WA15 Wind Set for High Performance Wind Measurement

The WA15 is based on accurate sensors installed on a large crossarm. It is designed for demanding wind measurement applications.

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

The WA15 consists of a Vaisala Anemometer WAA151, a Vaisala Wind Vane WAV151, an optional crossarm, a power supply and cabling.

Anemometer with excellent linearity

The 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.

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 (e.g. 246 Hz = 24.6 m/s). However, for the highest accuracy, the characteristic transfer function should be used to compensate for starting inertia.
(See technical data.)

Sensitive wind vane

The WAV151 is a counter-balanced, low-threshold, optoelectronic wind vane. Infrared LEDs and phototransistors are mounted on six 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 in cold climates.

Complete package available

The anemometer and vane are designed to be mounted on Vaisala crossarms.

The WHP151 power supply provides the operating and heating power needed for the WA15. The power supply, as well as the signal and power cables are available as options.

Features/Benefits

- 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

Technical data

Vaisala Wind Set WA15

Options and accessories

Crossarm and termination box	WAC151
16-lead signal cable	ZZ45048
6-lead power cable	ZZ45049
Crossarm and analog transmitter	WAT12
6-lead cable for signal and power	ZZ45049
Crossarm and serial RS485 transmitter	WAC155
Serial RS485 transmitter card	WAC155CB
Power supply	WHP151
Set of bearings and gasket	16644WA
Cup assembly	7150WA
Tail assembly	6389WA

Technical data

Vaisala Anemometer WAA151

Wind speed

Measurement range	0.4 ... 75 m/s
Starting threshold	< 0.5 m/s *
Distance constant	2.0 m
Characteristic transfer function	U = 0.328 + 0.101 × R
(where U = wind speed [m/s], R = output pulse rate [Hz])	
Accuracy (within range 0.4 ... 60 m/s)	
with characteristic transfer function	± 0.17 m/s **
with transfer function U = 0.1 × R	± 0.5 m/s***

General

Operating power supply	U_{in} = 9.5 ... 15.5 VDC, 20 mA typical
Heating power supply	AC or DC 20 V, 500 mA nominal
Output	0 ... 750 Hz square wave
Transducer output level	
with I_{out} < +5 mA	high state > U_{in}-1.5 V
with I_{out} > –5 mA	low state < 2.0 V
Settling time after power turn-on	< 30 µs
Plug 6-PIN	MIL-C-26482 type
Cabling	6-wire cable through crossarm
Recommended connector at cable end	SOURIAU MS3116F10-6P
Operating temperature with heating	-50 ...+55 °C (-58 ...+131 °F)
Storage temperature	-60 ...+70 °C (-76 ...+158 °F)
Material	
housing	AlMgSi, grey anodized
cups	PA, reinforced with carbon fibre
Dimensions	240 (h) × 90 (Ø) mm
Swept radius of cup wheel	91 mm
Weight	570 g

Test compliance

Wind tunnel tests	ASTM standard method D5096-90
Exploratory vibration test	MIL-STD-167-1
Humidity test	MIL-STD-810E, Method 507.3
Salt fog test	MIL-STD-810E, Method 509.3

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

* Measured with cup wheel in position least favoured by flow direction. Optimum position gives approx. 0.35 m/s threshold.

** Standard Deviation

*** 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

Vaisala Wind Vane WAV151

Wind direction

Measurement range at wind speed 0.4 ... 75 m/s	0 ... 360°
Starting threshold	<0.4 m/s
Resolution	±2.8°
Damping ratio	0.19
Overshoot ratio	0.55
Delay distance	0.4 m
Accuracy	better than ±3°

General

Operating power supply	U_{in} = 9.5 ... 15.5 VDC, 20 mA typical
Heating power supply	AC or DC 20 V, 500 mA nominal
Output code	6-bit parallel GRAY
Output levels	
With I_{out} < +5 mA	high state > U_{in} –1.5 V
With I_{out} > –5 mA	low state < 1.5 V
Settling time after power turn-on	< 100 µs
Plug 10-PIN	MIL-C-26482 type
Cabling	10-wire cable through crossarm
Recommended connector at cable end	SOURIAU MS3116F12-10P
Operating temperature with heating	-50 ...+55 °C (-58 ...+131 °F)
Storage temperature	-60 ...+70 °C (-76 ...+158 °F)
Material	
housing	AlMgSi, grey anodized
wave	Alsi 12 anodized
Dimensions	300 (h) × 90 (Ø) mm
Swept radius of vane	172 mm
Weight	660 g

Test compliance

Wind tunnel tests	ASTM standard method D 5366-93
(for starting threshold, distance constant, transfer function)	
Exploratory vibration test	MIL-STD-167-1
Humidity test	MIL-STD-810E, Method 507.3
Salt fog test	MIL-STD-810E, Method 509.3

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

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