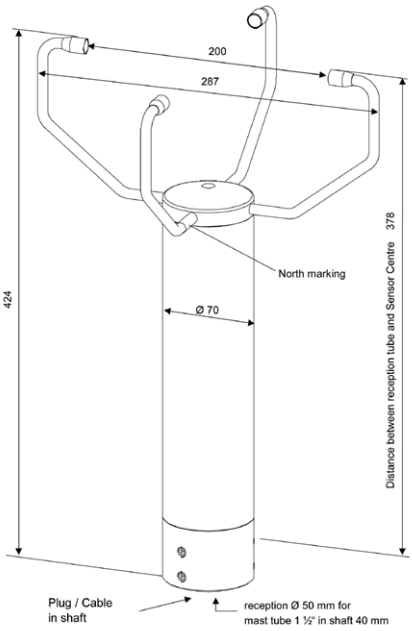
Ultrasonic Anemometer Thies 2D

S82100H
(P6003H)

- Measurement of wind direction and wind velocity and virtual temperature
- Highest precision
- Maintenance free / with heating
- Digital & Analog outputs

Dimensional Drawing



Range of Application
The Ultrasonic Anemometer 2D is designed to acquire the horizontal components of wind velocity and wind direction as well as the virtual temperature. Due to the high measuring rate, the instrument is ideal for the inertia free measurement of gusts and peak values. The accuracy of the air temperature measurement (virtual temperature) surpasses that one of the classic method where the temperature transmitter is used in a weather and thermal radiation shield. The measured data are available as analogue signals or as a data telegram via a serial interface. The sensors as well as the instrument body are automatically heated, in case of critical ambient temperatures. Thus, the function is guaranteed even in case of snowfall or freezing rain, and the risk of icing is extensively avoided.

Wind velocity and direction
The speed of propagation of the sound in calm air is superposed by the velocity components of an air flow in wind direction. A wind velocity component in the direction of the propagation of the sound supports the speed of propagation, thus leading to an increase in the speed. A wind velocity component opposite to the direction of propagation, on the contrary, leads to a reduction of the speed of propagation. The speed of propagation resulting from the superposition leads to different propagation times of the sound at different wind velocities and directions over a fixed measurement path. As the speed of sound is very dependent on the air temperature, the propagation time of the sound is measured on both of the measurement paths in both directions. In this way, the influence of the temperature dependent speed of sound on the measurement result can be eliminated.

By combining the two measuring paths which are at right angles to each other, one obtains the measurement results of the sum and the angle of the wind velocity vector. Afterwards, one receive the angle and the sum of the wind velocity by transformation into polar coordinates.

Virtual Temperature
As previously mentioned, the speed of the propagation of sound is highly dependent on the air temperature, but is hardly affected by air pressure and humidity. Thus these physical properties of gases can be used to measure air temperature. As this is a measurement of gas temperature which is made without thermal coupling to a measurement sensor, it is called the "virtual temperature". The advantages of this measured variable is, on the one hand, its inertia free reaction to the actual gas temperature, and, on the other, the avoidance of measurement errors such as those which occur when a solid state temperature sensor is heated up by radiation.

Ammonit
Measurement GmbH

Wrangelstrasse 100, D-10997 Berlin, Germany
T: +49 30 6003188-0, E: info@ammonit.com

measuring wind power
www.ammonit.com

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(P6004H)

Wind Speed	
Measuring range	0...75 m/s, scaling of the analog output is free selectable
Accuracy	≤ 5 m/s: ± 0.1 m/s; > 5 m/s: ± 2% of meas. value
Resolution	0.1 m/s (standard); <0.1 m/s (user-defined)
Wind Direction	
Measuring range	0...360°
Resolution	1° (standard), < 1°(user-defined)
Accuracy	± 1°
Virtual Temperature	
Measuring range	-50...+70°C
Accuracy	± 0.5 K to 35 m/s
Data Output Digital	
Interface	RS 485 / RS 422
Baud rate	1200 to 230400 selectable
Output	Instantaneous values, wind speed / direction and acoustic-virtual temp. Sliding mean values 0.5 sec to 100 min freely selectable
Output rate	1 per 1 msec to 1 per 60 sec., adjustable
Status identification	Heating, measurement path failure, ΔT path temperatures
Data Output Analog	
Electr. output	0...20 mA / 0...10 V or 4...20 mA / 2...10 V, wind velocity & direction, virtual temp.
Output	Instantaneous values, sliding mean values 0.5 sec to 100 min freely selectable
Output rate	Updating rate 1 to 100 msec
Resolution	16 bit
Analog inputs	
Input Number	Up to 3 analog inputs possible. (3x standard, 2x add. configurable acc. to manu.)
Input Resolution	16 bit
Sampling rate	0.1...100 Hz per channel
Input range	0...10 V
Data processing	Output of measured values in user-specific telegram
Accuracy	± 1% of meas. value in the range -40...+70°C
Linearity, integral	INL: type < 6LSB
Effective low-noise bits	Type 14 bit (at DC-supply for avoiding of dynamic cross-talk in the connection line)
General	
Temperature Range	Oper. temperature: -50....+70°C; Storage: -50....+80°C; with heating up to -75°C
Internal measuring rate	Up to 400 measurements per second at 20°C
Operating voltage	Power supply electronics: 8 V to 78 V DC, 1.5 VA, max. 2.5 VA Power supply electronics + heating: 24 V AC/DC ±15%: typ. 80 VA, max. 90 VA @ 24V
EMC	EN 55022: 1998 class B; EN 55024: 1998; EN 61326:1997; A3:2003
Electr. Connection	8-pole plug
Manufacturer	Thies / 4.3820.01.310

Last Modification: 2012-01-02