Thunderstorm Warning System Product Presentation

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30/04/2026

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2. Applications
3. Questions and Answers

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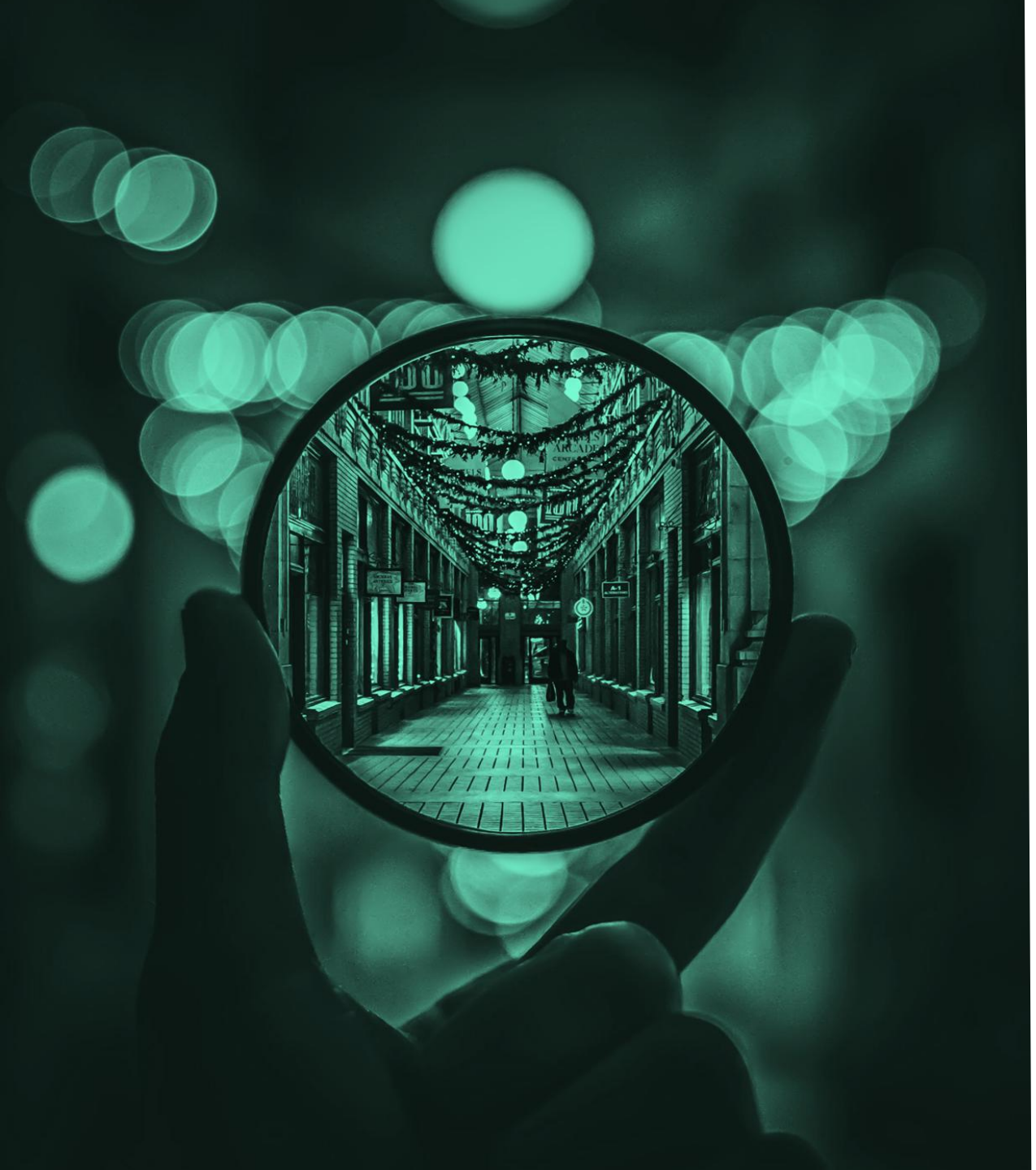


1. Thunderstorm Warning System

BTD-1

Thunderstorm Warning System

Thunderstorm Warning System

History

The **BTD-1 (Thunderstorm Warning System)** is an advanced sensor for thunderstorm monitoring based on a quasi-electrostatic technique, which measures variations in the atmospheric electric field to detect and predict lightning activity.

Within the landscape of detection technologies, several solutions exist, each with different approaches and limitations. **Lightning Location Networks**, for example, rely on sensor networks operated by third parties: they offer high accuracy in localization and timing, but require subscriptions, a stable internet connection, and may introduce delays of several minutes. Moreover, they only detect lightning after it has occurred, without providing any advance warning of storm development.

Single radio sensors, on the other hand, are local systems often integrated with sirens or warning lights and operate in real time. However, they are susceptible to electromagnetic interference and can generate numerous false alarms. Combining them with optical sensors reduces these errors, but significantly limits operational range and effectiveness, especially during daytime.

Another technology is **Electric Field Mills**, which measure the intensity of the atmospheric electric field. These instruments can identify critical conditions, but are limited to short ranges (around 20 km), have low spatial accuracy, and are unable to determine the direction of lightning. Additionally, the presence of mechanical components makes them more prone to failures and maintenance issues, particularly in harsh environmental conditions.

The **BTD-1** overcomes these limitations thanks to a proprietary technique that analyzes variations in the electric field within the 1–50 Hz band. This approach enables a much wider detection range (up to 83 km), the ability to detect even weak lightning, and, most importantly, the capability to generate alerts before the first lightning strike by sensing electrical charges in the air and in raindrops. The system is also robust, has no moving parts, and is designed to operate in harsh environments.

Electric Field & Lightning Detection

During a thunderstorm, a **separation of electric charges** forms inside the cloud, creating an electric field between the cloud and the ground. When a lightning strike occurs, part of this charge is neutralized, causing **a rapid change in the electric field**.

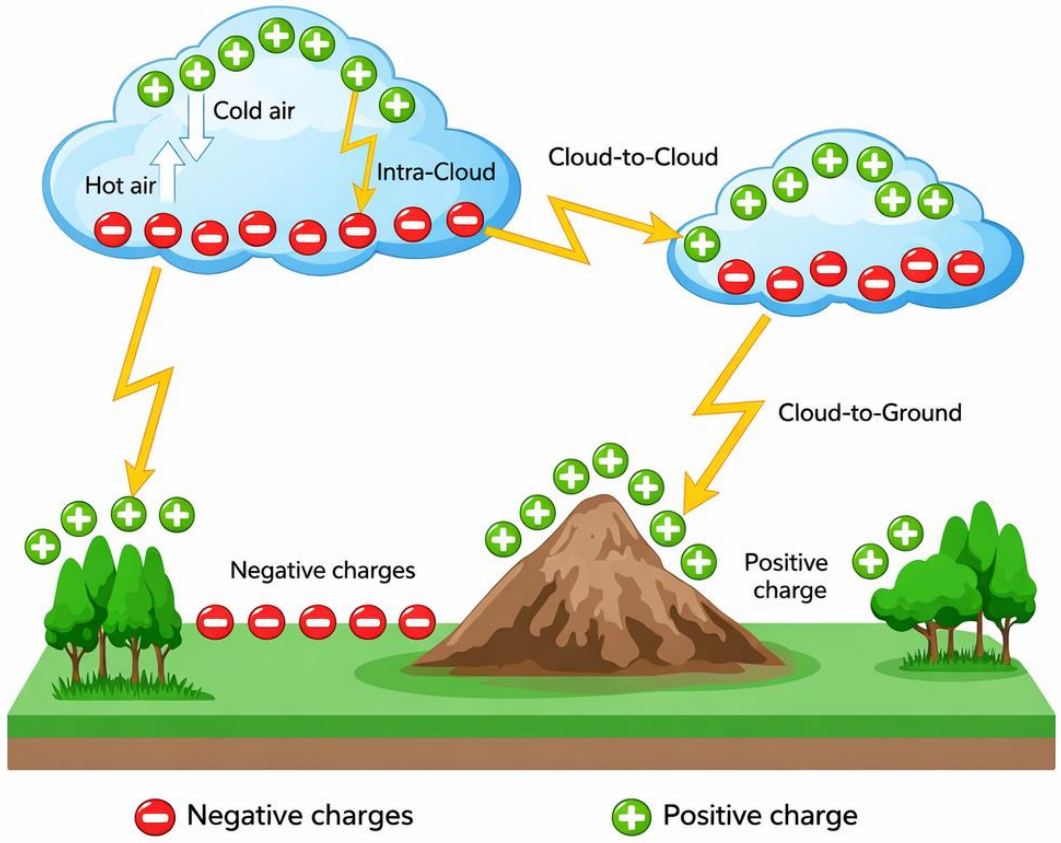
The BTD-1 continuously measures these variations, detecting lightning in an indirect but highly effective way.

Before the **first lightning strike**, the storm cloud is already electrically active. Raindrops and ice particles become electrically charged and carry these charges toward the ground.

The BTD-1 can detect these conditions through the increase in the electric field and the presence of charged precipitation, **generating an early warning**.

Most lightning (~80%) occurs **within the cloud (intra-cloud)** and does not reach the ground. Many traditional systems mainly detect cloud-to-ground lightning, missing a large number of events.

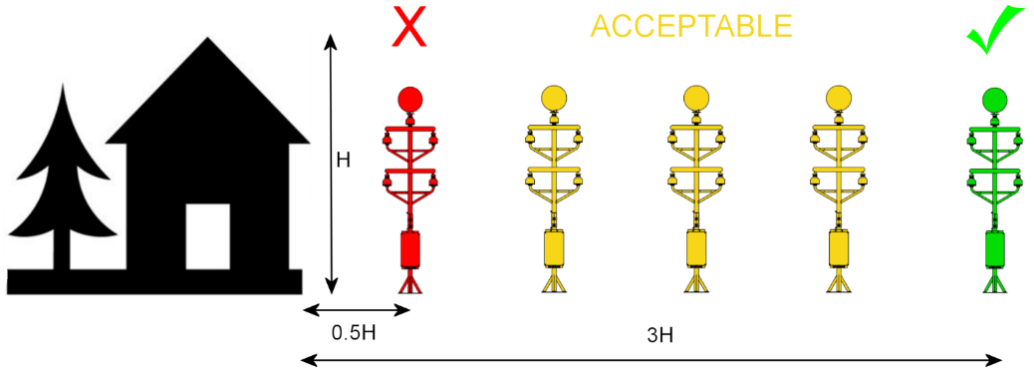
By relying on the electric field, the BTD-1 can detect **all types of lightning**, including weaker discharges and those occurring within the cloud.



BTD site requirements

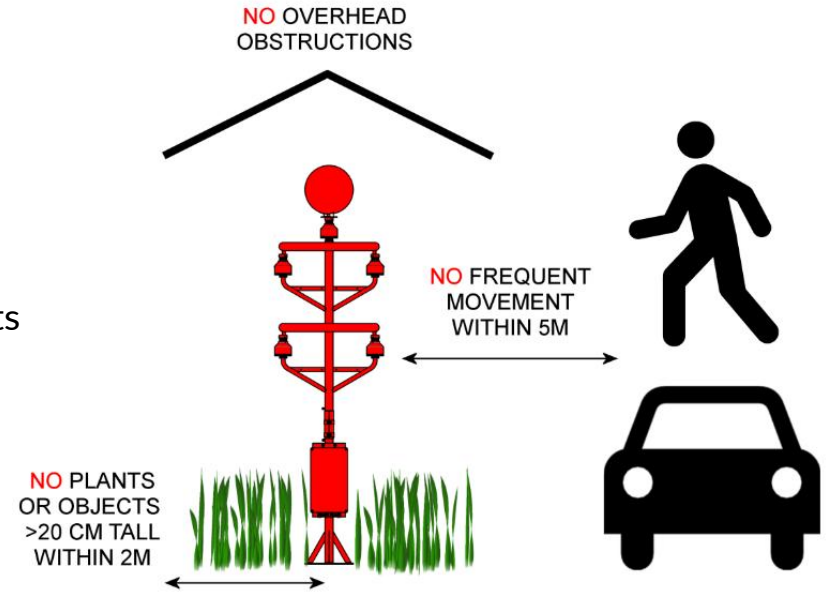
Ideal Site

- Flat ground
- No object closer than 3 times its own height
- No overhead cables/objects
- No movement within 10 metres



IDEAL SITE = Installed on flat, open ground, with no nearby trees, masts or buildings.

Can be installed quite close to nearby objects or on a rooftop if necessary, but will require additional calibration procedures.



Thunderstorm Warning System

Actual portfolio

Warns of thunderstorms in the local area, tracking their activity up to 83 km away. Highly sensitive and also warns when conditions are likely to produce lightning nearby, even before the first flash of the storm.

Originally developed for airports, provides distance and direction to lightning within two seconds of occurence. Includes relays to activate alarms.

BTD-300	BTD-350	BTD-200
• Standard version • Most sensitive lightning detector in the world • 83 km (51 mile) range	• Rugged version suitable for marine environment, including onboard moving vessels • Same performance as BTD-300	• Compact version • 35 km (22 miles) range • Wireless and solar-powered options • Suitable for golf courses etc.

BTD-300 *BTD-350* *BTD-200* *BTD-1*

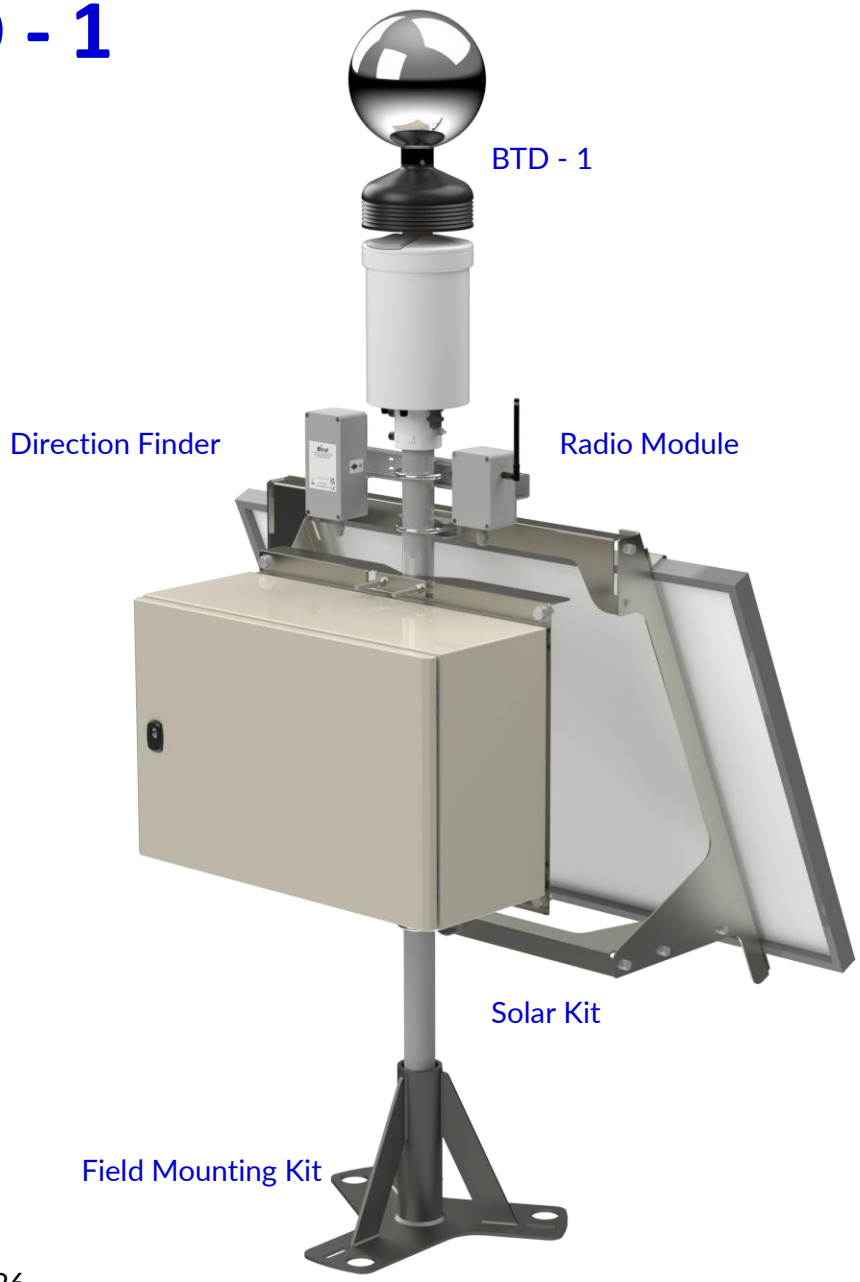
BTD product range comparison

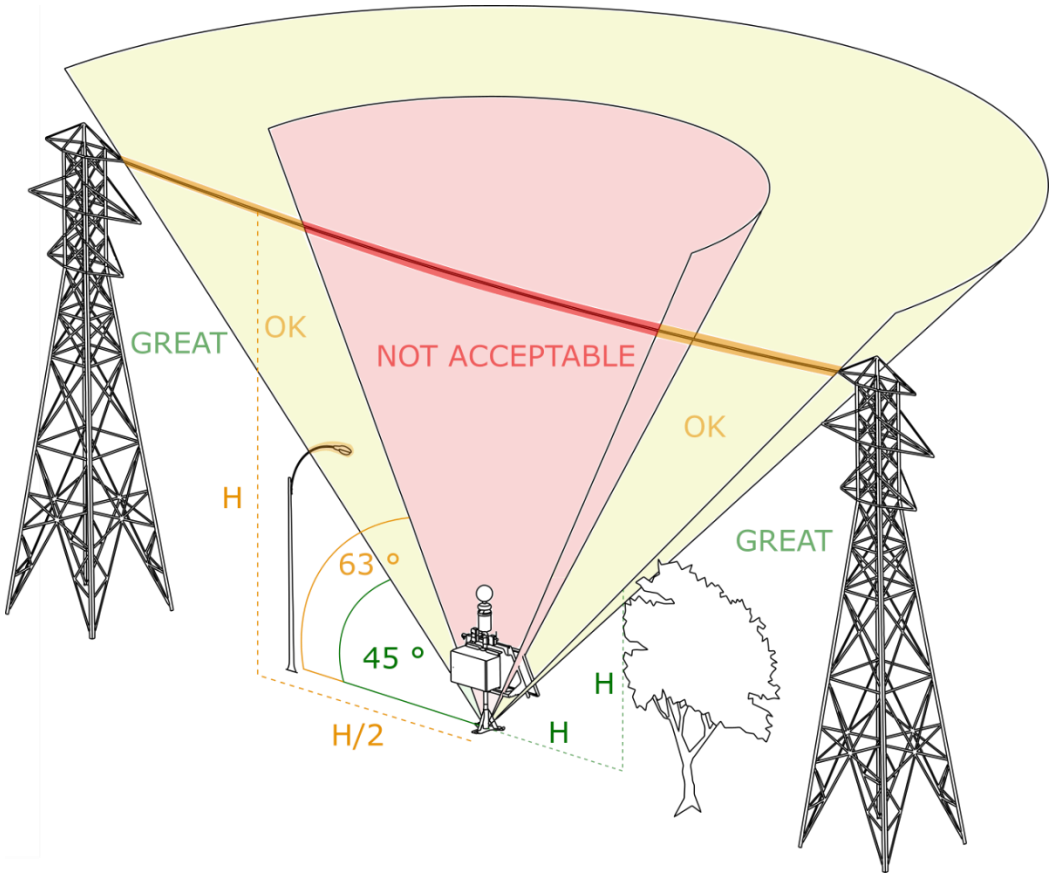
Attribute	BTD-300	BTD-350	BTD-1
Flash detection max range (km)	83	83	35 (standard); 83 (optional)
Flash Direction Finder option	Yes	Fitted as standard	Yes
Severe storm alert	No	No	Yes
Wireless option	No	No	Yes, 200m range
Solar power option	No	No	Yes, plug and play
User interface	Basic User Interface; Lightning Works (optional)	Basic User Interface; Lightning Works (optional)	Lightning Eye (Optional)
Communication Interfaces	Ethernet or RS422	Ethernet or RS422	Ethernet (Optional/PoE)/RS422
Connection method	Gland to screw terminals	Gland to screw terminals	M12 connectors (gland for relays)
Relay Outputs	3 relays with volt free contacts: Alert, Warning, Self-test. All relays 16VAC 35VDC 5A	3 relays with volt free contacts: Alert, Warning, Self-test. All relays 16VAC 35VDC 5A	3 relays with volt free contacts: Customisable All relays 16VAC 35VDC 5A
Power Supply	110-240 VAC	110-240 VAC	9–36 VDC / PoE
Power consumption (W)	12	20	3
Additional Power consumption with Direction Finder (W)	5	Fitted as standard	5
Additional Power for Extreme Heating (W)	N/A	N/A	50
Operating Temperature (C)	-40 to +60	-40 to +60	-20 to +50
Sensor Weight (kg)	25	25	4.8
Sensor Height (mm)	2460	2480	638
Sensor width (mm)	620	620	200

Thunderstorm Warning System BTD-1

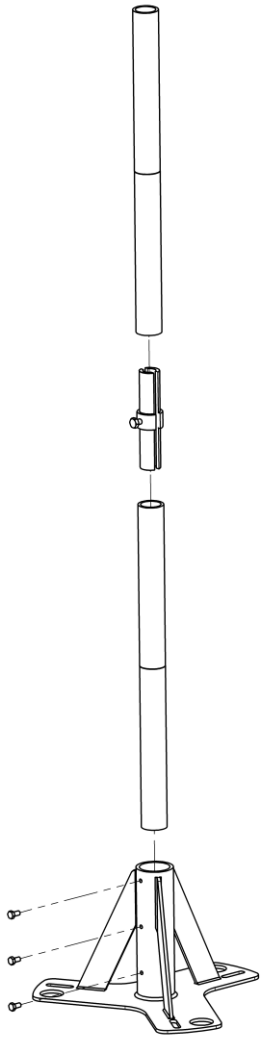
Thunderstorm Warning System BTD-1

BTD - 1


BTD - 1
Direction Finder
Radio Module
Solar Kit
Field Mounting Kit


GREAT
OK
NOT ACCEPTABLE
OK
GREAT
H
63 °
45 °
H
H
H/2

BTD - 1

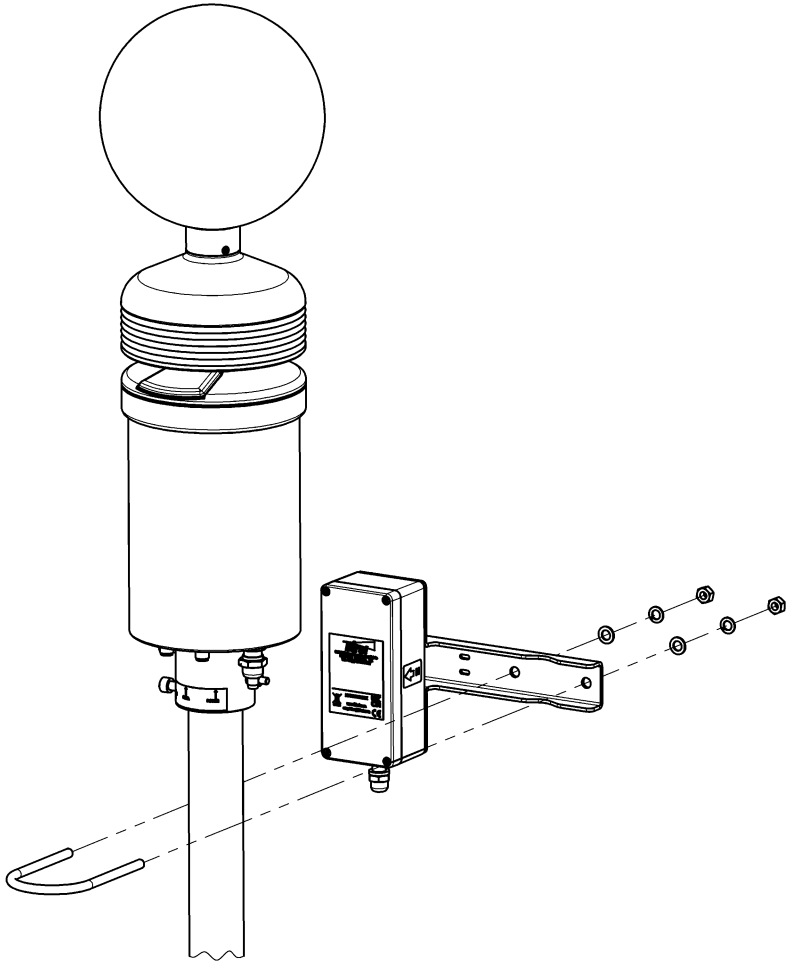


BTD – Field Mounting Kit

- Base Support
- Pole (2 sections & join)
- 3 x ground anchors

Solution for soil anchor. Option for customers to build concrete base and use instead without ground anchors

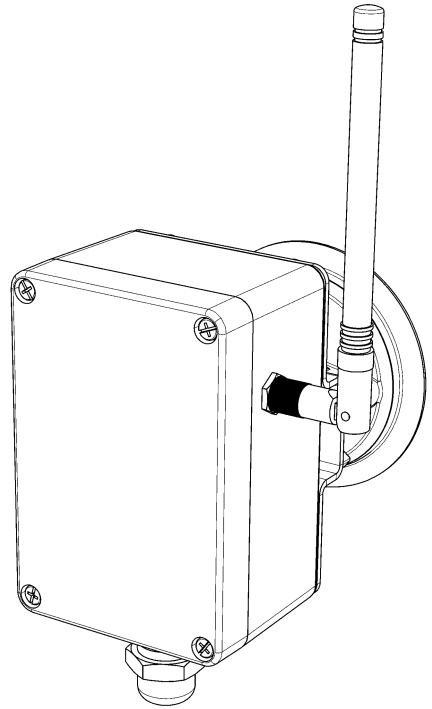
BTD - 1



BTD – Radio Module (EU)

- 1 x Radio Module Transmitter
- 1 x Radio Module Receiver

Plug and play with BTD-1 kit

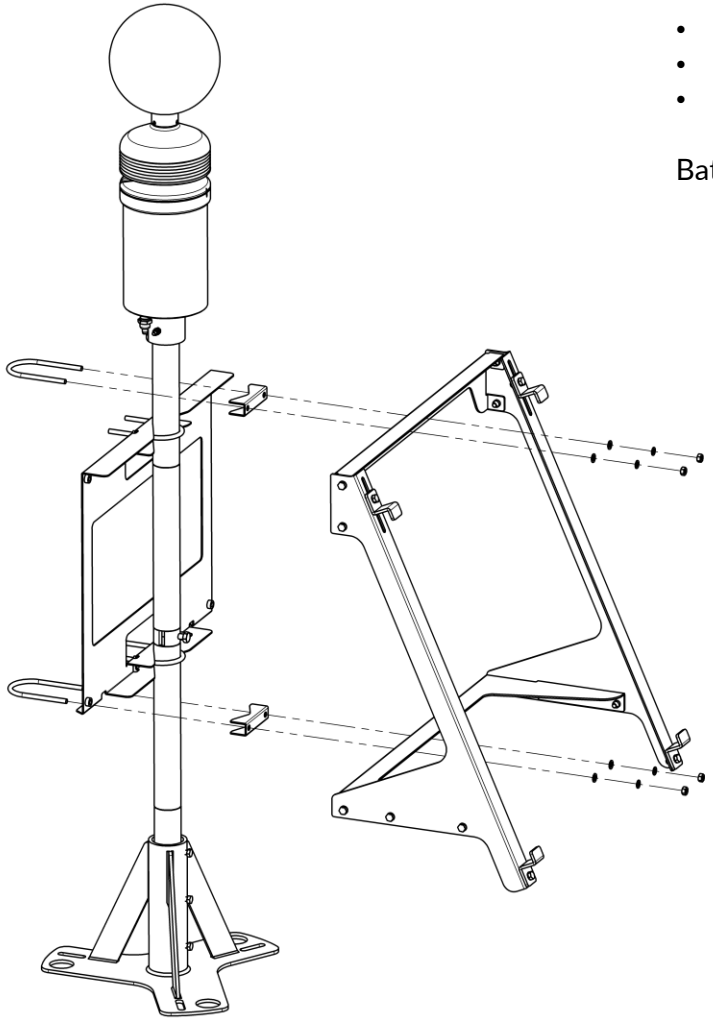


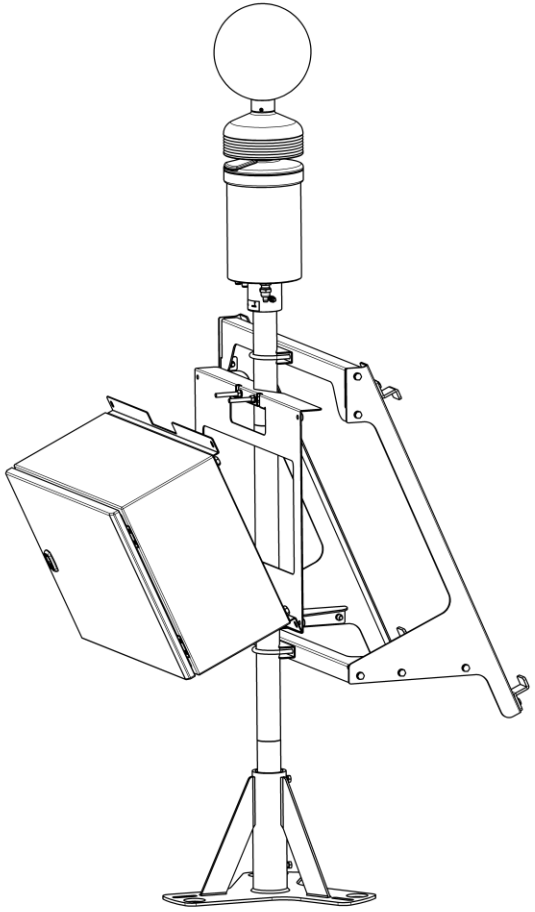
BTD - 1

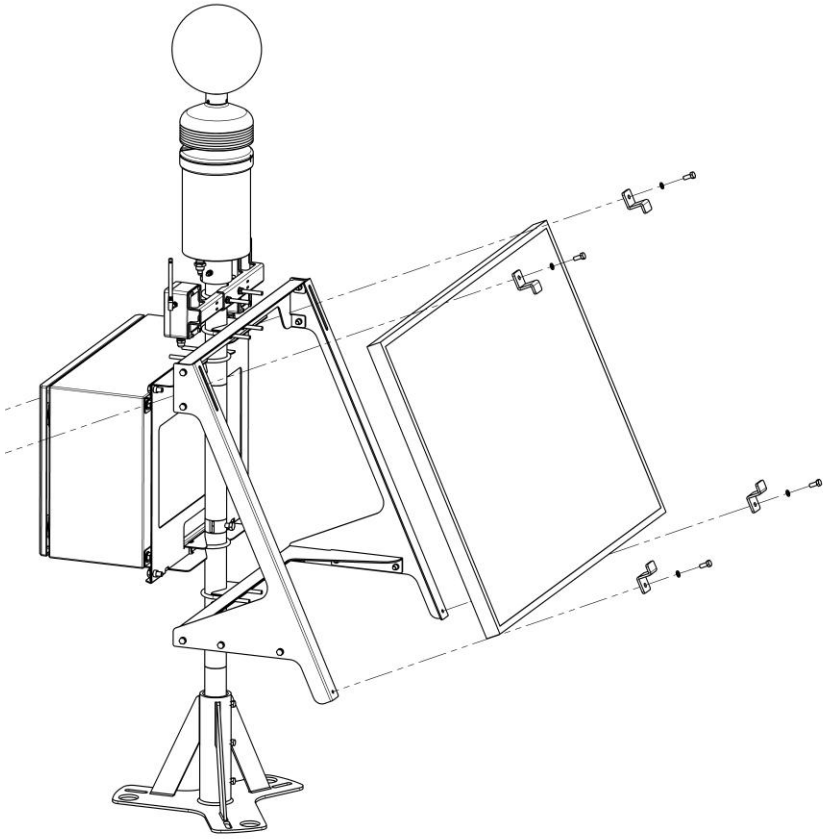
BTD – Solar Kit

- 1 x Electronics bracket
- 1 x Solar bracket
- 1 x Electronics enclosure
- 1 x Solar panel

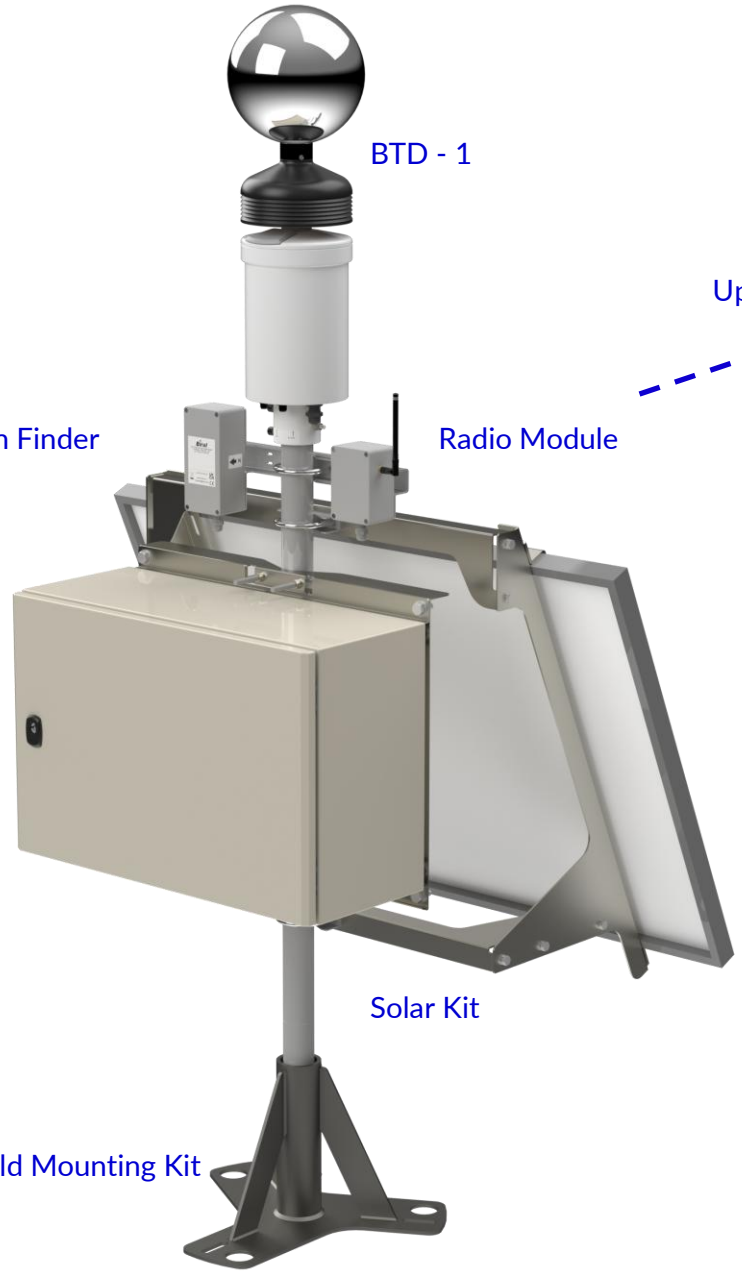
Battery MUST be bought separately via local distributor.



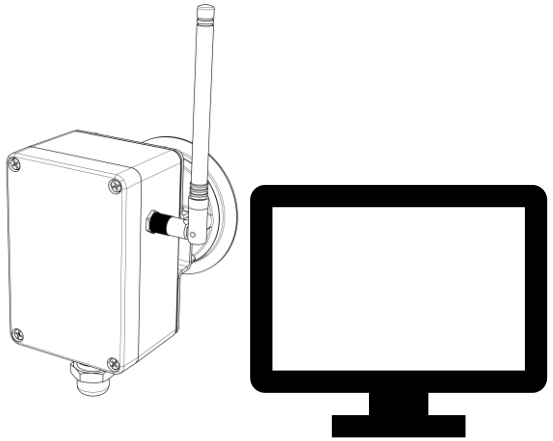


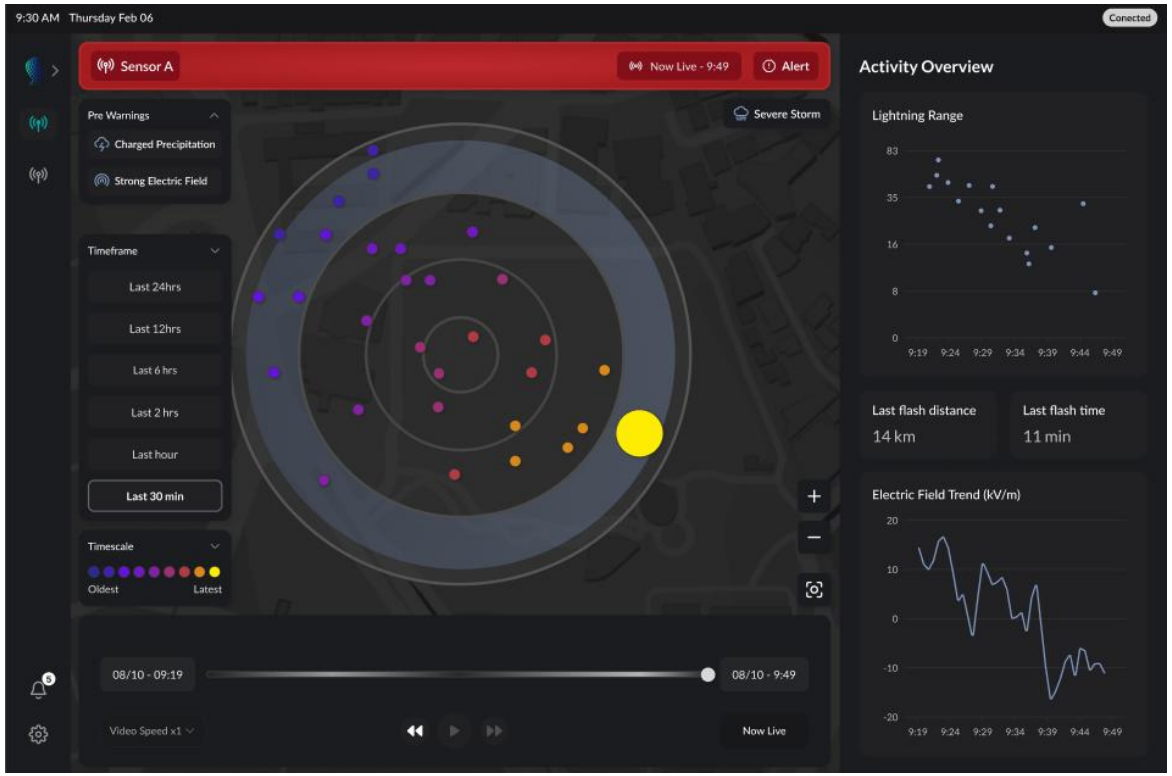


BTD - 1



Up to 200m





Thunderstorm Warning System BTD-1

BEST-IN-CLASS DETECTION EFFICIENCY

Detects more storm activity earlier, with very low false alarm rate and reduced interference from man-made sources.

Highlights storm cells with increased risk of large hailstones.

ADVANCED WARNING

Early warning of overhead thunderstorm conditions.

ACCORDING TO THE STANDAR

EN50536:2011+A1:2012, Class 1 Detector
IEC 62793, Class A Detector
EN61326-1:2021, Industrial Limits

UP TO 83 KM RANGE

35 km standard range, extendable up to 83 km.

GPS/GNSS TIMING

ntegrated GPS/GNSS supports highly accurate flash timing and UTC-based time reference.

PLUG-AND-PLAY MODULARITY

Easy installation with optional accessories and integration modules.

Product Overview

General Information:

Code Prj: BRI-2501

Name: BTD-1

Articol code: BTD-1.....

Key Message:

- Standalone
- Flexible
- Configurable

Segmentation

Key advantage:

1. Early Warning, Not Just Detection
The BTD-1 not only detects lightning, but also identifies the conditions that precede it, providing a **true early warning** of thunderstorms.

2. Total Lightning Awareness
Detects **all types of lightning** (intra-cloud, cloud-to-ground, cloud-to-cloud), providing a complete view of thunderstorm activity.

3. Real-Time Local Monitoring
A **standalone, real-time system** with no dependency on external networks or internet connection.

4. Advanced Detection Technology
Based on **quasi-electrostatic technology**, measuring electric field variations for more sensitive and earlier detection.

5. Easy Industrial Integration
RS422 communication

6. Modular & Scalable Solution
Expandable system with:

Direction Finder | Radio Module | Extended Range | Dedicated software | solar system

TRAINING
PM-Sales Expert
Week 17

PRE-LAUNCH
Partner & Customer
Week 18 (29 April)

LAUNCH
Week 19 (06 May)

LINKEDIN
Week 19 (06 May)

TRAINING
Partner
Week tbd

INTERSOLAR
23–25 June
Munich

Standard: Warranty: 2 Years

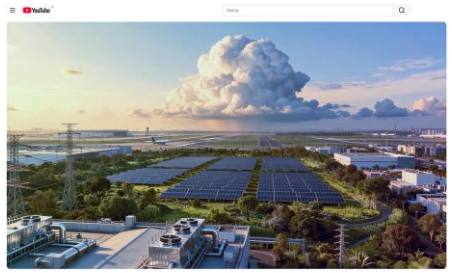
Product Documentation

Off-line materials:

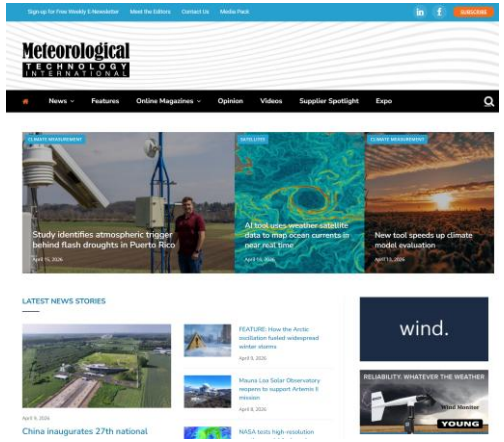
Descr	Language
Datasheet	ENG
Manual BTD	ENG
Manual Direction Finder	ENG
Manual Solar Kit	ENG
Manual Radio Module	ENG
Manual Software	ENG
Rendering/Pictures	n.a.
Price list	ITA | ENG
Presentation	ENG
Technical comparison	ENG
Video	ENG

On-line materials:

Descr	Language
Post LINKEDIN	ENG
Web Site page	ITA | ENG
Advertising Magazine	ENG
Advertising - Editorial Magazine	ENG
Event INTERSOLAR	n.a.
PARTNER TRAINING	ENG

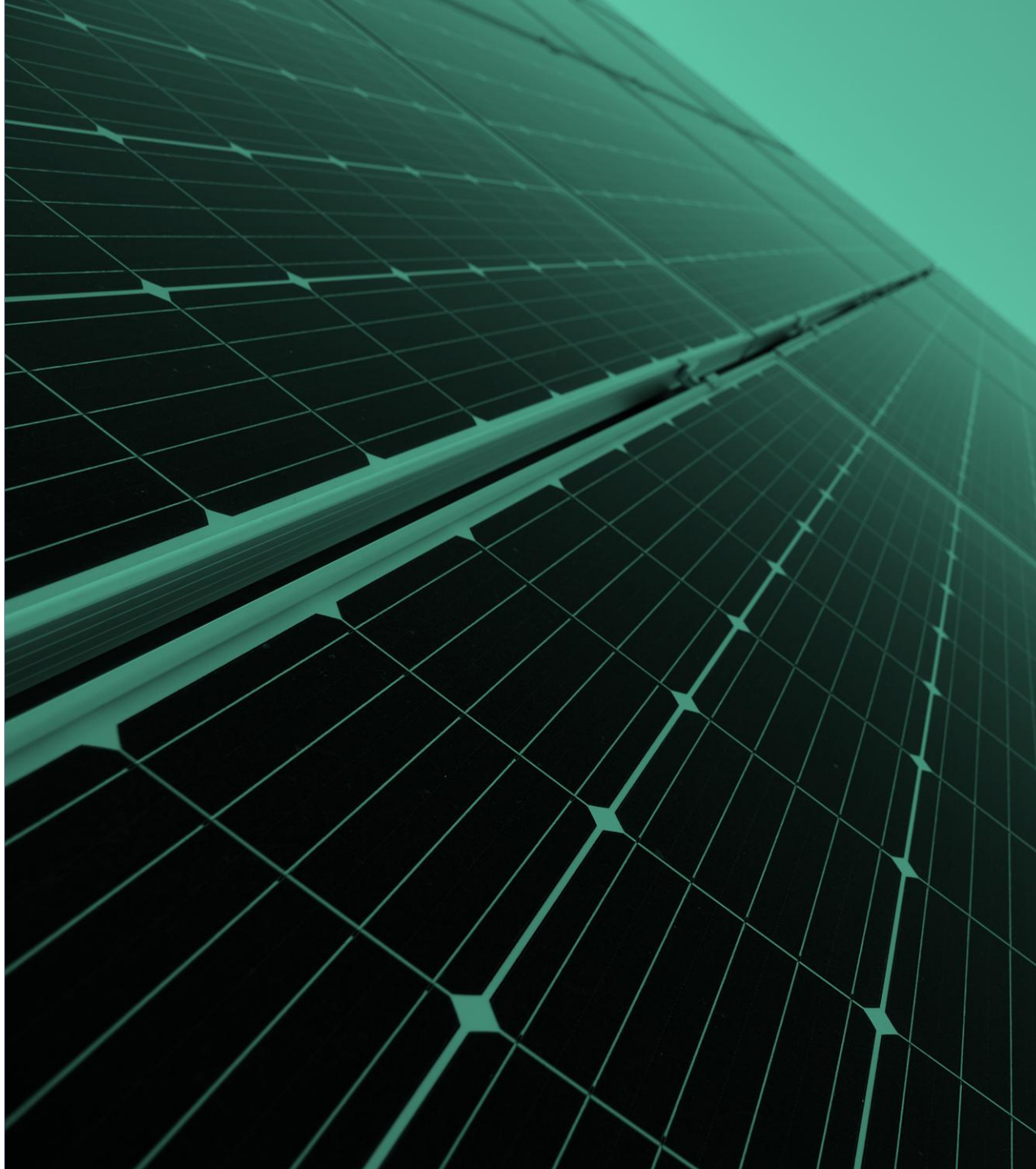


MAGAZINE



2. Applications

Typical applications



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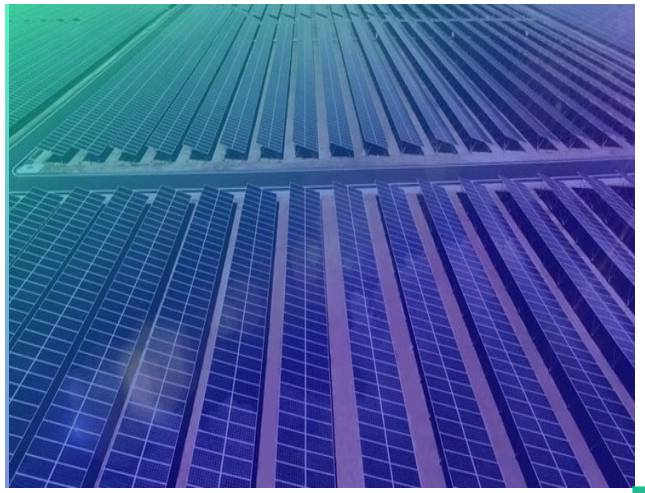
Applications



SOLAR FARM

Reduce risk and protect energy operations with early lightning warning

SHIPPING / PORTS

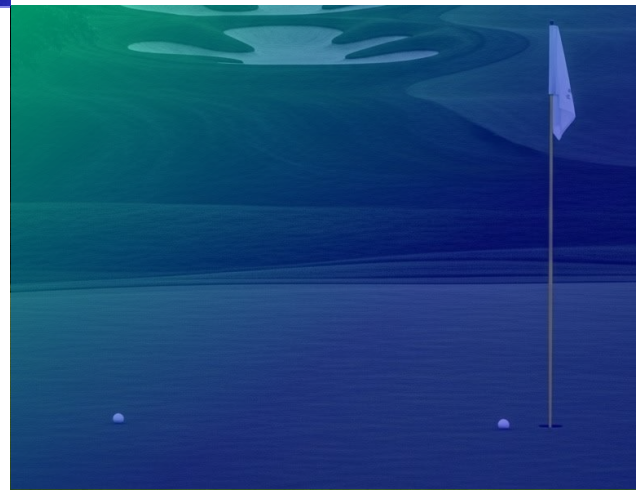
Keep port operations safer and more resilient during storm conditions

AVIATION

Support safer airfield operations with dependable lightnind detection

OUTDOOR VENUES

protect paple and outdoor activities with timely lightning alerts



2. Questions and Answers

Typical questions one might receive

Q&A

- What makes the BTD-1 different from lightning detection networks?

Unlike lightning networks, the BTD-1 is a local standalone sensor that does not rely on external infrastructure or internet connection. It provides real-time detection and early warning, while networks may introduce delays and only detect lightning after it occurs.

- Can the BTD-1 detect thunderstorms before the first lightning strike?

Yes. The BTD-1 detects early warning signals such as strong electric fields and charged precipitation, allowing it to identify developing thunderstorms before the first lightning flash.

- What types of lightning can the BTD-1 detect?

The BTD-1 detects all types of lightning, including:
Intra-cloud (IC) | Cloud-to-ground (CG) | Cloud-to-cloud (CC)
This ensures a more complete detection compared to systems that focus mainly on CG lightning.

- How accurate is the system in terms of distance and detection?

The system can detect lightning up to 35 km (83 km optional), with a distance accuracy of approximately:±5 km within 20 km ±10 km at extended range. It also achieves very high detection efficiency (up to ~99.9% for storm events).

- What are the key installation requirements?

For optimal performance:
Install the sensor in an open area, away from obstacles
Ensure proper grounding (earthing)
Avoid nearby electrical interference (e.g., transformers)
Maintain recommended installation height

Correct installation is critical for accurate detection and system reliability


senseca