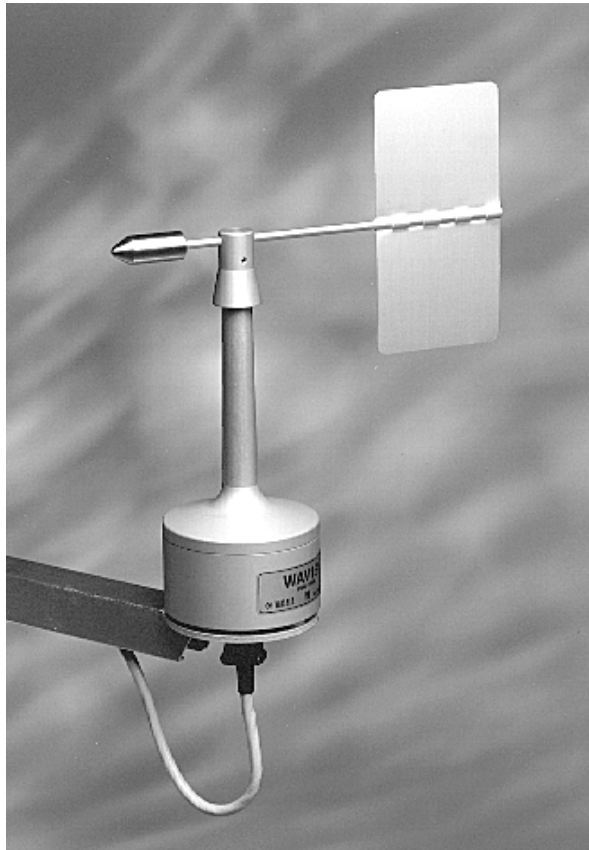


# WAV151 Wind Vane



- Counter-balanced optoelectronic sensor
- Low inertia and starting threshold
- Shaft heating for cold environment



## DESCRIPTION

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 code is changed in steps of 5.6°, one bit at a time to eliminate any ambiguities in the coding. Refer to the output code table on the reverse.

A heating element in the shaft tunnel keeps bearings above the freezing level in cold climates. Nominally it provides 10 W of heating power (14 W in conjunction with the WAA251 Heated Anemometer). It is recommended to use a thermostat switch in the sensor cross arm for switching the heating power on below +4 °C.

The WAV151 complies with the following performance and environmental test standards:

- Wind tunnel tests per ASTM standard method D 5366-93 (for starting threshold, damping ratio, overshoot ratio and delay distance; refer to technical data)
- Exploratory vibration test per MIL-STD-167-1
- Humidity test per MIL-STD-810E, Method 507.3
- Salt fog test per MIL-STD-810E, Method 509.3

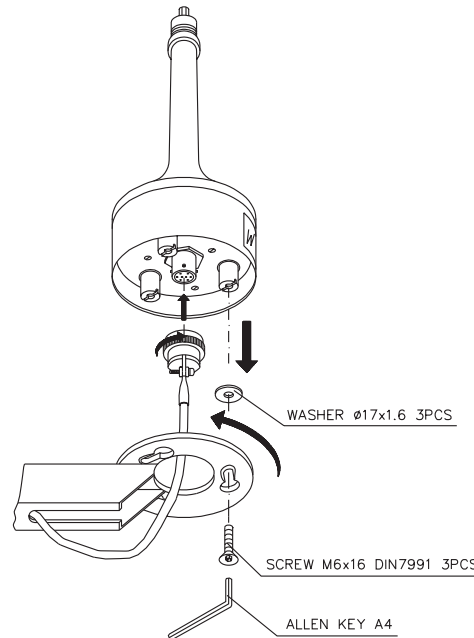


Figure 1. Mounting of wind sensor

## INSTALLATION

The WAV151 is mounted at the northern end of the WAC151 Cross Arm. The installation is safer with the tail removed. Fit the 10-pin cable plug through the mounting flange at the end of the cross arm, then connect it to the sensor. Mount the sensor to the flange by twisting, and tighten the screws.

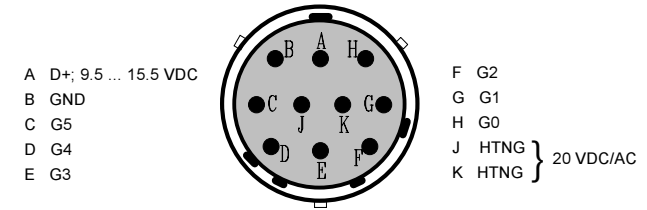


Figure 2. WAV151 connector

Usually the WAV151 is used in conjunction with the WAA151 Anemometer. Figure 3 shows the standard wiring in the WAC151 Cross Arm's junction box, when the WAV151 and WAA151 are used. The thermostat switch in the upper left corner is standardly included for temperature control of shaft heating power.

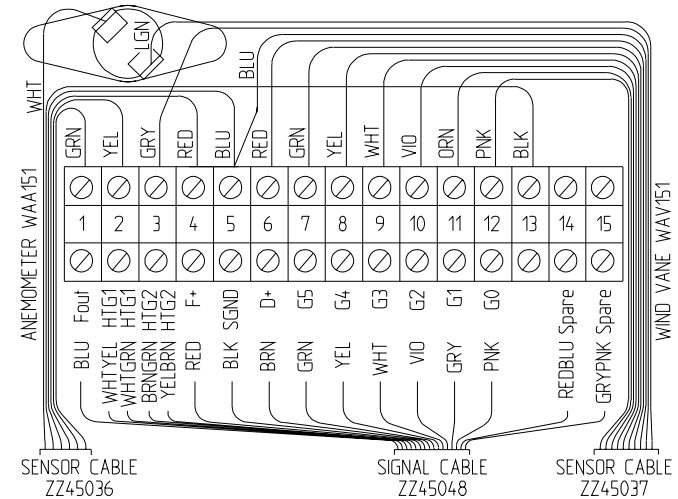


Figure 3. WAC151 Standard Wiring for WAV151 and WAA151



## TECHNICAL DATA

Sensor/Transducer type	Optical code disc
Measuring range	0 ... 360°
Starting threshold	< 0.4 m/s
Resolution	5.6°
Damping Ratio	0.14
Overshoot Ratio	0.65
Delay Distance	0.4 m
Accuracy	better than ± 3°
Input power supply	9.5 ... 15.5 VDC, 20 mA typical
Heating power supply	20 VDC or VAC, 500 mA typical
Output	6-bit parallel GRAY code <sup>1)</sup>
Transducer output level	
(I <sub>out</sub> < +5 mA)	High state > U <sub>in</sub> -1.5 V
(I <sub>out</sub> > -5 mA)	Low state < 1.5 V
Settling time after power turn-on	< 100 μs
Electrical connections	MIL-C-26482 type; 10-wire cable
Operating temperature	-50 ... +55 °C (with shaft heating)
Storage temperature	-60 ... +70 °C
Material	
Housing	AlMgSi, grey anodized
Vane	AlSi12, anodized
Dimensions & Weight	300 (h) × 90 (Ø) mm; 660 g Swept radius of vane: 172 mm

<sup>1)</sup> Output from connector pins C...H:

(°)	Output	(°)	Output	(°)	Output	(°)	Output
	CDEFGH		CDEFGH		CDEFGH		CDEFGH
N 0	000000	E 90	011000	S 180	110000	W 270	101000
6	000001	96	011001	186	110001	276	101001
11	000011	101	011011	191	110011	281	101011
17	000010	107	011010	197	110010	287	101010
23	000110	113	011110	203	110110	293	101110
28	000111	118	011111	208	110111	298	101111
34	000101	124	011101	214	110101	304	101101
39	000100	129	011100	219	110100	309	101100
45	001100	135	010100	225	111100	315	100100
51	001101	141	010101	231	111101	321	100101
56	001111	146	010111	236	111111	326	100111
62	001110	152	010110	242	111110	332	100110
68	001010	158	010010	248	111010	338	100010
73	001011	163	010011	253	111011	343	100011
79	001001	169	010001	259	111001	349	100001
84	001000	174	010000	264	111000	354	100000

Spare parts:	Order number:
Wind tail	6386WA
Set of bearings & gasket	16644WA



Head Office:  
VAISALA Oy  
PL 26, FIN-00421 Helsinki  
FINLAND  
Phone (int.): (+358 0) 894 91  
Telefax: (+358 0) 894 9227  
Telex: 122832 vsala fi



Ref. WAV151-UI85en-1.1

## MAINTENANCE AND REPAIR

Ball bearings must be checked once a year visually and by rotating the sensor shaft. To do this, remove the vane assembly. To ensure proper operation, the shaft should spin smoothly and it should not create any detectable noise.

To replace the ball bearings

- 1 Remove the vane assembly.  
There are three screws at the vane assembly center. Do not loosen the glue filled screw at the far side. The lock screw for the vane assembly is the lower one shown in figure 4.
- 2 Loosen the hex nut of the connector (with 27 mm tool). **Caution: Bending may break the connector pins!**
- 3 Loosen the three pan head screws at the bottom of the sensor body (with 7 mm tool).
- 4 Remove the lower body assembly by pulling it straight outwards.
- 5 Loosen the spacer screws and the heating element outlet.
- 6 Remove the printed circuit board. Do not twist nor bend the connector; bending may break pins.
- 7 Loosen the code disc fixing screw and remove the disc.
- 8 Remove the retaining ring (using narrow-pointed pliers).
- 9 Remove the spacer ring.
- 10 Remove the external retaining ring at the shaft (using narrow-pointed pliers).
- 11 Remove the lower bearing.
- 12 Push out the shaft through the upper body.
- 13 Remove the top bearing.

*Be careful when handling the ball bearings.*

Reverse work order for assembling the sensor.

*The disc must be positioned so that it does not touch the opto-coupler at any rotary position of the shaft.*

*When placing the lower body assembly, make sure that the O-ring is correctly positioned between the upper and lower bodies. It is recommended to replace the O-ring by a new one before re-assembly.*

The heating resistance element cannot be removed without special tools. It is recommended that replacing of the heating element is carried out by the manufacturer.

The wind vane has been counterbalanced at the factory but can be readjusted, if necessary. To do this, loosen the vane assembly and place it on its side on the table. A correctly balanced vane will stay in horizontal position.

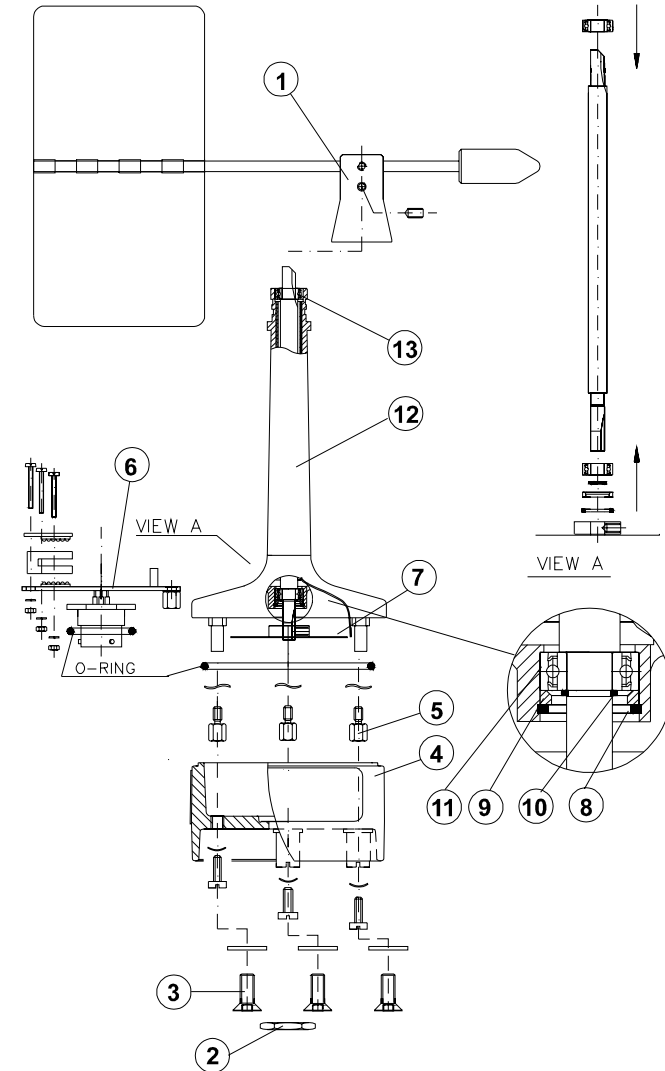


Figure 4. WAV151 assembly