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IMon-B300
Clearance Monitoring Data Acquisition Device

Datasheet

October 12, 2024
CN Rev.v1.0.0

Product Overview

The laser clearance monitoring radar is a LiDAR system designed for real-time monitoring of blade tip clearance distance. When the monitored blade clearance value approaches the specified minimum clearance threshold, the main control system of the wind turbine can immediately implement protective actions, such as deceleration and pitch feathering. When applied to in-service turbines, the clearance radar prevents blade-tower collision, removes power limitations of hazardous units, and thereby increases power generation. For new-generation turbines, it helps reduce blade costs and lower design constraints of the turbine system.

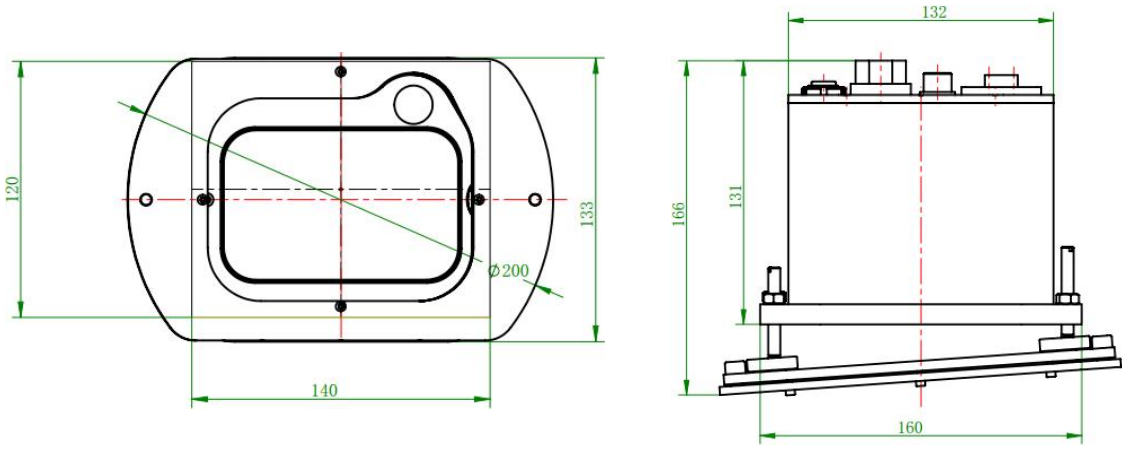
To meet the dedicated requirements of clearance monitoring on wind turbine towers, and to enhance practicality, data reliability and environmental adaptability in this specific application, the product is equipped with three-beam ranging and a set of dedicated algorithms. These include strong sunlight interference filtering, rain/snow/dust interference filtering, patchy fog interference identification and dense fog identification. Combined with the advantages of high repetition frequency of laser pulses and high-throughput data processing on its high-performance computing platform, the system greatly improves data availability, reduces false alarm rate and maintains high real-time performance. This enables rapid response from the wind turbine main controller and avoids power generation losses caused by false alarms.

Technical Parameters

Ranging specifications	
Ranging method	ToF
Detection range	200 m @ 90% reflectivity / 140 m @ 10% reflectivity
Blind zone	No requirement
Range resolution	≤0.1m
Measurement accuracy	±0.2m
Repeated measurement accuracy	±0.2m
Ambient light immunity	100Klux
Optical specifications	
Wavelength	905nm
Repetition frequency	20 kHz per channel
Laser safety class	Class 1
Beam direction	
Beam 1	0°
Beam 2	2.05°±0.2°
Beam 3	4.09°±0.2°
Output measurement results	
Real-time data products	Device ID, direct measured distance, return light intensity, data valid flag, system status
Fieldbus	Profibus DP / Modbus RTU / CANopen
Environmental adaptability	
Operating temperature range	-40°C~+60°C
Operating humidity range	0%~100% RH
Housing protection grade	IP65 (or customized per specific requirements)
Extreme weather	Operates normally under dew, frost and icing conditions
Others	
Operating power consumption	Within 60W
Supply voltage & max current	DC 24V, 3A
Dimensions	200×200×250mm

Product Specifications

Dimensional drawing:



Schematic diagram: