

WAS425 Ultrasonic Wind Sensor

- **Solid State Wind Speed and Direction**
- **Patented Technology**
- **MTBF of 26 Years**
- **No Regular Maintenance Required**
- **Works with Vaisala Displays**



ACCURATE AND MAINTENANCE-FREE

With the new wind sensor WAS425 from Vaisala, meteorologists now have an alternative to the cup and vane mechanical sensors. The WAS425 has no moving parts, and is resistant to contamination and corrosion. The WAS425 eliminates on-demand and periodic maintenance requirements while improving accuracy and reliability of data in all wind conditions, in all climates.

TECHNICAL SUMMARY

The WAS425 Wind Sensor uses ultrasound to determine horizontal wind speed and direction. The measurement principle is based on transit time, the time it takes for the ultrasound to travel from one transducer to another, depending on the wind speed along the ultrasonic path. The transit time is measured in both directions. For zero wind speeds, both the forward and reverse transit times are equal. With wind along the sound path, the upwind transit time increases and the downwind transit time decreases. Using these two transit time measurements, the WAS425A micro-controller computes the wind speed along the path. The computed

wind speed is independent of altitude, temperature, and humidity.

The method described for one path is repeated to determine the wind speed along each of the three paths which are offset by 120° with respect to each other. The micro-controller computes the wind speed and direction, as well as the rectangular components and reports them to the data logging system.

TWO MODELS

The WAS425 is available in two models: Standard and Heated. The heated model has thermostatically controlled heaters in the transducer heads to prevent freezing rain or snow to build up. The heaters require 36-volt power, which is available in a power supply kit mounted in a rain-tight enclosure. Analog and RS-232 outputs are available in the WAS425A and WAS425AH models.

TECHNICAL DATA

| | | | |
|--------------------------|---|--|--|
| Type | Ultrasonic 100 kHz. Fully compensated over temperature, humidity and altitude | | |
| Range | Operating: 0-65 m/s (0-144 m.p.h.; 0-125 knots) Survival (tested) 0-129 m/s (0-288 m.p.h.; 0-250 knots) | | |
| Response Characteristics | Maximum Reading Rate: 1 per second; Sonic Measurement Time: 0.2 second Signal Processing Time: 0.15 second; Response Time: 0.35 second | | |
| Accuracy | Wind Speed | ± 0.135 m/s (0.3 m.p.h.; 0.26 knots) or ± 3% of reading, whichever is greater, up to 144 m.p.h. | |
| | Wind Direction | ± 2 degrees Additional error of -2° for analog output only when reference voltage is more than 4V and angle is more than 291° | |
| Resolution | Wind Speed | 0.1 m/s (0.1 m.p.h.; 0.1 knots, 0.1 km/h) | |
| | Wind Direction | 1 ° | |
| Power | Heater (WAS425AH) | | 10 to 15 VDC Operating: 12 mA (analog) 36 VDC, ±10%, 0.7 A |
| Starting Threshold | Virtually zero | | |
| Delay Distance | Virtually zero | | |
| Dead Band Wind Direction | None | | |
| Output | Four different message formats, either polled or regular transmission. Bitrate adjustable from 300 to 19200 bits/s. | | |
| RS-232 | | | |
| Analog Wind Speed | Frequency | 5 Hz/m.p.h.; 0 to 625 Hz represents 0 to 125 m.p.h. | |
| | Voltage | 8.0 mV/m.p.h.; 0 to 1.0 V represents 0 to 125 m.p.h. | |
| | Output Impedance | 10 k Ω | |
| Analog Wind Direction | Simulated Potentiometer | 0 to Vref represents 0 to 359° | |
| | Reference Voltage | 1.0 to 5.0 V, | |
| | Output Impedance | 24 k Ω | |
| Available Averages | RS-232: 1 to 9 seconds | | |
| Operating Temperature | 425A: -40° to +50° C, 425AH: -55° to +55° C | | |
| Dimensions and weight | 11 W X 9.5 D X 21 H (inches), 27.94 X 24.3 X 53.34 (cm) Sensor only: 2.92 lbs (1.32 kg), with shipping carton: 7 lbs (3.17 kg) | | |
| Material | Sensor Arms: 316 Stainless Steel; Sensor Body: 6061-T6 Anodized Aluminum; Transducer Heads: Silicone Rubber and PVC | | |
| Traceability | The fundamental calibration constant used in the WAS425 Series was determined in a wind tunnel with an NIST traceable pressure sensor with pitot tube | | |
| Calibration | The WAS425 Series sensors require no calibration adjustments | | |
| Verification | The sensor geometry can be verified by physical measurement between transducers | | |



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