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sists of an upper (6) and a lower part (7). These parts are screwed together by means of fine thread and can be unscrewed without any tool. The pivot at the lower part has a size  $\text{Ø}34 \times 40 \text{ mm}$  and serves for fastening on a cross arm or similar. At the bottom of the pivot there is a socket (29) and plug (30) for a waterproof cable connection according to standard IP 67. The upper part contains a print plate (1) with a reflection light barrier. By means of the chopper wheel (12) on shaft, this light barrier produces a frequency proportional to the wind speed. The built-in heating, placed in the upper part and controlled by a thermostat, features applications during frost season resp. in cold climate.

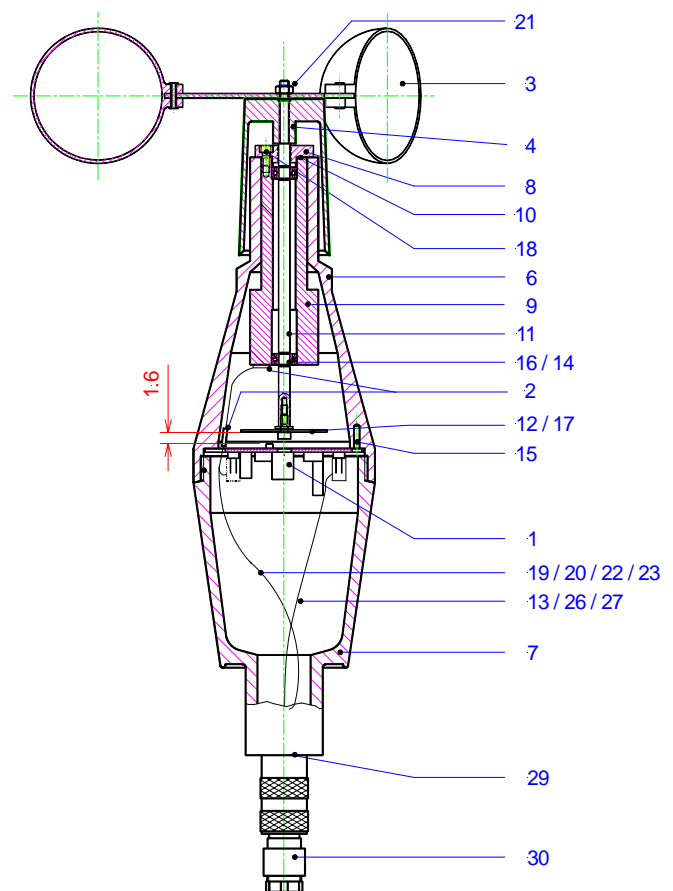
**Fig. 1: Mechanical design**

## Description

The wind speed sensor serves for transmission of electrically measured values of the wind speed. It is designed for applications in meteorology and environmental protection, e.g. automatic weather stations, at airports, on research vessels, at industrial sites, for mobile measuring systems etc.. Thanks to various simultaneously usable outputs it is suitable for a wide range of measuring tasks.

## 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 (3), made of polypropylene. The hub (4) made of polycarbonate and is tightened by means of a self securing nut (21). The shaft (11), made of stainless steel, is guided by two precision ball bearings (16), lubricated by a special oil with negligible change of viscosity with in a wide temperature range. The axial fixation is obtained by seeger rings (14). The polycarbonate housing con-



## Electrical design and principle of operation

The reflecting wheel, made of special plated aluminium, is equipped with 15 black segments. During rotation these segments pass the light barrier and create a sequence of reflection and absorption pulses, in a frequency proportional to the wind speed. 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 1.5 m. As there are 15 segments on the rotating wheel a resolution of  $1.5/15 = 0.1$  m windrun results and the corresponding frequency output to a measuring range 0...60 m/s is 0...600 Hz. The subsequent electronic resp. further analog outputs (refer to "Technical Data").

### Dimension:

Length: approx. 327 mm  
Cup assembly Ø: approx. 224 mm  
max. housing-Ø: 80 mm  
Pivot: Ø 34 x 40 mm  
Connection: 12 p., plug and socket, water- and dust proof according to IP 67

Weight: approx. 0.5 kg  
Measuring cable: LiY(C)Y 0.25 mm<sup>2</sup>  
(not included)

## Construction of the heating

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

## Ordering Code

Wind speed sensor, Frequency output 0..600 Hz, Open Collector; with built-in heating **451213**

Wind speed sensor, Frequency output 0...600 Hz, Open Collector; analog outputs 0...20 mA, 4...20 mA and 0...1 V; with built-in heating **451214**

## Technical Data

Measuring range: 0...60 m/s = 0...116.7 kn  
Max. load: 60 m/s  
Starting threshold: approx. 0.3 m/s  
Response length at  $v = 5$  m/s: < 2.5 m  
Accuracy: +/-0.3 m/s; at  $v < 15$  m/s 2% of range  
Supply:  
451214: 12...30 VDC; up to 50 mA  
451213: approx. 2,0 mA at 12 V

heating: 10...30 VDC; 7W.  
Output: digital:  
0...60 m/s = 0...600Hz  
Open Collector

additional version 451214:  
analog: 0...1 V  
0...20 mA  
4...20 mA  
Admissible load: approx. 400 Ohm

Admissible ambient temperature: -35...+80°C  
Housing material: polycarbonate, black  
Heating: controlled by thermostat, approx. 7W.

## 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 - 15 m available for this purpose. Lattice masts up to 46 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! Before mounting the cup assembly has to be fixed on the shaft of the sensor by means of the nut at the face.

**Attention:**

Take care that the cup assembly is placed correctly (white spot to be underneath)!

**Attention:**

Do not mount any wind speed sensors without cup assembly, otherwise (during rain) water could penetrate into the housing of the sensor!

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 (diameter 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 crossarm, type 9040, is recommended. Depending on location, the installation of lightning rod, type 9112, is advisable!

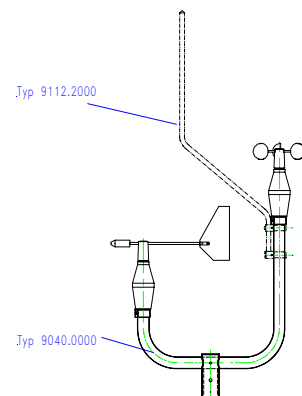
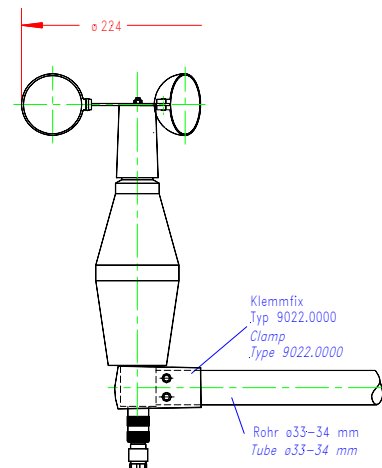
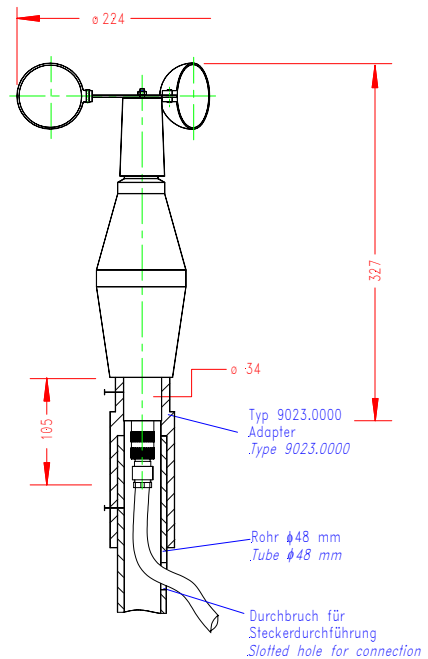
**Connection:**

Connection has to be carried out according to fig. 3.

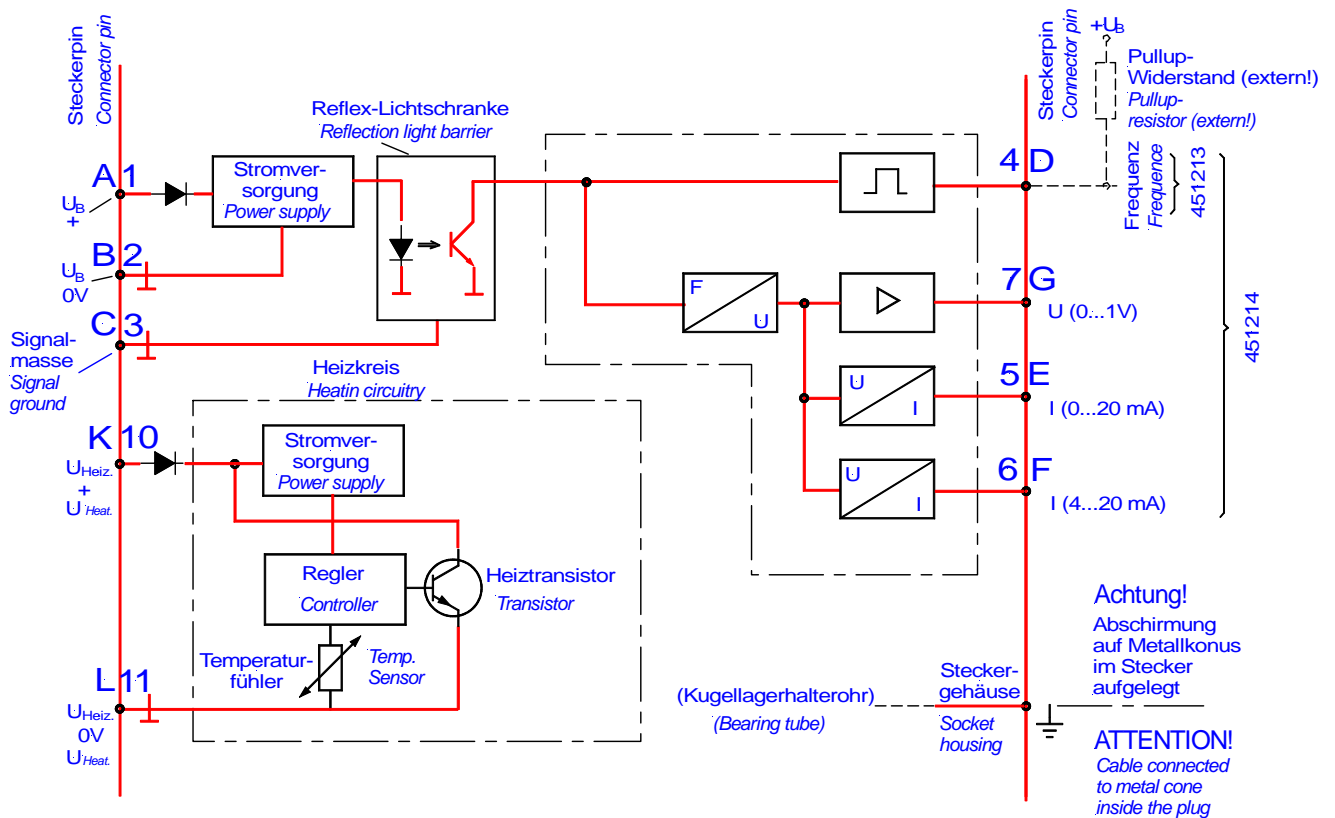
**Maintenance:**

The wind speed sensor type 451213/14 operates maintenance-free!

After a long use, if there is a decrease of sensitivity, the sensor needs to be checked and, if necessary, the bearings have to be changed.



**Fig. 3: Block diagram / Connection plan**



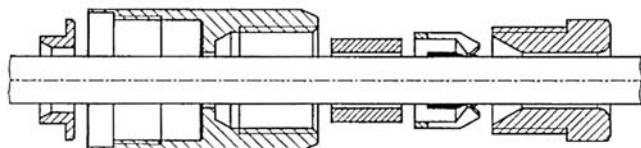
**Attention:**

When several analog outputs are used simultaneously, each output requires a separate ground wire to be installed directly close to the sensor.

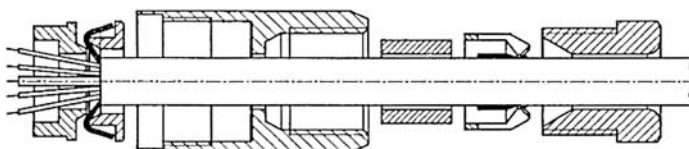
\*Pullup resistor not included. The maximum value of the resistor depends on the length of the signal cable.

Example for cable length up to 100 m : 20 kOhm. In case of connecting the sensor to the COMBILOG (LT) an external pullup resistor is not necessary.

## Handling instruction, Connector

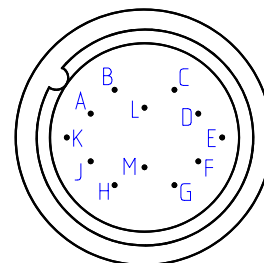


Teile auffädeln  
stringing parts

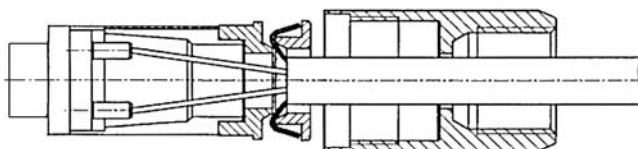


Abisolieren, Schirm aufweiten,  
Schirmklemmring montieren.

Stripping, widening of shield,  
assembling shield clamping ring.

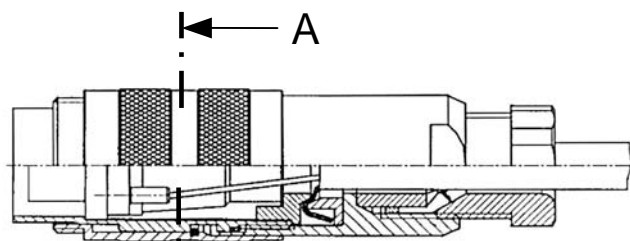


Schnitt A-A, vergrößert



Litze anlöten, Distanzhülse überschnappen,  
überstehenden Schirm abschneiden.

Soldering wire, tripping distance bush,  
cutting off projecting shield.



Übrige Teile gemäß Darstellung montieren.  
Assembling remaining parts according to plan.

The Fischer company reserves the right to make changes/improvements to their products and to their specifications at any time without prior notice to anyone.



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