

WindCube 2.1 XP lidar

VAISALA

The Vaisala WindCube® 2.1 XP is a ground-based vertical profiling lidar that delivers precise, bankable wind measurements from 40 m to over 400 m.

Equivalent to a very tall met mast, the WindCube measures wind speed, direction, vertical wind speed, and turbulence intensity at up to 20 heights simultaneously, without the installation constraints or safety risks of tall towers.

Using pulsed Doppler heterodyne laser technology, the WindCube sends rapid light pulses into the atmosphere and analyses the backscattered signals from aerosols naturally present in the air. The system processes these signals using the Doppler effect to provide highly accurate wind speed and direction data. This pulsed approach ensures constant spatial resolution throughout the wind profile, with reliable performance even in challenging conditions such as clouds, fog, dust, or around obstacles.

A vertical beam enables direct measurement of vertical wind speed, enhancing the accuracy of turbulence intensity (TI) assessments.

The WindCube 2.1 XP is supported by the Vaisala Compass web-based platform, which enables live monitoring, remote configuration of measurement heights, and multiple communication options for seamless data access.

Designed for fast and simple deployment, the WindCube can be installed and operational within hours. It is fully compatible with ART's Premium and Essentials autonomous power trailer solutions, providing reliable power in remote and off-grid environments.



ART – Exclusive ANZ Sales and Service Partner

As the exclusive sales and service partner for Vaisala WindCube in Australia and New Zealand, ART provides full turnkey solutions, including deployment, autonomous power options, and nationwide service and maintenance. Our team of trained specialists is equipped to deliver all levels of WindCube support, ensuring maximum uptime and continuity for your wind measurement campaigns.

Technical specifications

OPERATING ENVIRONMENT

Warranty	5 years standard, extendable once (up to 10 years) after maintenance
Preventive maintenance	5 years cycle (factory or onsite maintenance)
Operating temperature ⁽¹⁾	–30 °C to +55 °C / –22 °F to 131 °F (chamber conditions) Radiation +1000 W/m ² at +50 °C
Maximum operation altitude	4000 m (2000 m with provided ACDC converter)
Operating humidity	0 to 100% RH (non-condensing)
Environmental Protection	Designed for installation in many kinds of weather and environmental conditions. IP66 (WindCube complete system) and IP67 (optical head compartment)
Pollution degree ⁽²⁾	PD3
Rain protection	Wiper and hydrophobic window
Marine atmosphere (Salt Atmosphere Compliance) ⁽³⁾	IEC 60068–2–11 (240 hours)
Shocks and vibration	ISTA/FEDEX 6B

MECHANICAL SPECIFICATIONS

Cube dimensions (L × W × H)	554 × 566 × 554 mm (21.81 × 22.28 × 21.81 in)
With feet and wiper	608 × 566 × 661 mm (23.94 × 22.28 × 26.02 in)
Weight	59kg (system only) 28kg (shipping case only) 91kg (total with accessories)

ELECTRICAL SPECIFICATIONS

Input Power Supply DC Insulation class: Over voltage category	18–32 V DC Class III (PELV used) OVC II
Input Power Supply AC with the transformer provided by VAISALA Insulation class:	100–240 V AC 50/60 Hz Class I (PE connected)
Power consumption	35 W between –5 °C and +30 °C (23 °F and 86 °F) 105 W below –5 °C (23 °F) 50 W over +30 °C (86 °F) in chamber conditions

- 1) System operation at low temperature (below –20 °C) will require to operate with the Winter kit
- 2) IEC 60664–1
- 3) For an offshore usage Offshore product version is recommended
- 4) As verified on WindCube without Geofencing option
- 5) Height from WindCube feet. Data availability depends on environmental factors such as visibility, type of aerosols and variation of refractive index in the atmosphere
- 6) For 10–min averages, as assessed by several 3rd parties on multiple WindCube devices in 2024 according to IEC 61400–50–2 Ed.1. Uncertainty figures are Final Accuracy Class divided by $\sqrt{3}$.

COMPLIANCE

Compliance marks ⁽⁴⁾	CE, FCC, IC, UKCA
Laser safety compliance	1M Class / EN 60825–1: 2014 + A11 : 2021

MEASUREMENT SPECIFICATIONS

Measurement range ⁽⁵⁾	40 to > 400 m Constant measuring probe (spatial resolution)
Data sampling rate	1 Hz (average frequency on horizontal wind speed)
Measuring distances	20 user-defined distances simultaneously
Radial Wind Speed range	–28 ...+28 m/s
Reconstructed Wind Speed range	0–60 m/s
Reconstructed Wind Direction range	0 – 360°
Speed accuracy ⁽⁶⁾	0.1 m/s
Speed uncertainty ⁽⁶⁾	40 – 85m: 1.3% to 1.6% 90 – 130m: 0.6% to 1.2% 135 – 200m: 0.35% to 0.5% All detail available in Classification report
Direction accuracy ⁽⁶⁾	2°
Beam geometry	4 inclined beams at 28° and 1 vertical beam

DATA OUTPUT

Output data	1 s / 1–, 2–, 5–, 10–minute averaged (user-defined) horizontal and vertical wind speed Standard deviation Direction CNR (carrier-to-noise ratio) Data availability
Complex terrain measurements	FCR unlimited license
Data storage	Up to 5 years storage of all output data on 2 embedded industrial disks (main and back-up) Vaisala Compass secured cloud-based server
Data file format	.rtd and .sta (TSV files) ISO–8859–1 encoding
Communication	Wifi, LAN, 4G router (router availability upon region/country), Modbus RTU, Modbus TCP
Time synchronisation	GPS, NTP

About us

ART designs, manufactures, installs, and maintains turnkey infrastructure solutions for wind resource assessments, as well as for the broader renewables, resources and communications industries.

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