USER MANUAL

METEOROLOGY

Wind Sensors

aem | LAMBRECHT meteo

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Warranty

Please note the loss of warranty and non-liability by unauthorized manipulation of the system. You need a written permission of the LAMBRECHT meteo GmbH for changes of system components. These activities must be operated by a qualified technician.

The warranty does not cover:

1. Mechanical damages caused by external impacts (e. g. icefall, rockfall, vandalism).
2. Impacts or damages caused by over-voltages or electromagnetic fields which are beyond the standards and specifications in the technical data.
3. Damages caused by improper handling, e. g. by wrong tools, incorrect installation, incorrect electrical installation (false polarity) etc.
4. Damages which are caused by using the device beyond the specified operation conditions.

Versions

The family of METEOROLOGY sensors includes the heatable sensors for wind speed type 14576 and wind direction type 14566.

Measuring elements

CUP ROTOR

The three-armed cup rotor is set into rotation by the wind. The number of rotations is a measure of the wind speed. The design features of the cup rotor, which are permanently monitored by quality management during the manufacturing process, ensure optimum linearity.

WIND VANE

The single-bladed wind vane has a long protrusion, so that even at low wind speeds the vane deflects according to the wind direction. The size and shape of the wind vane is optimized for a low starting value, while achieving an excellent compromise in terms of dynamic properties (inertia, natural frequency).

Installation wind vane

1. First, the wind vane is placed on the sensor. It can only be fixed in one direction on the sensor with the two captive screws.
2. Now the cable with the mounted coupling socket is pulled through the mounting mast with a diameter of approx. 50 mm.
3. The plug-in connection is made and secured by screwing.
4. Then the sensor is placed on the mast.
5. To align the sensor to the north, the two points on the sensor housing and the dome are positioned one above the other and, if necessary, fixed with an adhesive strip.
6. This allows a point determined in the south to be targeted via the sword of the wind vane and the fastening screw to be tightened in this position using the enclosed Allen key (4 mm).

Putting into operation

The wind can be represented by a vector quantity. For a complete description of the wind it is necessary to specify its speed and direction. The two components are subject to spatial and temporal variations; thus, strictly speaking, they are valid only for the site where the measuring instrument is put up. We therefore recommend to select the place of installation very carefully.

SELECTING THE PLACE OF INSTALLATION

Generally, wind measuring instruments should not measure the specific wind conditions of a limited area, but indicate the typical wind conditions of a wider area. The values measured at different places must be comparable.

Thus, when installing the sensor you should make sure the place of installation is not under the lee of great obstacles. The distance between the obstacles and the sensor should be 10 times the height of the obstacles (this corresponds to the definition of an undisturbed terrain).

If an *undisturbed terrain* of this kind does not exist the sensor must be put up at a height of at least 5 m above the obstacle height. If the sensor must be installed on a roof top the place of installation must be in the middle of the roof to avoid predominant wind directions.

If you want to measure both wind direction and wind speed, install the sensors at the same measuring point, if possible, and make sure to avoid any mutual influence of the sensors. A wind sensor pair easily meets this requirement since the sensors are set up side by side. Their horizontal distance should be approximately 1.5 m. The two sensors must be staggered vertically so that the lower edge of the upper wind speed sensor is 0.1 to 0.5 m above the upper edge of the lower wind direction sensor.

MOUNTING THE SENSOR ON THE MAST

Mount the sensor at the top of a grounded tube with an outer diameter of 50 to 52 mm. Make sure the device is easily accessible so that you can set up the north direction for the wind direction sensor and perform any maintenance work. To reach the sensors use a ladder of the appropriate length or a telescoping working platform of the appropriate height.

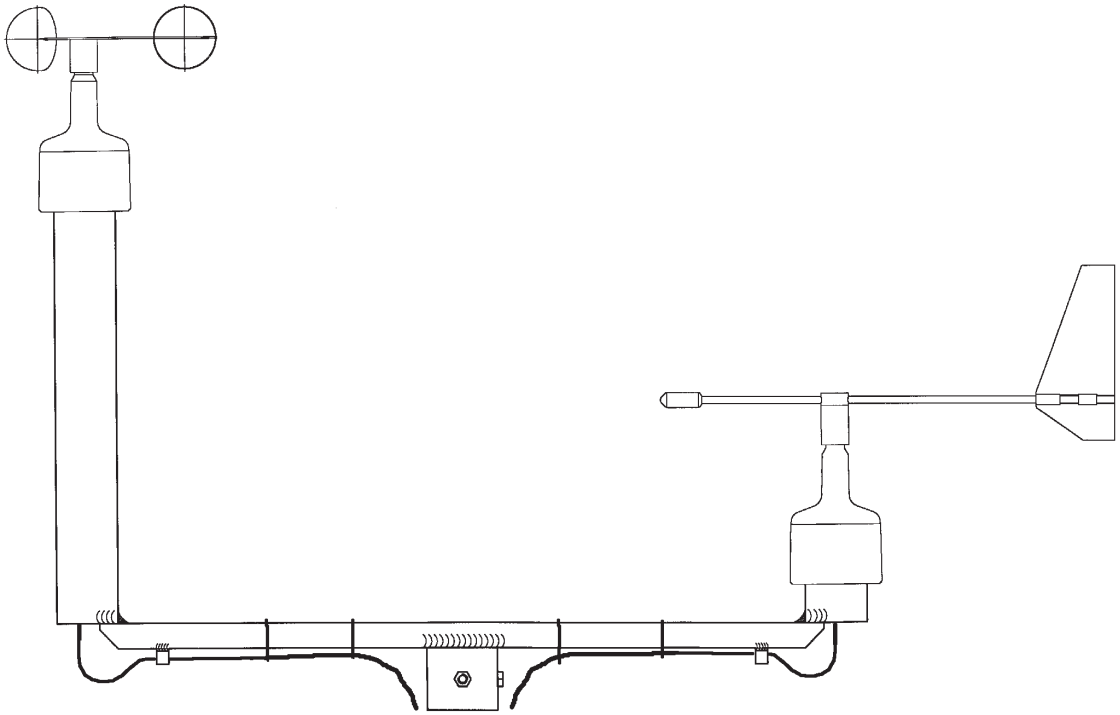
⚠ **Ladders or other lifting helps must be absolutely in order and must be guarantee a secure support!**

You can also use masts that can turn around their vertical axis or masts consisting of individual segments or telescoping masts that you can secure after setting up the north direction.

If wind speed and wind direction are measured at the same time, the measurement generally takes place not only at the top of a mast but also at the ends of a cross arm. The arms must stay torsion-free and vibration-proof even at high wind speeds and they must be accessible for you to perform mounting and maintenance work.

When you install the connecting cables make sure not to excessively shorten the cable leading to the connector in the lower part of the sensor casing so that you can later maintain or dismount the sensor.

VIEW OF CABLE ROUTING ON A WIND TRAVERSE



ESTABLISH ELECTRICAL CONNECTION

All sensors of the METEOROLOGY series are electrically connected via a 12-pin connector (pin) embedded in the base of the housing.

⚠ **Because the installation takes place in a dangerous height, the assembly personal must follow the rules for prevention of accidents.**

CABLE ROUTING

The connecting cable is suitably led along the mast between the data evaluation device (indicating instrument or data acquisition system) and the sensor. The cable must be fastened using appropriate cable ties (their length depends on the mast diameter). You can also install the entire connecting cable within the tube elements of the mast if the mast is prepared correspondingly.

! **Lead the cable in a wide curve from the mast to the bottom of the casing so that you can later easily dismount the cable.**

Example illustration:
Cable routing through an EMC compliant Pg socket

Please make sure the cable is protected from humidity on the side of the data processing system. Generally, Pg sockets that use a rubber joint to prevent humidity from penetrating into the terminal box of the data processing system provide sufficient protection.

OUTPUT SIGNAL

When you connect the output signal please note the assignment of the wires of the open cable end shown in the internal circuit diagrams on the following pages. The individual output wires lead you to the corresponding connecting terminals of the data acquisition section.

ELECTRONICS SUPPLY

On models 14566 and 14576, the electronics are supplied via the J(+) and H(-) wires of the 12-pin connector. The permissible values are:

Model	Voltage	Current
14566/14576	10...30 VDC	max. 30 mA

The electronic heating of versions 14566 and 14576 is supplied via an external power supply unit. The necessary voltage of 24 VDC is connected via the M(-) and G(+) wires.

GROUNDING

To reduce the risk of inductive interference the sensor must be properly grounded (screening on both sides). The use of ready-made connecting cables from LAMBRECHT meteo guarantees a proper grounding between sensor and cable. You just have to connect the cable screening to the ground of the indicator or the data acquisition unit. When other cables are used, you must create an appropriate screening.

ADJUSTING THE WIND VANE

For wind direction measurements the north mark on the sensor must be aligned with the geographical north direction; the allowed maximum alignment deviation is ±3 degrees. To set up the sensor's north orientation select a landmark which is as far as possible up north with regard to the final position of the wind direction sensor. The reference point can be selected using a topographical map (1:25000). The exact position of the reference point is determined using an amplitude compass that can be adjusted horizontally on a stand.

A point on the rotary knob and another point on the casing shaft represent the north mark of the wind direction sensors. These two marks must be exactly in line with each other; when you have aligned the marks, you may fix the wind vane with e.g. a piece of adhesive tape. When you have fixed the wind vane this way you can locate the reference point by aiming at it over the axis. Now you must turn the sensor casing on the mounting tube until the tip of the wind vane points to the reference point in the north.

Please make sure there is no magnetic deviation of the compass.

When the north direction is set up for the wind direction sensor, tighten the headless screws in the lower part of the casing and remove any adhesive tape, if necessary. Using an indicating instrument or a data acquisition system, verify the proper measurement and transmission of the measured values for at least three directions with an offset of 90 degrees from each other.

If the local conditions do not allow the reference point to be set up in a northerly direction, the procedure can be applied analogously to a southerly reference point. In this context, it must be ensured that the north mark on the wind sensor does not point to the reference point, but in the opposite direction.

Maintenance

The sensor design permits long periods of maintenance-free operation. To obtain useful measured data the measuring station must be systematically controlled and monitored. The properties of the sensor may change due to wear, soiling, and corrosion and as a result of external mechanical influences.

We therefore recommend to check the measuring station periodically according to intervals listed in this table:

Maximum interval	Wind direction and wind speed
a) 1 week	Time mark of the measuring system (correction if necessary) Visual inspection of the device function Rough check of the measured values
b) 6 months	Check of the measured value transmission Check of the sensors for tight fit on the instrument carrier
c) 2 years	Calibration of the wind sensors Check of the north alignment

If any problems should arise during the checks that you are unable to solve, please contact the LAMBRECHT meteo service at:

Tel: +49-(0)551-4958-0
E-Mail: support@lambrecht.net

Troubleshooting

If the sensor delivers no signal, the points below should be checked:

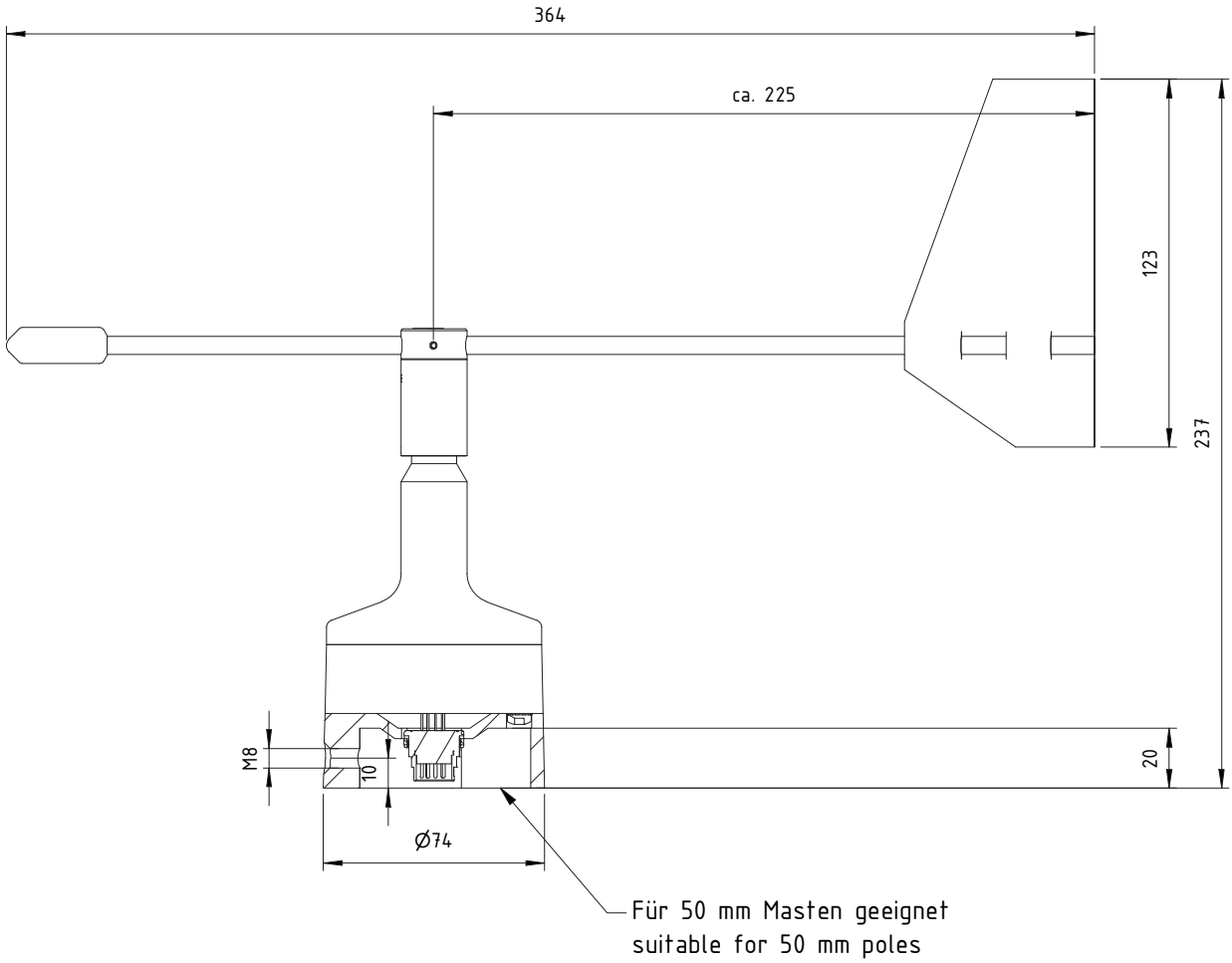
1. Does the wind vane resp. the cup rotor rotate? Are the measuring elements firmly frozen? Check the correct connection of the power supply as well as the signal line.
2. Is the wind vane or the cup rotor damaged? You can order the spare parts from LAMBRECHT meteo and replace them yourself by loosening the screws.

ID 32.14565.001010 Wind vane for wind direction sensor	ID 33.14565.017000 (order separately) 2 x Countersunk screw (loss-proof) for wind vane
ID 32.14576.005010 Cup rotor for wind speed sensor	ID 35.73801.618501 (order separately) 3 x Semi-circular screw for cup rotor

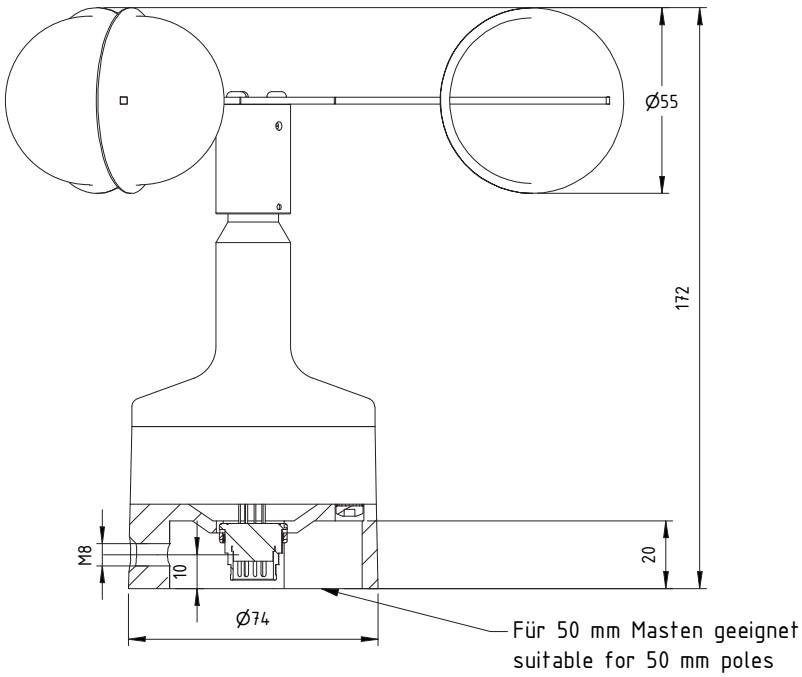
When mounting the cup rotor, use all three screws to ensure the correct and secure fit of the cup rotor.

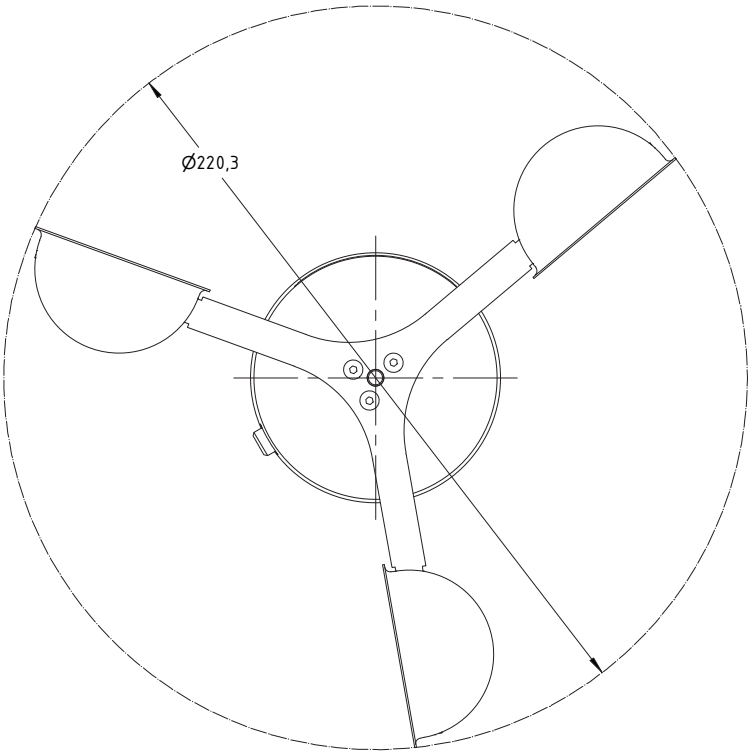
If there is no output signal despite a positive check of the a. m. points 1 and 2, the sensor must be sent to the manufacturer for repair.

Dimensional drawing 14566

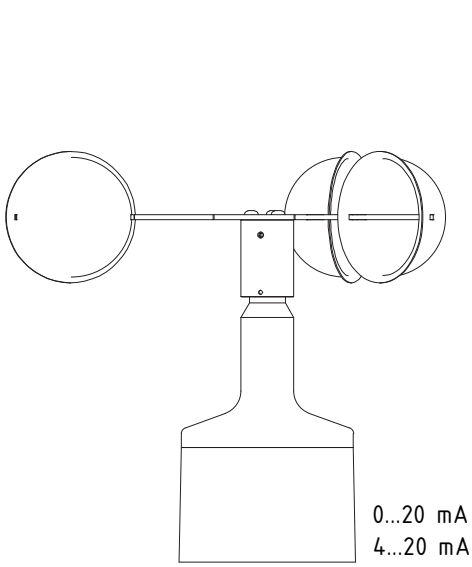


Dimensional drawing 14576

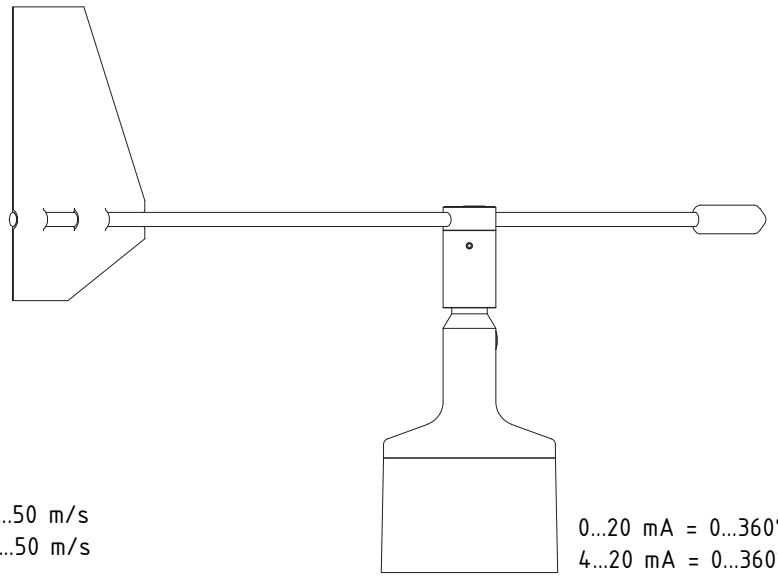




Connection diagram 14566 and 14576

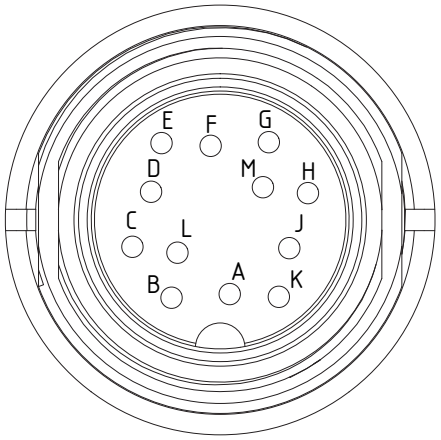


0...20 mA = 0...50 m/s
4...20 mA = 0...50 m/s



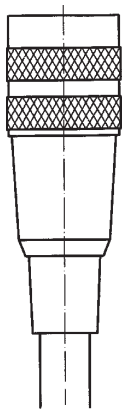
0...20 mA = 0...360°
4...20 mA = 0...360°

Anschlussbild / connection diagram		
PIN	Kabelfarbe color code	Funktion function
F	BK	+ 0...20 mA
E	BN	GND (I OUT)
D	RD	+ 4...20 mA
C	NC	NC
L	OG	Fout 700 Hz (WG)
B	YE	GND (A GND)
A	GN	SDI-12 OUT
K	NC	NC
J	BU	+ 10...30 VDC (Elektronik)
H	VT	GND
M	GY	- 24 VDC Heating
G	WH	+ 24 VDC Heating

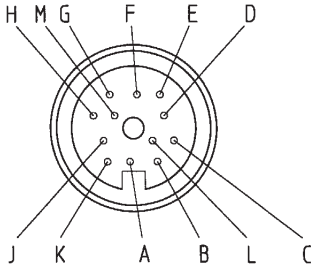


Cable assignment

ID 32.14565.060 xxx



Coupling socket
ID 65.53070.470100



View of the connector from
the plug contact side

Disposal

LAMBRECHT meteo GmbH is listed and registered at the Stiftung Elektro-Altgeräte Register ear under:

WEEE-Reg.-Nr. DE 45445814

In the category of monitoring and control instruments, device type: “Monitoring and control instruments for exclusively commercial use”.

Within the EU

The device has to be disposed according to the European Directives 2002/96/EC and 2003/108/EC (Waste Electrical and Electronic Equipment). Do not dispose the old device in the household waste! For an environmentally friendly recycling and disposal of your old device, contact a certified disposal company for electronic waste.

Outside the EU

Please follow the regulations in your country regarding the appropriate disposal of waste electronic equipment.

Technical data

	METEOROLOGY Wind direction sensor	METEOROLOGY Wind speed sensor
ID	00.14566.400000	00.14576.400000
Measuring range	0...360°	0.3...50 m/s
Accuracy	1°	2 % FS
Resolution	1°	0.1 m/s
Starting value	0.3 m/s	0.3 m/s
Output	0...20 mA (maximum load 500 Ohm) 4...20 mA (maximum load 500 Ohm)	0...20 mA = 0...50 m/s (maximum load 500 Ohm) 4...20 mA = 0...50 m/s (maximum load 500 Ohm)
Operating ranges	temperature: -30...+70 °C heated; 0...+70 °C unheated; survival wind speed: 100 m/s	temperature: -30...+70 °C heated; 0...+70 °C unheated survival wind speed: 100 m/s
Supply voltage	10...30 VDC	10...30 VDC
Heating voltage	24 VDC, 600 mA (for controlled heating)	24 VDC, 600 mA (for controlled heating)
Housing	seawater resistant aluminum; anodized; IP 53	seawater resistant aluminum; anodized; IP 53
Measuring elements	wind vane, aluminum, dimensionally stable	three-arm cup rotor, aluminum, breakproof
Dimensions	see dimensional drawing; for mounting on tube Ø 49...51 mm	see dimensional drawing; for mounting on tube Ø 49...51 mm
Weight	0.6 kg	0.4 kg
Included in delivery	plug, 12-pin; if a cable is ordered as well, the plug is mounted on it	plug, 12-pin; if a cable is ordered as well, the plug is mounted on it
ACCESSORIES (please order separately)		
ID 32.14565.060000	Ready-made cable with 12–pin plug; length: 12 m	
ID 32.14565.060020	Ready-made cable with 12–pin plug; length: 15 m	
SPARE PARTS (please order separately)		
ID 32.14565.001010	Wind vane for wind direction sensor (Screws see “Troubleshooting“)	
ID 32.14576.005010	Cup rotor for wind speed sensor (Screws see “Troubleshooting“)	

In case of possible icing and ice formation on the movable sensor measuring element, the function is reduced for the time of icing.

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