



**HD 2003, HD 2003.1
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 ± 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 **demo 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.

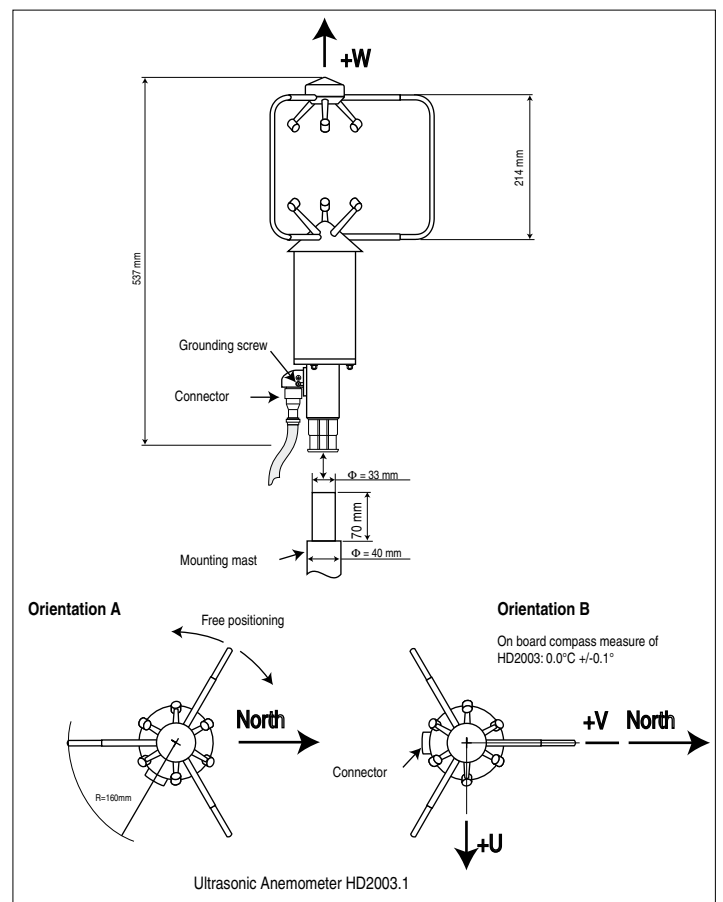
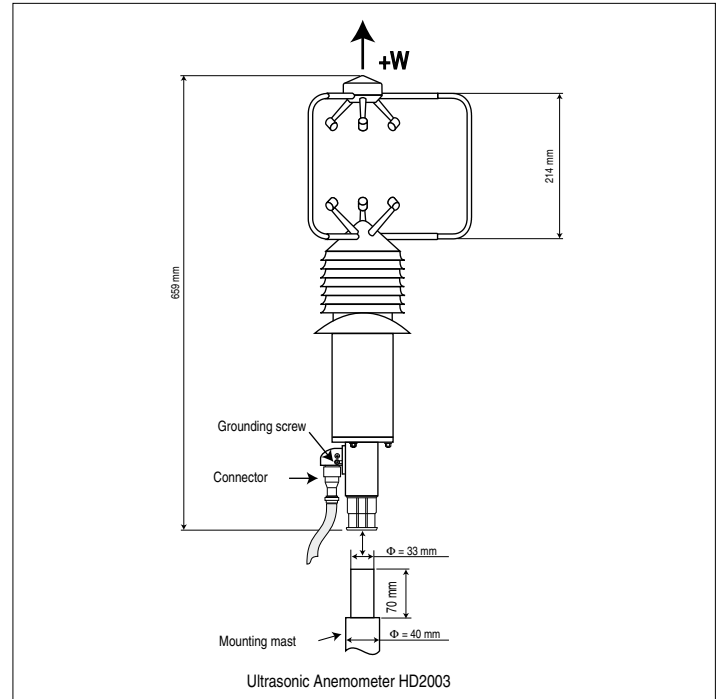
Typical applications:

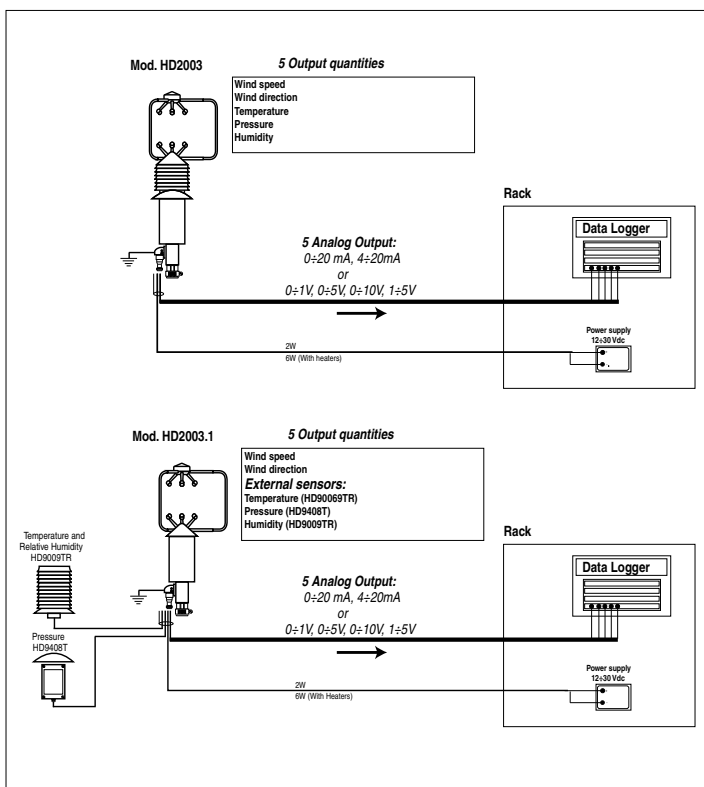
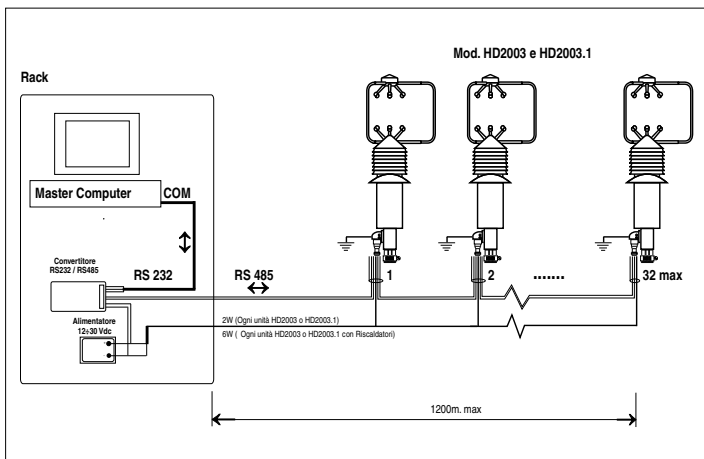
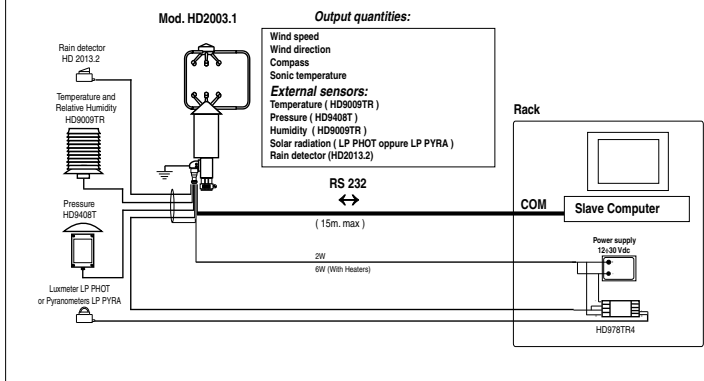
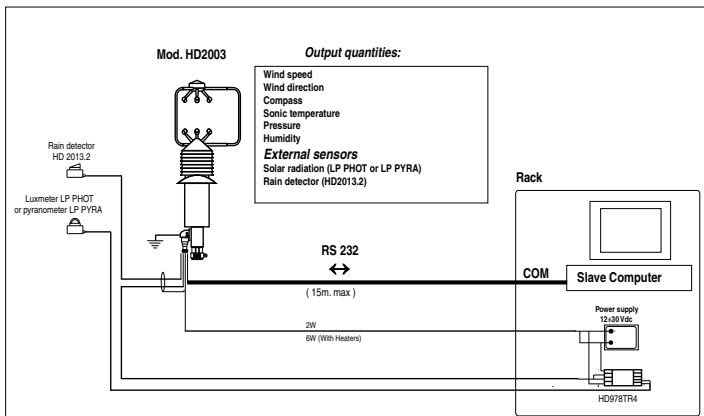
- Meteorology
- Aviation and Navigation
- Tunnels, Highways
- Climatology
- Sport and winter stations
- Safety in yards
- Industrial buildings

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÷3600 sec. or 1/50 sec. (RS232 or RS485)





Wind Speed

- Measuring unit m/s, cm/s, km/h, knots, mph
- Range 0÷65 m/s (234 km/h)
- Resolution 0.01 m/s
- Accuracy ± 1% of reading

Wind Direction

- Range Azimuth: 0÷360° Elevation: ± 60°
- Resolution 0.1°
- Accuracy ± 1°

Sound speed

- Range 300 ÷ 380 m/s
- Resolution 0.01 m/s
- Accuracy ± 1% of reading

Sonic Temperature

- Range -40 + 60°C
- Resolution 0.1°C
- Accuracy ± 1°C

Compass

- Range 0 ÷ 360°
- Resolution 0.1°
- Accuracy ± 1°

Digital Outputs

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

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 $\bar{n}10^{\circ}\text{C}$

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

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% RH @ 23°C un the range 5÷90%RH, 2.5% in the remaining range.

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: Static anemometer for measuring the speed and direction of wind, air temperature, relative humidity and barometric pressure. Wind speed and direction, U-V-W Cartesian Components of speed, sound speed, sonic temperature. Five different analogue voltage or current outputs for different ranges. Communication software for bi-directional links for net connection of different anemometers, interfaces available RS-232 and RS-485. Different measuring units and average periods are available. Ultrasonic transducers heating as optional. 12..30 Vdc power supply, 120mA consumption at 15Vdc. To be mounted on a mast diam.33mm. Flying connector included.

HD2003R: Transducers heating option for HD 2003 against ice or snow.

HD2003.1: Static anemometer for measuring the speed and direction of wind. Wind speed and direction, U-V-W Cartesian Components of speed, sound speed, sonic temperature.

Five different analogue voltage or current outputs for different ranges. Communication software for bi-directional links for net connection of different anemometers, interfaces available RS-232 and RS-485. Different measuring units and average periods are available. Transducers heating as optional. 12...30 Vdc power supply, 120mA consumption at 15Vdc. To be mounted on a mast diam.33mm. Flying connector included.

- HD200.1R:** Transducers heating option for HD 2003.1 against ice or snow.
- CP2003/5:** 26-pole shielded cable diam. 8mm, length 5m. complete with watertight connector at one side and free at the other end.
- CP2003/10:** 26-pole shielded cable diam. 8mm, length 10m. complete with watertight connector at one side and free at the other end.
- CP2003/C:** Watertight 26-pole connector Tyco 62IN- 16A - 16 - 265 - 4 0445
- HD2003.77:** Clamping for mast Ø 40mm
- HD2003.77C:** 2 crossed sleeves for tube Ø 40mm
- HD2003.1.14:** Crossed clamping for mast Ø 40mm with 6 inputs Ø 16mm
- HD2003.2.17:** Support rod for sensors Ø 16mm, length 500mm
- HD2003.71K:** Mast kit Ø 40mm, height 2m, in two pieces, Ø 33mm tapered tip (HD2003.71, HD2003.72, HD2003.73)
- HD2003.74:** Clamping with bubble level for Ø 40mm mast with 3 bracing tie rods
- HD2003.75:** Flange for Ø 40mm mast with grounding rod.
- HD2003.75K:** Accessories kit for bracing the mast, to fix on the ground (HD2003.80, HD2003.82 - stainless steel strings). 2m fixing diameter.
- HD2003.78:** Flange plate for Ø 40mm mast to fasten on the floor
- HD2003.78K:** Accessories kit for bracing the mast, to fasten on the floor (HD2003.81, HD2003.82- stainless steel strings). 2m fixing diameter.
- HD2003.79K:** Fixing kit to mount pyranometers on clamping Ø 40mm (HD2003.77 - HD2003.79)
- HD2003.83:** Transverse mast L=150 cm
- HD2003.83.1:** Transverse mast L=75 cm
- HD2003.85K:** Fixing kit with adjustable height to mount pyranometers on Ø 40mm mast (HD2003.84 - HD2003.85 - HD2003.79)

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.

