



# THREE AXIS ULTRASONIC ANEMOMETER

**HD2003 and HD2003.1** are three axis ultrasonic anemometers, they measure the speed and direction of wind, the U-V-W Cartesian components of speed, sound speed and sonic temperature.

**The HD2003 allows also to detect temperature and relative humidity of the air and barometric pressure.**

The HD2003 main features are:

- Determination of the anemometric quantities represented in diverse measurement units: wind speed and direction, U-V-W Cartesian components of speed, sound speed, sonic temperature.
- **(HD2003 Model)** additional output quantities: Temperature, Relative Humidity and Pressure.
- 5 analogue voltage or current outputs, with different measuring ranges.
- RS232 and Multidrop RS485 Serial Communication interfaces.
- Configurable output rate of digital output data string.
- Configurable average periods 1÷60sec and 1÷60min. for all output quantities.
- Algorithmic raw data processing and validation, assuring  $\pm 1\%$  precision to anemometric quantities.
- Digital high frequency data acquisition mode with 50Hz data output.
- Self-diagnosis with error checking and report.
- Reliability and precision on whole measuring range, no additional calibration required.
- Flexible, easy-to use operating software, configurable according to the user's needs through Computer interface.
- User interface for 'Setup' management and software upgrade through RS232 or RS485.
- Automatic alignment to the magnetic North through built in compass.
- No moving part, with reduced maintenance and service costs.
- Rugged and reliable structure, suitable for continuous operation even in severe environmental conditions.
- Low power consumption.
- **(On request) Heaters Option:** built-in heating device of sonic transducers, to prevent ice and snow formation. Assures correct measurements even in presence of sleet or snow.

## Typical applications:

- Meteorology
- Aviation and Navigation
- Tunnels, Highways
- Climatology
- Sport and winter stations
- Safety in yards
- Industrial buildings

## Technical specifications

### Output quantities

- Anemometric parameters Wind speed and direction, Sound Speed, Sonic Temperature, U-V-W Components

- Meteorological parameters **(Model HD2003)** Pressure, Temperature, Relative Humidity

- Heading Compass with magnetic Azimuth

- Moving Averages 1÷60 sec./ 1 ÷ 60 min.

- Output rate 1÷50Hz (RS232 or RS485)

### Wind Speed

- Measuring unit m/s, cm/s, km/h, knots, mph

- Range 0÷60 m/s (216 km/h)

- Resolution 0.01 m/s

- Accuracy  $\pm 1\%$  of reading

### Wind Direction

- Range Azimuth: 0÷360° Elevation:  $\pm 60^\circ$

- Resolution 0.1°

- Accuracy  $\pm 1^\circ$

### Sound speed

- Range 300 ÷ 380 m/s

- Resolution 0.01 m/s

- Accuracy  $\pm 1\%$  of reading

### Sonic Temperature

- Range -40 + 60°C

- Resolution 0.1 °C

- Accuracy  $\pm 1^\circ\text{C}$

### Compass

- Range 0 ÷ 360°

- Resolution 0.1°

- Accuracy  $\pm 1^\circ$

## Digital Outputs

- Communications
- Baud Rate
- Output Rate

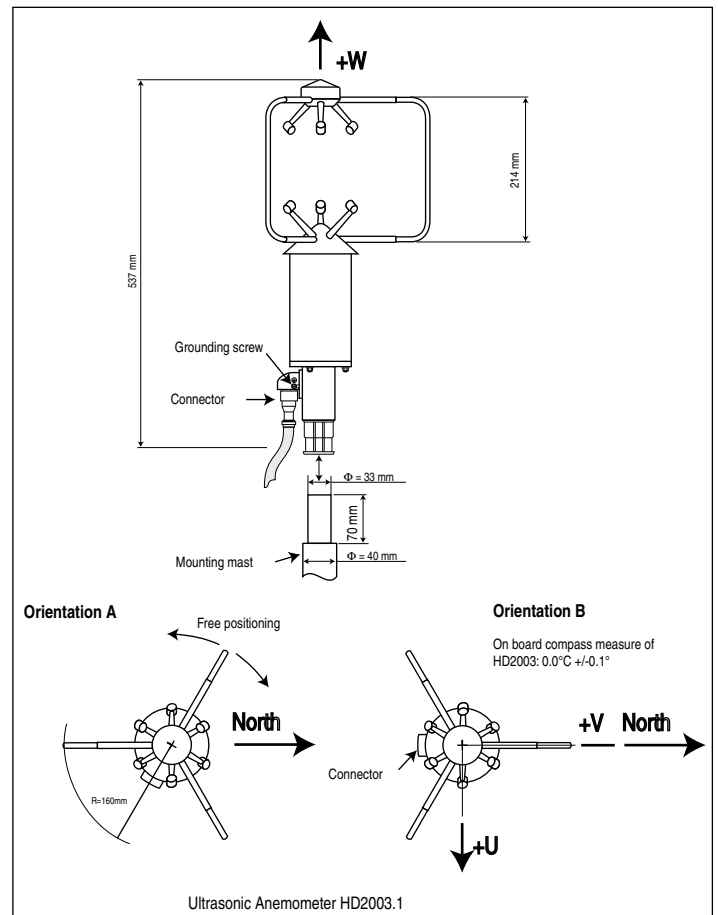
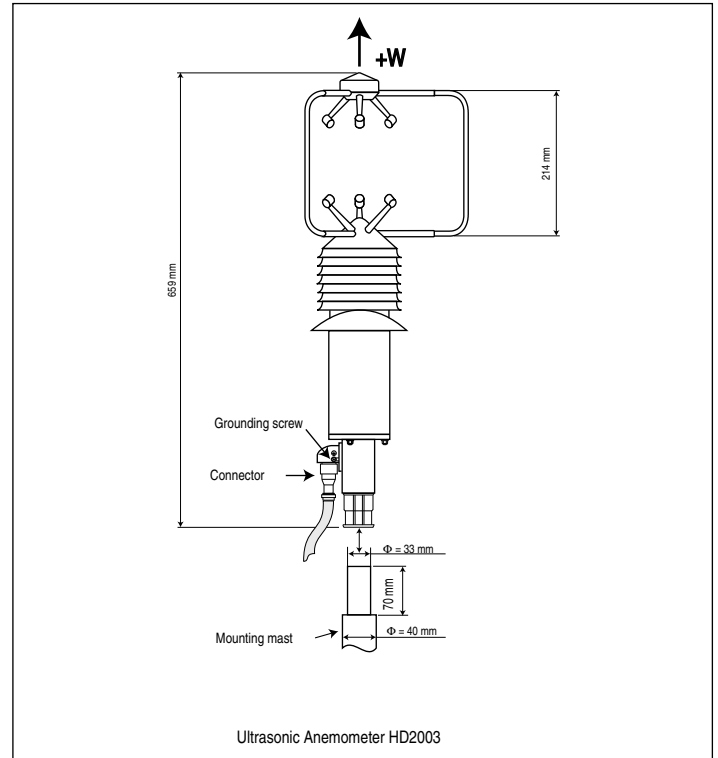
RS-232 full duplex, Multidrop RS-485 half duplex  
9600 ÷ 115200 bit/sec.

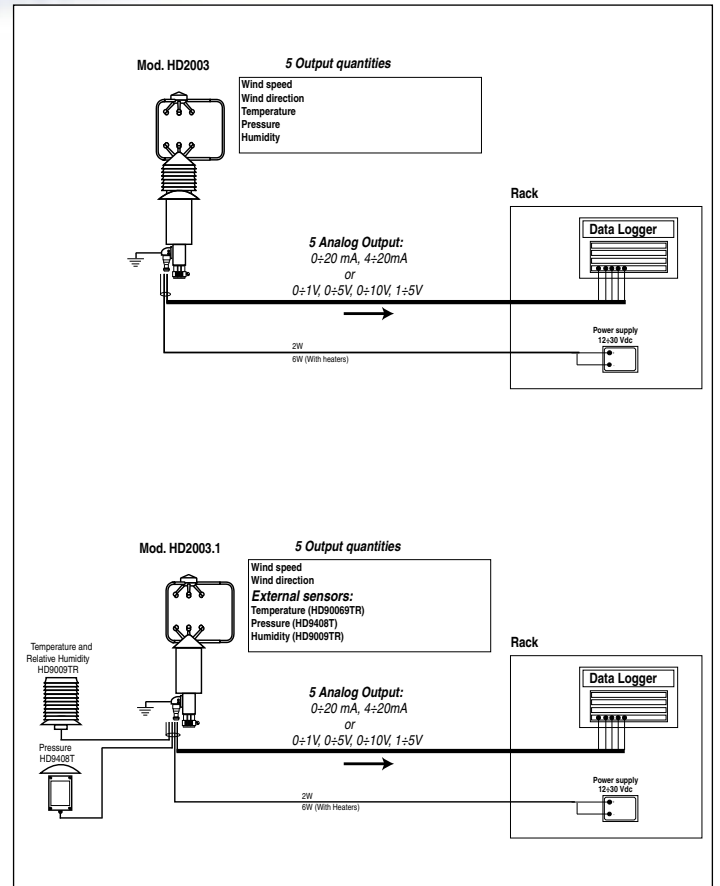
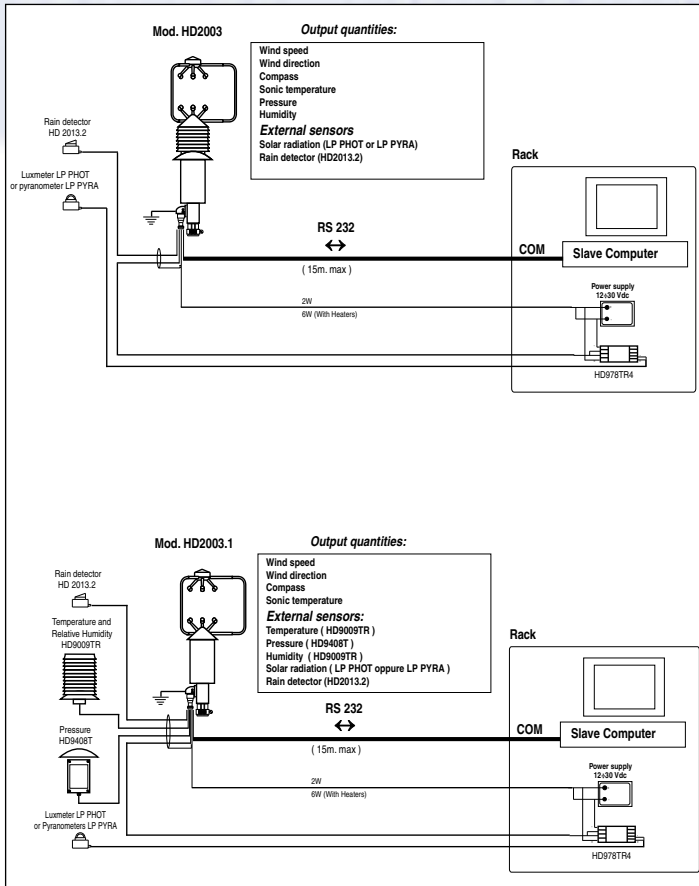
Normal functioning mode: 1 ÷ 3600 sec

Digital high frequency: 1/50 sec

- Measured data

Digital string of anemometric quantities and compass  
**(Model HD2003)** Pressure, temperature, relative humidity





### Relative Humidity

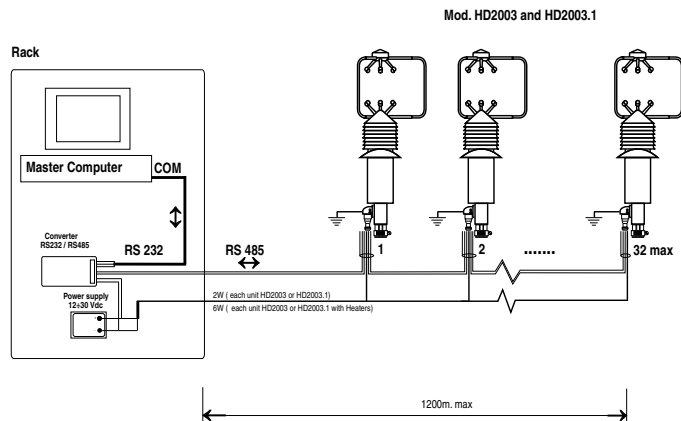
Capacitive sensor

Analog output ( 0 ÷ 100% RH): 0÷20mA, 4÷20mA, 0÷1V, 0÷5V, 1÷5V, 0÷10V

Range: 0 ÷ 100% RH

Resolution 0.1 % RH

Accuracy ± 2.5% RH @ 23°C



### Analog Outputs

- Number 5, selectable between all available output quantities
- Range 0÷20mA, 4÷20mA, 0÷1V, 0÷5V, 1÷5V, 0÷10V
- Resolution 14 bit max

### Power supply

- Range 12 ÷ 30 VDC
- Power <2W (typically 110mA @ 15Vdc)  
<6W Models with heaters and environment temperature not lower than  $\bar{n}$ 10°C

### Heaters (On request at the time of placing the order)

Heating with automatic temperature control on sonic transducers, to prevent ice and snow formation.

### Temperature, Relative Humidity, and Pressure Sensors (Model 2003)

#### Temperature

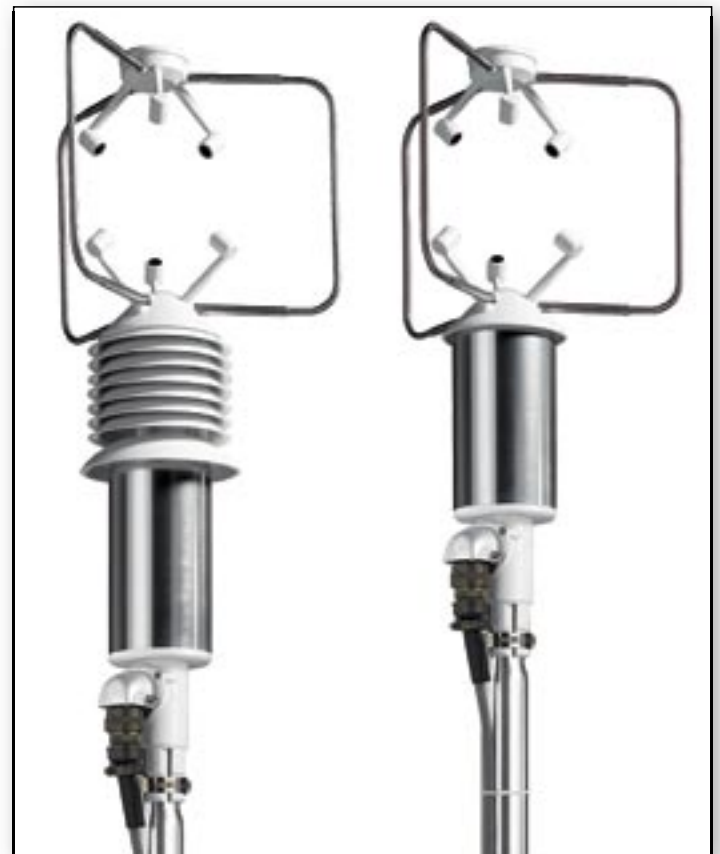
Pt100 sensor

Analog output 0÷20mA, 4÷20mA, 0÷1V, 0÷5V, 1÷5V, 0÷10V

Range: -40 + 60°C

Resolution 0.1°C

Accuracy ± 0.2°C, ± 0.15°C of reading



HD 2003

HD 2003.1



### Pressure

Piezoresistive sensor

Analog output: 0÷20mA, 4÷20mA, 0÷1V, 0÷5V, 1÷5V, 0÷10V

Range 800 ÷ 1100 mbar (On request: 600 ÷ 1100 mbar)

Resolution 0.1mbar

Accuracy ± 0.4mbar @ 20°C

Thermic effects ± 0.8mbar from -40°C up to +60°C

Long-term stability < 0.2% f.s. in 6 months @ 20°C

### Order codes:

**HD2003:** Three-Axis Ultrasonic Anemometer with internal sensors of Temperature - Relative Humidity - Pressure

**HD2003.R:** Heaters Option for Three-Axis Ultrasonic Anemometer with internal sensors of Temperature - Relative Humidity - Pressure

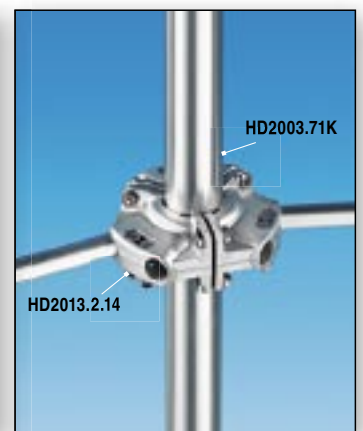
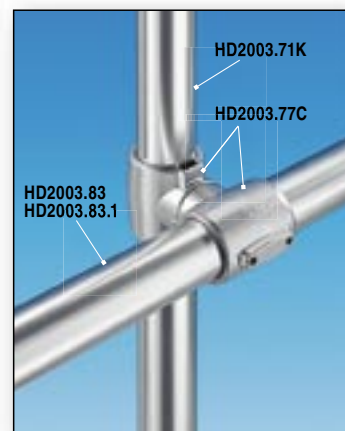
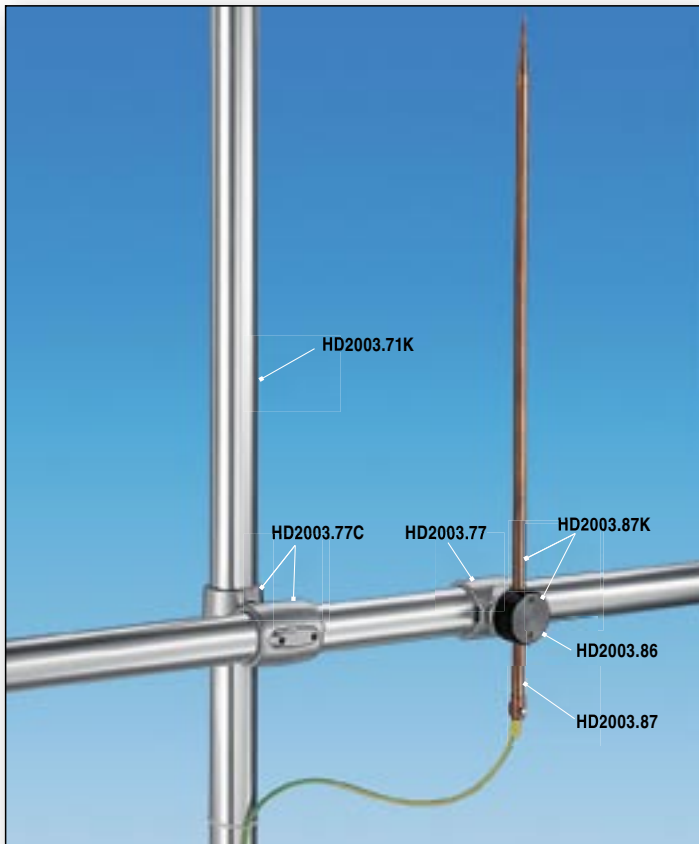
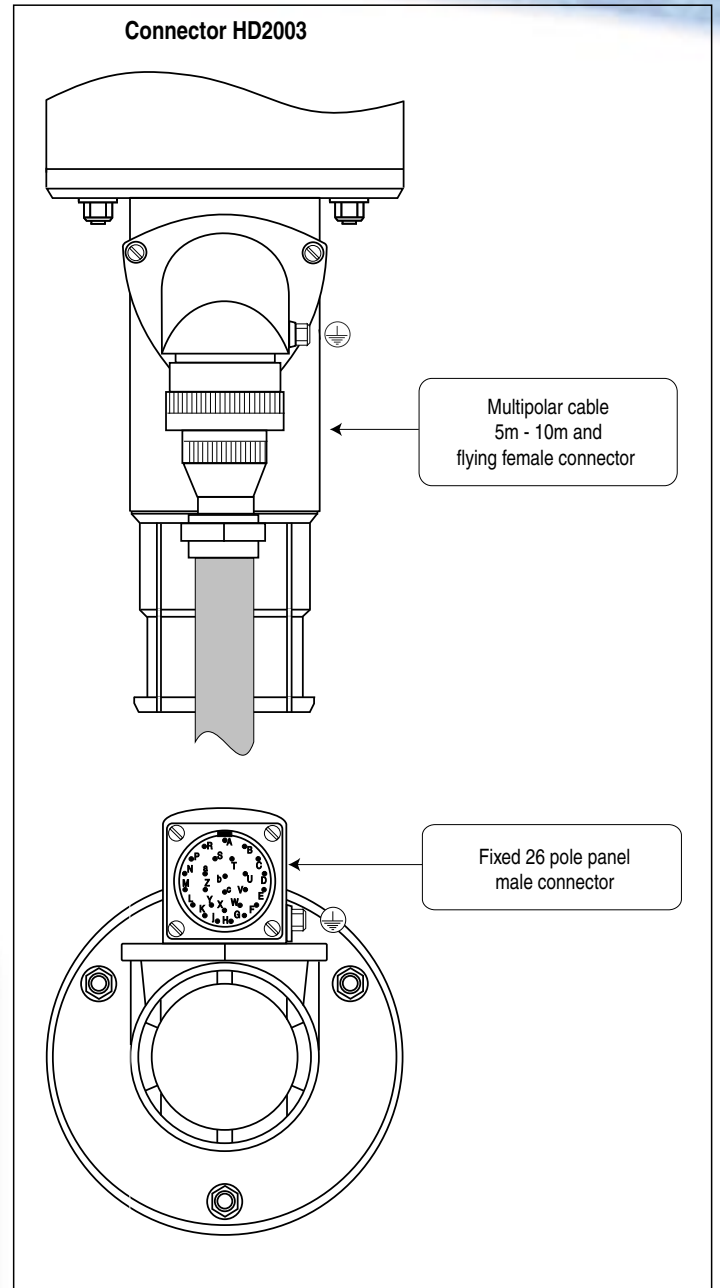
**HD2003.1:** Three-Axis Ultrasonic Anemometer

**HD2003.1R:** Heaters Option Three-Axis Ultrasonic Anemometer

**CP2003.5:** Cable Ø = 8mm, length=5m, with 26 poles shielded plug (only on one end)

**CP2003.10:** Cable Ø = 8mm, length=10m, with 26 poles shielded plug (only on one end)

**CP2003.C:** 26 poles plug Tyco 62IN-16A-16-26S-4 0445



Please specify also the following:

- **Model HD2003:** optional range of pressure sensor 600 ÷ 1100 mbar (Factory Default = 800 ÷ 1100 mbar)
- **Model HD2003:** if you need to employ additional output quantities, by external sensors with analog output 0÷1V. In order to linearize their range on the scale 0÷1V, it is necessary to specify in this case the number of sensors that you intend to employ (max. two), and their physical range.
- **Model HD2003.1:** if you need to employ additional external sensors with analog output 0÷1V. In order to linearize their range on the scale 0÷1V, it is necessary to specify in this case the number of sensors that you intend to employ (max. five), and their physical range.