

IEC-tested AQ510 Wind Finder for Wind Resource Assessment



Wind energy assessment with the IEC-classified SoDAR AQ510 Wind Finder

With the AQ510 Wind Finder we offer leading SoDAR technology for accurate wind resource assessment. AQ510 Wind Finder is the **first SoDAR fully classified according to IEC 61400-12-1:2017**. Additionally, a number of validations completed by leading wind consultants confirm that AQ510 Wind Finder is the best SoDAR for wind measurement on the market!

AQ510 Wind Finder is designed to measure the **complete wind profile at hub height** - up to 200 m above the ground. Our SoDAR system efficiently measures wind speed, wind direction and turbulences at every 5 meters between 40 and 200 meters - **in all climates**. AQ510 Wind Finder supports you in finding the right place to build a profitable wind farm. You can easily deploy the **mobile self-sufficient system** to evaluate the wind conditions. Move the trailerised system to your selected site, switch it on and **collect instant wind data**. Wind measurement has never been easier.

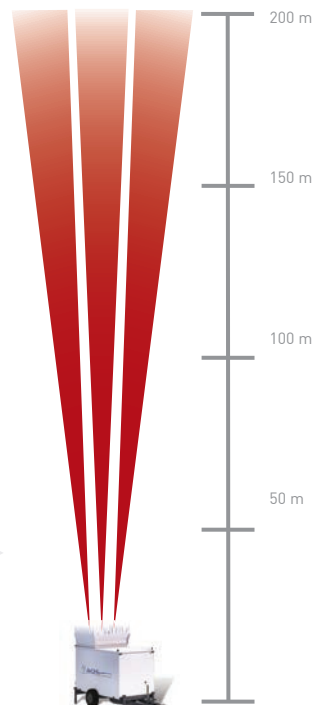
AQ510 Wind Finder is the first SoDAR, which has successfully performed the IEC classification process - a milestone for SoDAR-based remote sensing!

Detailed wind profile at hub height

Measuring of wind speed, wind direction and turbulences at every 5 meters between 40 and 200 m. Measurement of katabatic winds.

Mobile measurement system

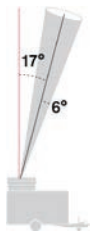
Mobile and self-sufficient system, which operates in all climates. Customized power supply and heating system.



Wind Resource Assessment with the SoDAR AQ510 Wind Finder

SoDAR technology – Principle of operation

By using the SoDAR (Sound Detection And Ranging) technology, wind profiles are measured with the help of sound. SoDAR technology is comparable with radar systems. Instead of radio signals, SoDAR systems send out **tone pulses** into the atmosphere. The sound is reflected by small temperature variations. The **reflected sound** has a **different frequency** than the transmitted, due to the **Doppler effect**. The difference between both frequencies is used to calculate wind speed and direction.



The AQ510 Wind Finder is designed with a special acoustic horn system, which measures a **three-dimensional wind field with high accuracy**. Based on the monostatic technique, the speakers emitting the sound pulses also act as microphones to listen to the reflected sound. The system transmits short powerful tone pulses in three directions. The acoustic horn system is designed with protected speaker elements, where the sound is reflected by parabolic dishes. Thus the SoDAR system **can measure wind even in heavy rain and snowfall with high data availability**.



Proven SoDAR technology for your successful wind measurement campaign.

Advanced SoDAR technology – AQ510 Wind Finder

Three-dimensional wind field

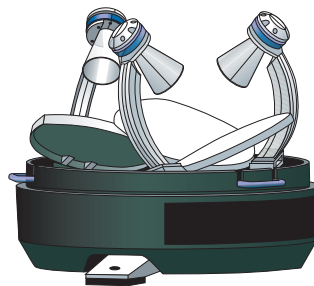
Tone pulses are sent in three beams inclined 17° from vertical line and separated 120°.

Linux operating system and web-based monitoring

Proven open-source operating system - same as Ammonit Meteo-40 data logger. Online monitoring of system activities.

Powerful acoustic horn system

High frequency tone pulses with 4300 Hz reflected by parabolic dishes for more power in the returning atmospheric echo.



High turbulence data available

Turbulence measurement on same level as horizontal wind speed. At 150m >92% data availability; at 100m >97%.

Parabolic-shaped reflectors

Focus the returning atmospheric echos into the receiving microphones.

Low power consumption – only 30 W

On average only 30 W for stand-alone system including built-in sensors. Waste heat of the diesel generator is used to melt snow on parabolic dishes.

Weather-proof design and easy deployment

Neither snow nor rain or debris can block or cause damage. Integrated tilt sensor for easy alignment. Built-in GPS module for geofencing.

Customized power and heating solutions

Depending on the installation site, solar modules, fuel cell or diesel generator provide the system with power.

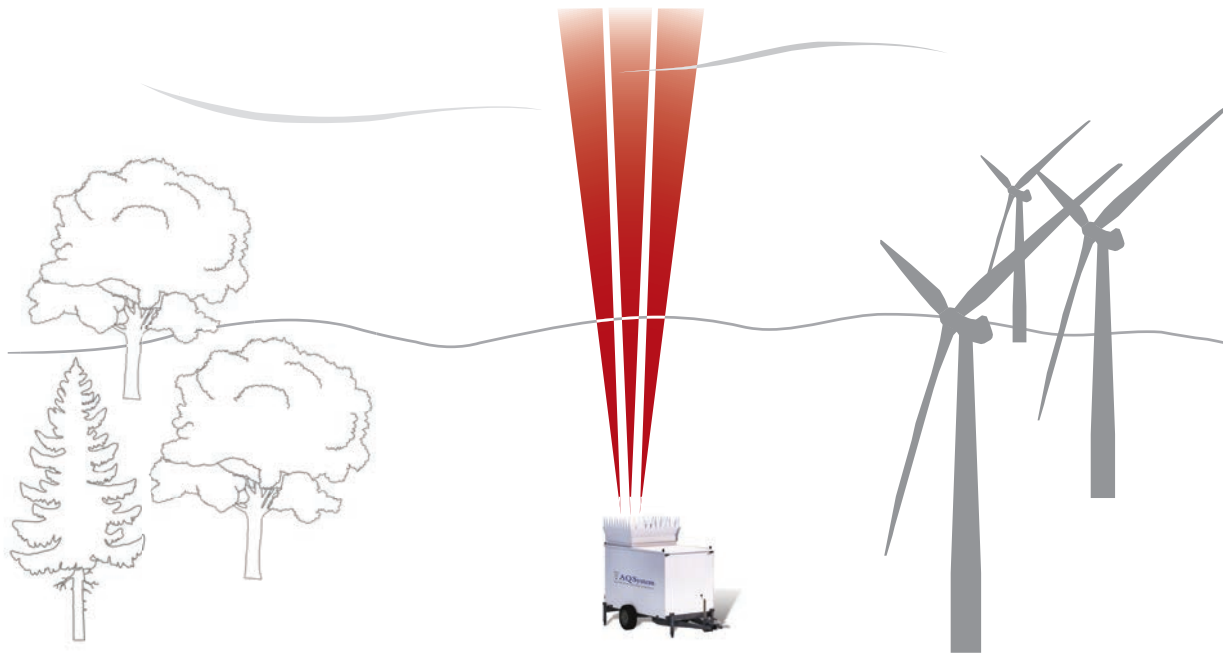
AQ510 Wind Finder – Measuring Wind Conditions at Hub Height

AQ510 Wind Finder: First IEC-classified SoDAR

According to **IEC 61400-12-1:2017**, remote sensing devices have to be classified and verified to provide accurate and consistent data for precise wind energy calculations. The SoDAR completed **a full - even extended - IEC classification**. Four devices with six deployments have been used in the classification process with a total measurement period of twenty-six months. **All systems showed similar sensitivities to each environmental parameter and delivered a standard uncertainty close to each other, proving the robustness of AQ510 Wind Finder.**

Prior to the IEC classification, leading wind consultants including BBB Umwelttechnik, DNV GL and Ecofys performed a number of **validation tests** of the AQ 510 Wind Finder. The results of all validation tests have been excellent and confirmed the measurement accuracy of the SoDAR. Additionally, each AQ510 Wind Finder is **verified against a 103m IEC compliant met mast** prior to delivery.

AQ510 Wind Finder - proven measurement accuracy.



Easy-to-use wind measurement system

AQ510 Wind Finder has been developed for **wind site assessment** as well as **wind farm monitoring**. The SoDAR system is easy to use. Conveniently position the system with the help of the **integrated tilt sensor and GPS module** at your selected site and switch it on. You instantly collect wind data. It has never been easier to measure wind.

With its **trailerised platform system** AQ510 Wind Finder can quickly be moved from site to site to **explore the wind conditions**. AQ510 Wind Finder is robust and can be used in **all climates**. It accurately measures the wind characteristics in arctic climate as well as in hot summers. Due to the clever design of the AQ510 Wind Finder neither snow nor rain or debris affects the measurement. We offer different **power supply packages for regions with warm, mild or cold winters**.

Use Ammonit AQ510 Wind Finder to evaluate:

- Accuracy of extrapolation from met mast data
- Wind speed and directions up to hub-height - even up to rotor blade tip-height
- Shear coefficients to be used with met mast data
- Wind resource variability across the site





Easy-to-use, self-sufficient and mobile systems to conveniently explore wind conditions at your selected sites.

AQ510 Wind Finder – Proven wind measurement technology

Specifications

Characteristic	Description
Measurement range	40 ... 200 m
Height resolution	5 m (Number of measurement heights: 33)
Accuracy horizontal wind speed	± 2%
Availability of high turbulence data	>98% @ 100m; >92% @ 150m; >85% @ 200m
Wind speed range	0 ... 30 m/s
Vertical wind speed range	± 2.2 m/s
Mean value period	10 min
Transmitting frequency	4300 Hz
Zenith angle	17°
Soundbeam width	12°
Pulse power	max. 250 W
Acoustic power	17 W
Operating temperature range	-40 ... 60 °C
Operating humidity range	0 ... 100% RH
Interface	AQWebviewer
Data transfer / format	GPRS standard (satellite optional) / ASCII
Total power consumption (incl. sensors)	30 W (Note: Power consumption of SoDAR device only 15 W)

Available product kits suitable for various places of operation

Product kits	AQ510 Stand-alone	Warm Winter Kit	Mild Winter Kit	Cold Winter Kit
Order No.	S91110	S91410	S91420	S91430
				
Power pack	Instrument only	Warm winter kit	Mild winter kit	Cold winter kit
Power supply	12 VDC			
Batteries	-	2 x 12 V (305 Ah total)	2 x 12 V (610 Ah total)	3 x 12 V (660 Ah total)
Solar module	-	2 x 200 W (400 W total)	2 x 200 W (400 W total)	3 x 200 W (600 W total)
Fuel cell	-	-	Efoy Pro 2400 Duo	-
Diesel generator	-	-	-	220 VAC, 3.3 kW
Options	110 ... 240 VAC	Diesel heater, Trailer platform	Diesel heater, Trailer platform	
Dimension [m]	1.8 (height) x 1.0 (diameter)	0.6 (height) x 0.6 (width) x 1.02 (length)	0.6 (height) x 0.6 (width) x 1.02 (length)	2 (height) x 1.6 (width) x 3.4 (length)
Weight	approx. 120 kg	approx. 90 kg	approx. 170 kg	approx. 800 kg

Option: Trailer platform

Dimensions in m: 0.7 [height] x 1.9 [width] x 3 [length]

Weight: approx. 195 kg

*Increasing range of site measurements made under a range of meteorological characteristics, moving to formal wind speed and energy assessments being provided based in part on data from the device, but only with site-specific validations against conventional anemometry.

Thanks to AQSystem (www.aqs.se) for providing the photos for this brochure.

© Copyright Ammonit 2017