



THREE AXIS ULTRASONIC ANEMOMETER

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

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

Analog I/O:

- 4 analog input channels
- 4 analog output channels high resolution different voltage ranges

Communication Interface:

- RS232C serial output, RS485 multidrop
- RS485 connections option of a network of anemometers with 'on demand' data transmission for bidirectional link

Reliable, versatile, easy to use operating software which can be RS232C configured from the PC of the user according to his needs.

Data storing in different measuring units and times of average.

Autotest with checking and errors report

Software updating by RS232C or RS485

Reliable instrument, accurated in the whole measuring range, no moving parts then maintenance is not necessary.

Option for heating the ultrasonic sensors to avoid ice or snow coats.

Typical applications:

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

TECHNICAL SPECIFICATIONS

Ultrasonic Measurements.

- Parameters U-V-W, Strength and Direction of wind, Sound Speed, Sonic Temperature
- Unit of Measurement m/s, cm/s, Km/h, Knots, mph
- Averages 1 ÷ 60 sec. / 1÷60 min.
- Output rate 1 Hz accuracy ± 1% (after elaboration and validation of raw data).
- Protocols Custom, DacXnd (Extended analog outputs)

Wind Speed

- Range 0 – 60 m/s (216 km/h)
- Resolution 0.01 m/s
- Accuracy ± 1% of reading

Wind Direction

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

Sonic 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

Digital Outputs

- Communications RS-232 full duplex, Multidrop RS-485 half duplex
- Baud Rate 9600 – 115200 bit/sec.
- Output Rate 1 – 3600 sec. (RS232 and DacXnd in RS485)
- Measured data 2 separate strings between anemometric quantities and quantities present at analog inputs.

Analog Outputs

- Number 4 selectable: U, V, W, SoS or azimuth/elevation/SoW/°C +3 (**HD2003 model**): Temperature, Relative Humidity, Pressure.
- Range 0-1V, (on demand: 0-5V, 1-5V, 0-10V) **HD2003** Temperature, Relative Humidity, Pressure: 0÷1V (0÷5V on request)
- Resolution 12 bits
- Extended analog outputs (On requets with module ICP DAS I-7024® when placing the order).

- Number 4 selectable between all measured quantities (anemometric and analog inputs)
- Range 0÷20 mA, 4÷20mA, 0÷10V, -10+10V, 0÷5V, -5+5V.
- Resolution 14 bits

Analog Inputs

- Number 4
- Range 0-1V, (on demand: 0÷5V, 1÷5V, 0÷10V)
- Averages 1÷60 sec. / 1÷60 min.
- Resolution 12 bits

Power supply

- Range 12 – 30 Vdc
- Power <2W (typically 120mA @ 15Vdc)
- <6W Models with heaters and environment temperature not lower than -10°C

Heaters (On demand at the time of placing the order)

Heating with automatic temperature control on sonic transducers.

Model HD2003: Temperature – Relative humidity - Pressure Sensors

Temperature	Relative humidity	Pressure
Pt100 sensor	Capacitive	Piezoresistive sensor
0÷1Vdc analog output (0÷2V on request)	0÷1Vdc analog output (0% ÷ 100% RH) (0÷5V on request)	0÷1Vdc analog output (0÷5V on request)
Range: -40 + 60°C	Range: 0÷100% RH	Range: 800÷1100mbar (600÷1100mbar on request)
Resolution 0.1°C	Resolution 0.1%	Resolution: 0.1mbar
Accuracy ± 0.2°C	Accuracy ± 2.5% @23°C	Accuracy ±0.4mbar @20°C
± 0.15°C of the reading		Thermic effects ± 0.8mbar between -40°C and +60°C
		Long-term stability <0.2%F.S. in 6 months @ 20°C

Size

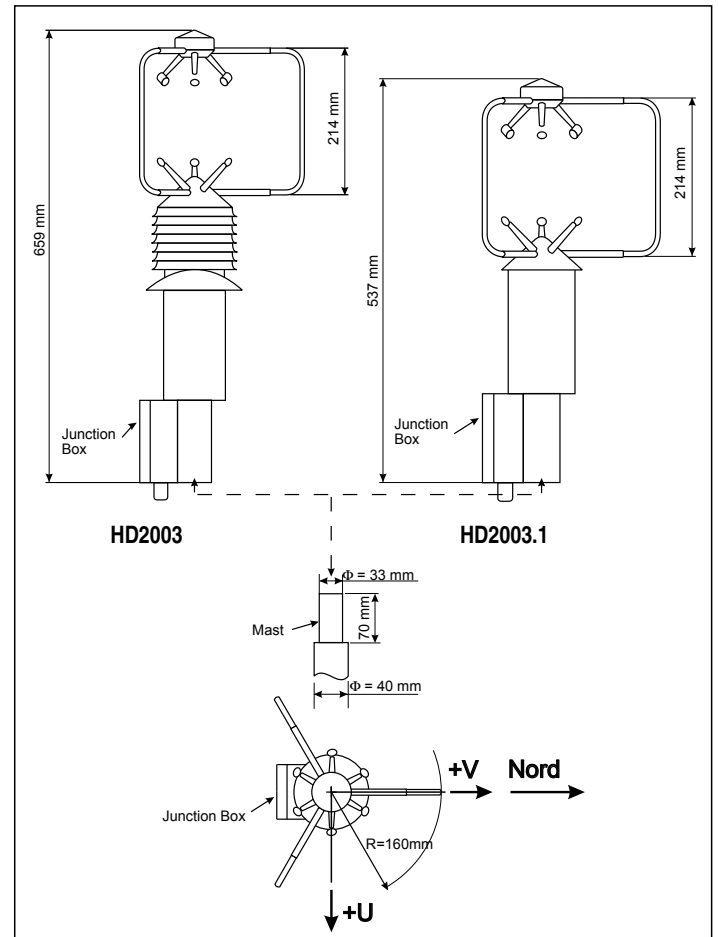
See drawing below

Weight

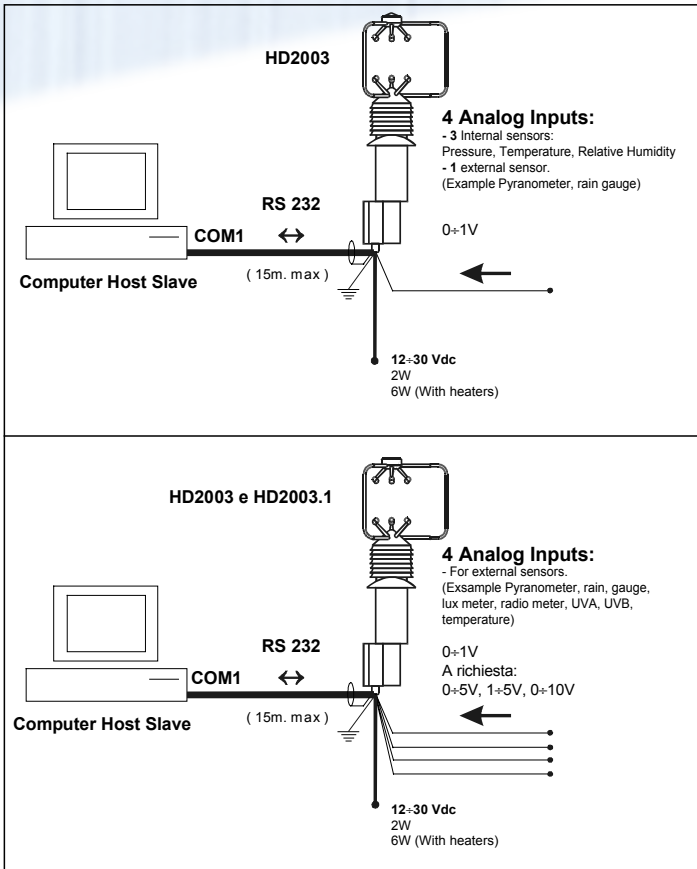
- HD2003: 2.2kg
- HD2003.1: 1.6kg

Environmental Conditions

- Temperature Range -40 +60°C
- EMC CE Regulations
- Precipitations Operation assured up to 300 mm/hr
- Humidity 0% - 100% RH

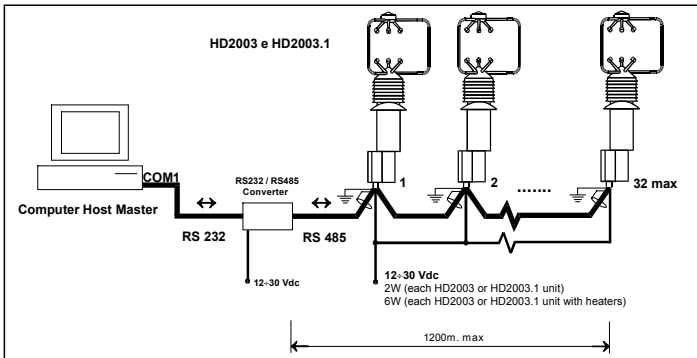


RS232 Serial Communication Example



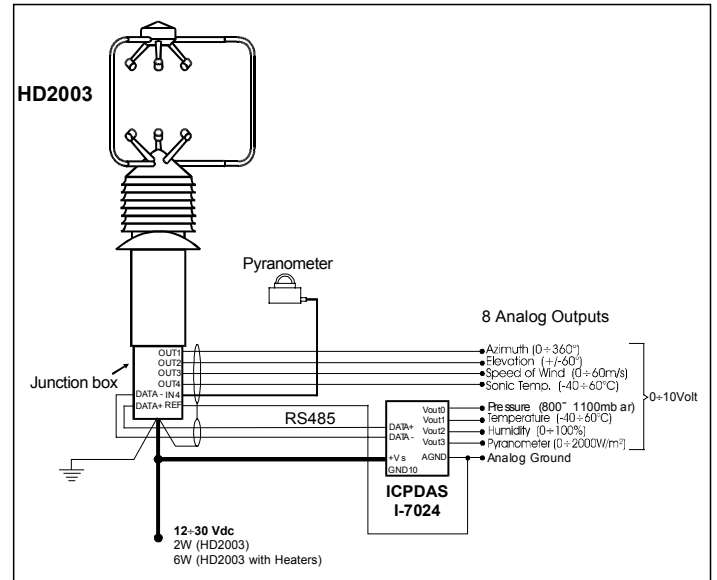
(HD2003 Model) In this second example, the three Analog Outputs of the Temperature, Relative Humidity and Pressure sensors are also available (0÷1V, on request 0÷5V).

RS485 Multidrop Communication Example

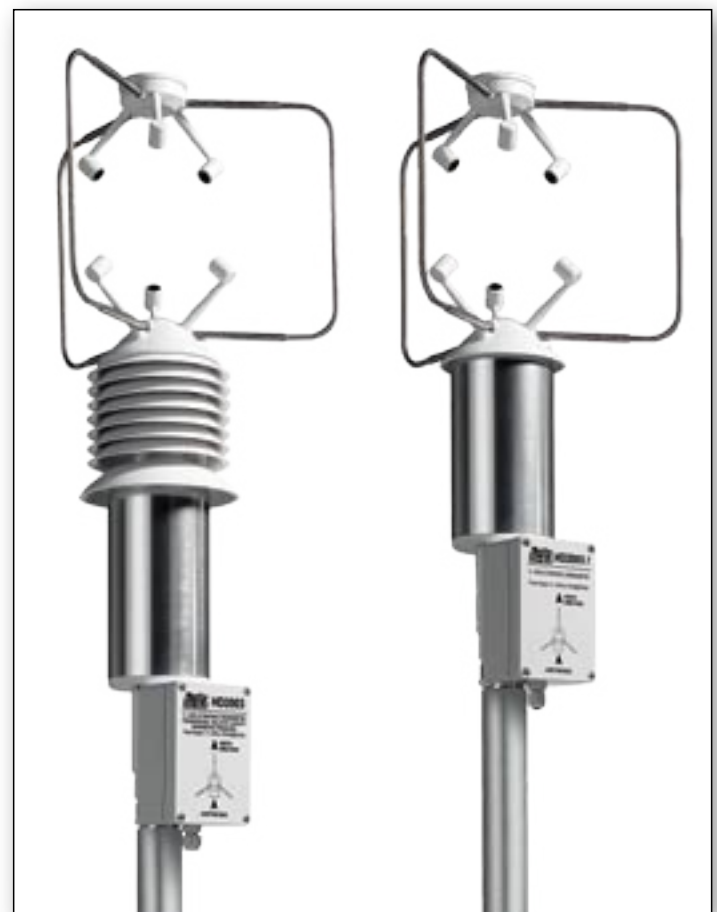


The Analog Input and Output connections remain as indicated in the RS232 Serial mode
 The ICP DAS I-7520 ® module (supplied on request) can be used as RS232/RS485 converter.

Extended Analog Outputs Example



In this example the Extended Analog Outputs mode is used in combination with Analog Outputs, for a total of 8 analog output channels available. The first 4 channels are gotten directly from the HD2003 junction box, and give an analog conversion in the range 0÷10V (supplied on request) of the anemometric quantities Azimuth, Elevation, Wind speed, Sonic temperature. Then there are 4 additional channels on the output terminals of the ICP DAS I-7024 ® module (supplied on request), that represent Pressure, Temperature, Relative Humidity, Solar Radiation.

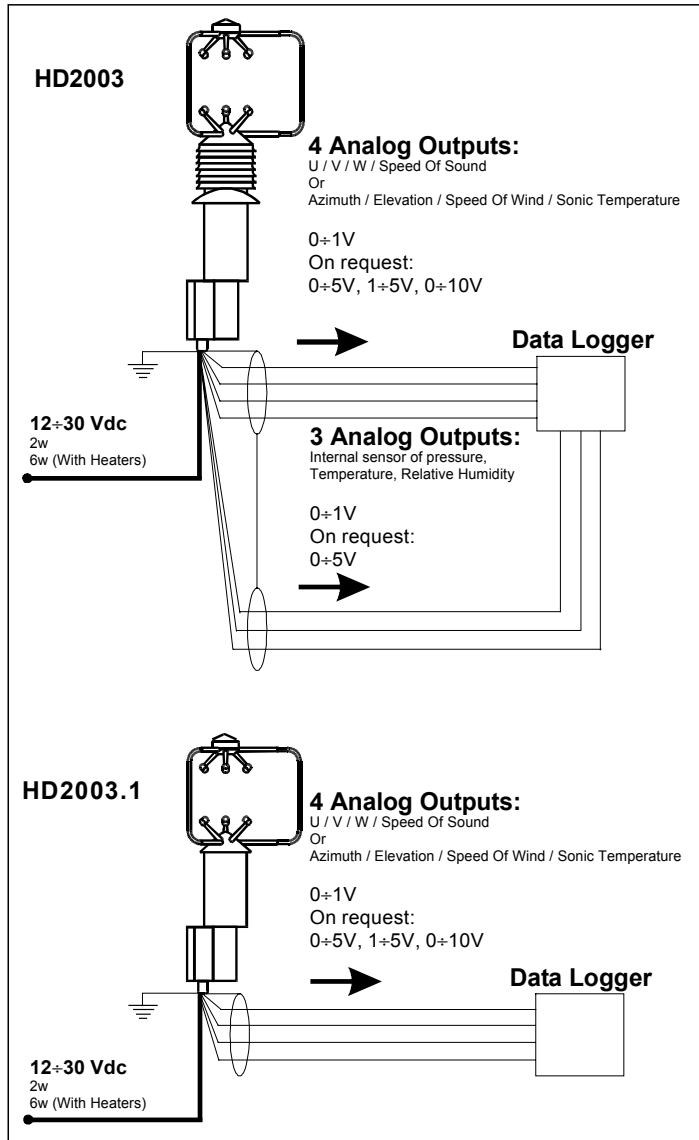


HD 2003

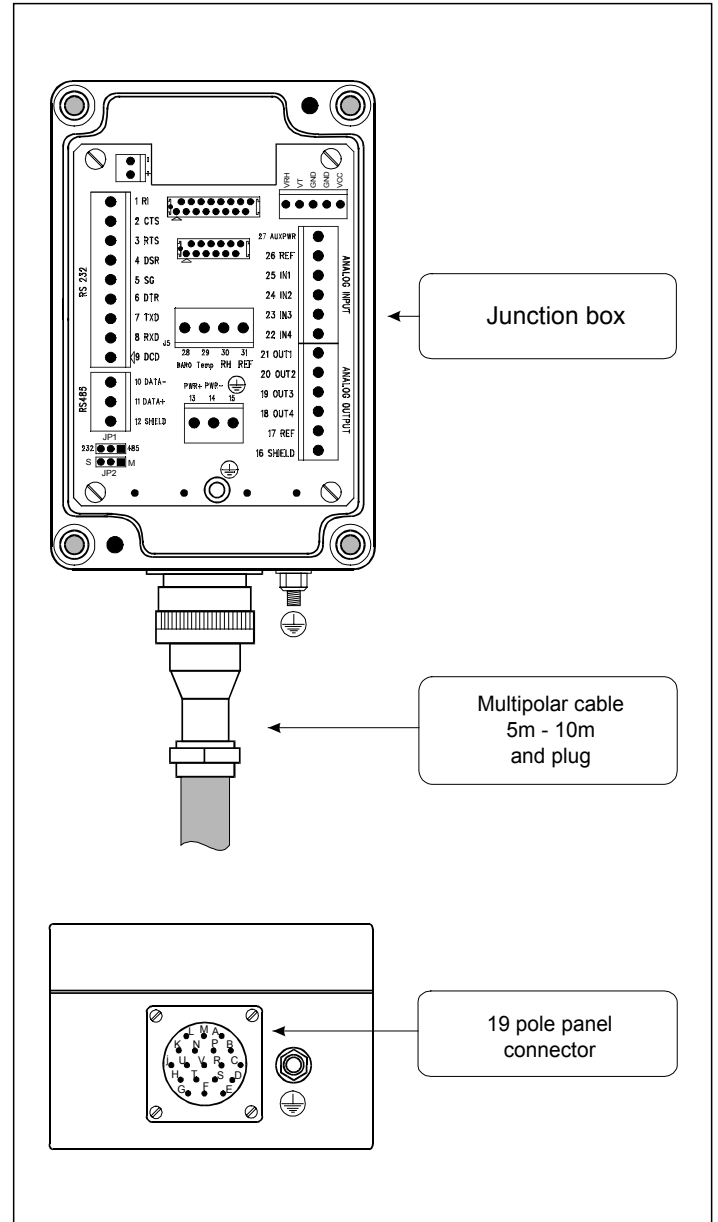
HD 2003.1

Analog Output Mode

The Analog Output mode is always active and is combined with RS232 Serial Communication, RS485 Multidrop and Extended Analog Outputs mode.



HD2003 junction box and cable



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 $\Phi=8\text{mm}$, length=5m, with 19 poles shielded plug (only on one end)
- CP2003.10** Cable $\Phi=8\text{mm}$, length=10m, with 19 poles shielded plug (only on one end)
- CP2003.C** 19 poles plug Tyco 62IN-15A-14-19S-023-4 0402 (for plug pin configuration, see Fig.1 – HD2003 junction box and cable)

Please specify also if you wish to receive the following:

- The ICP DAS I-7024 @ module remote interface specifying which range 0÷20 mA / 4÷20mA / 0÷10V / -10 +10 V / 0÷5V / -5 +5V
- The Analog Input Range 0 ÷ 5V / 1 ÷ 5V / 0 ÷ 10V (Factory Default = 0 ÷ 1V)
- The Analog Output Range 0 ÷ 5V / 1 ÷ 5V / 0 ÷ 10V (Factory Default = 0 ÷ 1V)
- HD2003 Model: The Analog Output Range sensors of Temperature – Relative Humidity – Pressure 0 ÷ 5V (Factory Default = 0 ÷ 1V)
- HD2003 Model: The Pressure Range sensor 600 ÷ 1100 mbar (Factory Default = 800 ÷ 1100 mbar)
- RS232/RS485 - ICP DAS I-7520 @ Converter