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DATASHEET

CL51

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VAISALA

Ceilometer CL51

for high-range cloud height detection



Vaisala Ceilometer CL51 is designed to measure high-range cirrus cloud heights without surpassing the low and middle layer clouds, or vertical visibility in harsh conditions.

CL51 employs a pulsed diode laser LIDAR (light detection and ranging) technology, where short, powerful laser pulses are sent out in a vertical or near-vertical direction. The reflection of light (backscatter) caused by clouds, precipitation or other obscuration is analyzed and used to determine the cloud base height.

Measurement from ground level

The enhanced single lens technology applied in CL51 ensures excellent performance starting at a height of virtually zero. The signal is strong and stable over the whole measurement range.

CL51 is able to detect 3 cloud layers simultaneously. If the cloud base is obscured due to precipitation or ground-based fog, CL51 reports vertical visibility. CL51 is able to provide the backscatter profile over the full measurement range. This information provides a possibility for an advanced boundary layer and atmospheric analysis.

Designed for harsh weather

CL51 has a shield with a blower and heater, which allows steady operation in precipitation and under extreme temperatures. Reliable solar protection is ensured by optical filters. A tiltable shield further protects the instrument from precipitation and specular reflection from ice crystals. The tilt angle measurement and correction is automatic.

Self-diagnostics

In addition to cloud height data, the fully automatic CL51 outputs messages with information on the instrument status. The information is based on comprehensive self-diagnostic routines. In case of a malfunction the diagnostics help the user to identify the failed module.

Maintenance

Periodic maintenance of CL51 is normally limited to window cleaning. There is no need for adjustments in the field. The automatic window blower with heater improves performance by keeping the window clean and dry. In cold conditions heating prevents frost generation on the window. Any malfunction is automatically reported in the data and status messages.

Features

- Cloud reporting range up to 13 km (43 000 ft)
- Backscatter profiling over full range up to 15 km (49 200 feet)
- Second-generation, advanced single-lens optics with excellent performance also at low altitudes
- Field-proven, fully automatic 24/7 operation in all weather conditions
- Modular design for easy installation and maintenance
- Extensive self-diagnostics with fault analysis
- Reliable operation in all weather: unsurpassed performance in precipitation
- Based on robust and affordable laser diode technology
- Detection of cirrus clouds
- Latest technology from the world leading manufacturer - over 5000 ceilometer installations worldwide

Data messages

- Cloud hits and internal monitoring data
- Cloud hits, status, and backscatter profile
- Emulation of CL31 and LD-40
- Sky condition (optional)

Technical data

Measurement performance

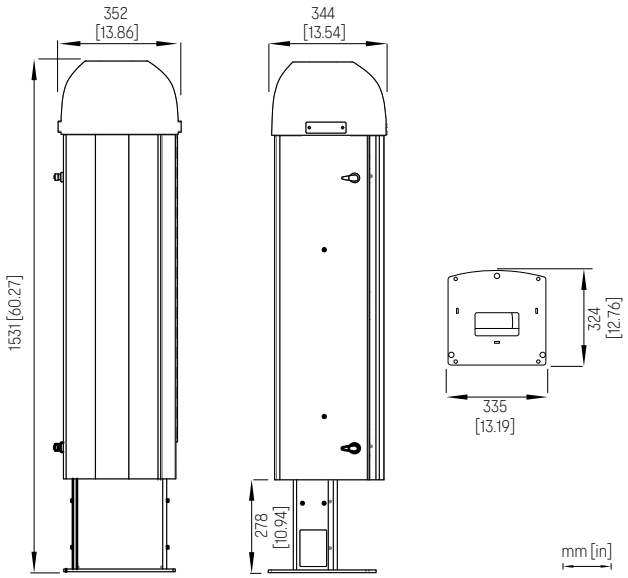
Measurement range	0–13 km (0–43 000 ft)
Backscatter profiling range	0–15 km (0–49 200 ft)
Reporting resolution	10 m (30 ft), units selectable
Reporting cycle	6–120 s, or polling
Distance measurement accuracy against a hard target	±5 m (16 ft)

Inputs and outputs

Operating voltage	115/230 V AC ±10 %
Current consumption (typical)	2.7/1.4 A
Overvoltage category	II
Interfaces	
Data	• RS-232 • RS-485, multidrop, 2-wire • DXL421 modem module • LAN (Ethernet) interface option
Maintenance	RS-232
Baud rate	
RS-232/RS-485	300–115 200 bps
Modem V.21, V.22	300–1200 bps

Operating environment

Operating environment	Outdoor use
Use in wet location	Yes
Operating temperature	–50 ... +60 °C (–58 ... +140 °F)
Operating humidity	0–100 %RH
Wind tolerance	Up to 55 m/s (123 mph)
Vibration	Lloyds Register / IEC 60068-2-6 5–13.2 Hz, ±1.0 mm 13.2–100 Hz, ±0.7 g 9.1–150 Hz, ±0.5 g
Pollution degree for inside electronics	2
Maximum operating altitude	3000 m (approx. 9800 ft)
IP rating	IP65 (measurement unit) IPX6 (with radiation shield)
UL 50E rating	Type 4



Mechanical specifications

Dimensions	
Measurement unit	834 × 266 × 264 mm (32.83 × 10.47 × 10.40 in)
Height with radiation shield	1531 mm (60.28 in)
Total	1531 × 335 × 324 mm (60.28 × 13.19 × 12.76 in)
Weight	
Measurement unit	18.6 kg (41.01 lb)
Radiation shield and blower	27.4 kg (60.41 lb)
Total	46.0 kg (101.41 lb)
Plywood transport container	
Container size	1650 × 540 × 480 mm (64.96 × 21.26 × 18.90 in)
Shipping weight	Typically 75 kg (165.3 lb)

Spare parts and accessories

Cable termination box with extra transient protection	Termbox-1200
PC maintenance cable	QMZ101
Shock absorbing mounting pad for ship installations	CT35022
Modem	DXL421
Attachment mechanics for radio modem antenna	CL51RADIOKIT
Graphical User Interface for Ceilometers	CL-VIEW
Boundary Layer View Software for Ceilometers	BL-VIEW
Bird deterrent	CL51BIRDKIT
Air Quality Plug and Play Package for Ceilometer with laptop and pre-installed BL-View	CLAQPACKAGE

Compliance

EU directives and regulations	LVD, EMC, RoHS
EMC immunity	EN 61326-1:2013, industrial environment
EMC emissions	EN 55032:2015 + A11:2020 EN 61000-3-2 EN 61000-3-3
Electrical safety	EN 61010-1:2010 + A1:2019
Environmental	EN IEC 63000:2018
Eye safety	EN 60825-1:2014+A11:2021 Complies with 21 CFR 1040.10 and 1040.11 except for the deviations pursuant to the *Laser Notice No. 56*, date May 8, 2019.
Compliance marks	CE, RCM, China RoHS



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