | Good ★★★★ | Heavy, requires concrete blocks and guys for tall versions ★★ | Free-standing base/wall bracket mounting | Weight of concrete blocks/ tripod base takes up space | Subject to deflection in wind and storm conditions ★★★ | Reduces separation distance/useful where roof space is limited |

*Table AT:1. Air Terminals/Masts features comparison*

## *From BS:EN 62305 . . .*

*The Lightning Protection Designer may need to consider the following when designing a system . . .*

# Roof mesh conductor system

BS:EN 62305 recommends the use of a protective mesh of conductors laid over the structure to be protected. This mesh can be supplemented with the use of Air Terminals. The risk assessment carried out from BS:EN 62305-2 determines both the Lightning Protection Level (LPL) and Lightning Protection Class (LPC) for a structure.

***Roof mesh spacing***

The roof mesh is spaced in accordance with guidelines contained within BS:EN 62305-3. *This can be summarised below:*

| LPC | Maximum mesh size (m) | Down conductor spacing (m) |
|---|---|---|
| I | 5 x 5 | 10 |
| II | 10 x 10 | 10 |
| III | 15 x 15 | 15 |
| IV | 20 x 20 | 20 |

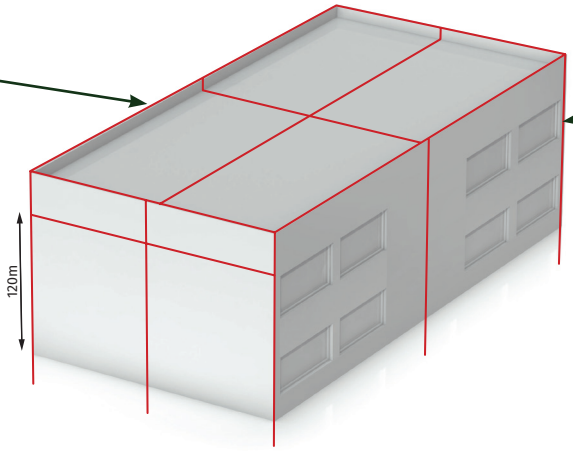
***Example of a roof mesh system***

Perimeter conductors should be placed close to the edge of the structure. If possible, place down conductors at each corner as well as spacing them equally around the structure.

A minimum of two down conductors is required, whether an Air Terminal, Mesh or Rolling Sphere concept is used.

| LPC | Maximum mesh size (m) |
|---|---|
| I | 5 x 5 |
| II | 10 x 10 |
| III | 15 x 15 |
| IV | 20 x 20 |

| LPC | Lateral conductor spacing (m)* |
|---|---|
| I + II | 10 |
| III | 15 |
| IV | 20 |
| *Buildings over 120m height | |




| LPC | Down conductor spacing (m) |
|---|---|
| I | 10 |
| II | 10 |
| III | 15 |
| IV | 20 |

Conductors are equally spaced - it is important to protect all exposed corners of the building.

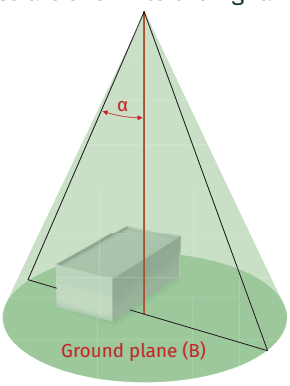
Minimum of two down conductors.

# Protective angle/zone of protection

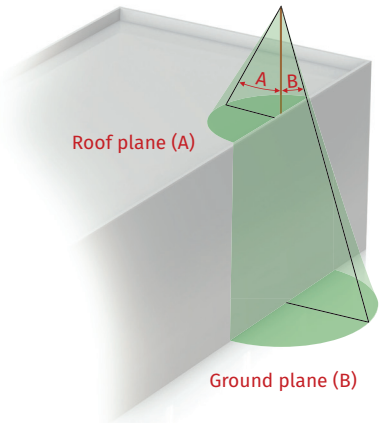
The protective angle differs according to the class of Lightning Protection System (ie I, II, III or IV) and the height of the Air Terminal above the reference plane.

Examples of how the protective angle changes with height and LPS class are shown to the right.

| Height of Air Terminal above reference plane (h) | Class I | | Class II | | Class III | | Class IV | |
|---|---|---|---|---|---|---|---|---|
| | Angle (deg) | Radius (m) | Angle (deg) | Radius (m) | Angle (deg) | Radius (m) | Angle (deg) | Radius (m) |
| 3m | 66.3 | 6.8 | 70.1 | 8.2 | 74.1 | 10.3 | 76.7 | 12.6 |
| 6m | 55.9 | 5.9 | 62 | 11.4 | 67.9 | 15 | 71 | 17.5 |
| 12m | 40.4 | 10.2 | 50.3 | 14.4 | 58.2 | 19.4 | 62.1 | 22.6 |
| 18m | 27.1 | 9.3 | 40.6 | 15.4 | 50.3 | 21.5 | 55.2 | 25.9 |




**Simple ground mounted terminal**




### Roof mounted terminal

In this circumstance there are two reference planes and angles:

**A** Roof to tip of Air Terminal

**B** Ground to tip of Air Terminal

## *From BS:EN 62305 . . .*

# Rolling Sphere

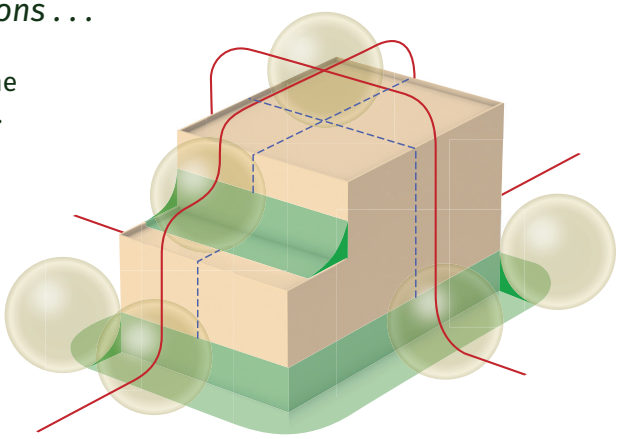
The Rolling Sphere can also be used to determine protective area.

| Lightning Protection Class | Radius of rolling sphere |
|---|---|
| I | 20m |
| II | 30m |
| III | 45m |
| IV | 60m |

*Some examples of Rolling Sphere applications . . .*

The sphere is rolled all over the structure. Where the sphere touches the building, protection is required.

This protection is usually in the form of a mesh system of conductors.



— Centre line of sphere

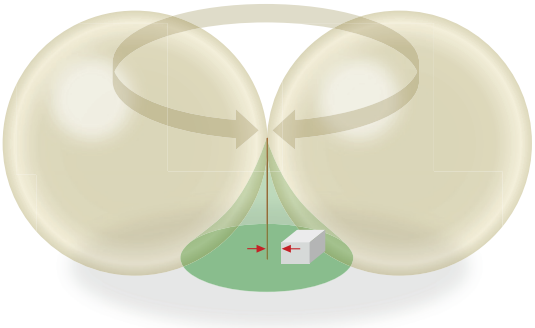
----- Protection required where the sphere touches the structure

Buildings over 60m in height should have both lateral (side) and roof conductors installed.

Spacing of conductors would still conform to the tables on page AT:9.

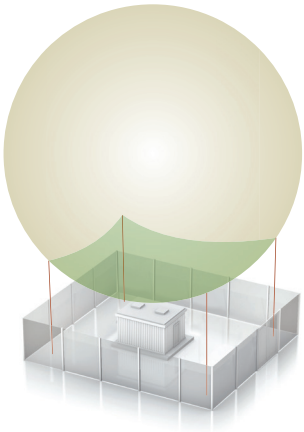
**When used in conjunction with a Lightning Mast . . .**

*The object being protected must be contained within the green protected area.*



**When used in conjunction with several Lightning Masts . . .**

*A separation distance needs to be maintained between the top of the object being protected and the bottom of the sphere.*



*From BS:EN 62305 . . .*

# Separation Distance

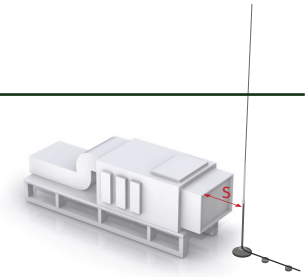
All metallic parts of a structure, electrical equipment and their supply cables should be incorporated into the Lightning Protection Design. This prevents dangerous 'side flashing' (or sparking) between the Lightning Protection Network and the conductive parts of the structure/building to be protected.

Where adequate separation exists between the Lightning Protection System and the conductive parts of the structure, side-flashing is considerably reduced.

*Some examples of achieving separation distance using Air Terminals are:*

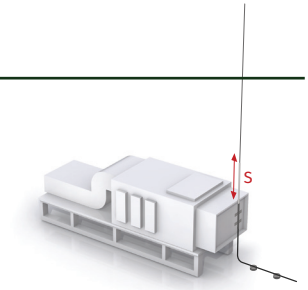
## Fixed or Free-Standing Masts

Maintaining the appropriate separation distance when there is plenty of roof space available to site masts.



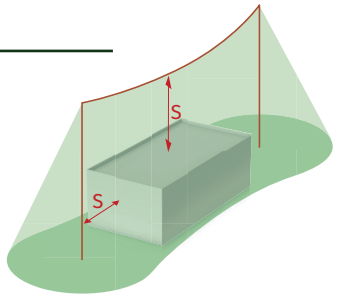

## Insulated Lightning Conductor

Using the Insulated Lightning Conductor system to simulate separation distance where the lack of space dictates that the Lightning Protection system must pass close to, or be connected to, the object to be protected.



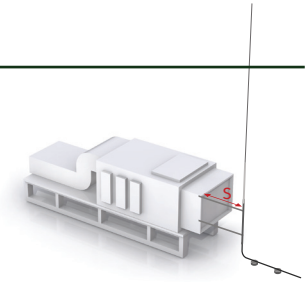

## Suspended Catenary Wires

Where space allows the use of an isolated system, for example a series of masts and catenary wires.




## Insulated Separation Bars

Where it is not possible, due to space constraints, to use a tripod mast, but it is possible to connect one end of an insulated spacer bar to the object to be protected, and the other to the lightning conductor/mast.




S = separation distance

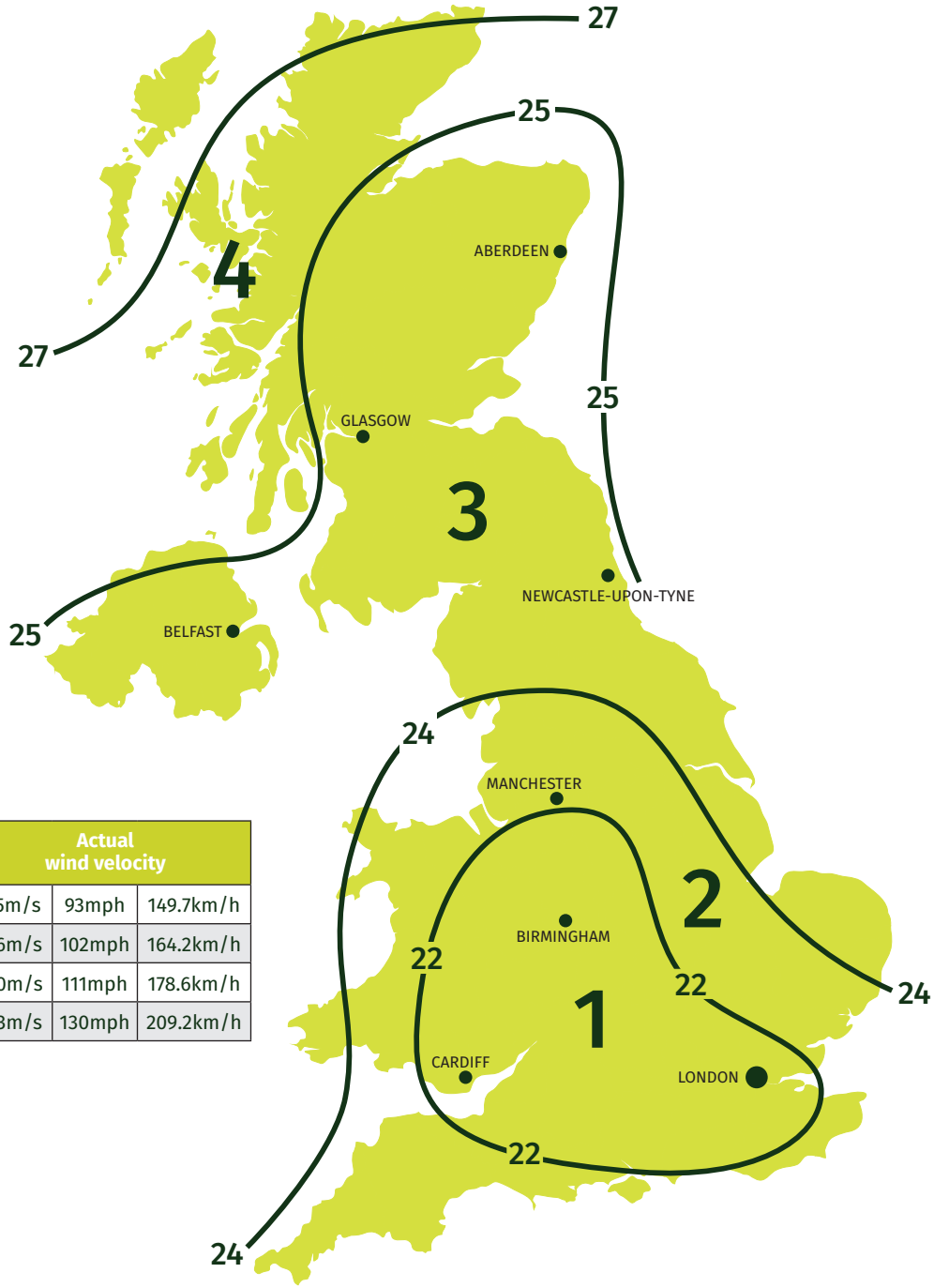
# Wind Loading

It is important that the Interception Mast/Air Terminal has minimum wind deflection and that the mast can withstand both constant and gusting winds.

## UK Wind Speed Map

The following map approximately indicates mean hourly wind speeds and actual velocity. However, it must be noted that wind speeds change with altitude, location and height above ground.

With this in mind, it is important to consider local wind conditions when designing a Lightning Protection System.




| Wind zone | Max basic mean hourly wind speed | Actual wind velocity | | |
|---|---|---|---|---|
| **Zone 1** | 22m/s | 41.5m/s | 93mph | 149.7km/h |
| **Zone 2** | 24m/s | 45.6m/s | 102mph | 164.2km/h |
| **Zone 3** | 25m/s | 50.0m/s | 111mph | 178.6km/h |
| **Zone 4** | 27m/s | 58.3m/s | 130mph | 209.2km/h |

*Figure AT:1 - UK wind speed map*

## Wind Loading (continued)

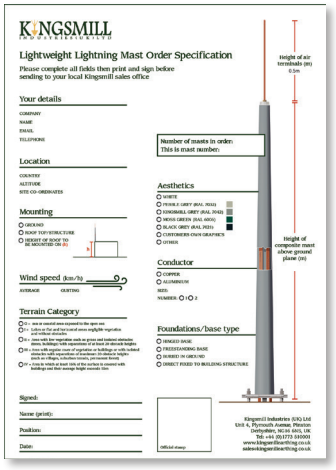
Lightning Interception Mast selection must take into account wind loading.

Air Terminals are often installed in exposed places - tops of buildings and open terrain. Therefore they must be capable of withstanding local wind conditions.

In order to calculate wind loading conditions, the following information is required:

- Location and/or coordinates
- Average wind speed
- Gusting wind speed
- Terrain category

*On the right is a copy of our questionnaire relating to calculating wind loading conditions for our Lightweight Lightning Masts.*



KINGSMILL

Lightweight Lightning Mast Order Specification

Please complete all fields then print and sign before sending to your local Kingsmill sales office

Your details

COMPANY
NAME
EMAIL
TELEPHONE

Location

COUNTRY
ALTITUDE
SITE CO-ORDINATES

Mounting

GROUND
ROOF TOP STRUCTURE
HEIGHT OF ROOF TO BE MOUNTED ON (ft)

Wind speed (km/h)

AVERAGE
GUSTING

Terrain Category

Number of masts in order:
This is mast number:

Aesthetics

WHITE
PEARL GREY (RAL 7032)
KINGSMILL GREY (RAL 7042)
MOSS GREEN (RAL 6005)
BLACK GREY (RAL 7021)
CUSTOMERS OWN GRAPHICS
OTHER

Conductor

COPPER
ALUMINIUM
SIZE:
NUMBER: 1 2

Foundations/base type

HINGED BASE
FREESTANDING BASE
BURIED IN GROUND
DIRECT FIXED TO BUILDING STRUCTURE

Height of air terminals (m)
0.5m

Height of composite mast above ground plane (m)

Signed:
Name (print):
Position:
Date:

official stamp

Kingsmill Industries (UK) Ltd
Unit 6, Plymouth Avenue, Pinxton
Derbyshire, NG16 6NS, UK
Tel: +44 (0) 1773 863 311
www.kingsmillearthing.co.uk
sales@kingsmillearthing.co.uk

*Figure AT:2 - Lightweight Lightning Mast installation in Qatar*

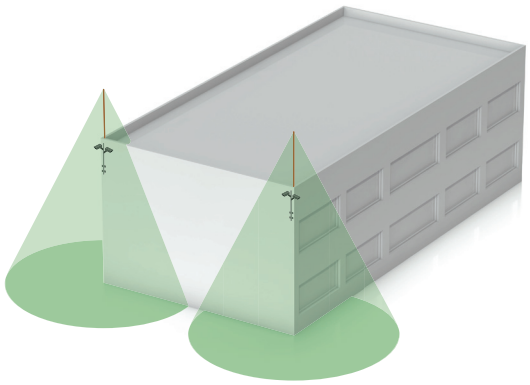
# Conventional Air Terminals

The Kingsmill range covers:

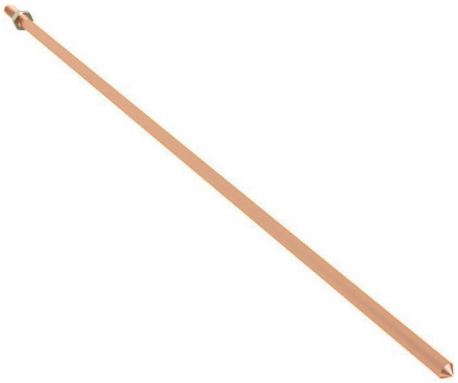
- Air Terminals
- Multi-Points
- Strike Pads
- Heavy duty wall mounting and hinged base masts

The products are available in copper and aluminium.

Air Terminals are used by the designer to solve protection problems for equipment such as cameras, roof mounted plant etc.



## Air Terminals



Kingsmill **Copper Air Terminals** are designed to be used with either the standard Air Terminal Base, Multi-Purpose Base or the Side Mounted Brackets. Threads are rolled for high strength.

### Copper

| ROD LENGTH (mm) | SHANK DIA (mm) | THREAD DIA (mm) | MATERIAL | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|---|
| 500 | 8.9 | 10 | Copper | 0.33 | ATCR1005 |
| 1000 | 8.9 | 10 | Copper | 0.65 | ATCR1010 |
| 500 | 14.2 | 16 | Copper | 0.75 | ATCR1605 |
| 1000 | 14.2 | 16 | Copper | 1.50 | ATCR1610 |
| 1500 | 14.2 | 16 | Copper | 2.25 | ATCR1615 |
| 2000 | 14.2 | 16 | Copper | 3.00 | ATCR1620 |
| 2500 | 14.2 | 16 | Copper | 3.75 | ATCR1625 |
| 3000 | 14.2 | 16 | Copper | 4.50 | ATCR1630 |

**Material:** Copper
**Standard:** BS:EN 62561-2

Kingsmill **Aluminium Air Terminals** are designed to be used with either the standard Air Terminal Base, Multi-Purpose Base or the Side Mounted Brackets. Threads are cut.

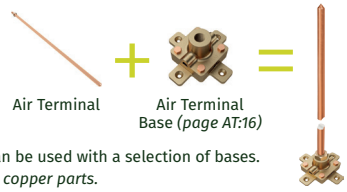
### Aluminium

| ROD LENGTH (mm) | SHANK DIA (mm) | THREAD DIA (mm) | MATERIAL | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|---|
| 500 | 10 | 10 | Aluminium | 0.11 | ATAR1005 |
| 1000 | 10 | 10 | Aluminium | 0.20 | ATAR1010 |
| 500 | 16 | 16 | Aluminium | 0.29 | ATAR1605 |
| 1000 | 16 | 16 | Aluminium | 0.58 | ATAR1610 |
| 1500 | 16 | 16 | Aluminium | 0.87 | ATAR1615 |
| 2000 | 16 | 16 | Aluminium | 1.16 | ATAR1620 |
| 2500 | 16 | 16 | Aluminium | 1.45 | ATAR1625 |
| 3000 | 16 | 16 | Aluminium | 1.74 | ATAR1630 |

**Material:** Aluminium
**Standard:** BS:EN 62561-2

APPLICATION

**COMPONENT ASSEMBLY:**




Kingsmill **Air Terminals** can be used with a selection of bases.
*Never mix aluminium and copper parts.*

## Elevation Rods

Kingsmill **Copper Elevation Rods** are designed to be used with either the standard Air Terminal Base, Multi-Purpose Base or the Side Mounted Brackets and the Multi-Point Air Terminal. Threads are rolled for high strength.

### Copper

| ROD LENGTH (mm) | SHANK DIA (mm) | THREAD DIA (mm) | MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|---|---|
| 500 | 14.2 | 16 | Copper | 0.75 | CELV1605 |
| 1000 | 14.2 | 16 | Copper | 1.50 | CELV1610 |
| 1500 | 14.2 | 16 | Copper | 2.25 | CELV1615 |
| 2000 | 14.2 | 16 | Copper | 3.0 | CELV1620 |
| 2500 | 14.2 | 16 | Copper | 3.75 | CELV1625 |
| 3000 | 14.2 | 16 | Copper | 4.50 | CELV1630 |

**Material:** Copper
**Standard:** BS:EN 62561-2

Kingsmill **Aluminium Elevation Rods** are designed to be used with either the standard Air Terminal Base, Multi-Purpose Base or the Side Mounted Brackets and the Multi-Point Air Terminal. Threads are cut.

### Aluminium

| ROD LENGTH (mm) | SHANK DIA (mm) | THREAD DIA (mm) | MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|---|---|
| 500 | 16 | 16 | Aluminium | 0.30 | AELV1605 |
| 1000 | 16 | 16 | Aluminium | 0.59 | AELV1610 |
| 1500 | 16 | 16 | Aluminium | 0.88 | AELV1615 |
| 2000 | 16 | 16 | Aluminium | 1.17 | AELV1620 |
| 2500 | 16 | 16 | Aluminium | 1.46 | AELV1625 |
| 3000 | 16 | 16 | Aluminium | 1.74 | AELV1630 |

**Material:** Aluminium
**Standard:** BS:EN 62561-2

## Multi Points

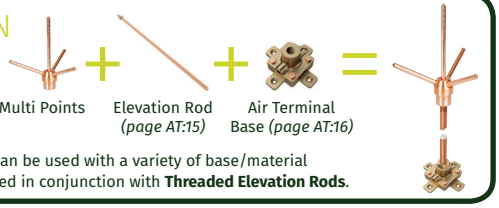
Kingsmill **Multi Points** are designed to be used with the Kingsmill **Elevation Rod**.

| THREAD DIAMETER (mm) | MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|
| 16 | Copper | 0.54 | MPAT |
| 16 | Aluminium | 0.14 | MPATA |

**Material:** Copper/aluminium
**Standard:** BS:EN 62561-2

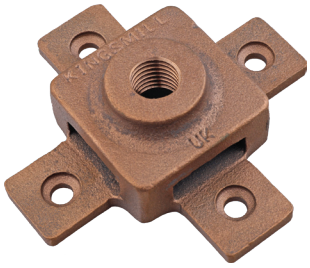
APPLICATION

**COMPONENT ASSEMBLY:**

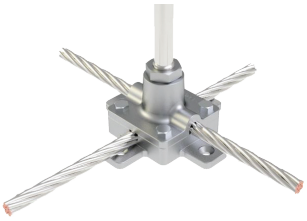



Kingsmill **Multi Points** can be used with a variety of base/material options but must be used in conjunction with **Threaded Elevation Rods**.

# Air Terminal Bases



CATBxx - Tape



CATBxx - Stranded Conductor

CATBxx - Stranded Conductor

AATBxx (in horizontal mode)
- Solid Circular or Tape

AATBxx (in vertical mode)
- Solid Circular or Tape

Kingsmill **Air Terminal Bases** are designed to be used with the Kingsmill **Air Terminals** and **Elevation Rods**.

| THREAD DIA (mm) | CONDUCTOR SIZE (mm) | MATERIAL | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 16 | 25 | Copper | 0.50 | CATB16 |
| 16 | 25 | Aluminium | 0.17 | AATB16 |
| 10 | 8 or 25 x 3 | Aluminium | 0.15 | AATB10 |
| 16 | 31 x 6 | Copper | 0.50 | CATB316 |
| 16 | 50mm² | Copper | 0.80 | CATB50 |
| 16 | 70mm² | Copper | 0.75 | CATB70 |
| 16 | 95mm² | Copper | 0.90 | CATB95 |

**Material:** Gunmetal/aluminium
**Standard:** BS:EN 62561-1, Class H

FIXINGS

4 x CSK 1½ x No.10 woodscrew (BCSW1.5-10 brass for copper/ A2CSKSLT1.5-10 stainless steel for aluminium) + plug (PP10) not included

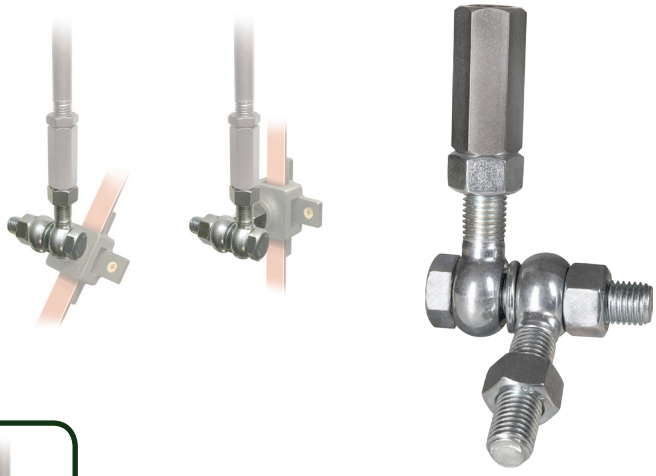
SEE FIXINGS SECTION - PAGE FIX:4

## Air Terminal Pivoting Adapter

Kingsmill **Air Terminal Pivoting Adapters** can move through 180° to align the Air Terminal into the desired plane. They are suitable for M16 thread copper and aluminium Air Terminals.

| THREAD DIAMETER | MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|
| M16 | Stainless Steel | 0.611 | ATPBA16 |

**Material:** Stainless Steel
**Standard:** BS:EN 62561-1, Class H



APPLICATION

**COMPONENT ASSEMBLY:**

Air Terminal *(page AT:14)* + Air Terminal Base *(page AT:16)* + Rod to Tape Coupling =

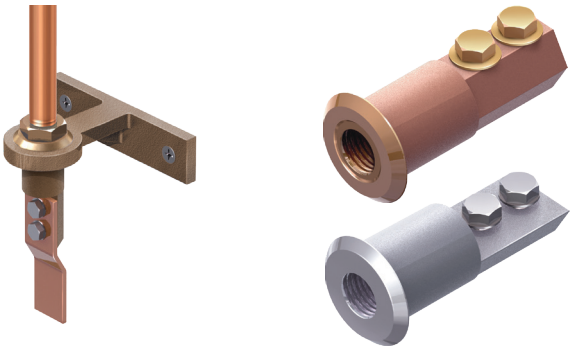
**Air Terminal Pivoting Adapters** are to be used in conjunction with Air Terminals and Air Terminal Bases. They can move through 180°.

## Rod to Tape Couplers

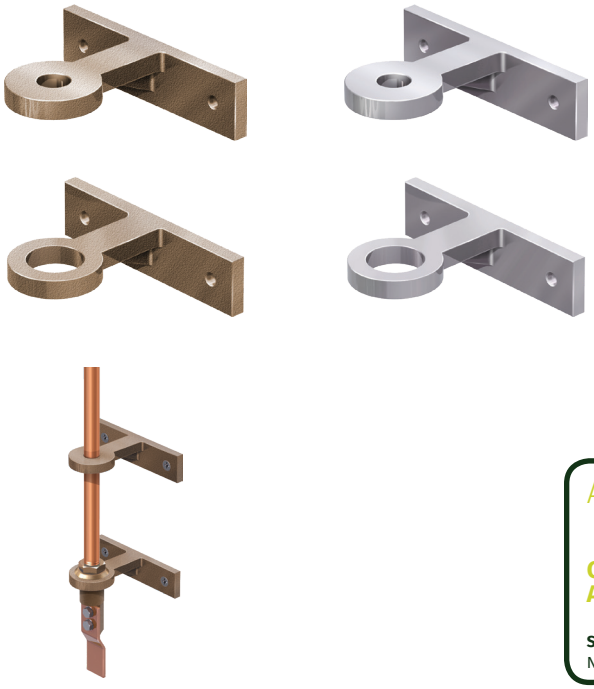
Kingsmill **Rod To Tape Couplers** are used in conjunction with **Side Mounted Brackets**.

| THREAD DIA (mm) | CONDUCTOR SIZE (mm) | MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|---|
| 16 | 25 x 3 | Gunmetal | 0.23 | RBCC16 |
| 16 | 25 x 3 | Aluminium | 0.08 | RBCA16 |
| 16 | 8 | Gunmetal | 0.25 | RBCC08 |

**Material:** Gunmetal/aluminium
**Standard:** BS:EN 62561-1, Class H



# Side Mounted Rod Brackets



Kingsmill **Side Mounted Rod Brackets** are designed to be installed to the side of the building where it is not possible to fit a conventional Air Terminal Base. **Side Mounted Rod Brackets** are sold as a set of two.

| ROD DIAMETER (mm) | MATERIAL | QUANTITY | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 16 | Gunmetal | 2 | 0.91 | RBC16 |
| 16 | Aluminium | 2 | 0.29 | RBA16 |

**Material:** Gunmetal/aluminium

FIXINGS

4 x CSK 1½ x No.10 woodscrew (BCSW1.5-10 brass for copper/ A2CSKSLT1.5-10 stainless steel for aluminium) + plug (PP10) not included

SEE FIXINGS SECTION - PAGE FIX:4

APPLICATION

**COMPONENT ASSEMBLY:**

Air Terminal *(page AT:14)* + Side Mounted Rod Bracket + Rod to Tape Couplers *(page AT:17)* =

**Side Mounted Rod Brackets** are to be used in conjunction with the Rod to Tape Couplers. Never mix aluminium and copper parts.

# Standing Seam Roof Air Terminal and Base

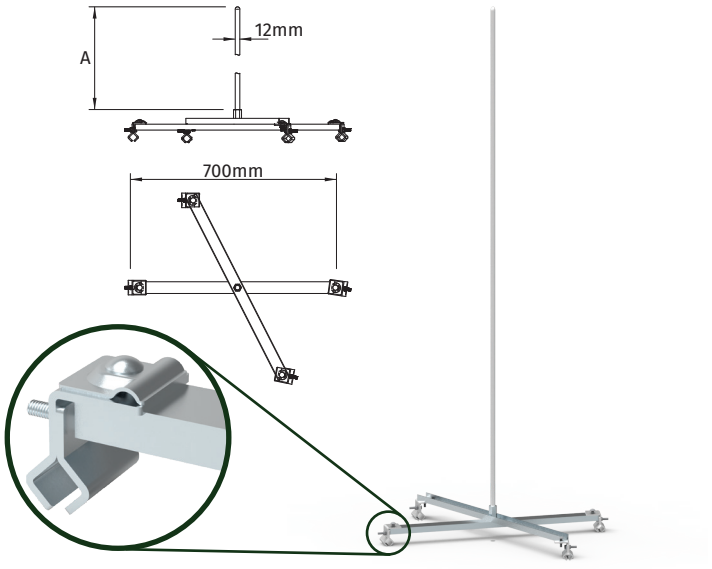
Kingsmill **Standing Seam Roof Air Terminals and Bases** are used with Standing Seam type roofing sheets.

They are suitable for use with 8mm diameter aluminium conductors.

Connection is by means of a clamp on the mast leg *(shown below).*

| ROD LENGTH (A) (mm) | ROD DIAMETER (mm) | CONDUCTOR DIA + MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|---|
| 1000 | 12 | 8mm Aluminium | 0.23 | KM97121009 |
| 2000 | 12 | 8mm Aluminium | 0.08 | KM97122009 |

**Material:** Aluminium Air Terminal/Zinc Plated Steel Base



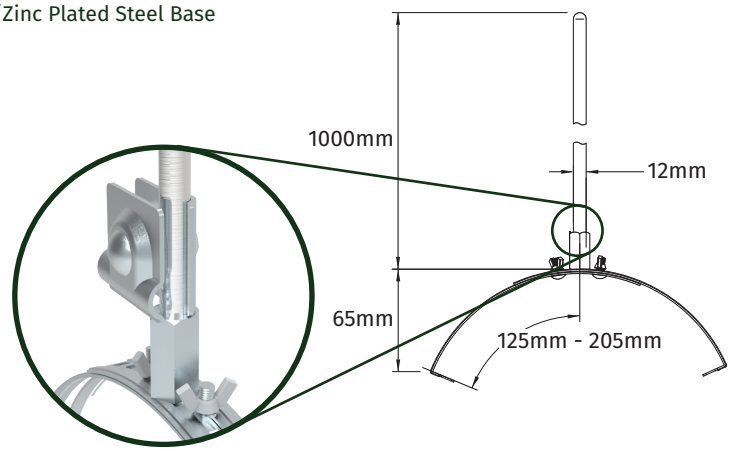
## Ridge Tile Air Terminal (single bracket)

Kingsmill **Ridge Tile Air Terminals (single bracket)** are for use with 8mm diameter aluminium conductors.

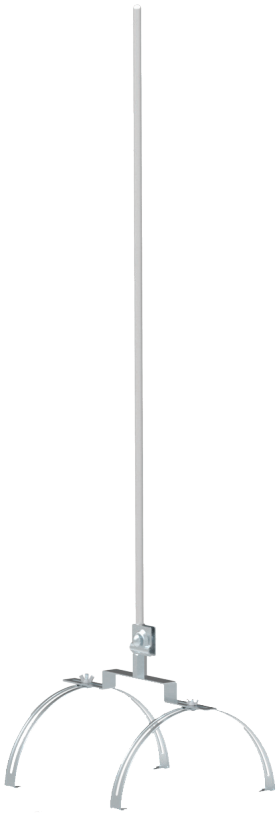
Connection of Conductor to Air Terminal is by means of a galvanised steel clamp *(shown below).*

| ROD DIAMETER (mm) | TERMINAL HEIGHT (mm) | CONDUCTOR DIAMETER + MATERIAL | DEPTH (mm) | TILE DIAMETER (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|---|---|
| 12 | 1000 | 8mm Aluminium | 65 | 125 - 205 | 0.6 | KM97111009 |

**Material:** Aluminium/Zinc Plated Steel Base




## Ridge Tile Air Terminal (double bracket)

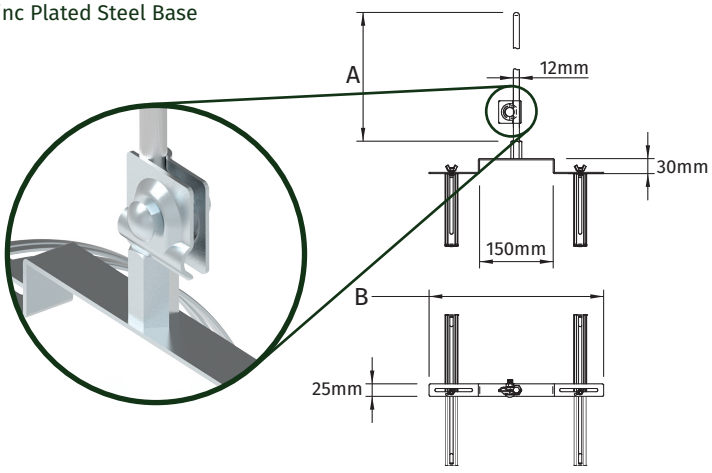


Kingsmill **Ridge Tile Air Terminals (double bracket)** are for use with 8mm diameter aluminium conductors.

Connection of Conductor to Air Terminal is by means of a galvanised steel clamp *(shown below).*

| ROD DIAMETER (mm) | TERMINAL HEIGHT (A) (mm) | CONDUCTOR | TILE WIDTH (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|---|
| 12 | 1000 | 8mm Aluminium | 36 | 0.9 | KM97101009 |
| 12 | 1500 | 8mm Aluminium | 350 | 1.1 | KM97101509 |

**Material:** Aluminium/Zinc Plated Steel Base

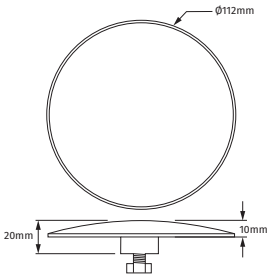


## Strike Pads

Kingsmill **Strike Pads** are ideal for use at roof level in car parks or for protection of building sides on structures over 60m high.

| MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|
| Copper | 0.41 | CSP1 |
| Aluminium | 0.13 | ASP1 |
| Stand-off bracket (copper to suit CSP1) | 0.08 | CSP1B |
| Stand-off bracket (stainless steel to suit ASP1) | 0.07 | ASP1B |

**Material:** Copper/Aluminium

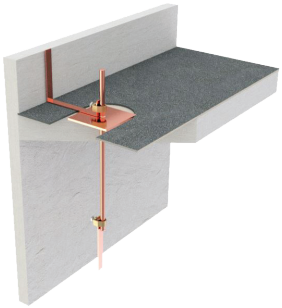


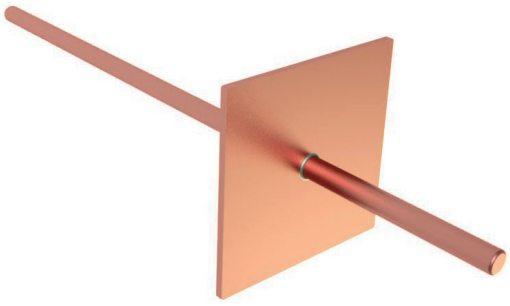

## Puddle Flanges

Kingsmill **Puddle Flanges** are designed to take lightning conductors through surfaces such as roofing.

| NOMINAL DIMENSIONS (mm) | MATERIAL | WEIGHT (kg) | PART No. |
|---|---|---|---|
| 150 x 150 x 625 | Copper | 1.54 | CPF |
| 150 x 150 x 625 | Aluminium | 0.50 | APF |

**Material:** Copper to BS:EN 13601
Aluminium to BS:EN 755-5



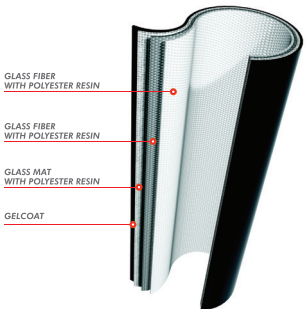


# Heavy Duty GRP Air Terminal Masts

Kingsmill can manufacture special masts for applications where resilience to mechanical damage and vandalism is paramount, whilst still maintaining a pleasant aesthetic appearance.

Kingsmill bring innovation to lightning protection through the introduction of easy to install Heavy Duty GRP Air Terminal Masts.

Suited to projects using the “protective angle” or “rolling sphere” methods for determining zones of protection.


## Wall Mounted Heavy Duty GRP Air Terminal Masts

Kingsmill **Heavy Duty Wall Mounted GRP Air Terminal Masts** are manufactured from white GRP and are supplied with brackets.

They are suitable for use with aluminium or copper **Air Terminals** of 0.5m and 1.0m heights. Standard Air Terminal height = 0.5m.

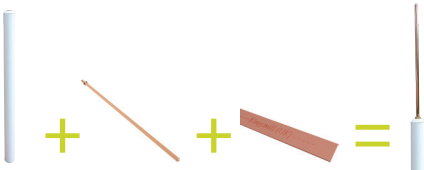
***Air Terminals and conductors are not included. These must be specified at the time of quotation/order.***

| MAST HEIGHT (excluding Air Terminal) (mm) | MAST DIA. (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 1000 | 65 | 1.92 | KMHDATM10 |
| 2000 | 65 | 3.84 | KMHDATM20 |
| 3000 | 65 | 5.76 | KMHDATM30 |
| 4000 | 65 | 7.68 | KMHDATM40 |
| 5000 | 65 | 9.60 | KMHDATM50 |

**Material:** Mast - GRP / Bracket - Galvanised Steel

APPLICATION

**COMPONENT ASSEMBLY:**




Combine Kingsmill **Wall Mounted Heavy Duty GRP Air Terminal Masts** with 500mm copper or aluminium **Air Terminals** *(see above)* and any compatible **Conductors** from our extensive range *(see Conductor section)*.

# Hinged Base Heavy Duty GRP Air Terminal Masts

Kingsmill **Flange Base Heavy Duty GRP Air Terminal Masts** are suitable for use with 14.2mm diameter Air Terminals. They are white and suitable for use with aluminium or copper Air Terminals of 0.5m and 1.0m heights. Standard Air Terminal height = 0.5m.

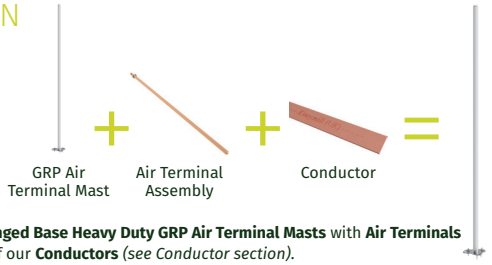
***Air Terminals and conductors are not included. These must be specified at the time of quotation/order.***

| MAST HEIGHT (excluding Air Terminal) (mm) | MAST DIA. (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 1000 | 65 | 6.92 | KMFBHDATM10 |
| 2000 | 65 | 8.84 | KMFBHDATM20 |
| 3000 | 65 | 10.76 | KMFBHDATM30 |
| 4000 | 65 | 12.68 | KMFBHDATM40 |
| 5000 | 65 | 14.60 | KMFBHDATM50 |

**Material:** Mast - GRP / Bracket - Galvanised Steel

## APPLICATION

**COMPONENT ASSEMBLY:**



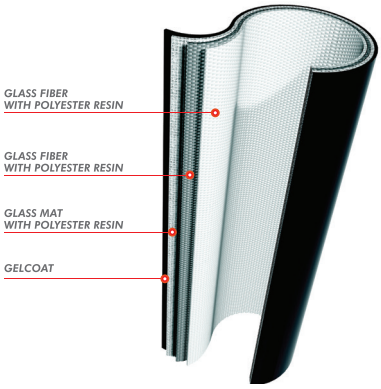

Combine Kingsmill **Hinged Base Heavy Duty GRP Air Terminal Masts** with **Air Terminals** *(see above)* and any of our **Conductors** *(see Conductor section).*

# Lightweight Lightning Mast

Kingsmill bring innovation to lightning protection through the introduction of an easy to install, aesthetically pleasing Lightweight Lightning Mast.

Suited to projects using the “protective angle” or “rolling sphere” methods for determining zones of protection.

The conical design brings greater strength, wind loading capability and minimal wind deflection.


## Aesthetics

**Single mast:**
No unsightly guy wires or supports.

**Colours:**
Three standard colours *(see below)*. Other colours available subject to RAL code.

**Patterns:**
It is possible to add a pattern to the mast, for example camouflage.

## Ease of installation

- Lightweight
- Quick and easy to install
- Reduced installation time
- Hinged base option to facilitate easy testing and inspection
- Three mounting options:
  - direct burial
  - hinged
  - free-standing base

## Durability

- Composite high strength material
- Corrosion resistant
- UV protected
- Vandal resistant (mechanical damage and graffiti)
- The composite mast itself does not cause interference for radio, microwaves etc.

## Safety

- Glass-polyester composite construction - an insulating material that helps reduce touch potential
- The mast does not absorb energy in the event of a vehicular collision

## Product Selection

Wind loading and location of the masts are key elements in determining the type and size of foundation/base that can be used. Therefore it is important that Kingsmill carry out calculations to verify the correct foundation selection.

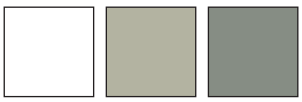
## Flexibility of Selection

Our Lightweight Lightning Mast can be customised to customer requirements.

It allows the user flexibility to choose either aluminium or copper Air Terminals and Conductor. Users can also select one or two down-conductors as well as vary the cross-sectional area.

There are three standard colours to choose from:

- White
- Pebble Grey (RAL 7032)
- Kingsmill Grey (RAL 7042)



. . . but we can offer other colours as well as customer specific pattern and graphic effects.


## Range and Part Number Selection

**The standard mast is designed for a basic wind speed of v = 22m/s. Stronger masts are available on request.**

*Ordering codes are made up from combinations of the following data:*

Basic mast part number + Colour code + Foundation code + Conductor material + Number and type of conductors + Height and material of air terminal

Kingsmill **Lightweight Lightning Masts** are supplied with 16mm x 500mm copper Air Terminals and one or two 25mm x 3mm copper or aluminium Down Conductors (can supply 8mm conductor on request).

***Standard mast sizes are outlined in the tables below:***
*NOTE: Air Terminals and Conductors are not included. Please specify these for quotation/order. Standard Air Terminal height = 0.5m. Available in copper and aluminium.*

### Root mounting/Direct burial in ground Masts (part no. without Conductor and Air Terminal assembly)

| BASIC MAST PART NUMBER | HEIGHT ABOVE GROUND (m) | HEIGHT INCLUDING AIR TERMINAL (m) | POLE DIAMETER AT BASE (mm) | NO. OF MAST SECTIONS | WEIGHT (kg) |
|---|---|---|---|---|---|
| KMLM5500 | 5 | 5.5 | 120 | 1 | 9 |
| KMLM6500 | 6 | 6.5 | 120 | 1 | 10 |
| KMLM7500 | 7 | 7.5 | 120 | 1 | 11 |
| KMLM8500 | 8 | 8.5 | 120 | 1 | 14 |
| KMLM9500 | 9 | 9.5 | 120 | 1 | 16 |
| KMLM10500 | 10 | 10.5 | 140 | 1 | 23 |
| KMLM11500 | 11 | 11.5 | 140 | 1 | 26 |
| KMLM12500 | 12 | 12.5 | 140 | 1 | 29 |
| KMLM13500 | 13 | 13.5 | 175 | 2 | 70 |
| KMLM14500 | 14 | 14.5 | 175 | 2 | 85 |
| KMLM15500 | 15 | 15.5 | 175 | 2 | 100 |
| KMLM16500 | 16 | 16.5 | 175 | 2 | 115 |
| KMLM17500 | 17 | 17.5 | 175 | 2 | 123 |
| KMLM18500 | 18 | 18.5 | 175 | 2 | 138 |
| KMLM19500 | 19 | 19.5 | 200 | 2 | 148 |
| KMLM20500 | 20 | 20.5 | 200 | 2 | 154 |

### Hinged base Masts (part no. without Conductor and Air Terminal assembly)

| BASIC MAST PART NUMBER | HEIGHT ABOVE GROUND (m) | HEIGHT INCLUDING AIR TERMINAL (m) | POLE DIAMETER AT BASE (mm) | NO. OF MAST SECTIONS | HINGE BASE TYPE | WEIGHT (kg) |
|---|---|---|---|---|---|---|
| KMLMHB5500 | 5 | 5.5 | 120 | 1 | Triangular | 22 |
| KMLMHB6500 | 6 | 6.5 | 120 | 1 | Triangular | 23 |
| KMLMHB7500 | 7 | 7.5 | 120 | 1 | Triangular | 25 |
| KMLMHB8500 | 8 | 8.5 | 120 | 1 | Triangular | 26 |
| KMLMHB9500 | 9 | 9.5 | 120 | 1 | Triangular | 27 |
| KMLMHB10500 | 10 | 10.5 | 140 | 1 | Triangular | 34 |
| KMLMHB11500 | 11 | 11.5 | 140 | 1 | Triangular | 38 |
| KMLMHB12500 | 12 | 12.5 | 140 | 1 | Triangular | 40 |
| KMLMHB13500 | 13 | 13.5 | 175 | 2 | Square | 112 |
| KMLMHB14500 | 14 | 14.5 | 175 | 2 | Square | 127 |
| KMLMHB15500 | 15 | 15.5 | 175 | 2 | Square | 139 |
| KMLMHB16500 | 16 | 16.5 | 175 | 2 | Square | 150 |
| KMLMHB17500 | 17 | 17.5 | 175 | 2 | Square | 162 |
| KMLMHB18500 | 18 | 18.5 | 175 | 2 | Square | 175 |
| KMLMHB19500 | 19 | 19.5 | 200 | 2 | Circular | 203 |
| KMLMHB20500 | 20 | 20.5 | 200 | 2 | Circular | 209 |
| KMLMHB21500 | 21 | 21.5 | 200 | 2 | Circular | 222 |
| KMLMHB22500 | 22 | 22.5 | 200 | 2 | Circular | 236 |

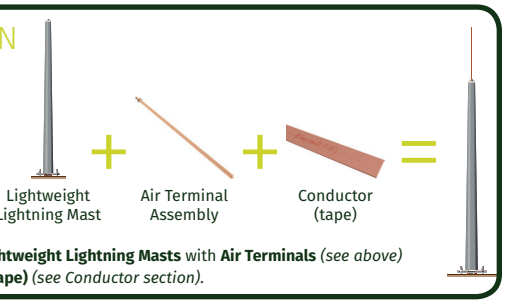
## Foundation Types

Dependent upon wind-loading and location, the Kingsmill Lightning Mast can be fixed to a concrete foundation, fixed to structural steelwork or set into the ground.

**The type of base offered is dependent on wind-loading and other operational conditions.**

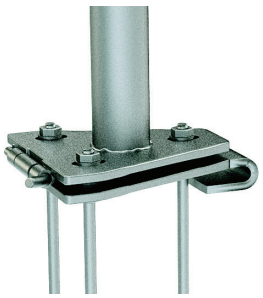
*The recommended base option is hinged and used in conjunction with a concrete foundation or directly fixed/incorporated to the structure.*

APPLICATION

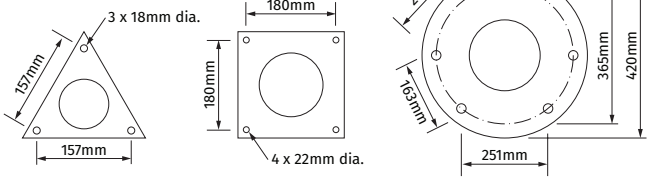



Combine Kingsmill **Lightweight Lightning Masts** with **Air Terminals** *(see above)* and our **Conductors (tape)** *(see Conductor section).*

## Hinged Bases



The recommended base options




Masts 5m - 12m

Masts 13m - 18m

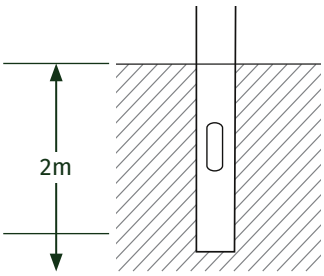
Masts 19m - 22m

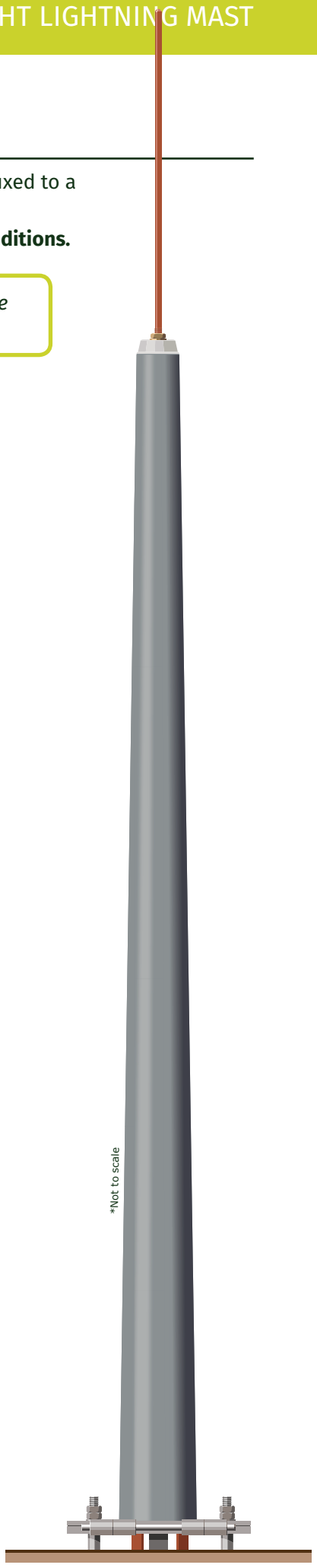
## Free-Standing

Free-Standing Bases are not available for all mast height/wind loading conditions - please contact Kingsmill for advice.

## Direct Burial (root mounted/direct in the ground)

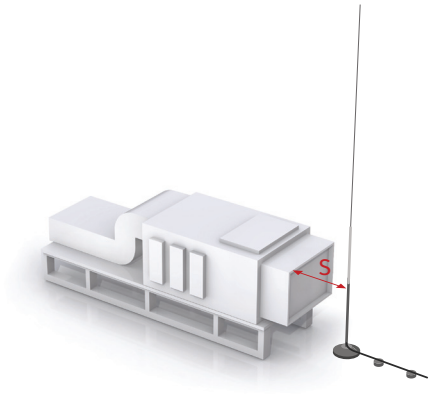
When the foundation required is by direct burial in the ground, please refer to the part number where the foundation type is "Direct In Ground".



# Free-Standing Interception Masts/Air Terminals

The Kingsmill range of Free-Standing Interception Masts/Air Terminals are suited to the protection of roof mounted plant, for example chillers, solar panels etc.

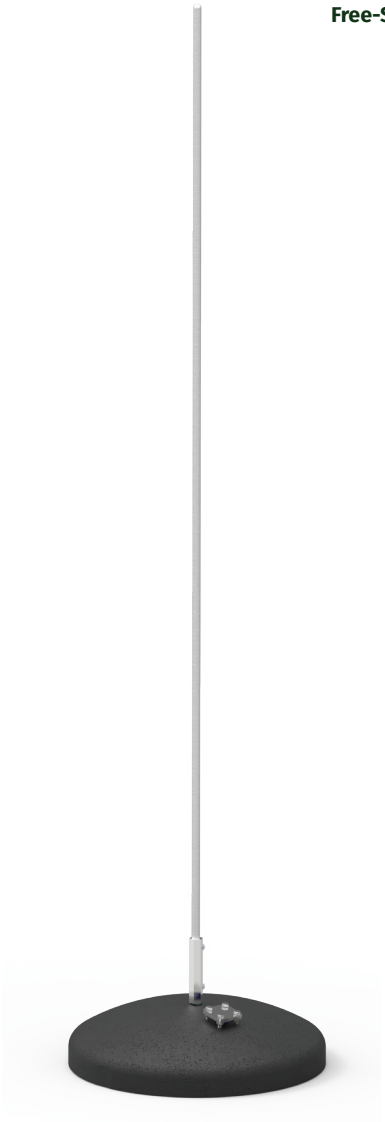



Used where there is sufficient roof space to maintain the appropriate separation distance between the mast and the object being protected.

S = separation distance

*Figure AT:3 - Free-standing Air Terminals installed with 8mm diameter aluminium conductor*

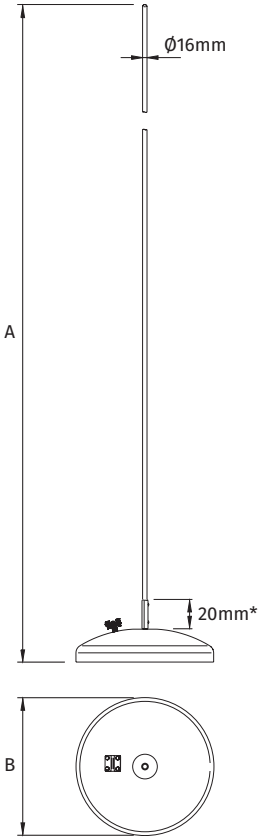
# Free-Standing Air Terminals (1m - 4m)



**Free-Standing Air Terminals (1m - 4m)** are suitable for wind speeds of 24-27m/s, 86.4-169.2km/h, 53.7-105.1mph

| TOTAL HEIGHT (A) (mm) | MOUNTING BLOCK DIAMETER (B) (mm) | MOUNTING BLOCKS WEIGHT (kg) | ASSEMBLY WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 1000 | 345 | 20.0 | 22.0 | KM94341009 |
| 2000 | 345 | 20.0 | 22.6 | KM94342009 |
| 3000 | 500 | 40.0 | 43.6 | KM94343009 |
| 4000 | 500 | 40.0 | 44.0 | KM94344009 |

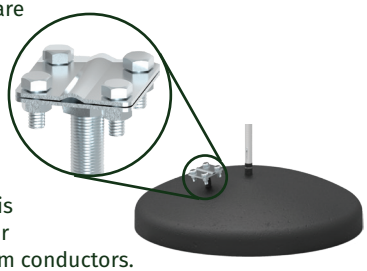
Each **Free-Standing Air Terminal (1m - 4m)** is manufactured from 16mm diameter aluminium and supplied with a **Stainless Steel Stabiliser** and a **Concrete Mounting Block** incorporating a **Mast to Roof Conductor Connector**.




### Concrete Mounting Block

The Air Terminal is supplied complete with a round **Concrete Mounting Block** incorporating the **Mast to Roof Conductor Connector** for connection from the Air Terminal to the roof Conductor.

**Concrete Mounting Blocks** are a combination of concrete and a bitumastic compound to protect against wet weather conditions.

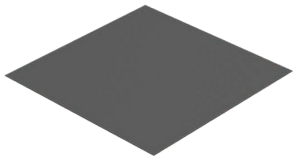


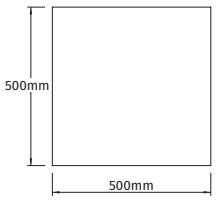
The stainless steel **Mast to Roof Conductor Connector** is suitable for either copper or aluminium 8mm or 25 x 3mm conductors.

**Optional stabiliser, 2500mm to 4000mm Air Terminals only.*

Kingsmill recommend the use of a square membrane **Roof Protection Pad** under each concrete block *(not included in the above set – see part number KM94308221, below)*. The membrane helps protect the waterproof roof covering from mechanical damage.

# Roof Protection Pad






Roof Protection Pads fit underneath the mast mounting blocks to prevent damage to the roof surface from the bare Concrete Mounting Block.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Membrane Support Square Plate for Concrete Base | 0.30 | KM94308221 |

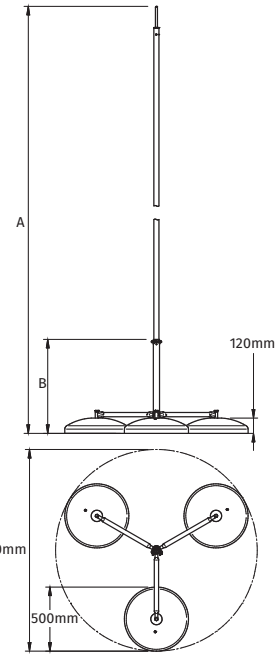
**Material:** Polymer Membrane

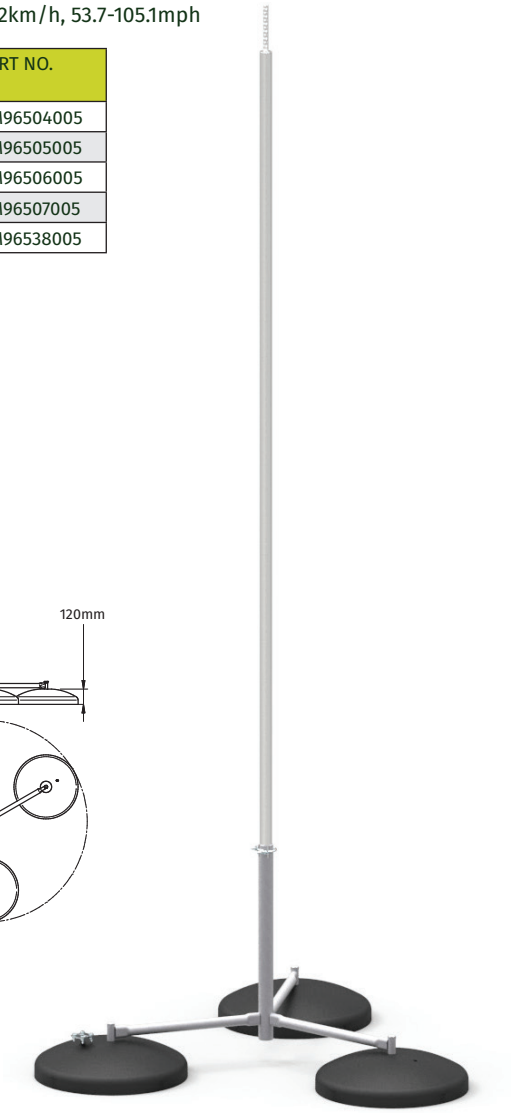
# Free-Standing Air Terminals (4m - 8m)

**Free-Standing Air Terminals (4m - 8m)** are suitable for wind speeds of 24-27m/s, 86.4-169.2km/h, 53.7-105.1mph

| TOTAL MAST HEIGHT (A) (mm) | ALUMINIUM AIR TERMINAL LENGTH (mm) | STAINLESS STEEL MAST AND TRIPOD BASE HEIGHT (B) (mm) | ASSEMBLY WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 4000 | 200 | 640 | 138 | KM96504005 |
| 5000 | 200 | 640 | 139 | KM96505005 |
| 6000 | 200 | 640 | 140 | KM96506005 |
| 7000 | 200 | 640 | 141 | KM96507005 |
| 8000 | 2000 | 6000 | 145 | KM96538005 |

Each **Free-Standing Air Terminal (4m - 8m)** comprises:
- 1 x 16mm diameter aluminium **Air Terminal**
- 2 x 40mm diameter stainless steel **Mast and Tripod Bases**
- 3 x 40kg **Concrete Mounting Blocks** and
- 1 x **Mast to Roof Conductor Connector**.

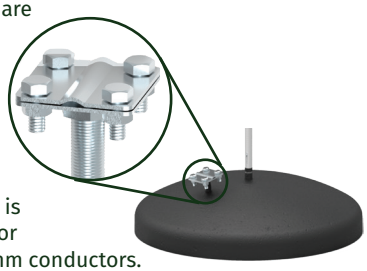


## Concrete Mounting Block

The Air Terminal is supplied complete with three round **Concrete Mounting Blocks** incorporating a **Mast to Roof Conductor Connector** for connection from the Air Terminal to the roof Conductor.

**Concrete Mounting Blocks** are a combination of concrete and a bitumastic compound to protect against wet weather conditions.



The stainless steel **Mast to Roof Conductor Connector** is suitable for either copper or aluminium 8mm or 25 x 3mm conductors.

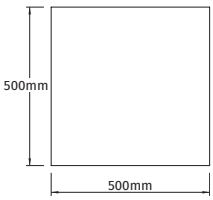
Kingsmill recommend the use of a square membrane **Roof Protection Pad** under each concrete block *(not included in the above set – see part number KM94308221, below)*. The membrane helps protect the waterproof roof covering from mechanical damage.

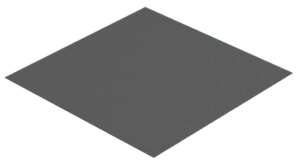
# Roof Protection Pad

Roof Protection Pads fit underneath the mast mounting blocks to prevent damage to the roof surface from the bare Concrete Mounting Block.

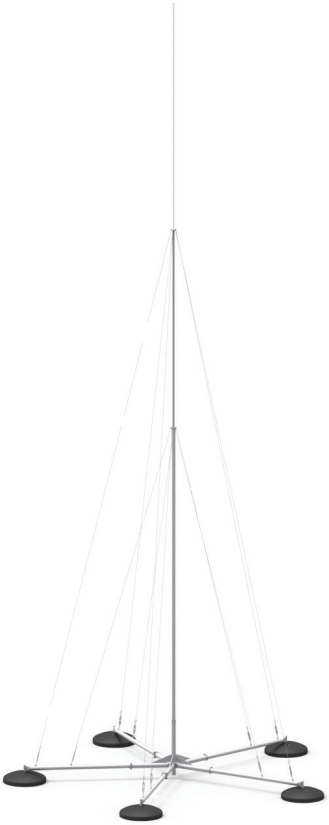
| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Membrane Support Square Plate for Concrete Base | 0.30 | KM94308221 |

**Material:** Polymer Membrane



# Free-Standing Air Terminals (8m - 10m)

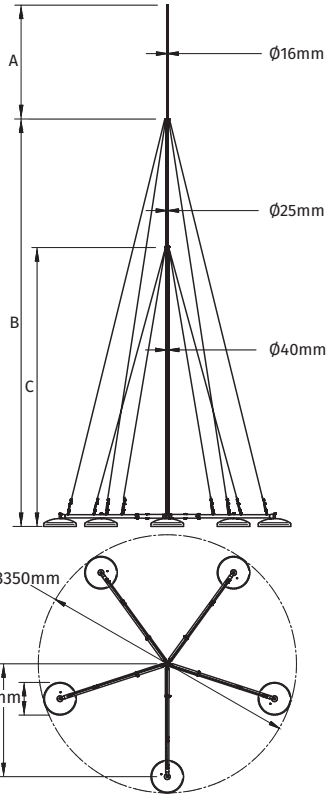


**Free-Standing Air Terminals (8m - 10m)** are suitable for wind speeds of 24-27m/s, 86.4-169.2km/h, 53.7-105.1mph

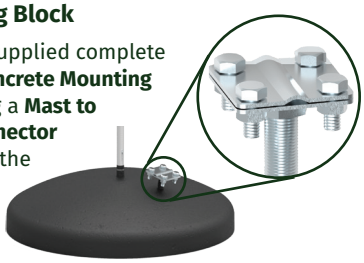
| TOTAL MAST HEIGHT (mm) | ALUMINIUM AIR TERMINAL LENGTH (A) (mm) | STAINLESS STEEL SECTION HEIGHTS | | ASSEMBLY WEIGHT (kg) | PART NO. |
|---|---|---|---|---|---|
| | | (B) (mm) | (C) (mm) | | |
| 8000 | 1765 | 6235 | 4280 | 220kg | KM96508005 |
| 9000 | 2265 | 6735 | 4280 | 230kg | KM96509005 |
| 10000 | 2700 | 7300 | 5000 | 240kg | KM96501005 |

Each **Free-Standing Air Terminal (8m - 10m)** comprises:

- 1 x 16mm diameter aluminium **Air Terminal**
- 1 x 25mm diameter stainless steel guyed **Mast**
- 1 x 40mm diameter stainless steel guyed **Mast**
- 1 x Stainless steel **Fivepod Base**
- 5 x 40kg **Concrete Mounting Blocks** and
- 1 x **Mast to Roof Conductor Connector**.




### Concrete Mounting Block



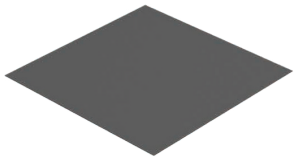
The Air Terminal is supplied complete with three round **Concrete Mounting Blocks** incorporating a **Mast to Roof Conductor Connector** for connection from the Air Terminal to the roof Conductor.

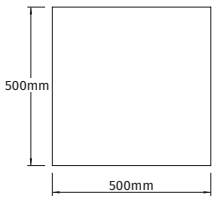
**Concrete Mounting Blocks** are a combination of concrete and a bitumastic compound to protect against wet weather conditions.

The stainless steel **Mast to Roof Conductor Connector** is suitable for either copper or aluminium 8mm or 25 x 3mm conductors.

Kingsmill recommend the use of a square membrane **Roof Protection Pad** under each concrete block *(not included in the above set – see part number KM94308221, below)*. The membrane helps protect the waterproof roof covering from mechanical damage.

# Roof Protection Pad






Roof Protection Pads fit underneath the mast mounting blocks to prevent damage to the roof surface from the bare Concrete Mounting Block.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Membrane Support Square Plate for Concrete Base | 0.30 | KM94308221 |

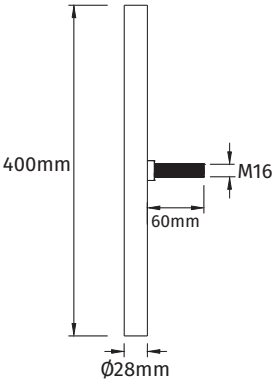
**Material:** Polymer Membrane

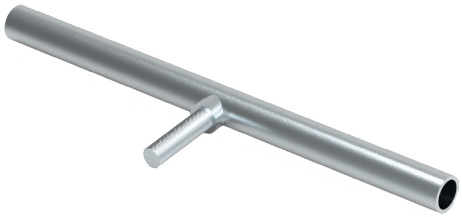
# Concrete Base Carrying Handle

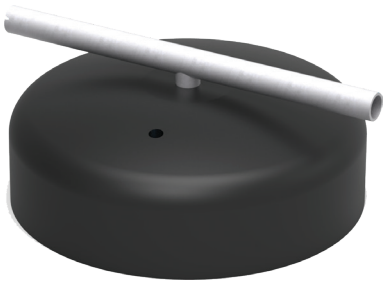
For use by two operatives for the safe lifting of 40kg blocks.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Carrying Handle for safe handling of Concrete Mounting Blocks | 0.60 | KM98500101 |

**Material:** Galvanised Steel



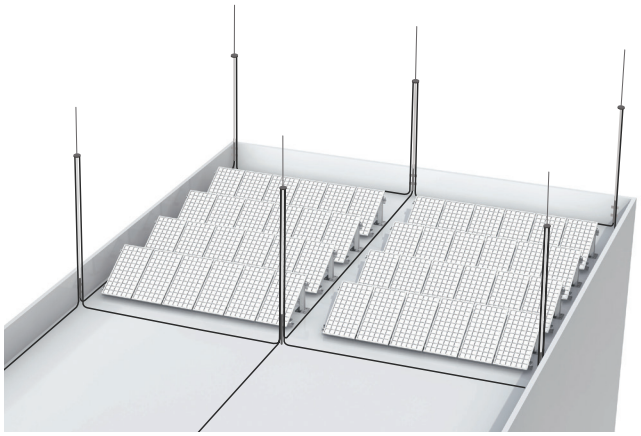



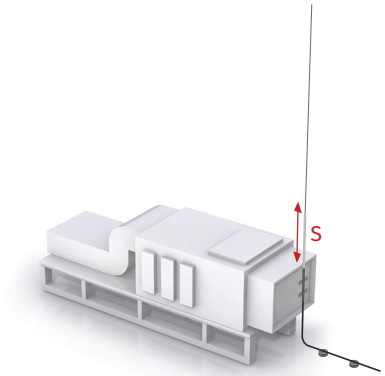


# Interception Masts/Air Terminals used with Insulated Lightning Conductor Cable

The Interception Masts/Air Terminals in this section are specially designed to be used with the Kingsmill Insulated Lightning Conductor.

This system is ideal where space is in limited supply. Through using Insulated Lightning Conductor, the Air Terminal can be placed closer to the object to be protected - for example, roof-mounted plant or solar PV panels.






S = separation distance

Used with objects where there is no possibility to maintain separation distance, due either to lack of sufficient space or simply for aesthetic reasons.

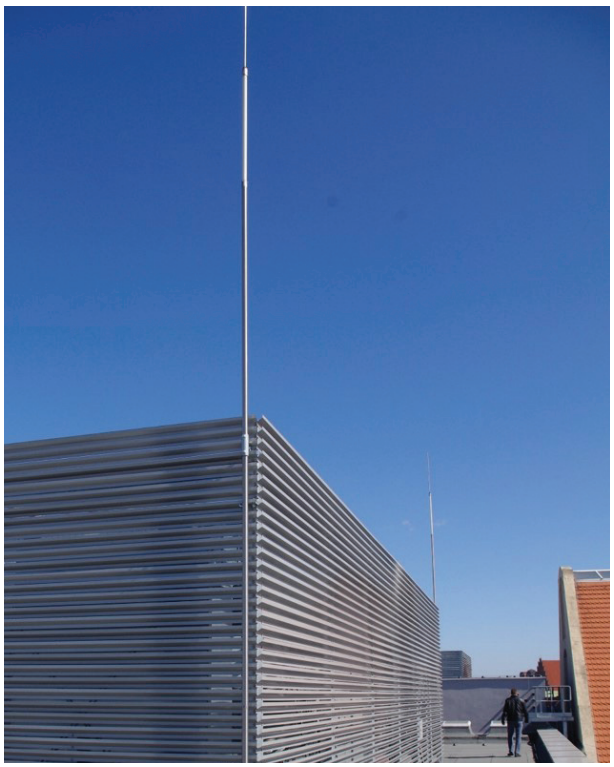


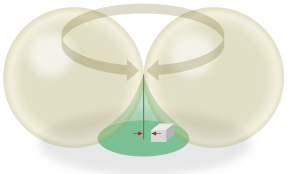
*Figure AT:4 - Ideal for use with plant screens*

*Figure AT:5 - Can be used with solar arrays*

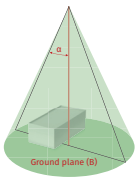
The cable simulates a separation distance of ≤0.75m in air and ≥1.5m in solid material and is used for maintaining the separation distance between the electrically conductive parts of the structure (to be protected) and the lightning protection system. Thus reducing flash over from the lightning protection system to exposed metallic and electrical structures - for example, air handling units, solar PV arrays, etc.

## Protective Angle

The protective area of the air terminal is determined by the rules contained within BS:EN 62305 part 3 – "protective angle" method of protection.



*Example 1*




*Example 2*

The minimum separation distance between the object being protected and the Lightning Protection System, is calculated according to the formulae for separation distances, given in BS:EN 62305 part 3.

The insulated cable does not have to replace the entire Lightning Protection down conductor, it can be connected to the conventional Lightning Protection System (Air Termination and Down Conductor network).

The cable should be connected to the rest of the roof mesh (bare or PVC covered conductor) not less than 1.5m away from the object being protected.

The separation distance (where there is sufficient space to permit) can be increased by installing the Air Terminal on a free-standing mast and moving it further away from the object being protected. If 1m (in air) is required, move the mast 0.25m away (0.25m +0.75m simulated separation distance = 1.0m).

*(The cable can also be run adjacent to conductive parts of the structure, as illustrated below.)*

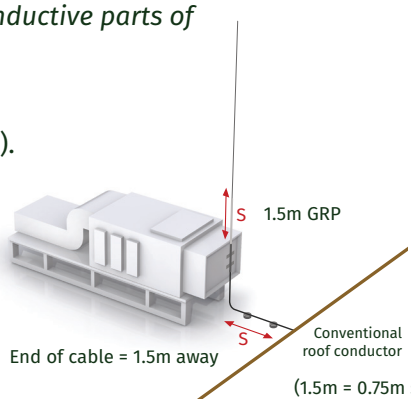
*Figure AT:6 - Pitched roof with PV arrays*

S = separation distance

The cable has a tested arresting capacity of 100kA lightning surge current (1.2/50µs).

The cable is flexible and thus ideally suited for routeing in external or confined areas, roofs, walls or embedded in concrete.

Bending radius of the cable is 280mm.




(1.5m = 0.75m separation distance in air)

## Notes on maximum conductor length

In cases where the separation distance required is greater than 0.75m, the use of additional cables is recomended to effectively reduce the separation distance. Such reduction (utilising additional cables) can only take place when the distance between the cables is not less than 0.2m. This distance (0.2m), minimises the interaction between the magnetic fields of the cables.

If however, the cables are run next to each other and less than 0.2m apart, the addition of an extra cable does not reduce either the separation distance or the maximum length of cable.

The values expressed in the table *(right)*, are valid for all types of A and B electrodes, provided that the difference in resistance of an individual electrode is less than or equal to 2.

Should the installation require longer cables than indicated in the table, then we recommend that you contact us to provide detailed design advice and options.

| NUMBER OF CABLES | LIGHTNING PROTECTION CLASS | | |
|---|---|---|---|
| | I | II | III + IV |
| 1 | - | 12.50m | 18.75m |
| 2 | 14.20m | 18.94m | 28.40m |
| 3 and more | 21.30m | 28.40m | 42.61m |

# Insulated Lightning Conductor Cable

## Basic Installation Accessories

Whatever the application, there is a suitable installation accessory for use with Insulated Lightning Conductor cable.

Examples of mounting and fixing accessories are shown below.
*For more information, see pages AT:36 - 49.*

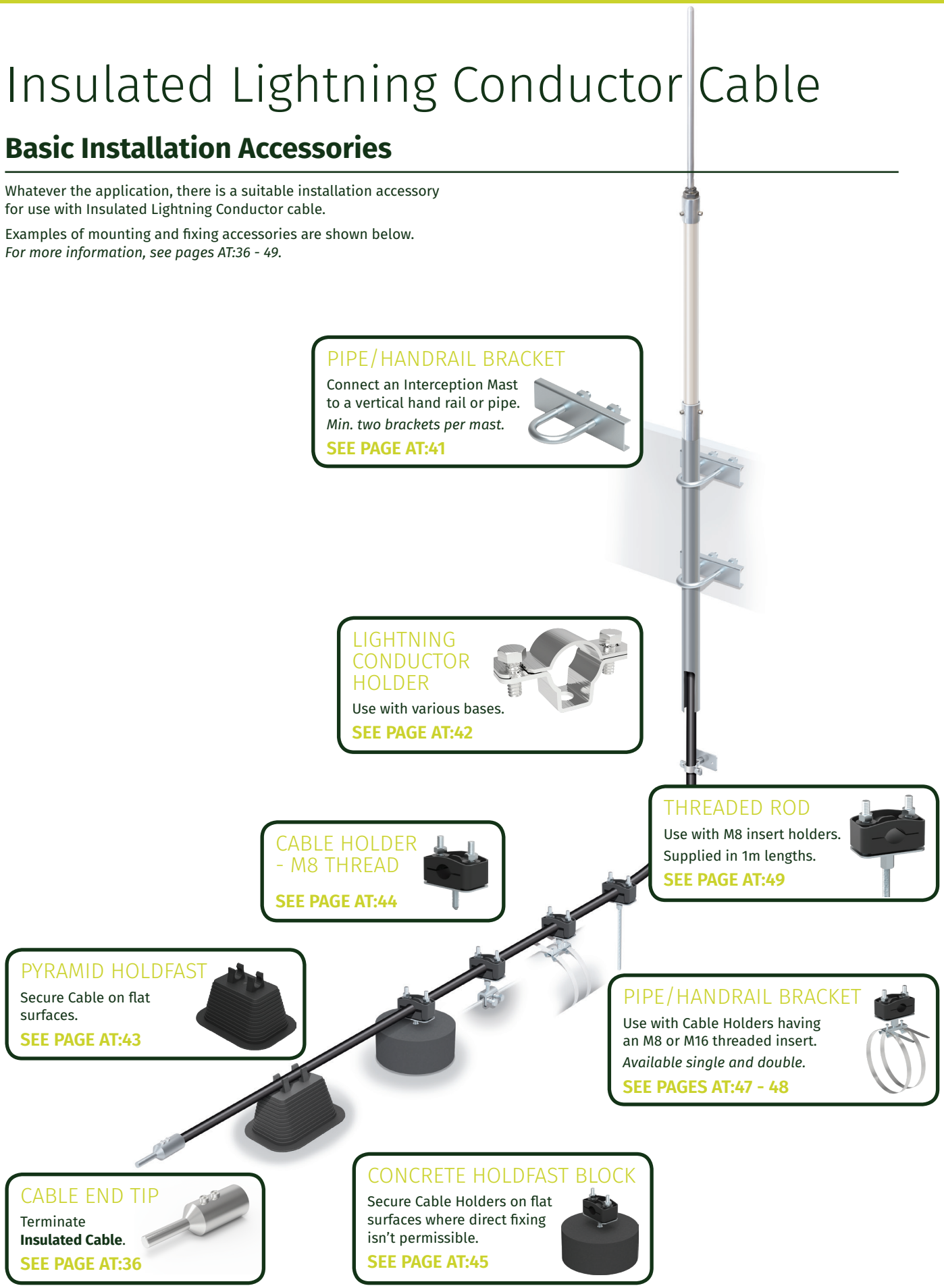



*Figure AT:6 - Example of an Insulated Lightning Conductor Cable installation showing various accessories*

# Insulated Lightning Conductor Cable

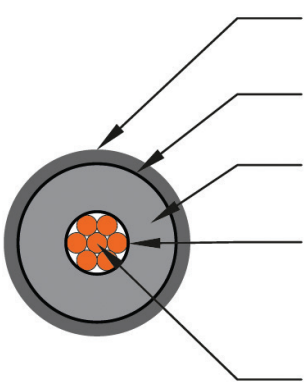
Kingsmill **Insulated Lightning Conductor Cable** is used for maintaining the separation distance between electrically conductive parts of the structure to be protected and the Lightning Protection System and is in accordance with IEC EN 62305-3.

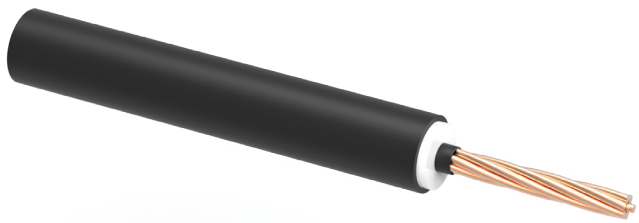
Used for equivalent separation distances of ≤0.75m in air and ≤1.5m in solid material.

**Insulated Lightning Conductor Cable** is flame-resistant in accordance with IEC EN 60332-1-2, its twisted copper core, is surrounded by insulation layers of meshed cross-linked polyethylene (XLPE) and the ageing-resistant polyvinyl chloride (PVC) sheath. The cable is flexible and ideally suited for routing in external areas, roofs, walls and embedding in concrete.

Kingsmill **Insulated Lightning Conductor Cable** system has a tested arresting capacity of 100kA lightning surge current (1.2/50µs).

The cable meets the requirements of IEC EN 62561-1.



| Insulated Lightning Conductor Cable | |
|---|---|
| **Part Number** | KM30000199 |
| **Colour** | Black |
| **The outer diameter** | 23.4mm |
| **Cross-section of the cable core** | 35mm² |
| **Maximum conductor resistance at 20°C** | 0.524 Ω/km |
| **Equivalent of separation distance for air** | 750mm |
| **Equivalent of separation distance for regular building materials** | 1500mm |
| **Cable weight** | 0.735kg/m |
| **Operating temperature range** | From -30°C to 70°C |
| **Assembly temperature range** | From -5°C to 40°C |
| **Minimum bending radius** | About 280mm |
| **Cable flammability** | Not spreading flame |
| **Flammability test** | PN-EN 60332-1-2; IEC 60332-1 |
| **Bending radius** | 280mm |

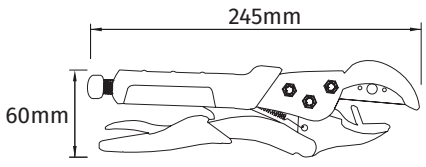
Can be used with standard connection accessories for 8mm size conductor.

**Insulated Lightning Conductor Cable** can used in conjunction with the **Air Terminals** outlined on pages AT:38 - 40. It can also be used in applications where it is not possible to maintain the separation distance between down conductors and the structure being protected, for example, running close to photovoltaic array panels.

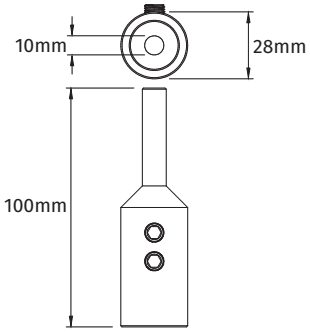
## Insulated Lightning Conductor Cable Scissors

Use Kingsmill **Insulated Lightning Conductor Cable Scissors** to strip insulation from the cable to enable installation of **Insulated Lightning Conductor Cable End Tips**.

| DESCRIPTION | PART NO. |
|---|---|
| Cable Scissors | KM31400101 |




## Insulated Lightning Conductor Cable End Tip



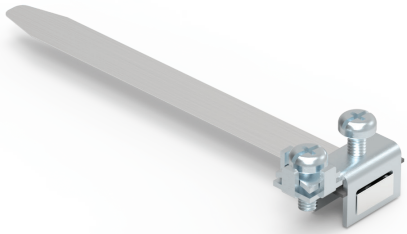

Use to terminate **Insulated Lightning Conductor Cable** for secure installation in **Cable Connectors** *(below)* and **Clamps** *(see Fittings section)*.

| SOCKET SCREWS | WEIGHT (kg) | PART NO. |
|---|---|---|
| 2 x M8 x 8 | 0.30 | KM30100105 |

**Material:** Stainless Steel

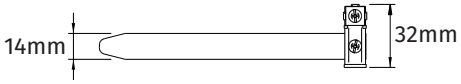
Sold as a kit comprising:
- Cable End Tip
- Heat Shrink Tubing
- Allen Key
- Glue

## Equipotential Bonding Strap

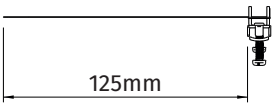


For equipotential connections to pipe work.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Equipotential bonding strap | 0.04 | KM96440105 |




**Material:**
Stainless Steel

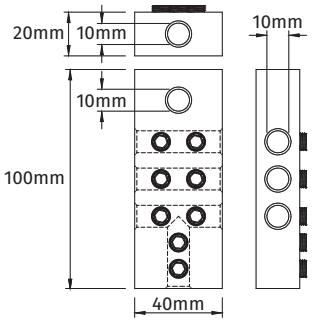



***There can be an electromagnetic field around the cable despite its insulation.***

Although the cable is insulated, the electromagnetic field cannot be completely isolated. By using the Equipotential Bonding Strap we ensure that the voltage charge is kept within tolerable limits.

The connection from equipotential bond to earth should be by the shortest route, preferably connected to an equipotential bonding bar, building reinforcing (if connected to a foundation electrode) or to the housings of securely earthed metal elements. This connection can be via 3.5mm$^2$ cable.

## Insulated Lightning Conductor Cable Connector




For connecting several Insulated Lightning Conductor cables together at the end of the cable run.

Used outside the separation distance area.

| MATERIAL | SOCKET SCREWS | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| Stainless steel | 8 x M8 x 8 | 0.54 | KM31300105 |

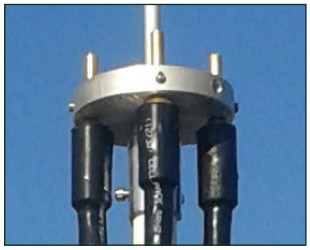
**Material:** Stainless Steel

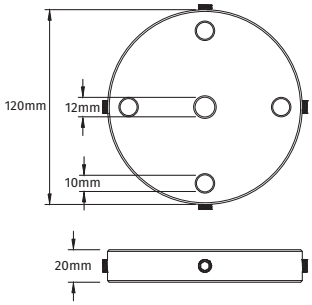
## Insulated Lightning Conductor Cable Connection Ring

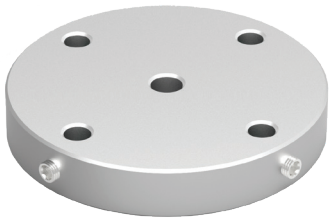
The **Connection Ring** connects several cables to the Air Terminal Mast, where more than one cable is required to meet separation distance requirements. The **Connection Ring** is fixed at the top of the Interception Mast (over the aluminium Air Rod section).

| SOCKET SCREWS | WEIGHT (kg) | PART NO. |
|---|---|---|
| 4 x M8 x 8mm | 0.60 | KM31500109 |

**Material:** Aluminium





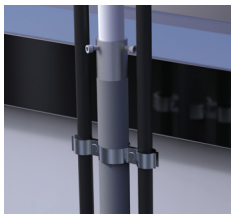
## Insulated Lightning Conductor Cable Holder

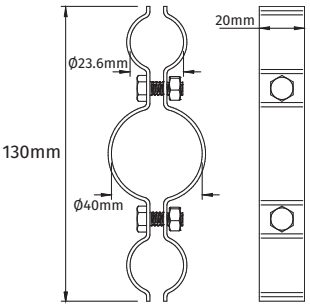
*For use with multiple cables on a mast.*

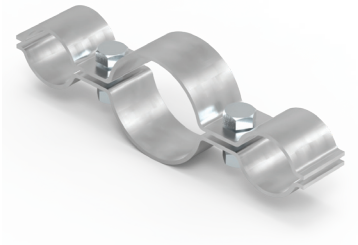
The Kingsmill **Interception Air Rod Cable Holder** holds two Insulated Lightning Conductor cables on either side of the Interception Mast - in cases where more than one conductor is used.

| SOCKET SCREWS | WEIGHT (kg) | PART NO. |
|---|---|---|
| 2 x M6 x 16 | 0.10 | KM30900105 |

**Material:** Stainless Steel





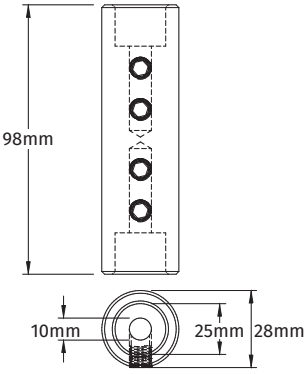



## Insulated Lightning Conductor Cable Connector

Used to connect cables outside the separation distance area.

| SOCKET SCREWS | WEIGHT (kg) | PART NO. |
|---|---|---|
| 4 x M8 x 8 | 0.39 | KM31100105 |

**Material:** Stainless Steel




## Insulated Lightning Conductor Free-Standing Tripod Interception Mast - 3m to 7m high

**Insulated Lightning Conductor Free-Standing Tripod Interception Masts** are suitable for wind speeds of up to 24 to 27m/s, 86.4 to 169.2km/h, 53.7 to 105.1mph

| TOTAL MAST HEIGHT (A) (mm) | ALUMINIUM AIR TERMINAL LENGTH (B) (mm) | BASE HEIGHT (C) (mm) | ASSEMBLY WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 3000 | 500 | 1000 | 135.00 | KM96573005 |
| 4000 | 1000 | 1500 | 138.00 | KM96574005 |
| 5000 | 1000 | 2500 | 139.00 | KM96575005 |
| 6000 | 1000 | 3500 | 140.00 | KM96576005 |
| 7000 | 1000 | 4500 | 141.00 | KM96577005 |

Each mast is supplied as a complete assembly, comprising of the following:

- Stainless steel **Tripod Base and Mast**
- 1500mm glass fibre **Insulation Section**
- Aluminium **Air Terminal**

The **Tripod Base and Mast** includes 3 x 40kg **Concrete Mounting Blocks**.

### Concrete Mounting Block

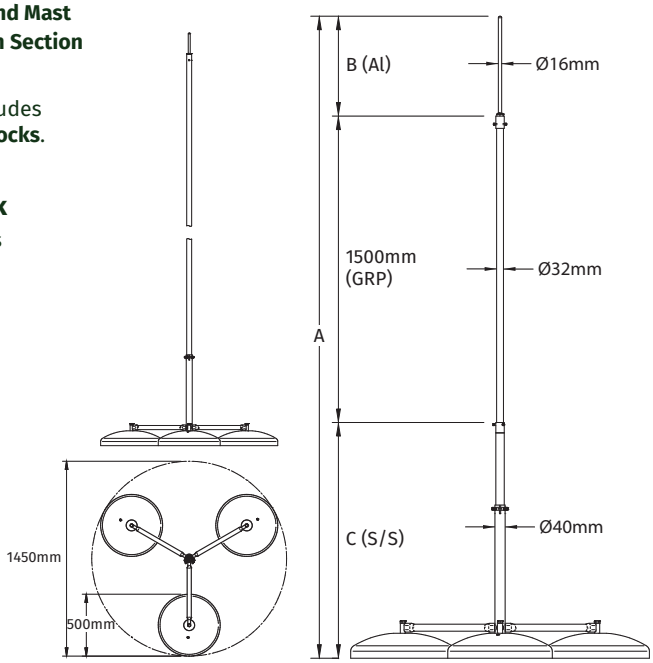
The Interception Mast includes 3 x **Concrete Mounting Blocks**.

**Concrete Mounting Blocks** are a combination of concrete and a bitumastic compound to protect against wet weather.

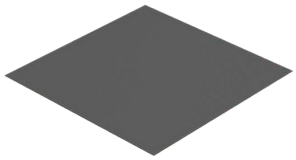
### Roof Protection Pad

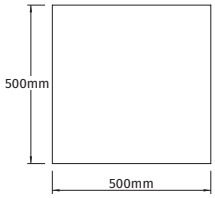
We recommend the use of a square membrane **Roof Protection Pad** under each concrete block *(not included in the above set - see part number KM94308221, below)*.

The membrane helps protect the waterproof roof covering from mechanical damage.




## Roof Protection Pad






**Roof Protection Pads** fit underneath the mast mounting blocks to prevent damage to the roof surface from the bare Concrete Mounting Block.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Membrane Support Square Plate for Concrete Base | 0.30 | KM94308221 |

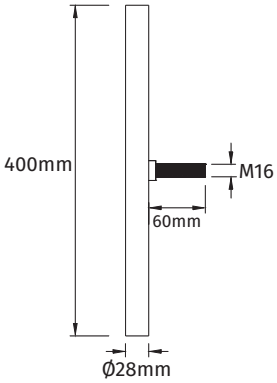
**Material:** Polymer Membrane

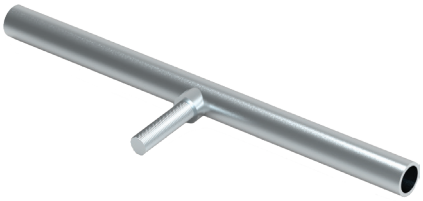
## Concrete Base Carrying Handle

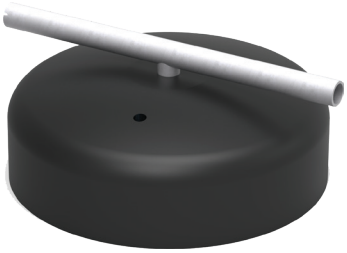
For use by two operatives for the safe lifting of 40kg blocks.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Carrying Handle for safe handling of Concrete Mounting Blocks | 0.60 | KM98500101 |

**Material:** Galvanised Steel





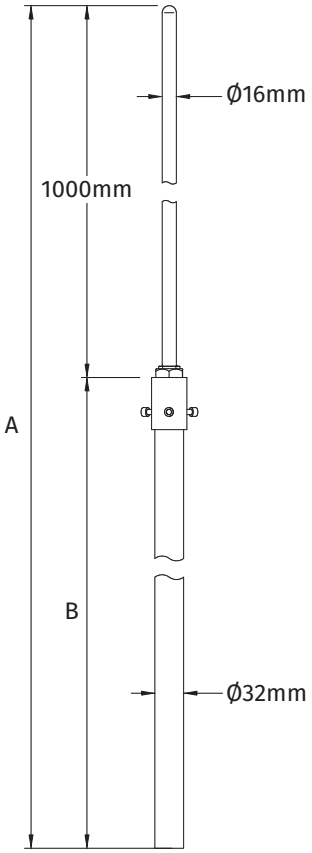
## Insulated Lightning Conductor Wall Mounted Interception Mast - 3m to 4m high

**Insulated Lightning Conductor Wall Mounted Interception Mast** comprises the following:
- 1000mm Aluminium **Air Terminal**
- GRP **Supporting Mast**

| OVERALL HEIGHT (A) (mm) | SUPPORTING MAST HEIGHT (B) (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 3000 | 2000 | 1.60 | KM96213005 |
| 4000 | 3000 | 1.90 | KM96214005 |

**Material:** Aluminium Air Terminal
GRP Supporting Mast

FIXINGS
KM96000202 (page AT:41) for fixing to the wall
KM96000401 (page AT:41) for fixing to pipes/handrails




# Insulated Lightning Conductor Wall Mounted Interception Mast - 3m to 7m high

| OVERALL HEIGHT (A) (mm) | AIR TERMINAL HEIGHT (B) (mm) | SUPPORTING MAST HEIGHT (C) (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 3000 | 500 | 1000 | 2.70 | KM96223005 |
| 4000 | 1000 | 1500 | 3.70 | KM96224005 |
| 5000 | 1000 | 2500 | 5.10 | KM96225005 |
| 6000 | 1000 | 3500 | 6.50 | KM96226005 |
| 7000 | 1000 | 4500 | 7.70 | KM96227005 |

The **Wall Mounted Interception Mast** is supplied in three sections:

- Stainless steel **Supporting Mast**
- 1500mm glass fibre **Insulation Section**
- Aluminium **Air Terminal**

When mounting against a wall or flat vertical structure, it is recommended that a minimum of 1000mm of the mast assembly is below the top of the wall/vertical surface.

It is recommended that two **Mast Holders** are used for each mast, spaced at a distance of 800mm apart.

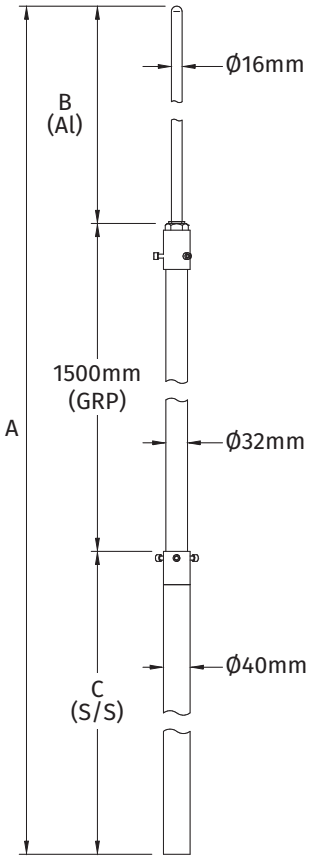
The mast can be fixed to the wall using two of our KM96000102 **Wall Mounted Brackets** *(page AT:41)*.

Alternatively, when fixing to handrails or tubular structures, the mast can be secured using two each of the following items:

- Mast Holder KM96000701 *(page AT:44)*
- Pipe/Handrail Brackets (suitably sized) *(pages AT:47 - 48)*

**Material:** Aluminium Air Terminal
GRP Insulation Section
Stainless Steel Supporting Mast

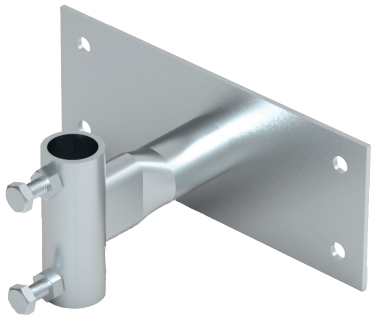
FIXINGS
KM96000202 (page AT:41) for fixing to the wall
KM96000401 (page AT:41) for fixing to pipes/handrails



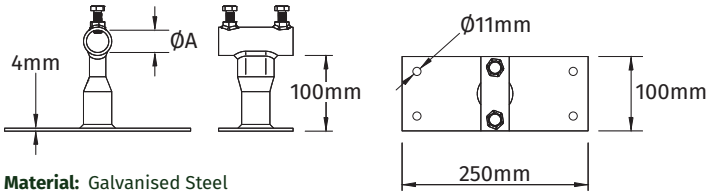
## Wall Mounted Bracket for Air Terminal Interception Mast

The Kingsmill **Wall Mounted Bracket for Air Terminal Interception Mast** is manufactured from hot dipped galvanised steel.

Use a minimum of two brackets per **Interception Mast** (maximum distance apart 0.8m).



| AIR TERMINAL DIAMETER (A) (mm) | SECURING BOLTS | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 31 | 2 x M10 x 30 | 1.50 | KM96000102 |
| 42 | 2 x M10 x 30 | 2.70 | KM96000202 |

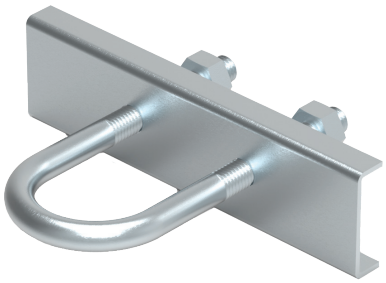



**Material:** Galvanised Steel

## Pipe/Handrail Bracket for Air Terminal Interception Mast

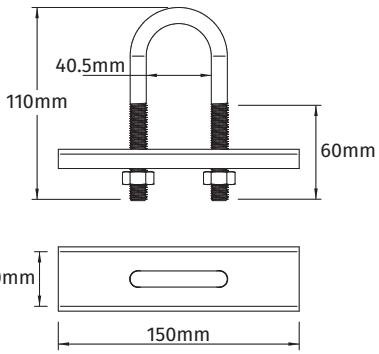
The Kingsmill **Pipe/Handrail Bracket for Air Terminal Interception Mast** connects an **Interception Mast** to a vertical hand rail or pipe.

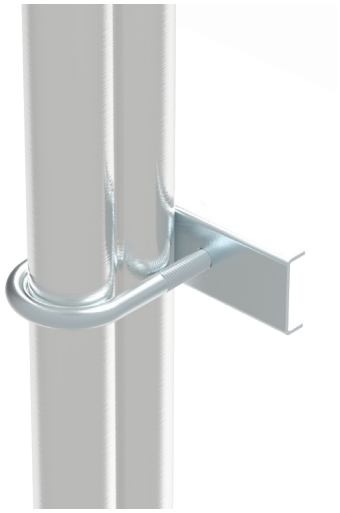
*Use a minimum of two brackets per mast.*



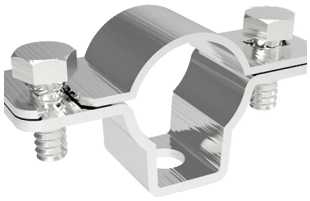
| DESCRIPTION | THREAD | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| Pipe/Handrail Bracket | M10 | 0.30 | KM96000401 |

**Material:** Galvanised Steel



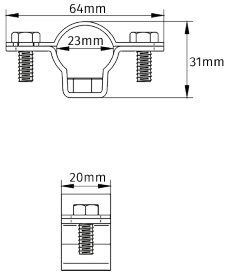



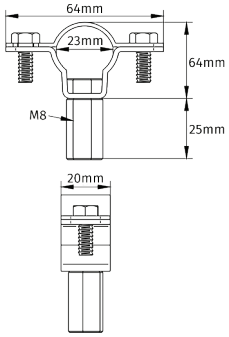
# Stainless Steel Insulated Lightning Conductor Holder



KM31600105

KM31600205



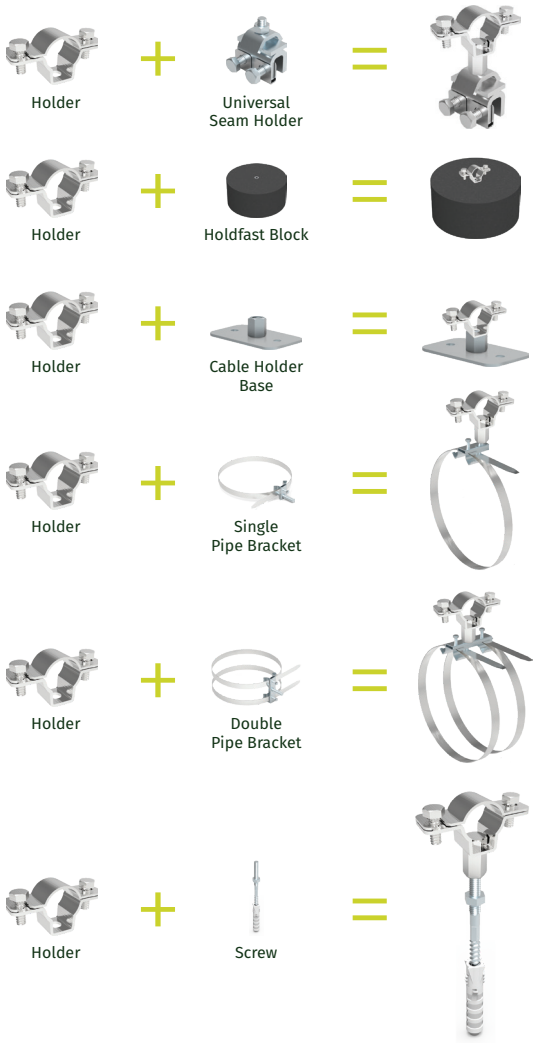

Corrosion resistant **Stainless Steel Insulated Lightning Conductor Holders** are used for fixing an insulated lightning conductor to various surfaces (when used with different adapters).

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Cable Holder | 0.04 | KM31600105 |
| Cable Holder with M8 internal thread adapter | 0.08 | KM31600205 |

**Material:** Stainless Steel

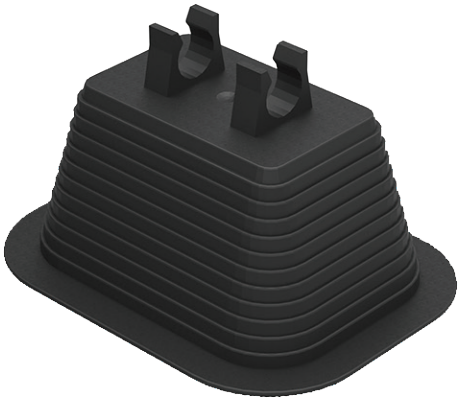
## APPLICATION

**COMPONENT ASSEMBLY:**



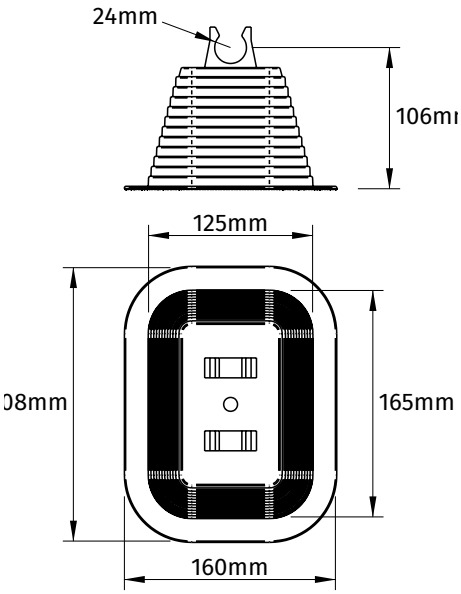
# Pyramid Holdfast

The **Pyramid Holdfast** is designed to hold the insulated cable on flat roofs where it is not possible to drill holes for fixing clips.

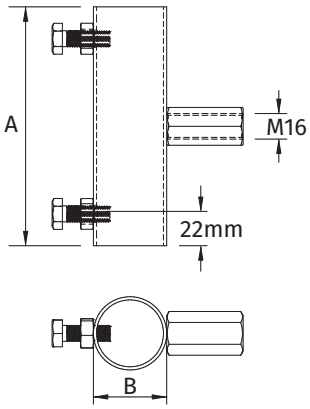


| CONDUCTOR DIAMETER | CONDUCTOR TYPE | NUMBER OF CLIPS | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| Cable Holder | Insulated | 2 | 2.20 | KM31000111 |

**Material:** PVC filled with concrete



## Air Terminal Mast Holder with Threaded Insert




The **Air Terminal Mast Holders with Threaded Insert** are designed for use with our insulated and steel/insulated Air Terminal Masts.

Use with **Pipe Fixing Brackets**:
KM97701105 - page AT:47 *(single)* and
KM96701105 - page AT:48 *(double)*.

| A | B | MAST TIGHTENING SCREWS | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 100 | 30 | 2 x M10 x 30 | 0.50 | KM96000701 |
| 130 | 42 | 2 x M10 x 30 | 0.70 | KM96000801 |

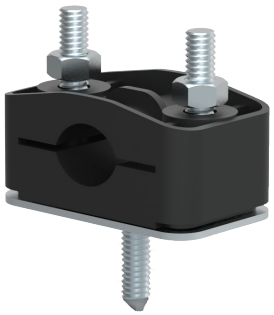
**Material:** Galvanised Steel

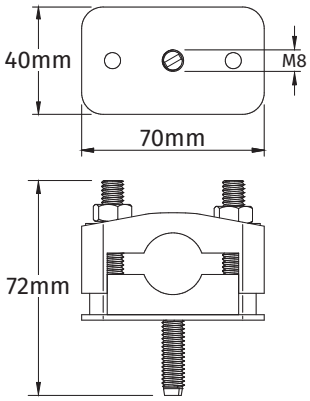
APPLICATION

**COMPONENT ASSEMBLY:**


The Kingsmill **Air Terminal Mast Holder with Threaded Insert** is designed for use with clamps/brackets having an M16 threaded stud.

## Insulated Lightning Conductor Cable Holder - M8 Thread





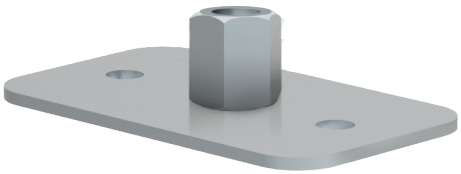

The **Insulated Lightning Conductor Cable Holder** is supplied with an M8 threaded stud.

| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Cable Holder with M8 threaded stud | 0.14 | KM30500101 |

**Material:** Galvanised Steel Insulated Saddle

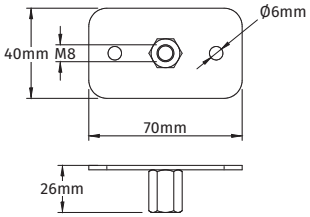
## Insulated Lightning Conductor Cable Holder Base

The **Cable Holder Base** is used to fix **Cable Holders** with an M8 threaded insert to a flat surface. It is supplied with 2 x 6mm diameter holes for self-tapping screws or bolts.



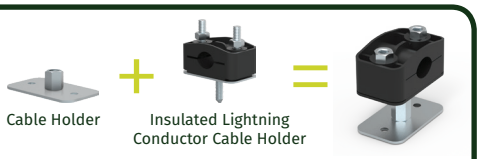
| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Cable Holder Base with M8 threaded stud | 0.10 | KM30600101 |

**Material:** Galvanised Steel




APPLICATION

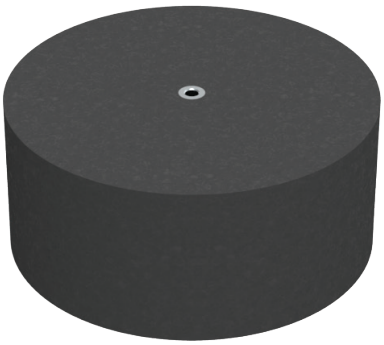
**COMPONENT ASSEMBLY:**




The Kingsmill **Insulated Lightning Conductor Cable Holder Base** is designed for use with Cable Holders having an M8 stud

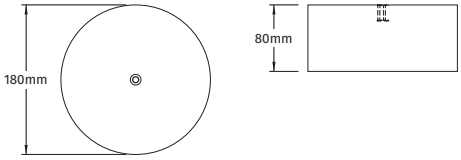
## Concrete Holdfast Block

The **Concrete Holdfast Block** is used for securing Cable Holders in place on flat surfaces where direct fixing isn't possible.



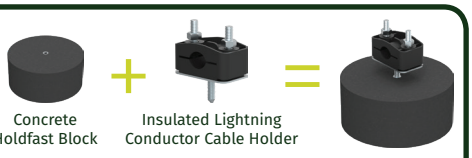
| DESCRIPTION | WEIGHT (kg) | PART NO. |
|---|---|---|
| Concrete Holdfast Block complete with M8 threaded insert | 5.00 | KM92910101 |

**Material:** Concrete



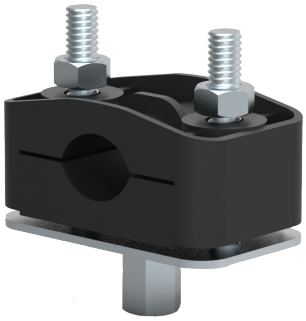

APPLICATION

**COMPONENT ASSEMBLY:**




The Kingsmill **Concrete Holdfast Block** is designed for use with bracketry having an M8 threaded rod.

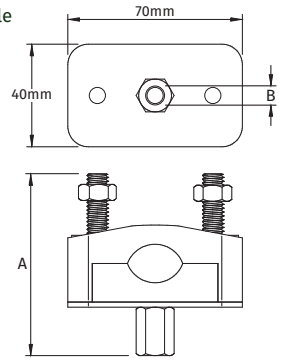
## Insulated Lightning Conductor Cable Holder with Connector



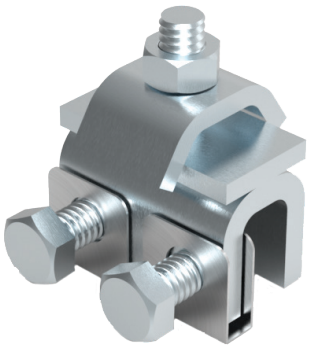
The **Insulated Lightning Conductor Cable Holder with Connector** is supplied with either M8 or M16 threaded inserts.

| DESCRIPTION | HEIGHT (A) (mm) | THREADED INSERT (B) | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| Cable Holder with M8 internal thread | 70 | M8 | 0.16 | KM30400101 |
| Cable Holder with M16 internal thread | 94 | M16 | 0.20 | KM30400201 |

**Material:** Galvanised Steel Insulated Saddle



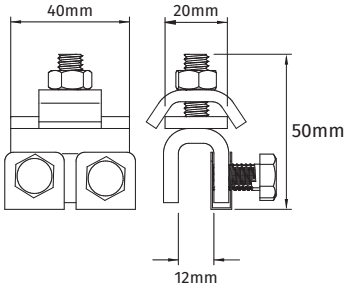

## Universal Seam Holder



The **Universal Seam Holder** is used for fixing Cable Holders to standing seam roofs.

| MATERIAL | BOLTS | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| Galvanised Steel | 3 x M8 x 25mm | 0.18 | KM99600101 |
| Hot Dip Galvanised | 3 x M8 x 25mm | 0.19 | KM99600102 |
| Stainless Steel | 3 x M8 x 25mm | 0.17 | KM99600105 |

**Material:** Galvanised Steel, Hot Dip Galvanised or Stainless Steel



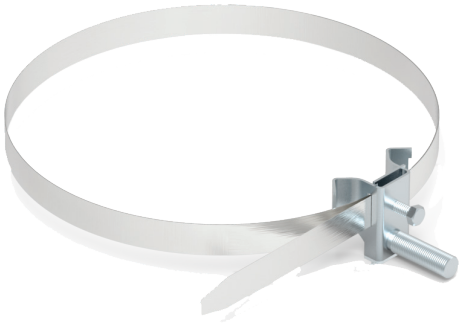

APPLICATION

**COMPONENT ASSEMBLY:**


The **Universal Seam Holder** is designed for Cable Holders with an M8 threaded insert (two M10 versions are also available).

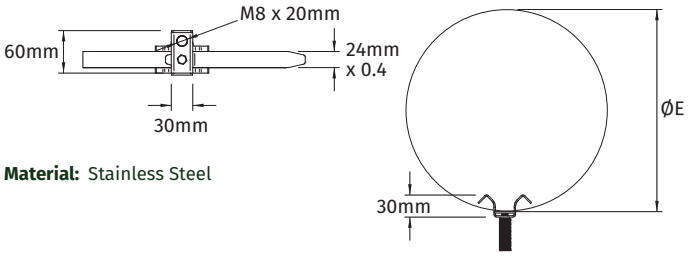
# Single Pipe/Handrail Bracket

The **Single Pipe/Handrail Bracket** is manufactured from stainless steel and is used in conjunction with **Cable Holders** having an M8 or M16 threaded insert and **Mast Holders** having M16 threaded inserts.



### Brackets for use with Cable Holders and accessories with M8 fixings

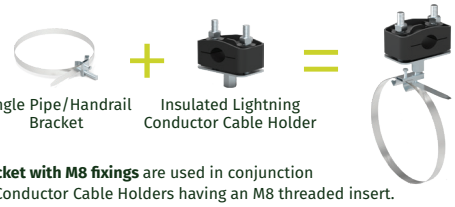
| BAND DIAMETER (ØE) (mm) | THREADED STUD | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 150 - 300 | M8 x 25mm | 0.18 | KM97700105 |
| ≤150 | M8 x 25mm | 0.16 | KM97700205 |
| 300 - 500 | M8 x 25mm | 0.21 | KM97700305 |




**Material:** Stainless Steel

APPLICATION

**COMPONENT ASSEMBLY:**

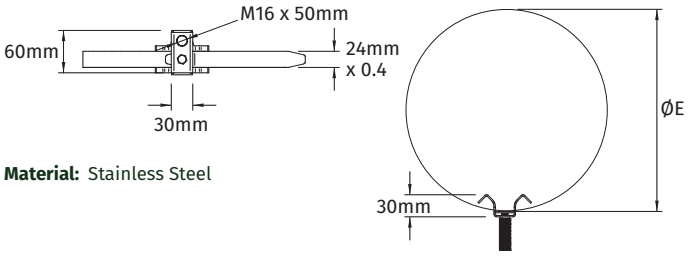


Single Pipe/Handrail Bracket + Insulated Lightning Conductor Cable Holder =

**Single Pipe/Handrail Bracket with M8 fixings** are used in conjunction with Insulated Lightning Conductor Cable Holders having an M8 threaded insert.

### Brackets for use with Mast Holders and accessories with M16 fixings

| BAND DIAMETER (ØE) (mm) | THREADED STUD | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 150 - 300 | M16 x 50mm | 0.23 | KM97701105 |
| ≤150 | M16 x 50mm | 0.21 | KM97701205 |
| 300 - 500 | M16 x 50mm | 0.26 | KM97701305 |




**Material:** Stainless Steel

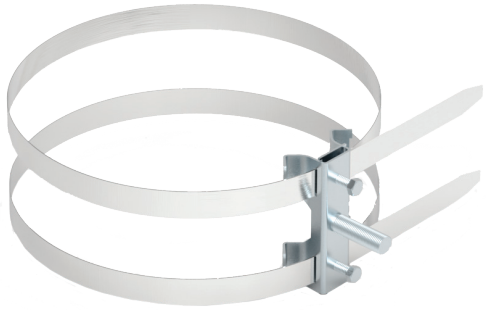
APPLICATION

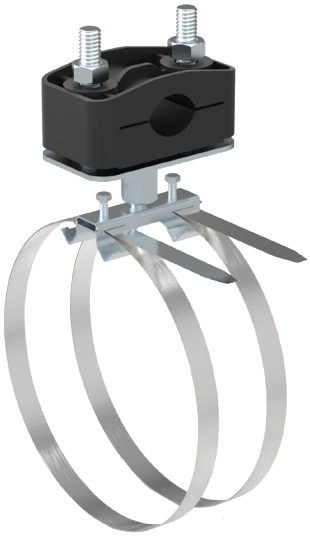
**COMPONENT ASSEMBLY:**

Single Pipe/Handrail Bracket + Insulated Lightning Conductor Mast Holder =

**Single Pipe/Handrail Bracket with M16 fixings** are used in conjunction with Insulated Lightning Conductor Mast Holders having an M16 threaded insert.

# Double Pipe/Handrail Bracket

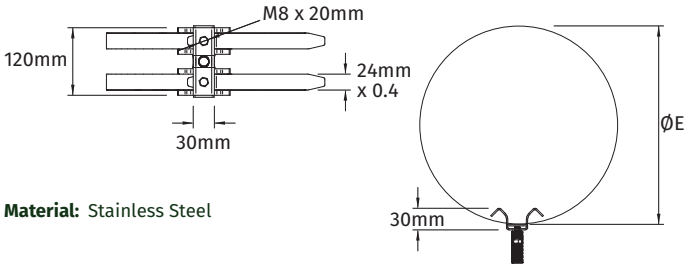




The **Double Pipe/Handrail Bracket** is manufactured from stainless steel and is used in conjunction with **Cable Holders** having an M8 or M16 threaded insert and **Mast Holders** having M16 threaded inserts.

**Brackets for use with Cable Holders and accessories with M8 fixings**

| BAND DIAMETER (ØE) (mm) | THREADED STUD | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 150 - 300 | M8 x 25mm | 0.36 | KM96700105 |
| ≤150 | M8 x 25mm | 0.32 | KM96700205 |
| 300 - 500 | M8 x 25mm | 0.42 | KM96700305 |




**Material:** Stainless Steel

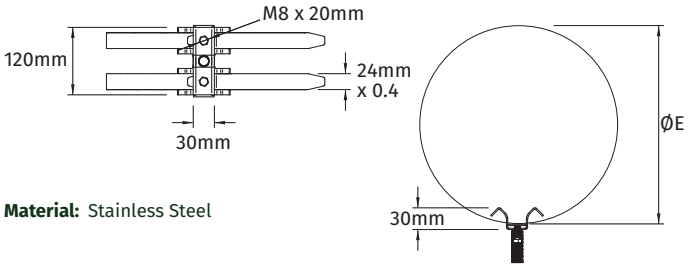
APPLICATION

**COMPONENT ASSEMBLY:**


**Double Pipe/Handrail Bracket for Cable holders** are used in conjunction with Insulated Lightning Conductor Cable Holders having an M8 threaded insert.

**Brackets for use with Mast Holders and accessories with M16 fixings**

| BAND DIAMETER (ØE) (mm) | THREADED STUD | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| 150 - 300 | M16 x 50mm | 0.41 | KM96701105 |
| ≤150 | M16 x 50mm | 0.38 | KM96701205 |
| 300 - 500 | M16 x 50mm | 0.47 | KM96701305 |




**Material:** Stainless Steel

APPLICATION

**COMPONENT ASSEMBLY:**

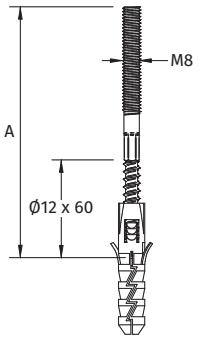

**Double Pipe/Handrail Bracket for Mast holders** are used in conjunction with Insulated Lightning Conductor Cable Holders having an M16 threaded insert.

## Double-Threaded Screw

**Double-Threaded Screws** can be used with holders having an M8 insert. For example, KM30400101 (page AT:46).

| SCREW LENGTH (A) (mm) | WEIGHT (kg) | PART NO. |
|---|---|---|
| 80 | 0.18 | KM31208001 |
| 120 | 0.29 | KM31212001 |
| 200 | 0.53 | KM31220001 |

**Material:** Galvanised Steel




APPLICATION


+

=


**COMPONENT ASSEMBLY:**

Double-Threaded Screw

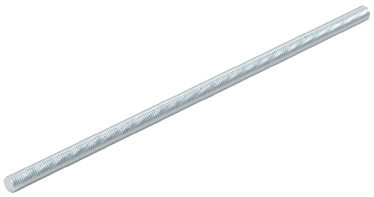
Insulated Lightning Conductor Cable Holder

The **Double-Threaded Screw** is designed for use where a large stand-off space is required.

## Threaded Rod

**Threaded Rods** can be used with holders having an M8 insert for exqample, KM30400101 (page AT:46).

Supplied in 1m lengths for cutting to size at site.

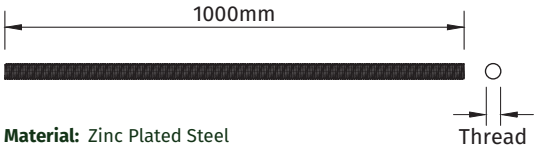


**Zinc Plated Threaded Rod**

| THREAD | WEIGHT (kg) | PART NO. |
|---|---|---|
| M8 | 0.40 | KM30800101 |
| M10 | 0.50 | KM30800201 |
| M12 | 0.60 | KM30800301 |
| M16 | 1.20 | KM30800401 |

**Stainless Steel Nuts**

| THREAD | WEIGHT (kg) | PART NO. |
|---|---|---|
| M8 | 0.004 | A2FN08 |
| M10 | 0.001 | A2FN10 |
| M12 | 0.016 | A2FN12 |
| M16 | 0.020 | A2FN16 |




**Material:** Zinc Plated Steel

APPLICATION


+

=


**COMPONENT ASSEMBLY:**

Threaded Rod

Insulated Lightning Conductor Cable Holder

The **Threaded Rod** is designed for use where a large stand-off space is required.

# Catenary Wire Systems

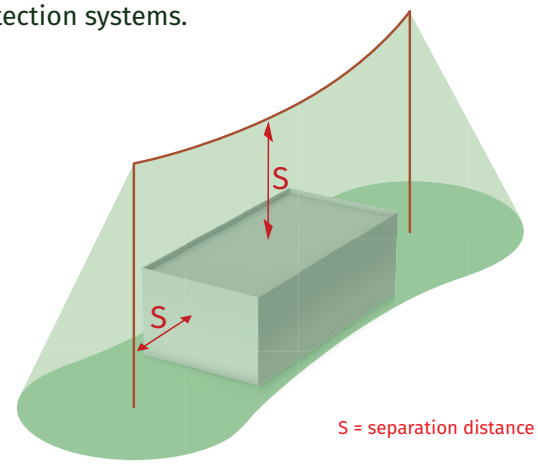
Kingsmill can offer a range of products to form catenary wire protection systems.

**These products encompass:**

- Wire
- Turnbuckles
- Masts

Such systems are used where an Isolated Lightning Protection System is required.

Designs are project specific since differing wind loading, separation distances and protective angles may apply.



S = separation distance

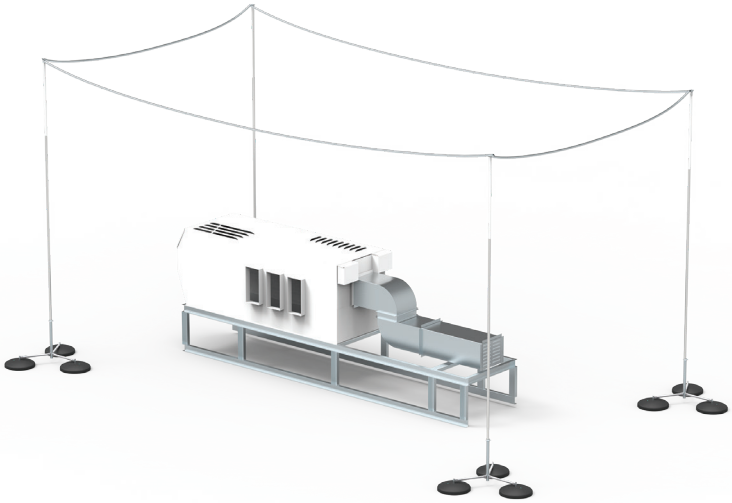
**Factors that must be taken into account when designing such a system are:**

- Wire (cable) type, size and weight
- Length of span, amount of wire (cable) sag
- Wind loading factors
- Ice loading factors
- Protective angles

## Free-Standing Masts

A catenary wire system is ideally constructed using our strong, lightweight mast.

However, smaller systems could utilise free-standing masts.

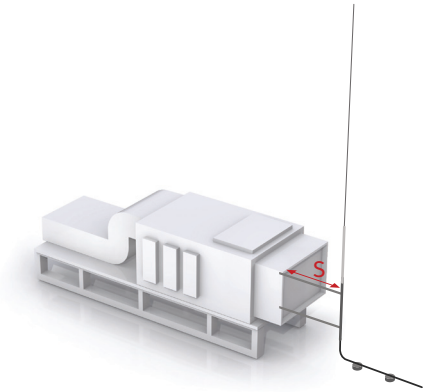


# Isolated Systems

Kingsmill can also supply Isolated Lightning Protection Systems, utilising Insulated Spacer Bars in conjunction with Air Terminals and Conductor Supports.

*Such systems are project specific and better options might be available. Please contact Kingsmill for advice.*

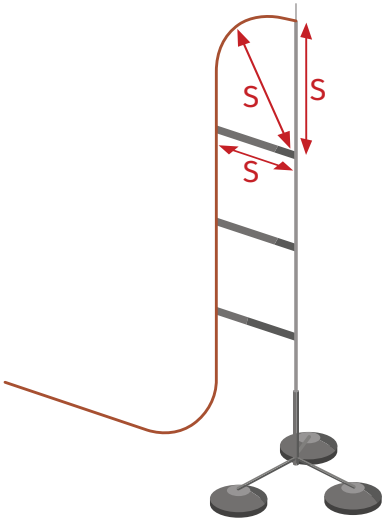
Can be used where roof space is limited but space permits their use. Otherwise, we recommend the use of the Insulated Lightning Conductor Cable system.




Maintains separation distance using **Insulated Separation Bars**.

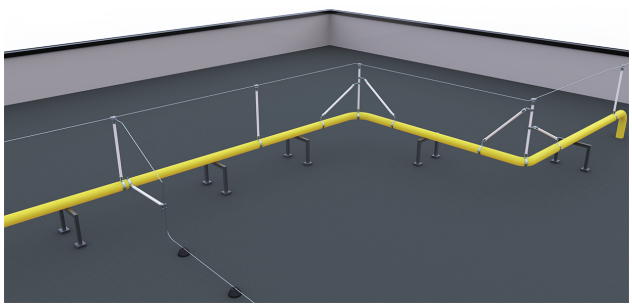
Used where there is sufficient space to mount one end of an insulated spacer bar to the equipment being protected, and clamp the mast or conductor into the other end of the insulated spacer bar.

S = separation distance




Isolated System using Mast and Insulated Bars to maintain the separation distance from the object being protected.

**NOTE:** Such systems are designed for use with 8mm diameter conductor, due to the ability to bend such material through 360° (all planes). Whereas, a tape can only be bent through one plane.



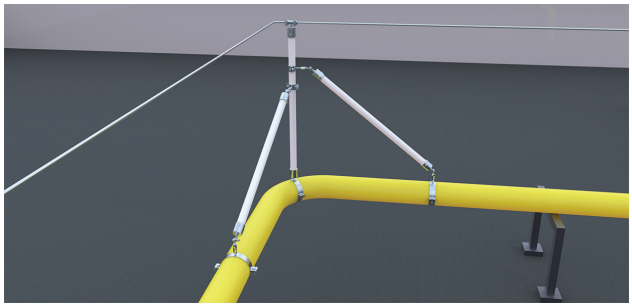


*Figure AT:7 - Isolation bars used to protect a pipeline*

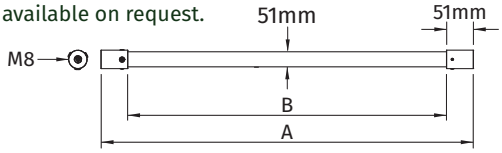
## Insulated Separation Bars

**Insulated Separation Bars** maintain the separation distance between the lightning protection conductor and the object being protected.

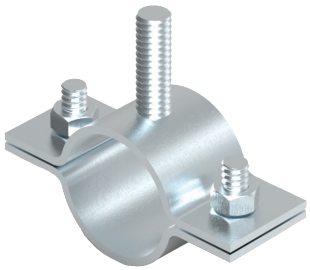
| DESCRIPTION | DIMENSIONS (mm) | | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| | A | B | | |
| 750mm Separation Bar | 750 | 638 | 0.48 | KM97900729 |
| 1000mm Separation Bar | 1000 | 888 | 0.57 | KM97900029 |
| 1500mm Separation Bar | 1500 | 1388 | 0.60 | KM97901529 |
| 2000mm Separation Bar | 2000 | 1888 | 0.80 | KM97920029 |

M16 threaded bars available on request.

**Material:** GRP



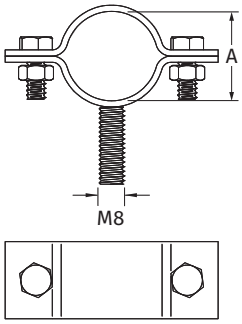

## Mast or Pipe to Insulated Separation Bar Clamp



**Mast or Pipe to Insulated Separation Bar Clamp** for connecting to an Interception Mast or Pipe.

| PIPE DIAMETER (A) (mm) | STUD | SCREW | WEIGHT (kg) | PART NO. |
|---|---|---|---|---|
| 32 | M8 | 2 x M8 x 20 | 0.10 | KM98300401 |
| 40 | M8 | 2 x M8 x 20 | 0.12 | KM98300601 |

**Material:** Galvanised Steel




## Wire Conductor Holder

**Wire Conductor Holder** secures the Lightning Conductor to the end of the Insulated Separation Bar.

| DESCRIPTION | STUD | WEIGHT (kg) | PART NO. |
|---|---|---|---|
| Wire Conductor Holder for 8mm diameter circular conductor and flat tape up to 30mm x 4mm | M8 | 0.06 | KM98400201 |

**Material:** Galvanised Steel