

Ultrasonic Anemometer Thies 2D – Heating in Arms and Sensor Head

S82200H



Ultrasonic Anemometer Thies 2D – Heating in Arms and Sensor Head

Order number	Availability
S82200H	Usually on stock

The Ultrasonic Anemometer 2D is designed to acquire the horizontal components of wind velocity and wind direction as well as the virtual temperature

Description

- Classified acc. to IEC 61400-12-1:2017
- Measurement of wind direction, wind velocity and virtual temperature
- Highest precision, maintenance-free, different heating options
- Digital & Analog outputs

The Ultrasonic Anemometer 2D is designed to acquire the horizontal components of wind velocity and wind direction as well as the virtual temperature in two dimensions. Due to the measuring principle the instrument is ideal for inertia-free measurement of gusts and peak values.

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 the direction of the wind. A wind velocity component in the propagation direction of the sound supports the speed of propagation; i.e. it increases if while a wind velocity component against the propagation direction reduces the speed of propagation.

The propagation speed resulting from 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 greatly depends on the temperature of the air, the propagation time of the sound is measured on each of the two measurement paths in both directions. This rules out the influence of temperature on the measurement result. By combining the two measuring paths which are at right angles to each other, the measurement results of the sum and the angle of the wind velocity vector are obtained in the form of rectangular components. After the rectangular velocity components have been measured, they are converted to polar coordinates by the digital-signal-processor of the anemometer and output as a sum and angle of wind velocity.

Acoustic virtual temperature

The thermodynamic interrelationship between the propagation velocity of sound and the absolute temperature of the air is defined by a root function. The physical interrelationship between sound velocity and temperature is ideal when measuring the air temperature as long as the chemical composition is known and constant.

Heating

The Ultrasonic is equipped with a sophisticated heating system, which keeps all outer surfaces that might disturb the data acquisition in case of ice formation, efficiently on a temperature above +5°C. The converters carrying arms belong to the heated outer surfaces, as well as the ultrasonic converters itself and the housing – depending on the model.

The Ultrasonic is able to acquire measuring data with high accuracy even in unheated state at temperatures down -40°C . There is no temperature-depending quality of the measuring data. The heating is necessary only for avoiding ice formation on the instrument construction and the associated blockage of the run time data acquisition.

Specifications

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General Information

Order Number S82200H

Wind Speed

Measuring Range 0 ... 75 m/s, scaling of the analog output is freely selectable (Starting threshold: 0.01 m/s)

Accuracy ± 0.1 m/s @ ≤ 5 m/s
 $\pm 2\%$ of measured value @ > 5 m/s

Resolution 0.1 m/s (standard)
< 0.01 m/s (user-defined)

Wind Direction

Measuring Range 0 ... 360°

Accuracy $\pm 1^\circ$

Resolution 1° (standard), < 1° (user-defined)

Virtual Temperature

Measuring Range -50 ... +70°C

Accuracy ± 0.5 K to 35 m/s

Resolution 0.1 K (standard)

Data Output Digital

Interface RS485 / RS422

Baud Rate 1200 to 230400 selectable

Output Instantaneous values (wind speed / direction, 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

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Resolution 16 bit

Analog Inputs

Input Number Up to 3 analog inputs possible (3x standard, 2x additional 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 $\pm 1\%$ 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 dynamic cross-talk in connection line)

General

Temperature Range Oper. temperature: -50 ... +80°C (heated), -30 ... +80°C (unheated)
Storage: -50 ... +80°C
(Heating operation down to -75°C)

Internal Measuring Rate Up to 400 measurements per second at 20°C

Operating Voltage S82100H Power supply electronics: 8 ... 78 V DC, 1.5 VA, max. 2.5 VA
Power supply electronics + heating: 24 V AC/DC $\pm 15\%$: typ. 80 VA, max. 90 VA @ 24V
S82200H
S82300H Power supply electronics + heating: 24 V AC/DC $\pm 15\%$: typ. 85 VA, max. 90 VA @ 24V
S82800H Power supply electronics + heating: 48 V AC/DC $\pm 15\%$: typ. 280 VA, max. 310 VA @ 48V
Power supply electronics + heating: 24 V AC/DC $\pm 15\%$: typ. 85 VA, max. 90 VA @ 24V

Electric Connection 8-pole plug

Mounting Mast tube 1 ½", e.g., DIN 2441

Protection IP 67

Weight

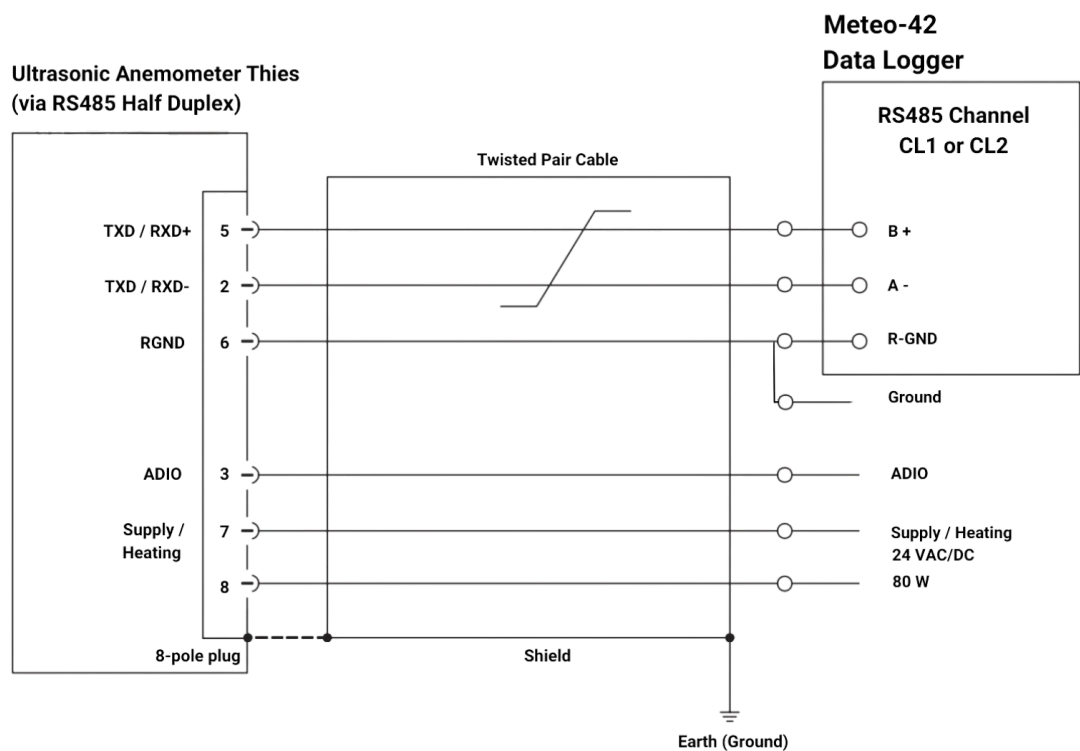
2.5 kg

Manufacturer

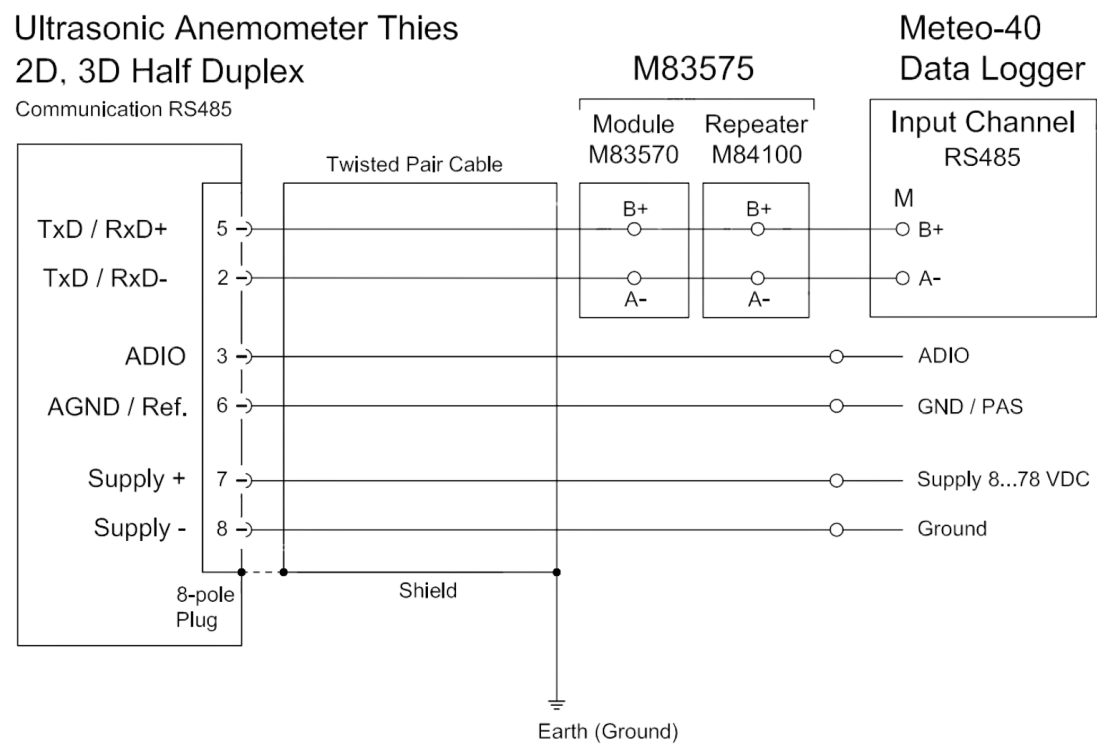
Thies

Sensor connection diagram

Sensor connection diagram to Ammonit Meteo-42 data logger



Sensor connection diagram to Ammonit Meteo-40 data logger



Accessories

- Calibration Ultrasonic Anemometer Thies 2D

Classification

Classification report Thies Ultrasonic 2D