DESCRIPTION

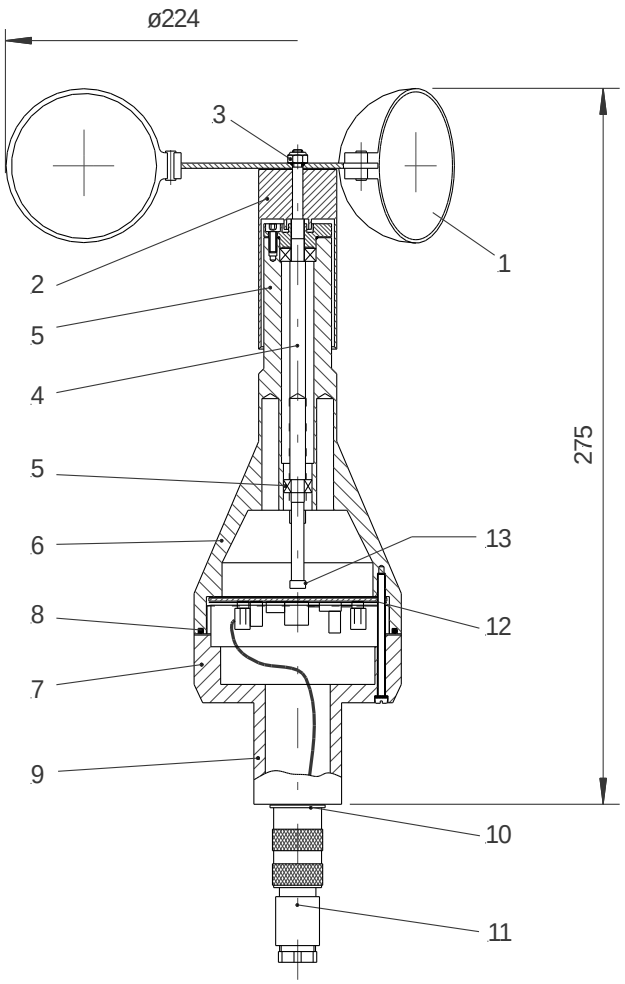
The wind speed sensor type 4038 serves for transmission of electrically measured values of the wind speed. It is designed for operation in meteorology and environmental protection, e.g. automatic weather stations, at airports, on research vessels, at industrial sites, for mobile measuring systems etc.
The instrument's rugged construction and its dust- and water repellent surface, as well as the optional heating enable heavy duty applications like wind energy measurement or operation under severe climatic conditions.

The device is particularly versatile thanks to several different available outputs (refer to "ordering code").

MECHANICAL DESIGN AND PRINCIPLE OF OPERATION

The sensor is designed as cup anemometer. Its basic construction is shown on fig. 1. The cup assembly comprises three cups (1), made of polypropylene. The hub (2) and is tightened by means of a self securing nut (3). The shaft (4), made of stainless steel, is guided by two precision ball bearings (5), lubricated by a special oil with negligible change of viscosity within a wide temperature range. The housing consists of an upper (6) and a lower part (7). These parts, as well as the hub, are made of a special coated aluminium alloy, featuring water repellence and corrosion protection. Sealing between upper and lower part is achieved by means of an O-ring. The pivot (9) at the lower part has a size ∅34 x 40 mm and serves for fastening on a cross arm or similar. At the bottom of the pivot there is a socket (10) and plug (11) for a waterproof cable connection according to standard IP67. The upper part contains a print plate with a magnetic encoder (12). The rotating magnet (13) on the shaft generates a rotating field, which is proportional to the wind speed.

FIG. 1: MECHANICAL DESIGN



ELECTRICAL
DESIGN AND PRINCIPLE OF OPERATION

The rotating magnet on the shaft consist of a magnetic north- and south pole. It creates a rotating field vertical to the shaft. This rotating field is detected by a magnetic encoder, which consist of 16.384 segments, on the PCB. Due to precise adjustment of the cup assembly radius there is an exact relation between rotational speed and windrun; the corresponding windrun to one rotation is 1500 mm. Due to the 16.384 segments on the magnetic encoder, the resolution of 1500 mm / 16.384 is 0.092 mm wind way. The downstream electronics prepare the digitized measurement signal in such a way that an optional analog signal output and a digital signal output are available. (refer to “Technical Data”).

For further signal processing, such as averaging etc., refer to product group 1, especially data logger COMBILOG 1022.

CONSTRUCTION OF THE HEATING

The integrated heating consists of a power transistor, controlled by a separate circuitry with temperature sensor.

TECHNICAL DATA

Measuring method:	magnetic, contact free
Measuring range:	0.3…60 m/s
Max. load:	100 m/s
Starting threshold:	< 0.5 m/s according to ICAO guideline for airports
Response length at v = 5 m/s:	< 2.5 m
Accuracy:	+/-0.3 m/s; at < 15 m/s 2% of range
Power supply Electronics:	12...26 VDC; <1.5 W
Heating power:	
Integrated heating (option)	15 W at 12 VDC 40 W at 24 VDC
optional analog Signal output:	0…10 V = 0…60 m/s or 0...20 mA = 0…60 m/s or 4…20 mA = 0…60 m/s
digital Signal output:	0…600 Hz = 0…60 m/s
Admissible load:	approx. 400 Ω
Operating temperature:	-40…+80 °C 0…+80 °C without heating and rel. Humidity >95 %
Connection:	connector, metal IP 67, when plugged in 12-p., plug and socket
Protection class:	IP 65, when operated upright
Measuring cable:	LiY(C)Y 0.25 mm^2 (not included)
Housing material:	Aluminium alloy
Compliances:	WMO Guide No. 8/7th ed. VDI 3786, T.2, 12/2000 MEASNET ICAO Annex 3, Attachment A

DIMENSIONS

Length:	approx. 275 mm
Cup assembly ∅:	approx. 224 mm
max. housing-∅:	80 mm
Pivot:	∅ 34 x 40 mm
Weight:	approx. 0.685 kg

ORDERING CODE

Data outputs 0…10 V and 0…600 Hz integrated heating 15…40 W *(Supply: 20…26 VDC)*	**4038.1000**
Data outputs 0…20 mA and 0…600 Hz integrated heating 15…40 W *(Supply: 12…26 VDC)*	**4038.1200**
Data outputs 4…20 mA and 0…600 Hz integrated heating 15…40 W *(Supply: 12…26 VDC)*	**4038.1400**

OPERATING INSTRUCTIONS

INSTALLATION

The wind speed sensor has to be placed at a suitable height (for example 10 m for meteorological measurement of the ground wind). There is a number of tilting masts of different heights from 5 to 15 m available for this purpose. Lattice masts up to 80 m height and various telescopic masts can be supplied (refer to product group 9). In any case it has to be taken care to avoid zones of lee or turbulences!

If, for example, it is necessary to reassemble the cup cross after transporting or servicing the encoder, proceed as follows:

1. Check whether the O-ring 4x1mm is still in the recess of the cap (2)! If necessary, replace with a new O-ring.
2. Put on the shell star and fasten it at the front with the M4 stop nut (3).

Attention:
Pay attention to correct position; The underside of the shell star is marked with a white dot.

The device may only be installed and operated with the shell star attached, otherwise water can penetrate into the housing!

Mounting is possible on a stand with 35 mm internal diameter or on an adapter type 9023 (see sketch, fig.2). In any case a suitable opening (∅35 mm) for plug connection has to be considered. For mounting on a cross arm a clamp type 9022 can be used (see sketch, fig. 2).

Using both - wind speed and wind direction sensor - a U-shaped cross arm, type 9040, is recommended. Depending on location, the installation of lightning rod, type 9112 or equivalent size, is advisable!
Power- and measuring lines shall be protected by suitable over voltage protection devices!

Installation on top of wind turbines, ship masts or similar structures with tilt motion, vibration or other dynamic force requires a rugged, eventually shock absorbing, suspension construction. In this case, please contact us for further consultance.

CONNECTION

Connection has to be carried out according to fig. 3.
Installation and connection of the corresponding plug is described separately on page 6.

MAINTENANCE

The wind speed sensor type 4038 operates maintenance-free!

Ball bearings, however, are subject to attrition. Their live time strongly depends on the ambient conditions, such as: average wind speed, pollution, vibration etc.. Therefore an occasional check for plausibility (during low wind speed) is recommended: If a decrease of sensitivity is detected, the shaft / ball bearing assembly will have to be replaced.

In case of remote sites with difficult access conditions, for example high measuring towers or wind turbines, an individual service schedule should be issued, including preventive replacement of the bearings, for example every 2 years.

FIG. 2: MOUNTING OPTIONS

(Standard from – stock solutions)

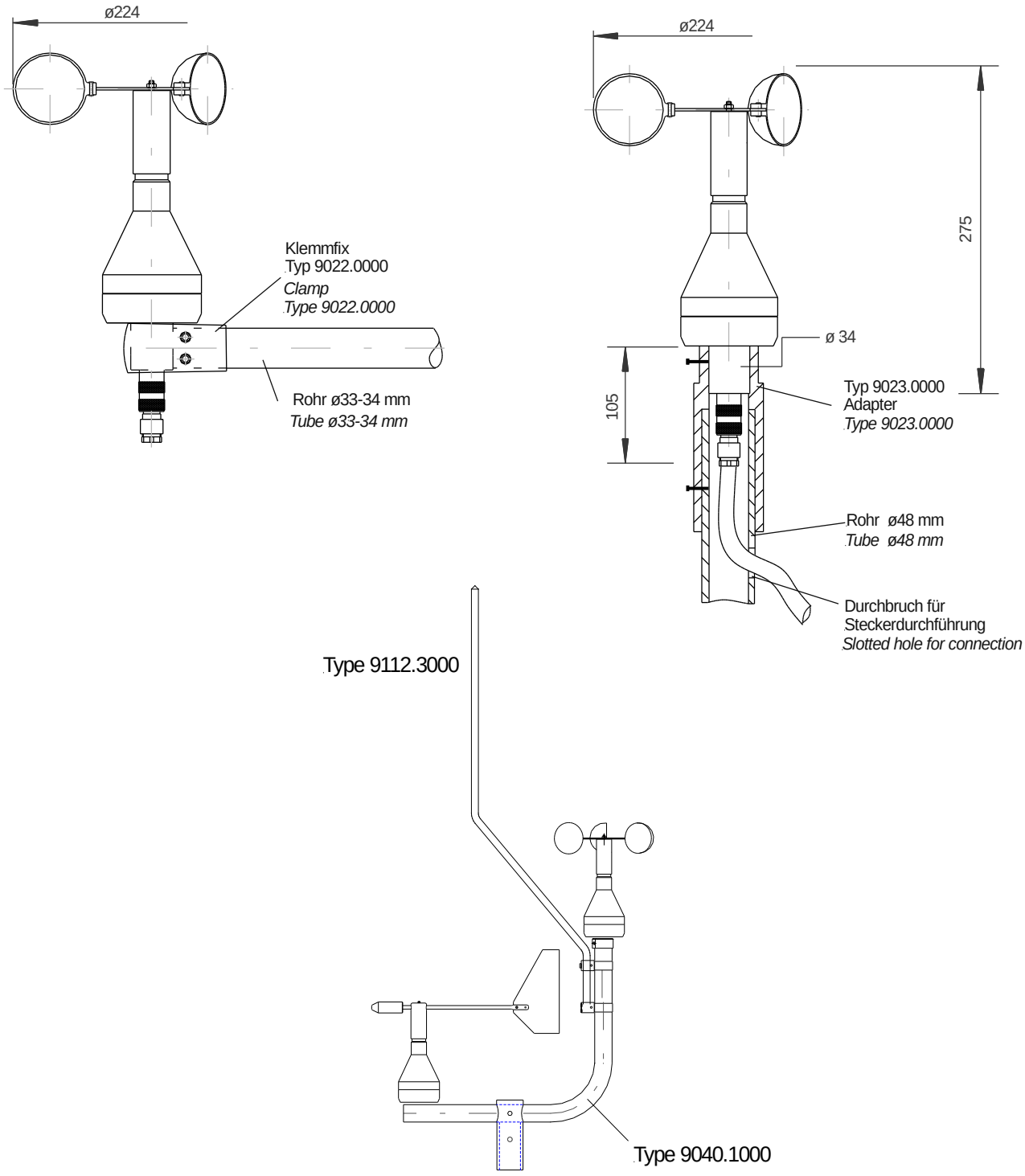


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FIG. 3: BLOCK DIAGRAM / CONNECTION PLAN

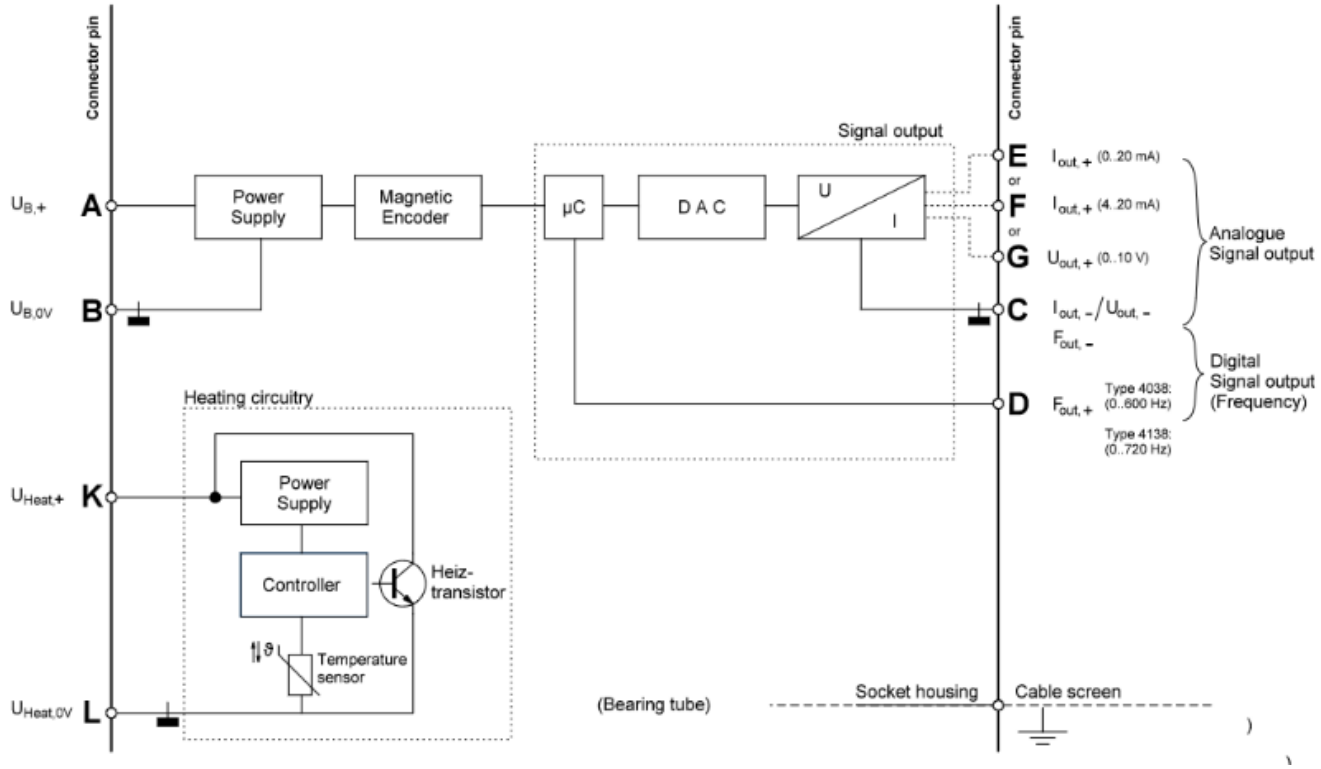
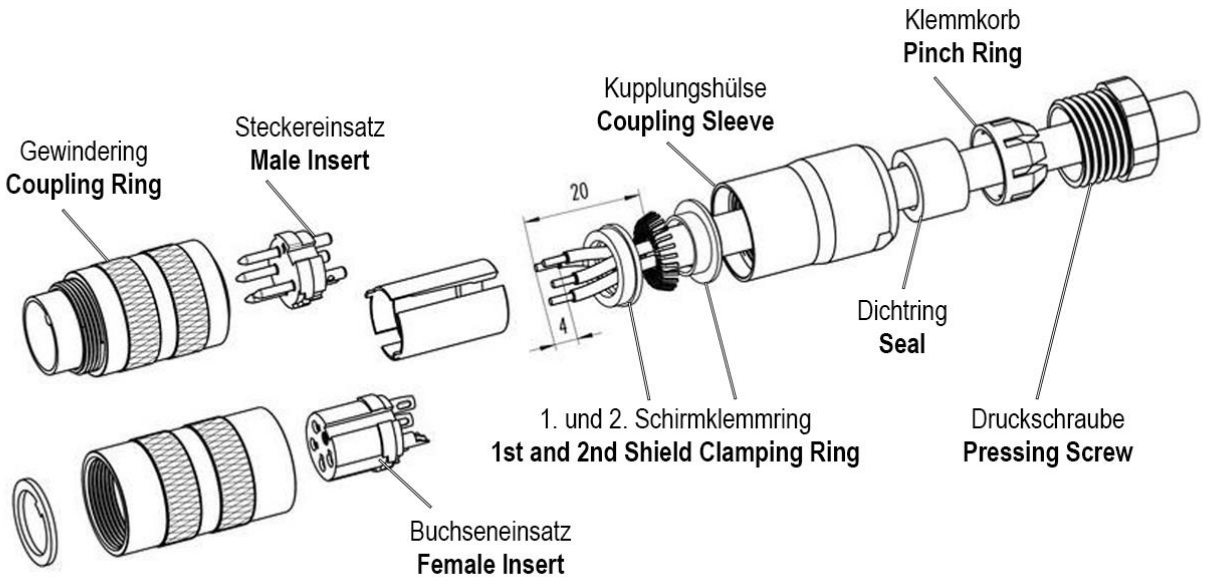


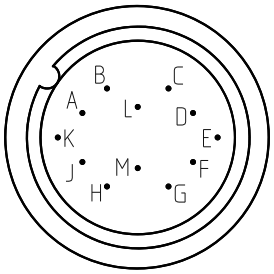
ABB. 4: HANDLING INSTRUCTION, CONNECTOR



PRODUCE FOR MOUNTING THE CABLE SOCKET

1. All parts for strain relief (pressure screw, pinch ring, seal, coupling sleeve) in above shown order to be threaded on the cable. Additionally thread the first shield clamping ring.
2. Strip the cable sheath by approximately 20 mm and strip cable strands by about 4 mm.
3. Shorten sheath and spread it and the insert second shield clamping ring.
4. Solder wires and mount spacer sleeves, slide the two clamping rings together with the shield and cut overlapping sheath.
5. Mount remaining parts according to the above sketch and tighten strain relief firmly.

12 pin connector
magnified illustration



solder side

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