

Procedure for Design and Installation of the PDCE-Anti Lightning Ball

January 13, 2026 — Revision 12.2

- Please read this document before designing or manufacturing the support pipe used to install the PDCE.
- Our company, Lightning Suppression Systems, does not perform the design or manufacturing of support pipes.
- Please comply with the building regulations of each country.
- Please ensure that strength calculations for wind pressure and vibration are carried out by the company responsible for designing and manufacturing the support pipe.
- This document is intended for general buildings and structures. In harsh environments—such as vessels or railway facilities that are subject to continuous vibration—or in cases where installation requirements are more stringent, please carry out the installation in accordance with your company's standards.

【Contact Information】

Lightning Suppression Systems Co., Ltd.

Contact Person: Ken Matsumoto

Tel: 045-264-4110

Business Hours: Weekdays 9:00–17:00



株式会社 落雷抑制システムズ

Lightning Suppression Systems

Introduction Flow

①. Pre-Installation Review

- **Determination of Installation Location and Method** (p.3～5)
- **Setting the Protection Range** (p.6)
 - Determine the installation height of the PDCE so that the protection target falls within the protection zone.
 - Please follow the building regulations of each country when setting the protection range.

②. Structural Strength Calculations (p.7～8)

- Please perform strength design in accordance with the building regulations of each country.
- ※Our company does not provide individual strength-calculation services for support pipes.

③. Verification of Compatibility When Installing the PDCE and Support Pipe onto the Structure (p.9)

④. Fabrication and Installation of the Support Pipe

- **Material Delivery Planning and Safe Construction** (p.10)
- **Precautions When Tightening Flange Bolts** (p.11)
- **Examples of Support Pipe Connections** (p.12～13)

Other Information

- Please perform grounding work in the same manner as for standard lightning rods.
- Please follow the building regulations of each country regarding post-construction inspections and the flow of required application documents.

①. Determining the Installation Location

Roof / Side Wall Installations

○Installation Method

Install the unit in the same manner as a standard rod-type lightning conductor.

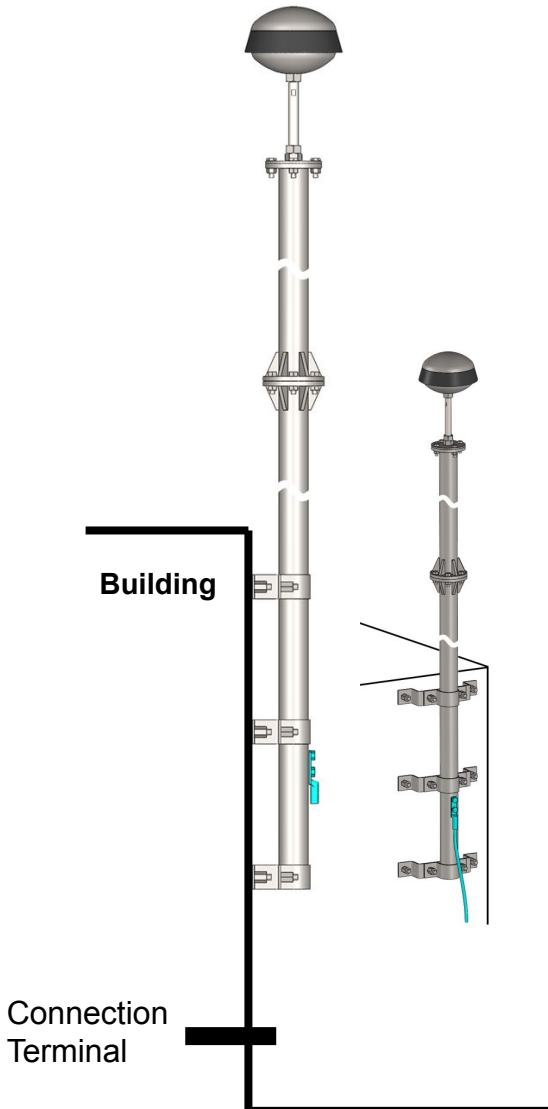
※If the installation height exceeds 5m, please consider the need for stay wires or auxiliary pipes.

○Differences Between the PDCE and Rod-Type Lightning Conductors

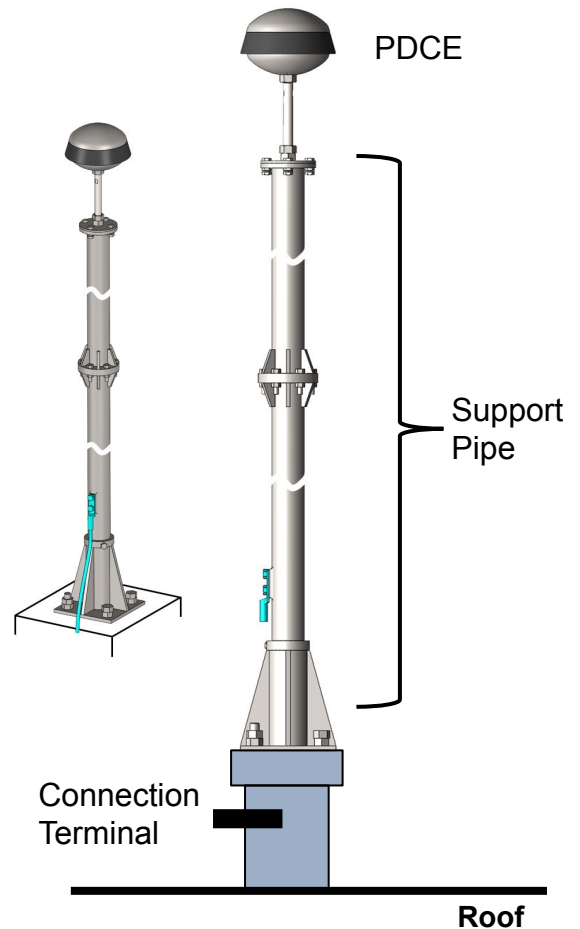
The PDCE has a larger horizontal projected area and greater weight compared to rod-type lightning conductors.

⇒Please take these factors into account during design.

●Side Wall Installation



●Roof Installation



①. Determining the Installation Location

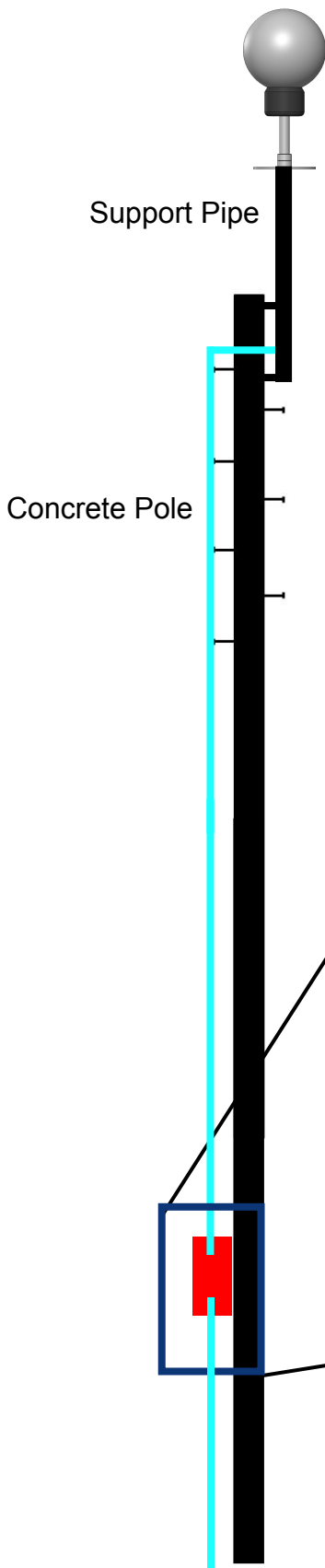
Installation Using a Dedicated Support Pole

○For Concrete Poles

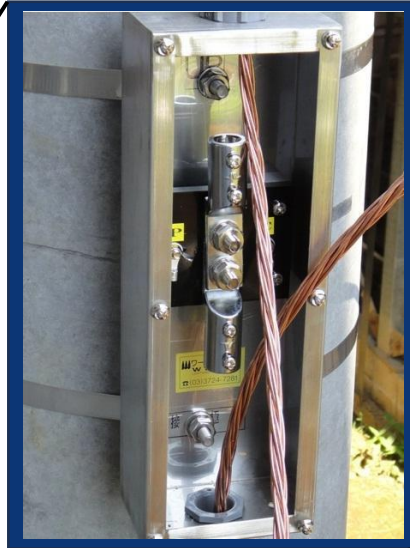
1. Lower the down conductor from the support pipe, route it through the test box, and connect it to ground using an hard-drawn stranded copper conductor.
2. A grounding terminal is required on the support pipe.

○For Metal Poles

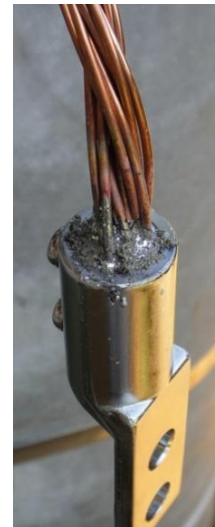
1. For metal poles, the pole itself serves as the down conductor, utilizing both the upper and lower ends of the pole.
2. When using a ferromagnetic pipe, do not run a grounding wire inside the pipe.



Test Terminal Box and Terminal



Secure with Solder



①. Determining the Installation Method for the Support Pipe

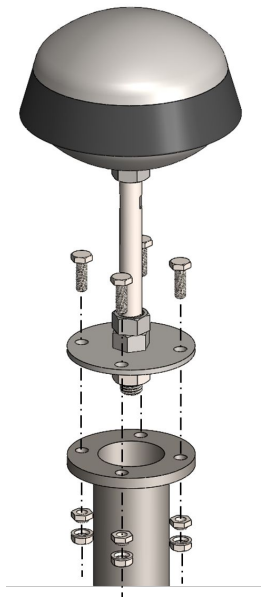
【Support Pipe Materials】

STK pipe / SGP pipe / SUS pipe, etc.

※Aluminum poles cannot be used due to the risk of galvanic corrosion.

○Flange Welding (Recommended)

We recommend forming the flange on the support pipe by welding.

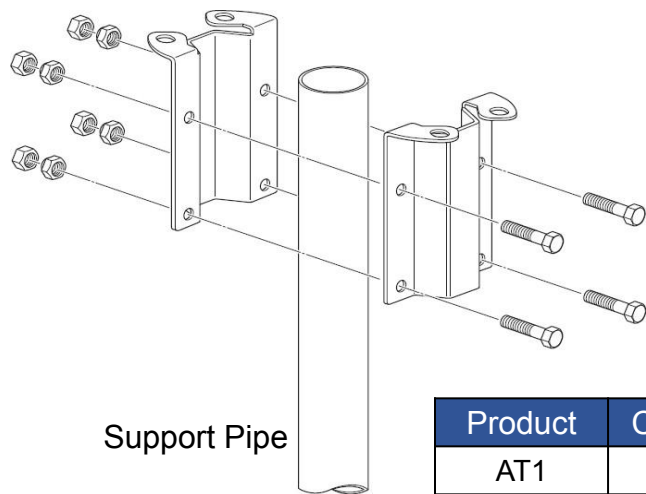


Flange Dimensions

Model	Diameter (mm)	Bolt Hole PCD (mm)
Baby	90	70
Junior/ALB-Small	115	90
Magnum/ALB-Large	150	115

○Using Attachments

Please use the attachment only under wind speeds of 34m/s or below.
Welded support structures provide superior strength compared to attachment-based installations.



Attachment

Product	Compatible Models	Support Pipe Dimensions
AT1	Baby	32A(Φ42.7mm)
AT2	Junior/ALB-Small	40A(Φ48.6mm)
AT3	Magnum/ALB-Large	50A(Φ60.5mm)
AT4	Magnum/ALB-Large	65A(Φ76.3mm)

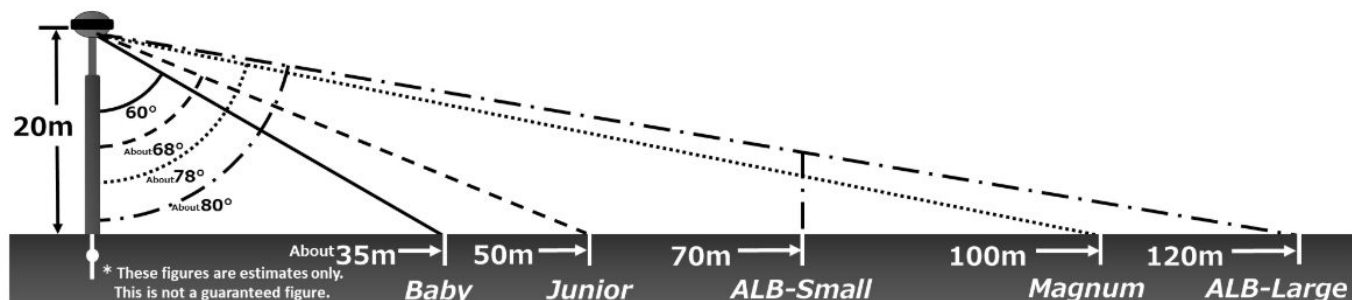
①. Setting the Protection Range and Installation Height of the PDCE

○When Lightning Protection is **Required** Under the Building Standards Act

⇒Please install the PDCE within the protection range specified by the applicable regulations.

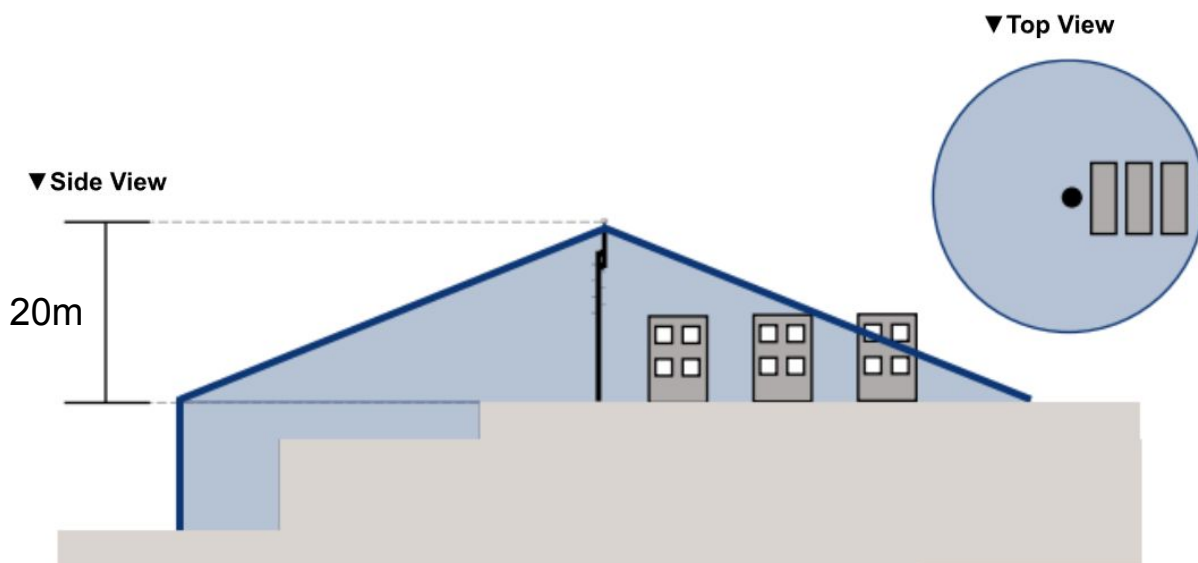
○When Lightning Protection is **Not Required** Under the Building Standards Act

⇒Please refer to the diagram below. It shows the maximum protection range for each PDCE model.



●Points to Note When Setting the Protection Range

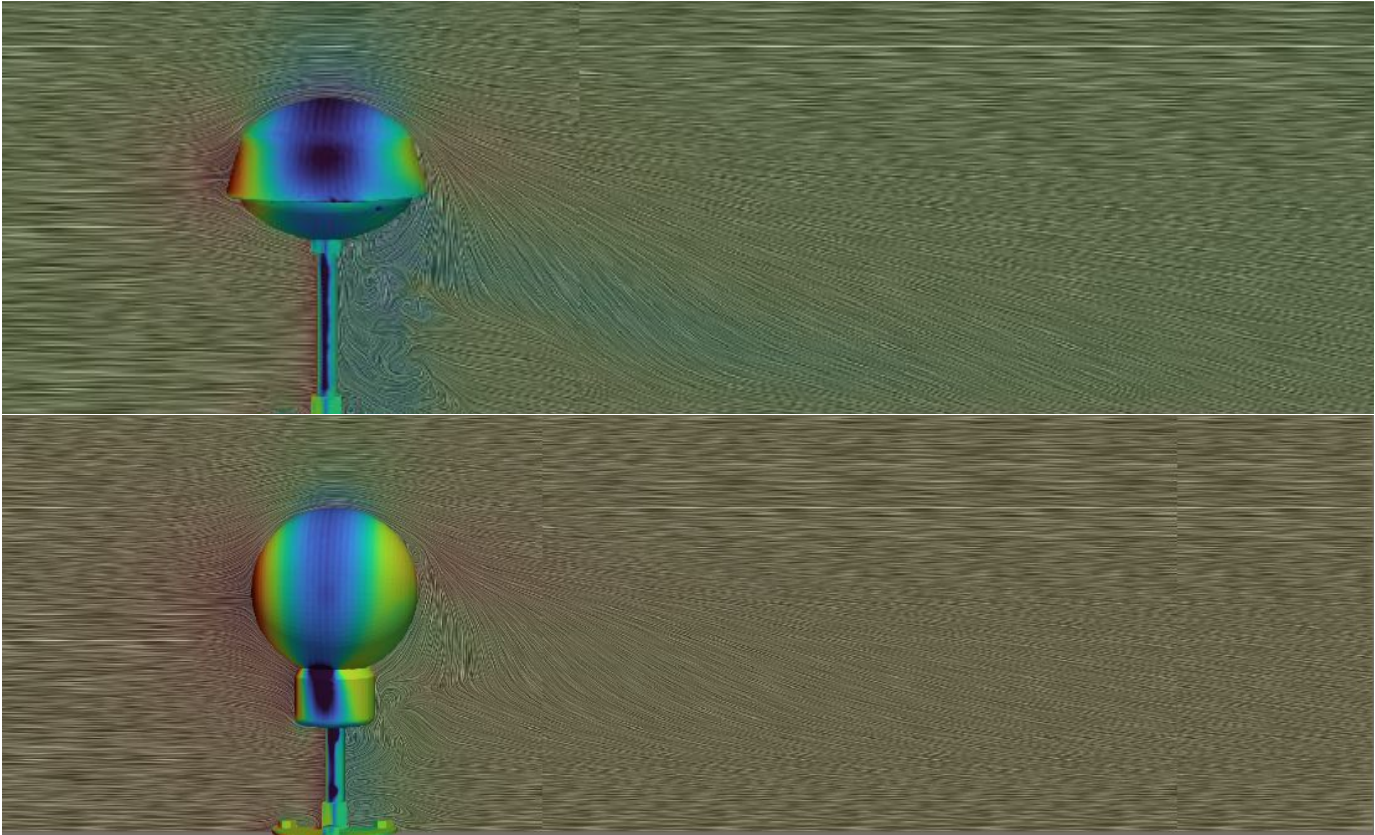
- Even if an object appears to be within the protection range when viewed from above, it may fall outside the range when viewed from the side. Please pay close attention to the height of the object to be protected.
- The protection range shown when the PDCE is installed at a height of 20m represents the maximum range.
(For the ALB-Small model, the maximum range is achieved at a height of 11.7m.)
- Even when there are elevation differences on the ground surface, the protection range shown in the diagram above represents the maximum range.



②. Structural Strength Assessment

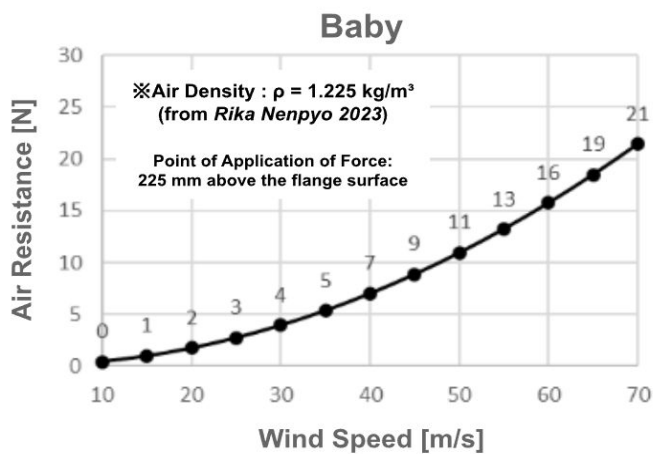
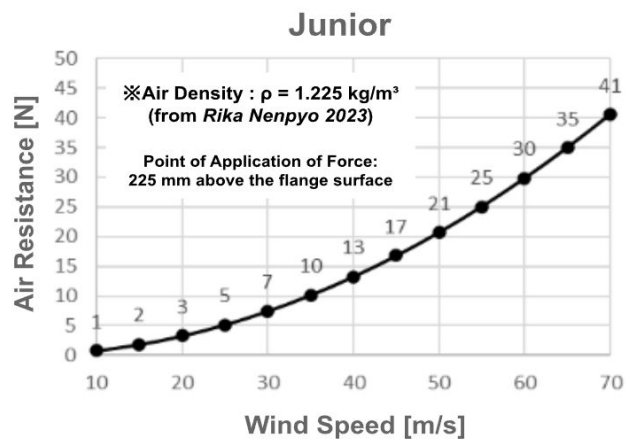
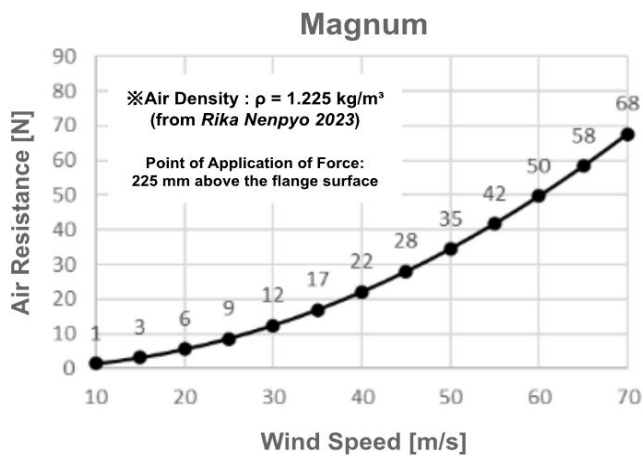
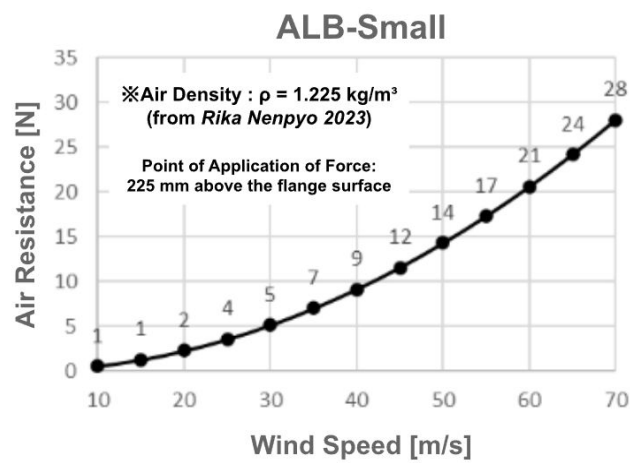
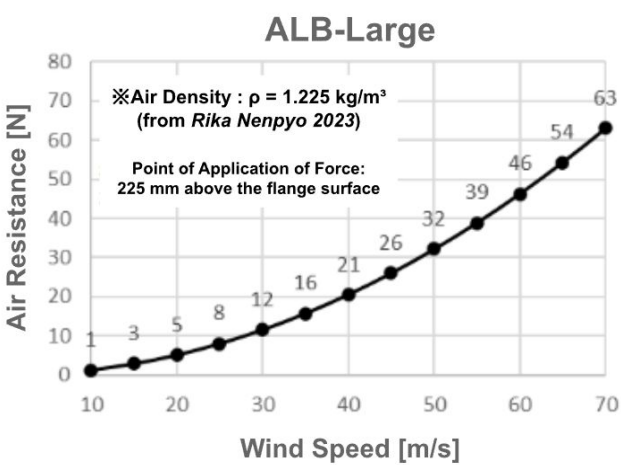
Air Resistance of the PDCE

The following section provides air-resistance data obtained through CFD analysis. Please use this information as a reference when evaluating structural strength.



	①	②	③
Product	Drag Coefficient (Cd)	Windward Area	Force Application Point (from the Flange Surface)
Magnum	0.55	410cm ²	28.9cm
ALB-Large	0.50	420cm ²	25.0cm
ALB-Small	0.55	170cm ²	15.1cm
Junior	0.52	260cm ²	22.5cm
Baby	0.65	110cm ²	17.0cm

②. Air Resistance by Wind Speed



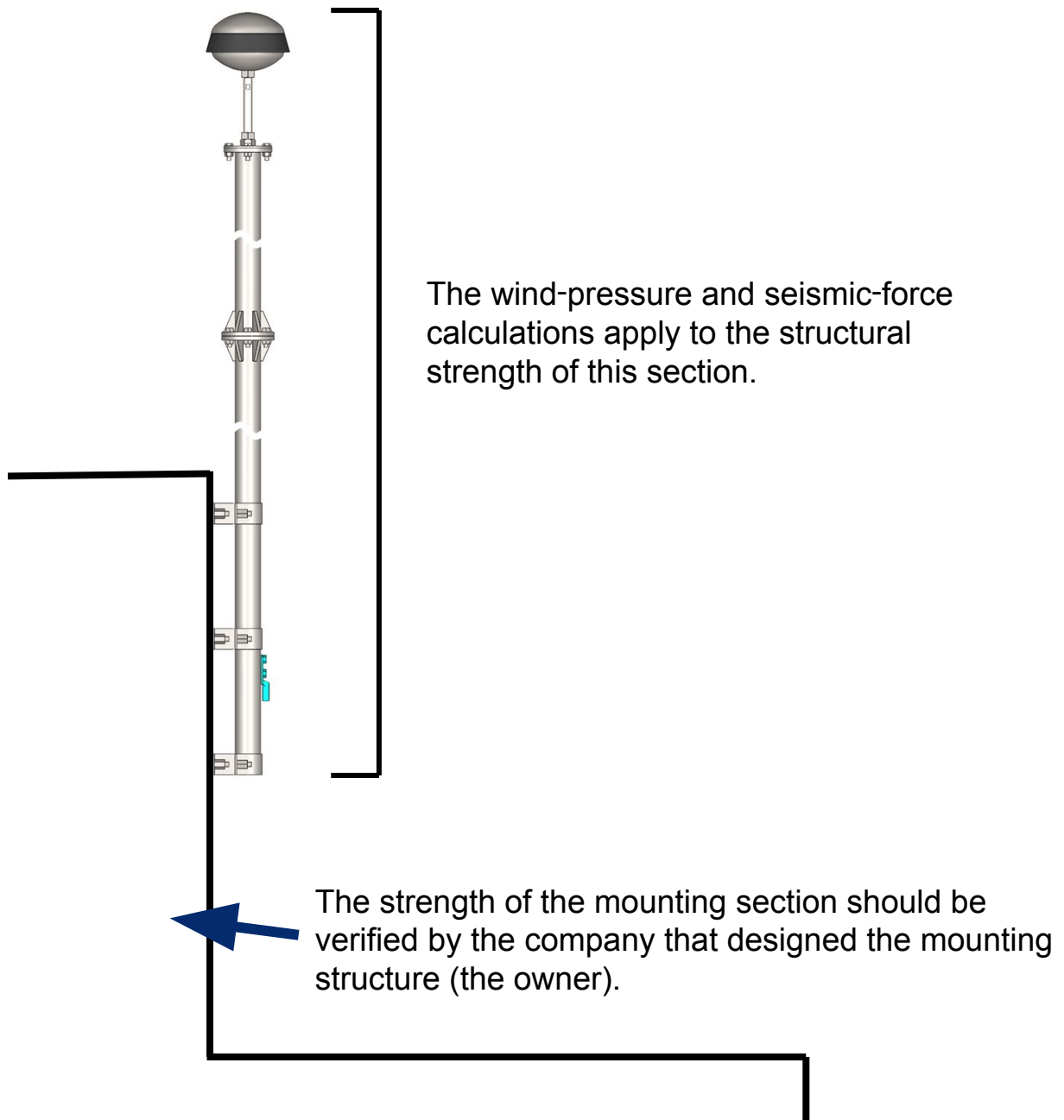
③. Verification of the Structural Strength on the Protected Side

○Scope of Structural Strength Calculations

⇒The structural strength calculations—such as wind pressure and seismic force—apply to the section from the lightning-receiving head down to the support pipe.

○Strength of the Mounting Section

⇒Please have the strength of the mounting section verified by the company that designed the structure (the owner).



④. Material Delivery Planning and Safe Construction Practices

The precautions related to material delivery planning and safe construction for installing the PDCE is the same as those for conventional rod-type lightning arresters.

○Material Delivery Planning

Please consider how the materials will be transported to the installation site.
Example : Transport the support pipe to the rooftop manually or by crane.

○Safe Construction Practices **Critical Warning**

Ensure that safety at elevated work locations is given the highest priority.
Falling objects can affect not only the workers but also people located below the installation area.
An object dropped from a height H can travel up to $2H$ horizontally.
In addition, **never perform any work when lightning is likely to occur.**

○Precautions Before Starting Installation Work

1. Conduct a final confirmation of the installation location in the presence of the owner.

2. If underground utilities or buried objects are known to exist, the site supervisor must remain present at all times.

3. If any buried objects are present, excavation must begin with manual digging (up to 60 cm).
Do not start excavation with machinery right away.

4. If a buried object is uncovered, assemble the grounding-rod installation team and ensure that all members fully understand the location of the buried object.

5. Place stakes or markers indicating the location of the buried object so that its position remains identifiable even after temporary backfilling.

6. If a buried object is accidentally damaged, promptly report it to the owner, confirm the restoration schedule, and notify all relevant parties.
Restoration work must be treated as the highest priority.

○When the PDCE is Subjected to a Strong Impact

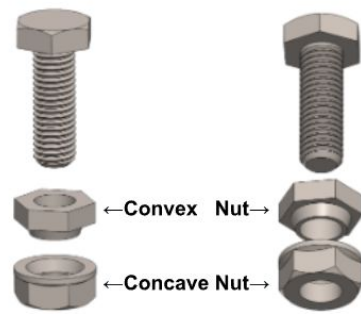
If the PDCE is subjected to a strong impact—such as being dropped before or during installation—its performance can no longer be guaranteed.
Such cases are not eligible for free replacement, so please ensure that all work is carried out safely and with utmost care.

④. Precautions for Bolt Tightening on the PDCE Flange Section

○When connecting the PDCE to the support pipe, tighten the assembly using a Hard Lock Nut.

●What is a Hard Lock Nut?

- A Hard Lock Nut prevents loosening of the bolt by generating a wedge effect through the tapered surfaces of two nuts: the convex nut and the concave nut.
- Please note that the installation requires a specific order and orientation.
- For mounting onto the flange section, insert the bolt from above and install the Hard Lock Nut on the underside.



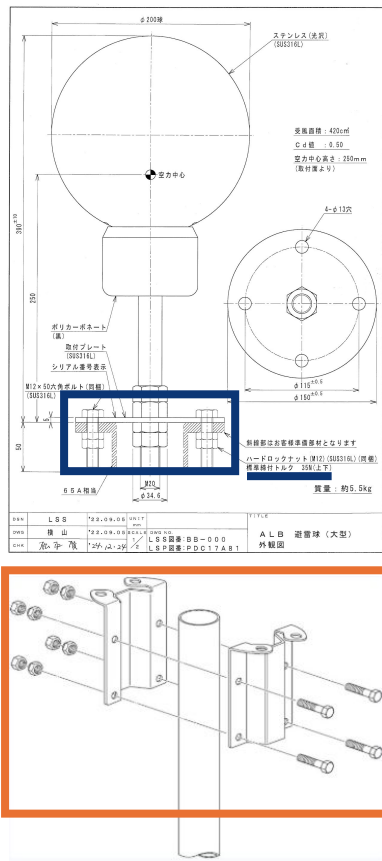
●About the Tightening Torque

- The specified tightening torque differs for each product.
 - Please refer to the table below and the drawings for each model.
- (The torque values are also indicated on the package of the included bolts.)

▼Tightening Torque by Product Specification

	Screw Size	Tightening Torque
Baby	M8	12Nm
Junior	M10	21Nm
Magnum	M12	35Nm
ALB-Small	M10	21Nm
ALB-Large	M12	35Nm
AT1	M8	12Nm
AT2	M10	21Nm
AT3	M12	35Nm
AT4	M12	35Nm

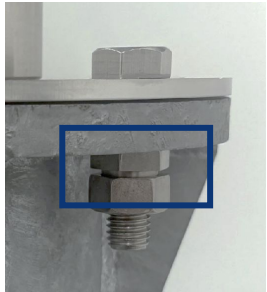
▼ Bolt Positions by Product



※When the plate is changed, tighten it using the torque specified for the corresponding plate size.

●Precautions for Hard Lock Nuts

- It is normal for a gap to remain between the nuts even when tightened to the proper torque.
- Do not continue tightening until the gap disappears, as this may cause damage to the bolt. Please ensure that the nuts are tightened to the specified torque.



④. Example of Support Pipe Connection



④. Example of Support Pipe Connection

○Upper Side Tightening



○Lower Side Tightening



If any on-site machining or modification is performed, appropriate anti-corrosion treatment must be applied.

- ※ For steel components, rust may develop and cause damage in areas where the plating has been removed during machining.
- ※ In some cases, painting may prevent proper electrical continuity.
If electrical continuity is required, apply paint only after tightening, or take other appropriate measures.