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DATASHEET

WA15

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VAISALA

Wind Set WA15

High-performance Wind Measurement



Features

- High-performance wind measurement set
- Long and successful track record in meteorological applications
- Accurate wind speed and direction measurement
- Low measurement starting threshold
- Conical anemometer cups provide excellent linearity
- Heated shaft prevents bearings from freezing

WA15 is based on accurate sensors installed on a cross-arm. It is designed for demanding wind measurement applications.

With a proven track record of successful installations, Vaisala Wind Set WA15 has earned its reputation as the industry standard in the wind sensor market.

WA15 consists of Vaisala Anemometer WAA151, Vaisala Wind Vane WAV151, an optional cross-arm, and cabling.

Anemometer with excellent linearity

WAA151 is a fast-response, low-threshold anemometer. Three lightweight, conical cups mounted on the cup wheel provide excellent linearity over the entire operating range, up to 75 m/s (168 mph).

A wind-rotated chopper disc attached to the shaft of the cup wheel cuts an infrared light beam 14 times per revolution. This generates a pulse output from the phototransistor.

The output pulse rate is directly proportional to wind speed, for example, 246 Hz = 24.6 m/s (55 mph). For the highest accuracy, the characteristic transfer function must be used to compensate for starting inertia.

Sensitive wind vane

WAV151 is a counter-balanced, low-threshold, optoelectronic wind vane. Infrared LEDs and phototransistors are mounted on 6 orbits on each side of a 6-bit GRAY-coded disc. Turned by the vane, the disc creates changes in the code received by the phototransistors. The output code resolution is ±2.8°.

Heated bearings withstand cold weather

Heating elements in the shaft tunnels of both the anemometer and vane keep the bearings above freezing temperatures in cold climates.

Complete package available

The anemometer and vane are designed to be mounted on Vaisala cross-arms.

Technical Data

WAA151 measurement performance

Sensor/Transducer type	Cup anemometer/opto-chopper
Observation range	0.4–75 m/s (0.9–168 mph)
Starting threshold [1]	< 0.5 m/s (1.1 mph)
Distance constant	4.0 m (13 ft 1 in)
Transducer output	
0–75 m/s (0–168 mph)	0–750 Hz square wave
Characteristic transfer function	Uf (wind speed) = 0.328 + 0.101 × R (output pulse rate)
Transducer output level	
(I_{out} < +5 mA)	High state > U_{in} –1.5 V
(I_{out} > -5 mA)	Low state < 2.0 V
Accuracy within 0.4–60 m/s (0.9–134 mph)	
With characteristic transfer function (standard deviation)	±0.17 m/s (0.38 mph)
With simple transfer function U_f = 0.1 × R	±0.5 m/s (1.12 mph) [2]

1) Measured with the cup wheel in position least favored by flow direction. The optimum position yields a < 0.35 m/s (0.8 mph) starting threshold.
2) Typical error vs. speed with the simple transfer function used.

RANGE (m/s)	0-3	3-10	10-17	17-24	24-31	31-37	37-44	44-51	51-58	58-65
ERROR (m/s)	-0.4	-0.3	-0.2	-0.1	0.0	+0.1	+0.2	+0.3	+0.4	+0.5

WAA151 inputs and outputs

Electrical connections	MIL-C-26482 type, 6-wire cable
Cabling	6-wir e cable through cross-arm
Recommended connector at cable end	Souriau UTS6JC10E6P
Operating power supply	U_{in} = 9.5–15.5 V DC, 20 mA, typical
Heating power supply	AC or DC 20 V, 500 mA, nominal
Settling time after power-up	< 30 µs

WAA151 operating environment

Operating temperature [1]	–50 ... +60 °C (–58 ... +140 °F)
Storage temperature	–60 ... +70 °C (–76 ... +158 °F)
Operating humidity	0–100 %RH
IP rating	IP65

1) With shaft heating.

WAA151 mechanical specifications

Dimensions (H × Ø)	240 × 90 mm (9.45 × 3.54 in)
Swept radius of cup wheel	91 mm (3.58 in)
Weight	570 g (1.26 lb)
Materials	
Housing	AlMgSi, gray anodized
Cup	PA, reinforced with carbon fiber

WA15 mechanical specifications

Junction box	125 × 80 × 57 mm (4.92 × 3.15 × 2.24 in)
Cross-arm length	800 mm (31.50 in)
Mounting to a pole mast with a nominal outside diameter	60 mm (2.36 in)

WAV151 measurement performance

Sensor/Transducer type	Optical code disc
Observation range at wind speed 0.4–75 m/s (0.9–168 mph)	0–360°
Starting threshold	< 0.4 m/s (0.9 mph)
Resolution	±2.8°
Damping ratio	0.19
Overshoot ratio	0.55
Delay distance	0.4 m (1 ft 4 in)
Accuracy	Better than ±3°
Output	6-bit par allel GRAY code
Transducer output level	
(I_{out} < +5 mA)	High state > U_{in} –1.5 V
(I_{out} > -5 mA)	Low state < 1.5 V

WAV151 inputs and outputs

Electrical connections	MIL-C-26482 type, 10-wire cable
Cabling	10-wir e cable through cross-arm
Recommended connector at cable end	Souriau UTS6JC12E10P
Operating power supply	U_{in} = 9.5–15.5 V DC, 20 mA typical
Heating power supply	20 V AC or DC, 500 mA nominal
Settling time after power turn-on	< 100 µs

WAV151 operating environment

Operating temperature [1]	–50 ... +60 °C (–58 ... +140 °F)
Storage temperature	–60 ... +70 °C (–76 ... +158 °F)
Operating humidity	0–100 %RH
IP rating	IP65

1) With shaft heating.

WAV151 mechanical specifications

Dimensions (H × Ø)	300 × 90 mm (11.81 × 3.54 in)
Swept radius of vane	172 mm (6.77 in)
Weight	660 g (1.46 lb)
Materials	
Housing	AlMgSi, gray anodized
Vane	AISI 12, anodized

WA15 compliance

Compliance marks	CE, China RoHS
EU directives and regulations	RoHS Directive (2011/65/EU) as amended by 2015/863 EMC Directive (2014/30/EU)
Electromagnetic compatibility (EMC)	EMC 55032:2015, Electromagnetic compatibility of multimedia equipment - Emission requirements. Class B. EN 61326-1:2013, Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1: General requirements.
Environmental	IEC/EN 63000:2018

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