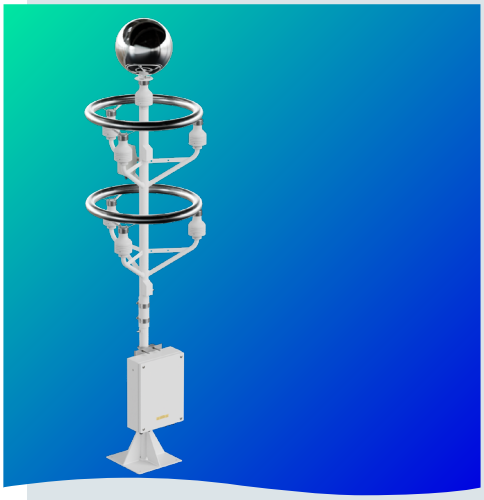
Marine Thunderstorm (Lightning) Detector

BTD-350



INTRODUCTION

The **BTD-350** is a standalone thunderstorm detector designed specifically for marine use on large vessels and offshore installations. Its reinforced stainless-steel and aluminium construction with marine-grade coating withstands salt spray, severe weather and vibration.
Using a unique quasi-electrostatic operating principle, it detects all types of lightning out to 83 km (45 NM) with an exceptionally low false alarm rate and can warn of the risk of overhead lightning even before the first discharge. The detector can operate with supplied PC software, be integrated into safety or weather systems, or directly trigger local alarms via optional relay outputs.

FEATURES

Quasi-electrostatic lightning detection

Measures atmospheric electric field disturbances rather than radio noise, giving very low false alarm rates and reliable storm detection.

Early warning capability

Indicates increased lightning risk from changes in local electric field and charged precipitation, allowing safety procedures to be activated in advance.

All lightning types detected

Detects cloud-to-cloud, cloud-to-ground, cloud-to-air and intra-cloud discharges for a complete view of thunderstorm activity.

Marine-optimised construction

Rugged, marine-coated metalwork and reinforced antenna supports for reliable operation in harsh on- and offshore environments.

Easy integration & low maintenance

Standard serial/Ethernet interfaces, optional relay outputs for autonomous alarms, self-test functions and optional field test unit to simplify commissioning and routine checks.

CONFIGURATION & MEASUREMENT

Detection principle

The BTD-350 uses three antennas to sense low-frequency (<50 Hz) disturbances in the atmospheric electric field generated by lightning discharges. Signal processing of these quasi-electrostatic measurements distinguishes true lightning from man-made electrical noise and provides accurate ranging.

Performance & risk indication

The detector classifies lightning activity into range bands up to 83 km (45 NM) and detects all major lightning types. By monitoring the local electric field and charged precipitation, it also reports elevated thunderstorm risk conditions, supporting early warnings for overhead lightning.

Range, direction & reporting

Storm activity is reported as distance bands, with repeatable and consistent ranging. When fitted with the direction-finding module, the system also provides storm direction information qualified by the electrostatic ranging, ensuring only genuine lightning is reported.

Interfaces & system integration

Data output is available via RS422 serial or Ethernet, with PC display/logging software supplied as standard. Optional relay outputs enable fully autonomous operation, automatically driving beacons, sounders or status lights when user-defined warning levels are reached, without the need for a host computer.

Configuration options

The detector can be supplied with Ethernet or RS422 communication, with or without the three-relay warning module, and with standard or customer-specific settings to match different marine, offshore and helideck monitoring applications.

- **HIGHLY IMMUNE TO EM INTERFERENCE WHICH IS THE MAJOR CAUSE OF FALSE ALARMS IN TRADITIONAL STANDALONE DETECTORS**
- **83 KM (45 NM) DETECTION RANGE EXCEEDS THE US FEDERAL AVIATION ADMINISTRATION REQUIREMENTS**
- **DETECTS CLOUD-TO-GROUND AS WELL AS THE WEAKER BUT MORE COMMON CLOUD-TO-CLOUD LIGHTNING**
- **PROVIDES INFORMATION FOR ENHANCED CAP437 REPORTING OF THUNDERSTORMS**
- **DEVELOPED FOR MARINE APPLICATIONS BOTH ON AND OFFSHORE**
- **CERTIFIED FOR MARINE OPERATION FOR SALT SPRAY, VIBRATION AND EMC**
- **MEETS EN50536:2011+A1:2012 REQUIREMENTS FOR A CLASS 1 DETECTOR**
- **MEETS IEC 62793 PERFORMANCE REQUIREMENTS FOR A CLASS A DETECTOR**

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General specifications

OUTPUTS & REPORTS

Update rate	2s
Serial outputs	Ethernet (virtual com port) or RS422
Message content	Self-test status Thunderstorm warning status Flash time Flash range Flash direction (optional)

POWER REQUIREMENTS

Sensor supply	100 to 240 Vac 50-60 Hz universal
Sensor power	~10 W

ADDITIONAL FEATURES

Relays (optional)	3 Relays with volt free contacts: Caution state, Warning state and Alert state Can be disabled at user configurable times
Warning thresholds	User configurable

ENVIRONMENTAL

Operating temperature	-40 °C to +60 °C
Relative humidity	0 – 100% RH
Protection rating	IP66
Wind	To 52 ms^{-1}

PHYSICAL

Material	Stainless steel, powder coated aluminium
Weight	25 kg
Height	2,460 mm
Warranty	2 years
Lifetime	>10 years

CERTIFICATION & COMPLIANCE

- CE Certified
- EMC (General) compliance with EN 61326:2013
- EMC (Marine) compliance with EN 60945:2002, Sections 9.2.2 & 9.2.3
- Corrosion resistance - EN 60945:2002, Sections 8.12 and EN 60068-2-52:1996 Test Kb
- Vibration EN 60945:2002, Section 8.7 and EN 60068-2-6:2008, Test Fc
- Compliance with EN50536:2011+A1:2012 for a Class 1 detector
- Performs in accordance with IEC 62793 for a Class A detector
- RoHS and WEEE compliant

Ordering codes

BTD350.

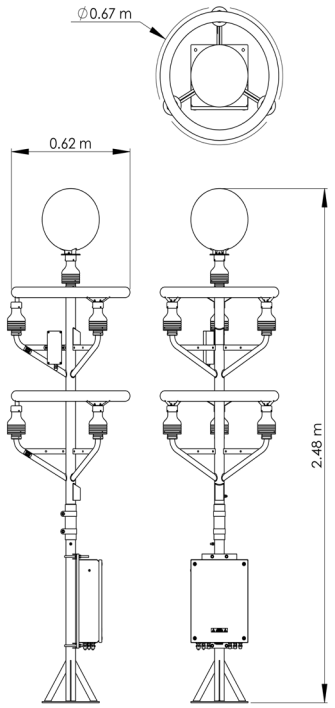
NH.			
			Configuration RC = regular configuration SC = special configuration
		Relay Output NR. = without relay outputs WR. = including relay outputs	
	Data output TE. = Ethernet output TD. = RS422 Serial		
No additional heating			

Example: BTD350.NH.TE.WR.RC

Measurement specifications

Detects	Cloud-to-Cloud, cloud-to-ground and intracloud lightning discharges
Output	Ethernet or Serial data
Detection efficiency	95% for single lightning flash (any type) 99% for storm with 2 flashes 99.9% for storm with 3 flashes For flashes within 56 km
Range	83 km (51 statute miles)
Uncertainty	0 to 20 km > ±5 km 20 to 83 km > ±10 km
Repeatability	0 to 20 km > ±300 m 20 to 83 km > ±1000 m
Range Resolution	10 m
False alarm rate	<2%
Maximum flash rate	120 per minute
Time of flash	Nearest 10ms (internal clock)
Measurement principle	Passive, quasi-electrostatic. No moving parts
Direction (optional)	Resolution 1°

Dimensions



Accessories – Optional

BTD.FTU	BTD-300 Field Test Unit
BTD.LW300	Lightning Works BTD-300 and BTD-350
BTD.WTY350	1 Year Extended Warranty

The sensor is delivered in sturdy foam lined wooden crate with display and logging software, user manual and calibration certificates.

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