VAISALA

WS425 Ultrasonic Wind Sensor for Critical Wind Measurement Applications

The WS425 defines the new standard of accurate wind measurement.

Features/Benefits
- Superior data availability and accuracy in all wind directions due to the patented three transducer layout
- No maintenance needed
- Theoretical mean time between failures (MTBF) 26 years
- Effects of temperature, humidity and pressure fully compensated
- Large transducer heads are insensitive to rain
- RS232/485/422, SDI-12 and analog outputs
- Operates with 10 ... 15 VDC, additional 36 VDC required for heated model
- Stainless steel as standard sensor material
- Field verification device available
- Can be mounted upside down
- US National Weather Service relies on Vaisala ultrasonic technology

The Vaisala Ultrasonic Wind Sensor WS425 gives meteorologists an alternative to the cup and vane mechanical sensors. With its continuous data availability, the WS425 is also ideal for a variety of wind measurement applications in aviation, road and railway safety and energy production.

Accurate and maintenance-free
The WS425 has no moving parts, and is resistant to contamination and corrosion. In addition to improving accuracy and the reliability of data in all wind conditions and climates, the WS425 eliminates on-demand and periodic maintenance.

Measurement based on ultrasound
The WS425 uses ultrasound to determine horizontal wind speed and direction. The measurement is based on transit time, the time it takes for the ultrasound to travel from one transducer to another, depending on the wind speed.

T-O-F
The transit time is measured in both directions for a pair of transducer heads. Using two measurements for each of the three ultrasonic paths at 60° angles to each other, the WS425 computes the wind speed and direction.

The wind measurements are calculated in a way that completely eliminates the effects of altitude, pressure, temperature and humidity.

Standard and heated models
The heated model has thermostatically controlled heaters in the transducer heads to prevent freezing rain or snow build- up. The standard model operates with a low current 10 ... 15 V supply. For the heated model, an additional 36 V supply is used for heating.

Outputs
SDI-12 provides the most extensive set of commands and calculations. The standard RS-232/485/422 protocol supports NMEA and three other message formats. Analog outputs are available as an option.

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Technical Data

Wind speed

Measurement range	
serial output	0 ... 65 m/s (0 ... 144 mph, 0 ... 125 knots)
analog output	0 ... 56 m/s (0 ... 124 mph, 0 ... 107 knots)
Starting threshold	virtually zero
Delay distance	virtually zero
Resolution	0.1 m/s (0.1 mph, 0.1 knots, 0.1 km/h)
Accuracy (range 0...65 m/s)	± 0.135 m/s (±0.3 mph, ±0.26 knots)
	or 3% of reading, whichever is greater

Wind direction

Measurement range	0 ... 360°
Starting threshold	virtually zero
Delay distance	virtually zero
Resolution	1°
Accuracy (wind speed over 1 m/s)	±2°

Outputs

Digital outputs	
type	RS232, RS422 or RS485,
	four different message formats
bit rate	adjustable from 1200 to 19200 bit/s
available averages	RS232: 1 to 9 seconds
SDI-12 Standard Data Interface	
type	3 wires for ground, signal and supply
bit rate	fixed 1200 bit/s
available averages	1 to 3600 seconds
Analog outputs	
wind speed	
frequency	5 Hz/mph
voltage	8.0 mV/mph
output impedance	10 kohm
wind direction	
simulated potentiometer	0 ... V_{ref} represents 0 ... 359°
reference voltage	1.0 ... 4.0 V
output impedance	24 kohm

Response characteristics

maximum reading rate	1 per second
sonic measurement time	0.2 s
signal processing time	0.15 s
response time	0.35 s

General

Operating power supply	10 ... 15 VDC, 12 mA typical (analog)
and for heated model	36 VDC ±10 %, 0.7 A
Operating temperature	
WS425 non-heated	−40 ... +55 °C (-40 ... +131 °F)
WS425 heated	−55 ... +55 °C (-67 ... +131 °F)
Material	
body	stainless steel (AISI 316)
sensor arms	stainless steel (AISI 316)
transducer heads	silicone rubber
Dimensions	
height	355 mm (14")
width	250 mm (10")
depth	286 mm (12")
Weight	1.7 kg (3.7 lbs)

Complies with EMC standard EN61326-1:1997 + Am1:1998 + Am2:2001; Generic Environment

Accessories

Cable supporting analog outputs, 10 m	ZZ45204
Cable supporting RS-232 outputs, 10 m	ZZ45203
Cable supporting RS-485/422 outputs, 10 m	010411
Cable supporting SDI-12 outputs, 10 m	WS425CABSDI
Adapter for 30-35 mm	
(1 1/4") diameter vertical tube	WS425FIX30
Adapter for 60 mm	
(2 1/4") diameter vertical tube	WS425FIX60
Bird Perch	WS425BIRDPERCH
Field verifier	WS425VERIFIER

Specifications subject to change without prior notice.
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