



## Air speed



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Air speed



## HD 2103.1 HD 2103.2



### HD 2103.1 HD 2103.2 THERMO-ANEMOMETERS

The **HD2103.1** and **HD2103.2** are portable instruments with a large LCD display. They are designed for use in the fields of air conditioning, heating, ventilation and environmental comfort. They use hot-wire or vane probes to measure air speed, flow rate, and temperature inside pipelines and vents. Temperature only is measured by immersion, penetration air or contact probes. The temperature sensor used can be chosen from the Pt100, Pt1000.

The probes are equipped with the SICRAM module, with the factory calibration data stored inside.

The HD2103.2 instrument is a **datalogger**. It stores up to 38,000 samples which can be transferred from the instrument to a PC connected via the RS232C and USB 2.0 serial ports. The storing interval, printing and baud rate can be configured using the menu.

The HD2103.1 and HD2103.2 models are equipped with an RS232C serial port and can transfer the acquired measurements in real time to a PC or to a portable printer. The *Max*, *Min* and *Avg* function calculate the maximum, minimum or average values. Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off that can be excluded.

**The instruments have IP66 protection degree.**

### INSTRUMENT TECHNICAL CHARACTERISTICS

#### Instrument

Dimensions	185x90x40mm
Weight	470g (complete with batteries)
Materials	ABS, rubber
Display	2x4½ digits plus symbols Visible area: 52x42mm

#### Operating conditions

Operating temperature	-5...50°C
Storage temperature	-25...65°C
Working relative humidity	0...90%RH without condensation
Protection degree	IP66

#### Power supply

Batteries	4 1.5V type AA batteries
Autonomy (*)	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	20µA
Mains	Output mains adapter 12Vdc / 1000mA

#### Measuring units

°C - °F - m/s - km/h - ft/min - mph - knot -
l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min
WCT

#### Security data stored

Unlimited, independent of battery charge conditions

#### Time

Date and time	In real time
Accuracy	1min/month max drift

#### Measured values storage - model HD2103.2

Type	2000 pages containing 19 samples each
Quantity	Total of 38000 samples
Storage interval	1,5,10,15,30s; 1,2,5,10,15,20,30min; 1hour

#### Serial interface RS232C

Type	RS232C electrically isolated
Baud rate	Can be set from 1200 to 38400 baud
Data bit	8
Parity	None
Stop bit	1
Flow Control	Xon/Xoff
Serial cable length	Max 15m
Print interval	Immediate or 1,5,10,15,30s; 1,2,5,10,15,20,30min; 1hour

#### USB interface - model HD2103.2

Type	1.1 - 2.0 electrically isolated
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#### Connections

Input module for the probes	8-pole male DIN45326 connector
Serial interface	8-pole MiniDin connector
USB Interface	Mini USB type B
Mains adapter	2-pole connector (positive at centre)

#### Measurement of temperature by Instrument

Pt100 measurement range	-200...+650°C
Pt1000 measurement range	-200...+650°C
Resolution	0.1°C
Accuracy	±0.1°C
Drift after 1 year	0.1°C/year

(\*) It's referred to all the probes except the hot wire ones, which autonomy is stated in the next pages



**PROBES AND MODULES TECHNICAL DATA EQUIPPED WITH INSTRUMENT**  
Wind speed measurement probes

**Hot-wire probes: AP471 S1 - AP471 S2 - AP471 S3 - AP471 S4**

	AP471 S1 - AP471 S3	AP471 S2	AP471 S4
Type of measure	Air speed, calculated flow rate, air temperature		
Type of sensor			
Speed	NTC thermistor	Omnidirectional NTC thermistor	
Temperature	NTC thermistor	NTC thermistor	
Measurement range			
Speed	0,1...40m/s	0,1...5m/s	
Temperature	-25...+80°C	-25...+80°C	0...80°C
Measurement resolution:			
Speed	0.01 m/s 0.1 km/h 1 ft/min 0.1 mph 0.1 knot		
Temperature	0.1°C		
Measurement accuracy:			
Speed	±0.2 m/s (0...0.99 m/s)	±0.2m/s (0...0.99 m/s)	
	±0.4 m/s (1.00...9.99 m/s)	±0.3m/s (1.00...5.00 m/s)	
	±0.8 m/s (10.00...40.0 m/s)		
Temperature	±0.8°C (-10...+80°C)	±0.8°C (-10...+80°C)	
Minimum speed	0.1 m/s		
Air temperature compensation	0...80°C		
Sensor working conditions	Clean air, RH<80%		
Battery life	Approx. 20 hours @ 20 m/s with alkaline batteries	Approx. 30 hours @ 5 m/s with alkaline batteries	
Unit of Measurement			
Speed	m/s – km/h – ft/min – mph – knot		
Flow rate	l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min		
Pipeline section for flow rate calculation	0.0001...1.9999 m²		
Cable length	~2m		

**Vane probes: AP472 S1 - AP472 S2**

	AP472 S1	AP472 S2
Type of measure	Air speed, calculated flow rate, air temperature	Air speed, calculated flow rate
Diameter	100mm	60mm
Type of measurement		
Speed	Vane	Vane
Temperature	K thermocouple	----
Measurement range		
Speed (m/s)	0.6...25	0.5...20
Temperature (°C)	-25...+80 (*)	
Resolution		
Speed	0.01 m/s 0.1 km/h 1 ft/min 0.1 mph 0.1 knot	
Temperature	0.1°C	----
Accuracy		
Speed	±(0.4 m/s +1.5%f.s.)	±(0.4 m/s +1.5%f.s.)
Temperature	±0.8°C	----
Minimum speed	0.6m/s	0.5m/s
Unit of Measurement		
Speed	m/s – km/h – ft/min – mph – knot	
Flow rate	l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min	
Pipeline section for flow rate calculation	0.0001...1.9999 m²	
Cable length	~2m	

(\*) The indicated value refers to the vane's working range.

**TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT**  
Temperature probes Pt100 sensor with SICRAM module

Model	Type	Application field	Accuracy
TP472I	Immersion	-196°C...+500°C	±0.25°C (-196°C...+300°C) ±0.5°C (+300°C...+500°C)
TP472I.0 1/3 DIN Thin Film	Immersion	-50°C...+300°C	±0.25°C (-50°C...+300°C)
TP473P.I	Penetration	-50°C...+400°C	±0.25°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)
TP473P.0 1/3 DIN Thin Film	Penetration	-50°C...+300°C	±0.25°C (-50°C...+300°C)
TP474C.I	Contact	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)
TP474C.0 1/3 DIN Thin Film	Contact	-50°C...+300°C	±0.3°C (-50°C...+300°C)
TP475A.0 1/3 DIN Thin Film	Air	-50°C...+250°C	±0.3°C (-50°C...+250°C)
TP472I.5	Penetration	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)
TP472I.10	Penetration	-50°C...+400°C	±0.30°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)
TP49A.0 Class A Thin Film	Immersion	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP49AC.0 Class A Thin Film	Contact	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP49AP.0 Class A Thin Film	Penetration	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP875.I	Globe-thermometer Ø150mm	-30°C...+120°C	±0.25°C
TP876.I	Globe-thermometer Ø50mm	-30°C...+120°C	±0.25°C
TP87.0 1/3 DIN Thin Film	Immersion	-50°C...+200°C	±0.25°C
TP878.0 1/3 DIN Thin Film	Photovoltaic	+4°C...+85°C	±0.25°C
TP878.1.0 1/3 DIN Thin Film			
TP879.0 1/3 DIN Thin Film	Compost	-20°C...+120°C	±0.25°C

*Common characteristics*

Temperature drift @ 20°C      0.003%/°C

**4 wire Pt100 and 2 wire Pt1000 Probes**

Model	Type	Application range	Accuracy
TP47.100.0	Pt100 4 wires	-50...+250°C	1/3 DIN
TP47.1000.0	Pt1000 2 wires	-50...+250°C	1/3 DIN

*Common characteristics*

Temperature drift @ 20°C      0.003%/°C

Pt100      0.003%/°C

Pt1000      0.005%/°C



Air speed

## ORDERING CODES

**HD2103.1:** The kit consists of the instrument HD2103.1, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **Probes and cables must be ordered separately.**

**HD2103.2:** The kit consists of the HD2103.2 **datalogger**, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **Probes and cables must be ordered separately.**

**HD2110CSNM:** 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.

**C.206:** Cable to connect the instruments HD21...1 directly to the USB port of the PC.

**CP23:** Connection cable USB 2.0 connector type A - Mini USB type B

**DeltaLog9:** Software for download and management of the data on PC using Windows operating systems.

**SWD10:** Stabilized power supply at 230Vac/12Vdc-1000mA mains voltage.

**HD40.1:** Portable, serial input, 24 column thermal printer, 58mm paper width. It uses the cable HD2110 CSNM (optional).

### Probes complete with SICRAM module AIR speed measurement probes

#### Hot-wire PROBES:

**AP471 S1:** Hot-wire telescopic probe, measuring range: 0.1...40m/s. Cable 2 metres long.

**AP471 S2:** Omnidirectional hot-wire probe, measuring range: 0.1...5m/s. Cable 2 metres long.

**AP471 S3:** Hot-wire telescopic probe with terminal tip for easy position, measuring range: 0.1...40m/s. Cable 2 metres long.

**AP471 S4:** Omnidirectional hot-wire telescopic probe with base, measuring range: 0.1...5m/s. Cable 2 metres long.

#### Vane probes:

**AP472 S1:** Vane probe with K thermocouple, Ø 100mm. Speed from 0.6 to 25m/s; temperature from -25 to 80°C. Cable 2 metres long.

**AP472 S2:** Vane probe, Ø 60mm. Measurement range: 0.5...20m/s. Cable 2 metres long.

### Temperature probes equipped with SICRAM module

**TP472I:** Immersion probe, Wire Wound Pt100 sensor. Stem Ø 3 mm, length 300 mm. Cable 2 meters long.

**TP472I.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 3 mm, length 230 mm. Cable 2 meters long.

**TP473P.I:** Penetration probe, Wire Wound Pt100 sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long.

**TP473P.0:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long.

**TP474C.I:** Contact probe, Wire Wound Pt100 sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long.

**TP474C.0:** Contact probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long.

**TP475A.0:** Air probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 230mm. Cable 2 meters long.

**TP472I.5:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 6mm, length 500 mm. Cable 2 meters long.

**TP472I.10:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 6mm, length 1000mm. Cable 2 meters long.

**TP49A.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP49AC.0:** Contact probe, Thin Film Pt100 sensor. Stem Ø 4 mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP49AP.0:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP875.I:** Globe thermometer Ø 150 mm with handle. Wire Wound Pt100 sensor complete of SICRAM module. Cable 2 meters long.

**TP876.I:** Globe thermometer Ø 50 mm with handle. Wire Wound Pt100 sensor complete of SICRAM module. Cable 2 meters long.

**TP877.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 3 mm, length 70 mm. Cable 2 meters long.

**TP878.0:** Contact probe for solar panels. Thin Film Pt100 sensor. Cable 2 meters long.

**TP878.1.0:** Contact probe for solar panels. Thin Film Pt100 sensor .Cable 5 meters long

**TP879.0:** Penetration probe for compost. Thin Film Pt100 sensor. Stem Ø 8 mm, length 1000mm. Cable 2 meters long.

### Temperature probes without SICRAM module

**TP47.100.0:** 4 wire direct Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. Connection cable 4 wires with connector, length 2 metres.

**TP47.1000.0:** Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. Connection cable 2 wires with connector, length 2 metres.

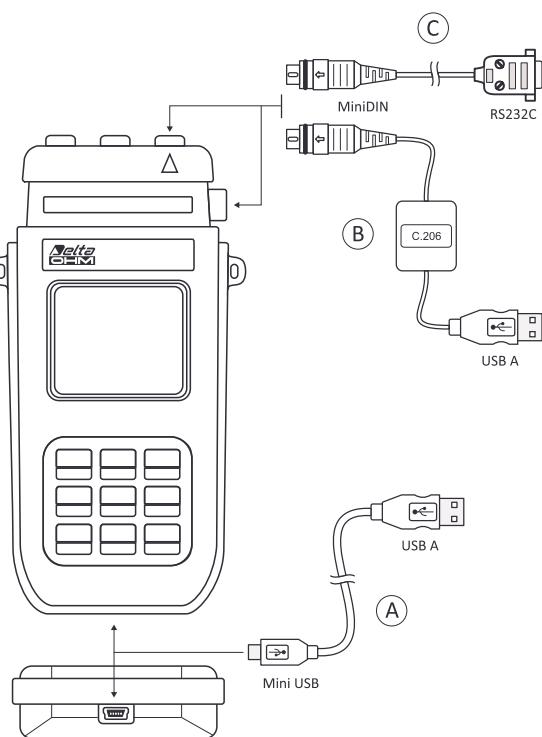
**TP47:** Only connector for probe connection: direct 4 wires Pt100 and 2 wires Pt1000.

**A** To the portable data loggers of the series **HD21....2** a serial port mini USB type HID (Human Interface Device) has been inserted.

For the connection to a PC with the cable USB type A - MiniUSB type B code CP23, **it is not necessary to load any driver USB.**

**B** For the connection of the models HD21....1 to the USB port of a PC, is necessary the USB/serial **converter C.206**. The converter is supplied with its own drivers which must be installed before the connection of the converter to the PC.(see details in the Cd-Rom supplied with the converter).

**C** The port with the miniDin connector in all included models, is a serial port type RS232C. The serial port RS232C of a PC or the printer HD40.1 can be connected by the cable HD2110CSNM.





## **HD 2303.0 THERMO-ANEMOMETER**

The **HD2303.0** is a portable instrument with a large LCD display. It is designed for use in the fields of air conditioning, heating, ventilation and environmental comfort. It uses hot-wire or vane probes to measure air speed, flow rate, and temperature inside pipelines and vents. Temperature only is measured by immersion, penetration air or contact probes. The temperature sensor used can be chosen from the Pt100, Pt1000.

The probes are equipped with the SICRAM module, with the factory calibration data stored inside. The *Max*, *Min* and *Avg* function calculate the maximum, minimum or average values. Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off that can also be excluded.

The instruments have IP67 protection degree.

### **INSTRUMENT TECHNICAL CHARACTERISTICS**

#### *Instrument*

Dimensions (Length x Width x Height)	140x88x38mm
Weight	160g (complete with batteries)
Materials	ABS
Display	2x4½ digits plus symbols Visible area: 52x42mm

#### *Operating conditions*

Operating temperature	-5...50°C
Storage temperature	-25...65°C
Working relative humidity	0...90%RH without condensation
Protection degree	IP67

#### *Power supply*

Batteries	3 1.5V type AA batteries
Autonomy (*)	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	< 20µA

#### *Measuring unit*

°C - °F - m/s - km/h - ft/min - mph - knot - l/s  
m³/min - m³/h - ft³/s - ft³/min

#### *Connections*

Input module for the probes      8-pole male DIN45326 connector

#### *Measurement of temperature by Instrument*

Pt100 measurement range	-200...+650°C
Pt1000 measurement range	-200...+650°C
Resolution	0.1°C
Accuracy	±0.1°C
Drift after 1 year	0.1°C/year

(\*) It's referred to all the probes except the hot wire ones, whose autonomy is stated in the table "Hot wire probes".

#### **PROBES AND MODULES TECHNICAL DATA EQUIPPED WITH INSTRUMENT**

##### **Wind speed measurement probes**

##### **Hot-wire probes: AP471 S1 - AP471 S2 - AP471 S3 - AP471 S4**

	AP471 S1 - AP471 S3	AP471 S2	AP471 S4
Type of measure	Air speed, calculated flow rate, air temperature		
Type of sensor			
Speed	NTC thermistor	Omnidirectional NTC thermistor	
Temperature	NTC thermistor		NTC thermistor
Measurement range			
Speed	0.1...40m/s	0.1...5m/s	
Temperature	-25...+80°C	-25...+80°C	0...80°C
Measurement resolution:			
Speed	0.01 m/s 0.1 km/h 1 ft/min 0.1 mph 0.1 knot		
Temperature	0.1°C		
Measurement accuracy:			
Speed	±0.2 m/s (0...0.99 m/s)	±0.2m/s (0...0.99 m/s)	
	±0.4 m/s (1.00...9.99 m/s)	±0.3m/s (1.00...5.00 m/s)	
	±0.8 m/s (10.00...40.0 m/s)		
Temperature	±0.8°C (-10...+80°C)	±0.8°C (-10...+80°C)	
Minimum speed		0,1 m/s	
Air temperature compensation		0...80°C	
Sensor working conditions	Clean air, RH<80%		
Battery life	Approx. 20 hours @ 20 m/s with alkaline batteries	Approx. 30 hours @ 5 m/s with alkaline batteries	
Unit of Measurement			
Speed	m/s - km/h - ft/min - mph - knot		
Flow rate	l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min		
Pipeline section for flow rate calculation		0.0001...1.9999 m²	
Cable length		~2m	

Air speed



## Vane probes: AP472 S1 - AP472 S2

	AP472 S1	AP472 S2
Type of measure	Air speed, calculated flow rate, air temperature	Air speed, calculated flow rate
Diameter	100mm	60mm
Type of measurement		
Speed	Vane	Vane
Temperature	K thermocouple	----
Measurement range		
Speed (m/s)	0.6...25	0.5...20
Temperature (°C)	-25...+80 (*)	
Resolution		
Speed	0.01 m/s - 0.1 km/h - 1 ft/min - 0.1 mph - 0.1 knot	
Temperature	0.1°C	----
Accuracy		
Speed	±(0.4 m/s +1.5%f.s.)	±(0.4m/s +1.5%f.s.)
Temperature	±0.8°C	----
Minimum speed	0.6m/s	0.5m/s
Unit of Measurement		
Speed	m/s - km/h - ft/min - mph - knot	
Flow rate	l/s - m³/s - m³/min - m³/h - ft³/s - ft³/min	
Pipeline section for flow rate calculation		0.0001...1.9999 m²
Cable length		~2m

(\*) The indicated value refers to the vane's working range.

## TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT Temperature probes Pt100 sensor with SICRAM module

Model	Type	Application field	Accuracy
TP472I	Immersion	-196°C...+500°C	±0.25°C (-196°C...+300°C) ±0.5°C (+300°C...+500°C)
TP472I.0 1/3 DIN Thin Film	Immersion	-50°C...+300°C	±0.25°C (-50°C...+300°C)
TP473P.I	Penetration	-50°C...+400°C	±0.25°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)
TP473P.0 1/3 DIN Thin Film	Penetration	-50°C...+300°C	±0.25°C (-50°C...+300°C)
TP474C.I	Contact	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)
TP474C.0 1/3 DIN Thin Film	Contact	-50°C...+300°C	±0.3°C (-50°C...+300°C)
TP475A.0 1/3 DIN Thin Film	Air	-50°C...+250°C	±0.3°C (-50°C...+250°C)
TP472I.5	Penetration	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)
TP472I.10	Penetration	-50°C...+400°C	±0.3°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)
TP49A.0 Class A Thin Film	Immersion	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP49AC.0 Class A Thin Film	Contact	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP49AP.0 Class A Thin Film	Penetration	-70°C...+250°C	±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)
TP875.I	Globe-thermometer Ø150mm	-30°C...+120°C	±0.25°C
TP876.I	Globe-thermometer Ø50mm	-30°C...+120°C	±0.25°C
TP87.0 1/3 DIN Thin Film	Immersion	-50°C...+200°C	±0.25°C
TP878.0 1/3 DIN Thin Film	Photovoltaic	+4°C...+85°C	±0.25°C
TP878.1.0 1/3 DIN Thin Film			
TP879.0 1/3 DIN Thin Film	Compost	-20°C...+120°C	±0.25°C

### Common characteristics

Temperature drift @ 20°C 0.003%/°C

### 4 wire Pt100 and 2 wire Pt1000 Probes

Model	Type	Application range	Accuracy
TP47.100.0	Pt100 4 wires	-50...+250°C	1/3 DIN
TP47.1000.0	Pt1000 2 wires	-50...+250°C	1/3 DIN

### Common characteristics

Temperature drift @ 20°C

Pt100	0.003%/°C
Pt1000	0.005%/°C

## ORDERING CODES

**HD2303.0:** The kit consists of the instrument HD2303.0, 3 1.5V alkaline batteries, operating manual, case. **Probes must be ordered separately.**

### Probes complete with SICRAM module AIR speed measurement probes

#### Hot-wire probes:

**AP471 S1:** Hot-wire telescopic probe, measuring range: 0.1...40m/s. Cable 2 metres long.

**AP471 S2:** Omnidirectional hot-wire probe, measuring range: 0.1...5m/s. Cable 2 metres long.

**AP471 S3:** Hot-wire telescopic probe with terminal tip for easy position, measuring range: 0.1...40m/s. Cable 2 metres long.

**AP471 S4:** Omnidirectional hot-wire telescopic probe with base, measuring range: 0.1...5m/s. Cable 2 metres long.

#### Vane probes:

**AP472 S1:** Vane probe with K thermocouple, Ø 100mm. Speed from 0.6 to 25m/s; temperature from -25 to 80°C. Cable 2 metres long.

**AP472 S2:** Vane probe, Ø 60mm. Measurement range: 0.5...20m/s. Cable 2 metres long.

#### Temperature probes equipped with SICRAM module

**TP472I:** Immersion probe, Wire Wound Pt100 sensor. Stem Ø 3 mm, length 300 mm. Cable 2 meters long.

**TP472I.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 3 mm, length 230 mm. Cable 2 meters long.

**TP473P.I:** Penetration probe, Wire Wound Pt100 sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long.

**TP473P.0:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long.

**TP474C.I:** Contact probe, Wire Wound Pt100 sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long.

**TP474C.0:** Contact probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long.

**TP475A.0:** Air probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 230mm. Cable 2 meters long.

**TP472I.5:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 6mm, length 500 mm. Cable 2 meters long.

**TP472I.10:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 6mm, length 1000mm. Cable 2 meters long.

**TP49A.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP49AC.0:** Contact probe, Thin Film Pt100 sensor. Stem Ø 4 mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP49AP.0:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP875.I:** Globe thermometer Ø 150 mm with handle. Wire Wound Pt100 sensor complete of SICRAM module. Cable 2 meters long.

**TP876.I:** Globe thermometer Ø 50 mm with handle. Wire Wound Pt100 sensor complete of SICRAM module. Cable 2 meters long.

**TP87.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 3 mm, length 70 mm. Cable 2 meters long.

**TP878.0:** Contact probe for solar panels. Thin Film Pt100 sensor. Cable 2 meters long.

**TP878.1.0:** Contact probe for solar panels. Thin Film Pt100 sensor .Cable 5 meters long

**TP879.0:** Penetration probe for compost. Thin Film Pt100 sensor. Stem Ø 8 mm, length 1000mm. Cable 2 meters long.

#### Temperature probes without SICRAM module

**TP47.100.0:** 4 wire direct Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. Connection cable 4 wires with connector, length 2 metres.

**TP47.1000.0:** Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. Connection cable 2 wires with connector, length 2 metres.

**TP47:** Only connector for probe connection: direct 4 wires Pt100 and 2 wires Pt1000.





# DO 2003

## HVAC Datalogger



### DO2003

- AIR SPEED AND FLOW RATE • TEMPERATURE
- TEMPERATURE/RELATIVE HUMIDITY • PRESSURE

**DO2003** is a **datalogger** portable instrument, specifically designed to perform measurements in air-conditioning, heating, ventilation, environmental comfort, energy saving both for industrial and residential application by means of a complete series of probes dedicated. It measures:

- Air speed and flow rate inside pipeline with hot-wire probes, vane probes or Pitot tube probes
- relative humidity and temperature with combined probes
- differential pressure up to 2000 mbar and barometric pressure
- temperature with immersion, penetration, air or contact probes.

This datalogger stores up to 12.000 readings which can be downloaded to a PC connected to the instrument through RS232C serial port. Storage interval, printing, baud rate can be configured on the menu.

"Record" (RCD) function calculates maximum, average and minimum values.

A big size dual display and a led series make the reading of data easy.

The instrument is provided also with these further functions: relative measurement, Hold function, zero correction for differential pressure probes and hot-wire probes.

### CHARACTERISTICS OF THE INSTRUMENT

Display: 3½ digit, dual LCD, figure height 12,5 mm. Unit of measure and other additional information are supplied with a led series.

No. 2 inputs: **input A** for air speed and pressure probes, **input B** only for combined temperature/humidity probes.

Storage capacity: 12.000 readings.

Storage interval and printing can be configured between 1 second and 1 hour.

Safety of stored data and battery charge situation unrelated.

Automatic switch-off after 8 minutes can be disabled.

Operating conditions:

Working temperature: -5°C..50°C.

Relative humidity 0-90% RH. not condensing.

Storage temperature: -20°C..+60°C.

Power supply: four 1.5V alkaline AA batteries, operating time with alkaline batteries 100 hours approx.

Probes input: 2 circular 8 pole DIN 45326 male connectors.

9 pole SUB D male RS232C serial output. Baud rate from 300 to 38400 baud. housing: ABS.

Dimensions and weight: 72x210x40 mm - 320gr.

### CHARACTERISTICS OF PROBES FOR DO2003 EQUIPPED WITH SICRAM MODULE

#### Probes for air speed measurement

##### Hot wire probe: AP471 S1 - AP471 S2 - AP471 S3 - AP471-S4

	AP471 S1 - AP471 S3	AP471 S2	AP471 S4
<b>Kind of measure</b>	Air speed, calculated flow, air temperature		
<b>Working range</b>			
Speed	0.1...40m/s	0.1...5m/s	
Temperature	-25...+80°C	-25...+80°C	0...+80°C
<b>Resolution</b>			
Speed	0.01 m/s (0...19.99) - 0.1m/s above 0.1 km/h 1 ft/min (0...1999) - 10ft/min above 0.1 mph	0.01 m/s (0...5 m/s) 0.1 km/h 1 ft/min 0.1 mph	0.01 m/s (0...5 m/s) 0.1 km/h 1 ft/min 0.1 mph
Temperature	0.1°C (-25...+80°C)	0.1°C (-25...+80°C)	
<b>Accuracy</b>			
Speed	±0.2 m/s (0...0.99 m/s)	±0.2 m/s (0...0.99 m/s)	
	±0.4 m/s (1.00...9.99 m/s)	±0.3 m/s (1.00...5.00 m/s)	
	±0.8 m/s (10.00...40.0 m/s)		
Temperature	±0.8°C (-10...+80°C)	±0.8°C(-10...+80°C)	
<b>Minimum speed</b>	0.1 m/s		
<b>Air temperature Compensation</b>	0...80°C		
<b>Sensor working conditions</b>	Clean air, RH<80%		
<b>Unit of measurement</b>			
Speed	m/s – km/h – ft/min – mph		
Flow rate	l/s – m³/h – cfm		
<b>Duct section for flow calculation</b>	0.001...1.999 m²		
<b>Cable length</b>	~2m		

Air Speed



AP471S4

## Vane probe: AP472 S1 - AP472 S2

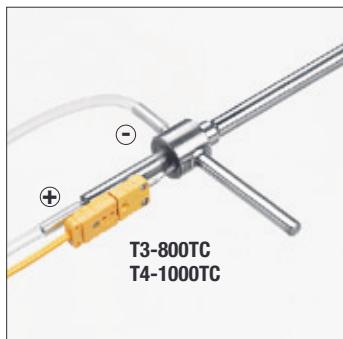
	AP472 S1	AP472 S2
Type of measurements	Air speed, calculated flow, air temperature	Air speed, calculated flow
Diameter	100 mm	60 mm
Type of measurement		
Speed	Vane	Vane
Temperature	Tc K	----
Measuring range		
Speed	0.6...25	0.5...20
Temperature (*)	-25...+80	-25...+80 (*)
Resolution		
Speed	0.01 m/s (up to 19.99 m/s), 0.1 m/s above 0.1 km/h - 1 ft/min. (up to 1999), 0.01·10 <sup>3</sup> ft/min. above -0.1 mph	
Temperature	0.1°C	----
Accuracy		
Speed	±(0.4 m/s +1.5% f.s.)	±(0.4 m/s +1.5% f.s.)
Temperature	±0.8°C	----
Min. speed	0.6m/s	0.5m/s
Unit of measurement		
Speed	m/s - km/h - ft/min - mph	
Flow	l/s - m <sup>3</sup> /s - cfm	
Duct section for flow calculation		
	0.001 - 1.999 m <sup>2</sup>	
Cable length		
	~2m	

(\*) The indicated value refers to the vane working range.

## Pitot tube probes: AP473 S1 - AP473 S2 - AP473 S3 - AP473 S4

	AP473 S1	AP473 S2	AP473 S3	AP473 S4
Kind of measurement	Air speed, calculated flow, differential pressure, Air temperature			
Working range				
Diff. pressure	10 mbar f.s.	20mbar f.s.	50mbar f.s.	100mbar f.s.
Speed (*)	2 ... 40m/s	2 ... 55m/s	2 ... 90m/s	2 ... 130m/s
Temperature	-200...+600°C	-200...+600°C	-200...+600°C	-200...+600°C
Resolution				
Speed m/s	0.1			
km/h	1			
ft/min	0,01·10 <sup>3</sup>			
mph	1			
Temperature	0.1°C			
Accuracy				
Speed	±0.4%f.s. of pressure	±0.3%f.s. of pressure		
Temperature	±0.8°C	±0.8°C		
Minimum speed	2 m/s			
Air temperature compensation	-200...+600°C (if K thermocouple is connected to the module)			
Unit of measurement				
Speed	m/s - km/h - ft/min - mph			
Flow rate	l/s - m <sup>3</sup> /h - cfm			
Duct section for flow calculation	.001...1.999 m <sup>2</sup>			

(\*) At 20°C, 1013mbar and Ps negligible.



## Temperature probes Pt100 sensor with SICRAM module

Model	Type	Application field	Accuracy
TP472I	Immersion	-196°C...+500°C ±0.25°C (-196°C...+300°C) ±0.5°C (+300°C...+500°C)	
TP472I.0 1/3 DIN Thin Film	Immersion	-50°C...+300°C ±0.25°C (-50°C...+300°C)	
TP473P.I	Penetration	-50°C...+400°C ±0.25°C (-50°C...+300°C) ±0.5°C (+300°C...+400°C)	
TP473P.0 1/3 DIN Thin Film	Penetration	-50°C...+300°C ±0.25°C (-50°C...+300°C)	
TP474C.I	Contact	-50°C...+400°C ±0.25°C (-50°C...+300°C)	
TP474C.0 1/3 DIN Thin Film	Contact	-50°C...+300°C ±0.25°C (-50°C...+300°C)	
TP475A.0 1/3 DIN Thin Film	Air	-50°C...+250°C ±0.3°C (-50°C...+250°C)	
TP472I.5	Penetration	-50°C...+400°C ±0.25°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)	
TP472L.10	Penetration	-50°C...+400°C ±0.30°C (-50°C...+300°C) ±0.6°C (+300°C...+400°C)	
TP49A.0 Class A Thin Film	Immersion	-70°C...+250°C ±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...-250°C)	
TP49AC.0 Class A Thin Film	Contact	-70°C...+250°C ±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)	
TP49AP.0 Class A Thin Film	Penetration	-70°C...+250°C ±0.3°C (-70°C...-50°C) ±0.25°C (-50°C...+250°C)	
TP875.I	Globe-thermometer Ø150mm	-30°C...+120°C ±0.25°C	
TP876.I	Globe-thermometer Ø50mm	-30°C...+120°C ±0.25°C	
TP87.0 1/3 DIN Thin Film	Immersion	-50°C...+200°C ±0.25°C	
TP878.0 1/3 DIN Thin Film	Photovoltaic	+4°C...+85°C ±0.25°C	
TP878.1.0 1/3 DIN Thin Film			
TP879.0 1/3 DIN Thin Film	Compost	-20°C...+120°C ±0.25°C	

## Relative humidity and temperature probes

### Measurement of relative humidity by Instrument

Measurement range	0...100%RH
Resolution	0.1%RH
Accuracy	±0.1%RH
Drift after 1 year	0.1%RH/year

### Measurement of temperature by Instrument

Pt100 measurement range	-50...+200°C
Resolution	0.1°C
Accuracy	±0.1°C
Drift after 1 year	0.1°C/year
Tc K measurement range	-50...+200°C
Resolution	0.1°C
Accuracy	±0.1°C
Drift after 1 year	0.1°C/year

## Relative humidity and temperature probes using SICRAM module

Model	Temperature sensor	Working range		Accuracy	
		%RH	Temperature	%RH	Temp
HP472ACR	Pt100	0...100%RH	-20°C...+80°C	±1,5%RH (10...90%RH)	±0.3°C
HP572ACR	Thermocouple K	0...100%RH	-20°C...+80°C	±2,0%RH (in the remaining range) for T= 15...35°C	±0.5°C
HP473ACR	Pt100	0...100%RH	-20°C...+80°C	-----	±0.3°C
HP474ACR	Pt100	0...100%RH	-40°C...+150°C	-----	±0.3°C
HP475ACR	Pt100	0...100%RH	-40°C...+150°C	±(1,5+1,5% of the displayed value) %RH	±0.3°C
HP475AC1R	Pt100	0...100%RH	-40°C...+180°C	-----	±0.3°C
HP477DCR	Pt100	0...100%RH	-40°C...+150°C	-----	±0.3°C
HP478ACR	Pt100	0...100%RH	-40°C...+150°C	-----	±0.3°C

### Common characteristics

#### Relative humidity

Sensor	Capacitive
Temperature drift @ 20°C	Max 0.02%RH/°C
Response time %RH	10sec (10...80%RH; air speed=2m/s) at constant air temperature

#### Temperature with sensor Pt100

Temperature drift @ 20°C	0.003%/°C
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#### Temperature with Tc K - HP572ACR

Temperature drift @ 20°C	0.02%/°C
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Same specifications reported above apply for **HP480** probe (for measuring humidity of the air in pipes), with the following exceptions:

HP480		
Temperature	Measuring range	-40...+60°C
Humidity	Dew point	-40...+60°C DP
Environmental Conditions	Working temperature	-40...+60°C
	Working pressure	16bar max

### Pressure probes

**PP472** Probe for measuring barometric pressure.

Working range: 800 ... 1100mbar Resolution: 1mbar  
Accuracy @ 20°C: ±1mbar Temperature range: -10 ... +50°C

### PP473 S1...S8 Differential pressure probes

Working range	S1=f.s.10mbar, S4=f.s.100mbar, S7=f.s.1bar,	S2=f.s.20mbar, S5=f.s.200mbar, S8=f.s.2bar	S3=f.s.50mbar, S6=f.s.500mbar,
Maximum overpressure	S1,S2,S3=200mbar	S4=300mbar	S5,S6=1bar
Accuracy @ 25°C	±0.5% f.s. (10, 20, 50mbar)	±0.25% f.s. (100mbar)	±0.15% f.s. (200, 500, 1000, 2000mbar)
Temperature range	-10 ... +50°C		
Fluid in contact with the membrane	non-corrosive dry gas or air		
Connection	tube Ø 5mm		

### Ordering codes

**DO 2003:** The kit consists of instrument, 4 1.5V alkaline batteries, instructions manual, carrying case and software Deltalog3. **Probes and cable have to be ordered separately.**

**9CPRS232:** Female/female 9 pole sub D cable for RS232C (null modem).

**DeltaLog3:** (vers.4.0 and following ones) Software for downloading and PC data management.

**C.205:** USB-RS232 converter. It connects the 9-pole subD connector of the instrument to the USB port of the PC.

### PROBES FOR AIR SPEED MEASUREMENTS

#### Probes equipped with SICRAM modules

### HOT-WIRE PROBES

**AP471 S1:** Hot-wire telescopic probe, measuring range: 0.1...40m/s. Cable 2 metres long.

**AP471 S2:** Omni-directional hot-wire probe, measuring range: 0.1...5m/s. Cable 2 metres long.

**AP471 S3:** Hot-wire telescopic probe with terminal tip for easy position, measuring range: 0.1...40m/s. Cable 2 metres long.

**AP471 S4:** Omnidirectional hot-wire telescopic probe with base, measuring range: 0.1...5m/s. Cable 2 metres long.

### Vane probes:

**AP472 S1:** Vane probe with thermocouple, Ø 100mm. Speed from 0.6 to 25m/s; temperature from -25 to 80°C. Cable 2 metres long.

**AP472 S2:** Vane probe, Ø 60mm. Measurement range: 0.5...20m/s. Cable 2 metres long.



### MODULES FOR PITOT TUBES

**AP473 S1:** Pitot tube probe, differential pressure 10mbar f.s. Air speed from 2 to 40m/s. The Pitot tube has to be ordered separately.

**AP473 S2:** Pitot tube probe, differential pressure 20mbar f.s. Air speed from 2 to 55m/s. The Pitot tube has to be ordered separately.

**AP473 S3:** Pitot tube probe, differential pressure 50mbar f.s. Air speed from 2 to 90m/s. The Pitot tube has to be ordered separately.

**AP473 S4:** Pitot tube probe, differential pressure 100mbar f.s. Air speed from 2 to 130m/s. The Pitot tube has to be ordered separately.

**PW:** Connection cable between AP473S... module and **Pitot tube**.

### TEMPERATURE PROBES EQUIPPED WITH SICRAM MODULE

**TP472I:** Immersion probe, Wire Wound Pt100 sensor. Stem Ø 3 mm, length 300 mm. Cable 2 meters long.

**TP472I.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 3 mm, length 230 mm. Cable 2 meters long.

**TP473PI:** Penetration probe, Wire Wound Pt100 sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long.

**TP473P.0:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 150 mm. Cable 2 meters long.

**TP474C.I:** Contact probe, Wire Wound Pt100 sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long.

**TP474C.0:** Contact probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable 2 meters long.

**TP475A.0:** Air probe, Thin Film Pt100 sensor. Stem Ø 4mm, length 230mm. Cable 2 meters long.

**TP472I.5:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 6mm, length 500 mm. Cable 2 meters long.

**TP472I.10:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 6mm, length 1000mm. Cable 2 meters long.

**TP49A.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP49AC.0:** Contact probe, Thin Film Pt100 sensor. Stem Ø 4 mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP49AP.0:** Penetration probe, Thin Film Pt100 sensor. Stem Ø 2.7mm, length 150mm. Cable 2 meters long. Aluminium handle.

**TP875.I:** Globe thermometer Ø 150 mm with handle. Wire Wound Pt100 sensor complete of SICRAM module. Cable 2 meters long.

**TP876.I:** Globe thermometer Ø 50 mm with handle. Wire Wound Pt100 sensor complete of SICRAM module. Cable 2 meters long.

**TP870.0:** Immersion probe, Thin Film Pt100 sensor. Stem Ø 3 mm, length 70 mm. Cable 2 meters long.

**TP878.0:** Contact probe for solar panels. Thin Film Pt100 sensor. Cable 2 meters long.

**TP878.1.0:** Contact probe for solar panels. Thin Film Pt100 sensor .Cable 5 meters long

**TP879.0:** Penetration probe for compost. Thin Film Pt100 sensor. Stem Ø 8 mm, length 1000mm. Cable 2 meters long.

### RELATIVE HUMIDITY AND TEMPERATURE PROBES COMPLETE WITH SICRAM MODULE

**HP472ACR:** %RH and temperature combined probe, dimensions Ø 26x170 mm. 2 m connecting cable.

**HP572ACR:** %RH and temperature combined probe, **K thermocouple sensor**. Dimensions Ø 26x170 mm. 2 m connecting cable.

**HP473ACR:** %RH and temperature combined probe. Dimensions: handle Ø 26x130 mm, probe Ø 14x120 mm. 2m connecting cable.

**HP474ACR:** %RH and temperature combined probe. Dimensions: handle Ø 26x130 mm, probe Ø 14x215 mm. 2m connecting cable.



**HP475ACR:** %RH and temperature combined probe. 2 m connecting cable. Handle Ø 26x110 mm. Stainless-steel tube Ø 12x560 mm. Terminal tip Ø 14x75 mm.

**HP475AC1R:** %RH and temperature combined probe. 2 m connection cable. Handle Ø 26x110 mm. Stainless steel stern Ø 14x480 mm.

**HP477DCR:** %RH and temperature combined sword probe. 2 m connecting cable. Handle Ø 26x110 mm. Probe tube 18x4 mm, length 520 mm.

**HP478ACR:** %RH and temperature combined probe. Dimensions Ø 14x130 mm. 5m connection cable.

**HP480:** Probe for the measurement of air humidity in pipes. 2m connecting cable. 1/4" Italian Standard quick coupling. AISI 304 measuring chamber.

*Protection for humidity probes Ø 26 mm (M24x1,5)*

P1: Stainless steel grid protection.

P2: 20µ sintered polyethylene PE protection.

P3: 20µ sintered bronze protection.

P4: 20µ sintered PE complete cap.

*Protection for humidity probes Ø 14 mm (M12x1)*

P6: 10µm sintered complete protection made of stainless steel.

P7: 20µm sintered complete protection made of PTFE.

P8: 20µm stainless steel grid and Pocan protection.

## PRESSURE PROBES

**PP472:** Barometric probe, working range 800...1100mbar.

**PP473 S1:** Differential pressure probe, full scale 10mbar.

**PP473 S2:** Differential pressure probe, full scale 20mbar.

**PP473 S3:** Differential pressure probe, full scale 50mbar.

**PP473 S4:** Differential pressure probe, full scale 100mbar.

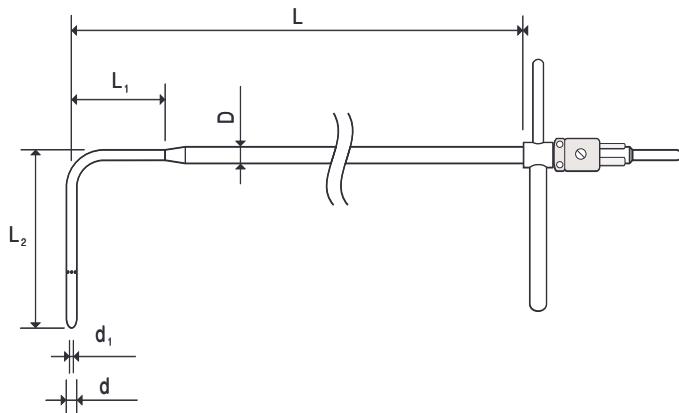
**PP473 S5:** Differential pressure probe, full scale 200mbar.

**PP473 S6:** Differential pressure probe, full scale 500mbar.

**PP473 S7:** Differential pressure probe, full scale 1bar.

**PP473 S8:** Differential pressure probe, full scale 2bar.

PITOT TUBES							
Stainless steel Pitot tubes to measure air speed and temperature for models provided with 'K' thermocouple. They can be connected to the SICRAM modules AP473S1, AP473S2, AP473S3 and AP473S4							



	d mm	d <sub>1</sub> mm	D mm	L mm	L <sub>1</sub> mm	L <sub>2</sub> mm	Temp. °C	Thermo-couple K	Material
T1-300	3	1	6	300	30	72	0...600°C	---	AISI 316
T2-400	5	2	8	400	45	120		---	
T2-600	5	2	8	600	45	120		---	
T3-500	8	3.2	8	500	---	192		---	
T3-800	8	3.2	8	800	---	192		---	
T3-800TC	8	3.2	8	800	---	192		TC	
T4-500	10	4.0	10	500	---	240		---	
T4-800	10	4.0	10	800	---	240		---	
T4-800TC	10	4.0	10	800	---	240		TC	
T4-1000	10	4.0	10	1000	---	240		---	
T4-1000TC	10	4.0	10	1000	---	240		TC	





# HD 2114P.0

# HD 2114P.2

# HD 2134P.0

# HD 2134P.2



## HD 2114P.0, HD 2114P.2, HD 2134P.0, HD 2134P.2 PORTABLE MICRO MANOMETER - THERMOMETER FOR PITOT TUBES

The **HD2114P.0** and **HD2114P.2**, **HD2134P.0** and **HD2134P.2** are portable micromanometers for Pitot tubes with large LCD display. They are used to perform measurements in air conditioning, heating and ventilation.

They measure the differential pressure measured by Pitot tube connected to the inputs of the instrument and achieve the speed and air flow in ducts or vents; also measure temperature with thermocouple K probe.

The instruments can be used as thermometers and can be employed with any kind of thermocouple K sensor if a standard miniature connector is used.

The HD2114P.2 and HD2134P.2 instruments are **dataloggers**. They store up to 36,000 samples which can be transferred from the instrument to a PC connected via the RS232C and USB 2.0 serial ports. The storing interval, printing and baud rate can be configured using the menu. They are also equipped with an RS232C serial port which can transfer in real time the acquired measurements to a PC or to a portable printer.

The **Max**, **Min** and **Avg** function calculates the maximum, minimum or average values. Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off which can be excluded. **The instruments have IP66 protection degree**.

### TECHNICAL SPECIFICATIONS OF THE INSTRUMENTS

#### Instrument

Dimensions (Length x Width x Height)	185x90x40mm
Weight	470g (complete with batteries)
Materials	ABS, rubber
Display	2x4½ digits plus symbols Visible area: 52x42mm

#### Operating conditions

Operating temperature	-5...50°C
Storage temperature	-25...65°C
Working relative humidity	0...90%RH without condensation

#### Protection degree

#### Power supply

Batteries	4 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	20µA
Mains - models <b>HD2114P.2</b> and <b>HD2134P.2</b>	Output mains adapter 12Vdc / 1000mA

#### Measuring unit

°C - °F - Pa - mbar - mmH <sub>2</sub> O - PSI - m/s
km/h - ft/m - mph - knot - l/s - m <sup>3</sup> /h - cfm

#### Security of memorized data

Unlimited, independent of battery charge conditions

#### Time

Date and time	in real time
Accuracy	1min/month max drift

#### Measured values storage - models HD2114P.2 and HD2134P.2

Type	2000 pages containing 18 samples each
Quantity	36000 samples
Storage interval	1,5,10,15,30 sec.; 1,2,5,10,15,20,30 min.; 1 hour

#### Serial interface RS232C - models HD2114P.2 and HD2134P.2

Type	RS232C electrically isolated
Baud rate	Can be set from 1200 to 38400 baud
Data bit	8
Parity	None
Stop bit	1
Flow Control	Xon/Xoff
Serial cable length	Max 15m
Print interval	Immediate or 1,5,10,15,30 sec.; 1,2,5,10,15,20,30 min.; 1 hour

#### USB interface - models HD2114P.2 and HD2134P.2

Type	1.1 - 2.0 electrically isolated
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#### Connections

Pressure inputs	2 quick couplings Ø 5mm
TC type K Temperature input	2-pole female polarized standard miniature connector
Serial interface - models <b>HD2114P.2</b> and <b>HD2134P.2</b>	8-pole MiniDin connector
USB interface - models <b>HD2114P.2</b> and <b>HD2134P.2</b>	MiniUSB type B connector
Mains adapter - models <b>HD2114P.2</b> and <b>HD2134P.2</b>	2-pole connector (positive at centre)

*Measurement of pressure, wind speed and flow rate calculated by the internal sensor, and*



temperature measured using thermocouple K

	HD2114P.0 HD2114P.2	HD2134P.0 HD2134P.2
<b>Measurement range</b>		
Differential pressure	±20mbar	±200mbar
Speed (*)	2 ... 55m/s	2 ... 180m/s
Temperature using thermocouple K	-200...+600°C	-200...+600°C
Temperature using Pitot tube	-200...+600°C	-200...+600°C
<b>Maximum overpressure</b>	±300mbar	±1bar
<b>Resolution</b>		
Differential pressure	0.005mbar - 0.5Pa	0.01mbar - 1Pa
Speed	0.5 m/s - 1 km/h - 1 ft/min - 1 mph - 1 knots	
Flow rate	1l/s - 0.01·10³m³/h - 0.01·10³cfm	
Temperature		0.1°C
<b>Accuracy</b>		
Differential pressure	±0.4%f.s.	±0.3%f.s.
Speed	±(2% reading+0.1m/s)	±(2% reading +0.3m/s)
Temperature (**)	±0.1°C	±0.1°C
<b>Minimum speed</b>	2 m/s	2 m/s
Automatic air temperature compensation	-200...+600°C	
Manual air temperature compensation	-200...+600°C	
<b>Unit of Measurement</b>		
Differential pressure	Pa - mbar - mmH <sub>2</sub> O - PSI	
Speed	m/s - km/h - ft/min - mph - knots	
Flow rate	l/s - m³/h - cfm	
Temperature	°C / °F	
Pipeline section for flow rate calculation	0.0001...1.9999 m <sup>2</sup>	
Fluid contacting the membrane	non corrosive air and gas	

(\*) At 20°C, 1013mbar and Ps negligible.

(\*\*) The accuracy only refers to the instrument. The error due to the thermocouple or to the cold junction reference sensor is not included.

Temperature drift @20°C	0.02%/°C
Drift after 1 year	0.1°C/year

#### Type K Thermocouple probes

##### Thermocouple probes accuracy:

Tolerance of a type of thermocouple corresponds to the maximum acceptable shift from the e.m.f. of any thermocouple of that type, with reference junction at 0°C. The tolerance is expressed in degrees Celsius, preceded by the sign. The percentage tolerance is given by the ratio between the tolerance expressed in degrees Celsius and the measurement junction temperature, multiplied by one hundred.

##### Tolerance classes for thermocouples (reference junction at 0°C)

Type of thermocouple	Tolerance Class 1	Tolerance Class 2	Tolerance Class 3 <sup>(1)</sup>
<b>Type T</b> Temperature interval Tolerance	from -40 to +125°C ± 0.5°C	from -40 to +133°C ± 1°C	from -67 to +40°C ± 1°C
Temperature interval Tolerance	from 125 to 350°C ± 0.004 · t	from 133 to 350°C ± 0.0075 · t	from -200 to -67°C ± 0.015 · t
<b>Type E</b> Temperature interval Tolerance	from -40 to +375°C ± 1.5°C	from -40 to +333°C ± 2.5°C	from -167 to +40°C ± 2.5°C
Temperature interval Tolerance	from 375 to 800°C ± 0.004 · t	from 333 to 900°C ± 0.0075 · t	from -200 to -167°C ± 0.015 · t
<b>Type J</b> Temperature interval Tolerance	from -40 to +375°C ± 1.5°C	from -40 to +333°C ± 2.5°C	-
Temperature interval Tolerance	from 375 to 750°C ± 0.004 · t	from 333 to 750°C ± 0.0075 · t	-
<b>Type K, type N</b> Temperature interval Tolerance	from -40 to +375°C ± 1.5°C	from 40 to +333°C ± 2.5°C	from -167 to +40°C ± 2.5°C
Temperature interval Tolerance	from 375 to 1000°C ± 0.004 · t	from 333 to 1200°C ± 0.0075 · t	from -200 to -167°C ± 0.015 · t
<b>Type R, type S</b> Temperature interval Tolerance	from 0 to +1100°C ± 1°C	from 0 to +600°C ± 1.5°C	-
Temperature interval Tolerance	from 1100 to 1600°C ± [1 + 0.003 (t-1100)] °C	from 600 to 1600°C ± 0.0025 · t	-
<b>Type B</b> Temperature interval Tolerance	-	-	from +600 to +800°C + 4°C
Temperature interval Tolerance	-	from 600 to 1700 °C ± 0.0025 · t	from 800 to 1700°C ± 0.005 · t

(1) The materials used for thermocouples are generally supplied so to comply with the production tolerances specified in the table for temperatures over -40°C. Nevertheless, these materials may not comply with the production tolerances for low temperatures reported under

Class 3, for T, E, K and N thermocouples when the thermocouples have to comply at the same time with the limits of Class 3 and those of Class 1 and/or Class 2.

#### USB and RS232 data connection

##### Please see the diagram at page VA-4

A The HD21x4P.2 instruments use a new serial miniUSB port HD type (Human Interface Device). It is not necessary to install any driver for connecting the instrument to the PC with the USB cable type A – MiniUSB type B coded CP23.

C The port equipped with the MiniDIN connector is an RS232C type that can be used for the connection to the PC or to the HD40.1 printer by using the cable HD2110CSNM.

#### ORDERING CODES

**HD2114P.0:** The kit consists of the HD2114P.0 with 20mbar full scale and thermocouple K input, 4 1.5V alkaline batteries, operating manual, case. The Pitot tubes have to be ordered separately.

**HD2114P.2:** The kit consists of the HD2114P.2 datalogger with 20mbar full scale and thermocouple K input, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. The Pitot tubes and cables have to be ordered separately.

**HD2134P.0:** The kit consists of the HD2134P.0 with 200mbar full scale and thermocouple K input, 4 1.5V alkaline batteries, operating manual, case. The Pitot tubes have to be ordered separately.

**HD2134P.2:** The kit consists of the HD2134P.2 datalogger with 200mbar full scale and thermocouple K input, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. The Pitot tubes and cables have to be ordered separately.

**HD2110CSNM:** 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.

**CP23:** Connection cable USB 2.0 connector type A - Mini USB type B.

**DeltaLog9:** Software for download and management of the data on PC using Windows operating systems.

**PW:** Extension with male-female standard miniature connectors to connect the Pitot tube's thermocouple K to the instrument, length 2m.

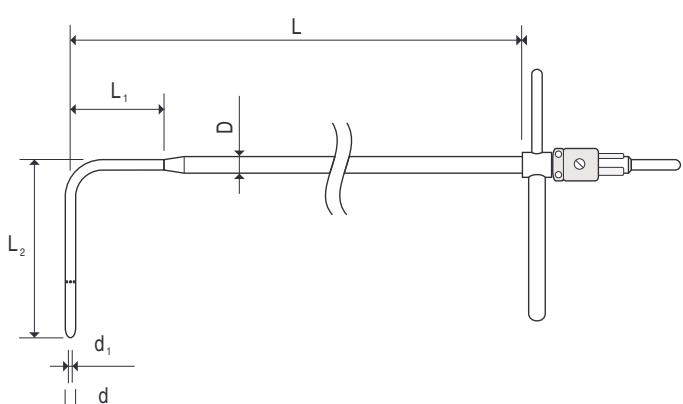
**SWD10:** Stabilized power supply at 230Vac/12Vdc-1000mA mains voltage.

**HD40.1:** On request, portable, serial input, 24 column thermal printer, 58mm paper width.

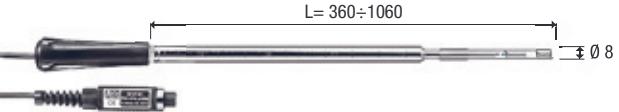
#### K type thermocouple probes

Any thermocouple probe with standard miniature connector available on the price list can be connected to these instruments.

Please see page AS-17.

PITOT TUBES									
Stainless steel Pitot tubes to measure air speed and temperature for models provided with 'K' thermocouple.									
									
d mm	d <sub>1</sub> mm	D mm	L mm	L <sub>1</sub> mm	L <sub>2</sub> mm	Temp. °C	Thermo-couple K	Material	
T1-300	3	1	6	300	30	72	---		
T2-400	5	2	8	400	45	120	---		
T2-600	5	2	8	600	45	120	---		
T3-500	8	3.2	8	500	---	192	---		
T3-800	8	3.2	8	800	---	192	---		
T3-800TC	8	3.2	8	800	---	192	0...600°C	TC	AISI 316
T4-500	10	4.0	10	500	---	240	---		
T4-800	10	4.0	10	800	---	240	---		
T4-800TC	10	4.0	10	800	---	240	TC		
T4-1000	10	4.0	10	1000	---	240	---		
T4-1000TC	10	4.0	10	1000	---	240	TC		

## AIR SPEED PROBES WITH SICRAM MODULE FOR PORTABLE INSTRUMENTS

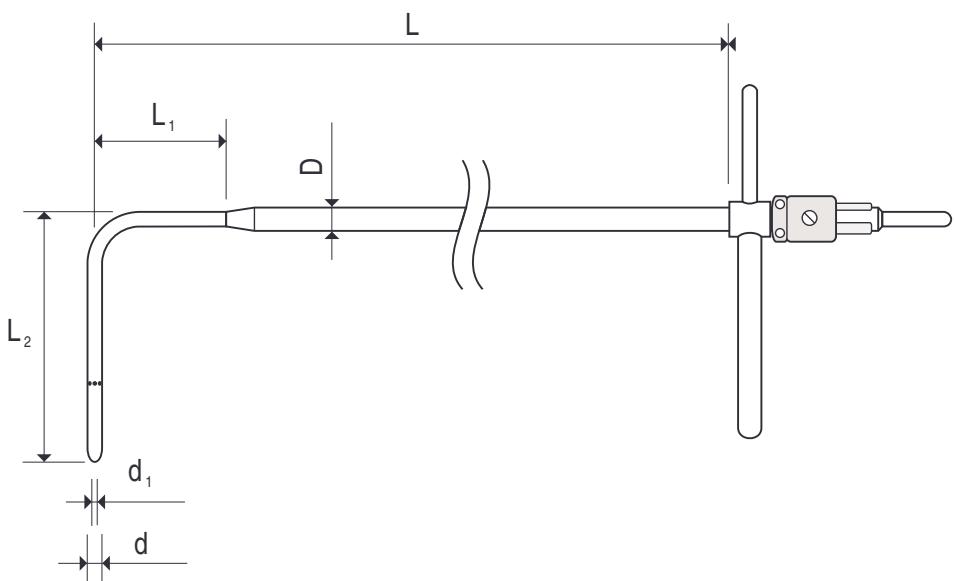
Code	Range m/s	Range Temp. °C	
<b>HOT-WIRE</b>			
AP471S1	0.1÷40	-25÷80	 <p>L= 360÷1060      <math>\varnothing</math> 0.8</p>
AP471S2	0.1÷5		 <p>L= 360÷1060      <math>\varnothing</math> 0.8</p>
AP471S3	0.1÷40		 <p>L= 450÷1140</p>
AP471S4	0.1÷5	0÷80	 <p>L= 380÷760</p>
<b>VANE</b>			
AP472S1	0.6÷25	-25÷80	 <p><math>\varnothing</math> 100</p>
AP472S2	0.5÷20		 <p><math>\varnothing</math> 60</p>
AST1	Telescopic shaft min. length 220 mm Telescopic shaft max. length 870 mm		

## MODULES FOR PITOT TUBES

Code	Range Press. Diff. mbar	Range Speed m/s	
AP473S1	10 f.s.	2÷40	
AP473S2	20 f.s.	2÷55	
AP473S3	50 f.s.	2÷90	
AP473S4	100 f.s.	2÷130	
PW	Connection cable between module AP473S... and Pitot tube provided with TC		

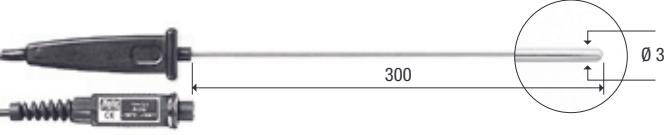
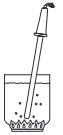
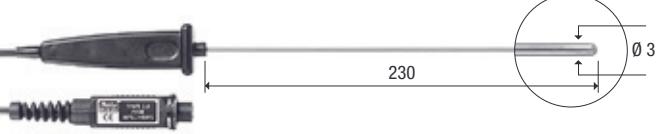
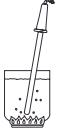
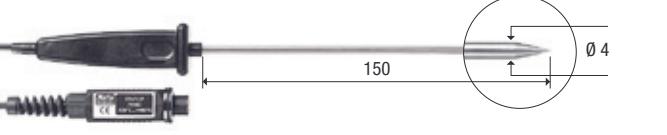
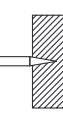
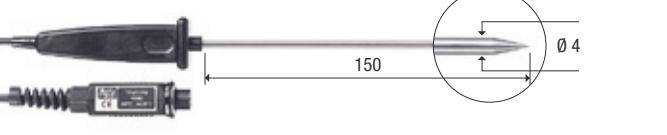
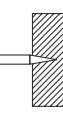
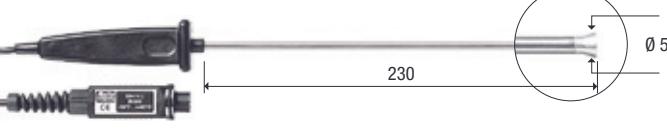
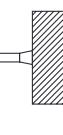
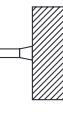
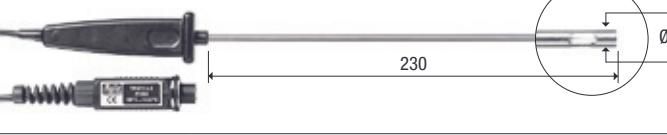
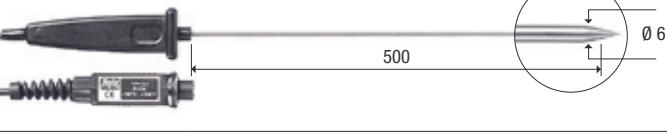
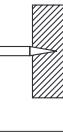
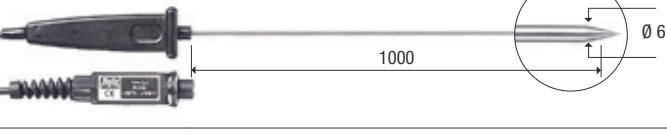
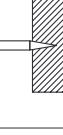
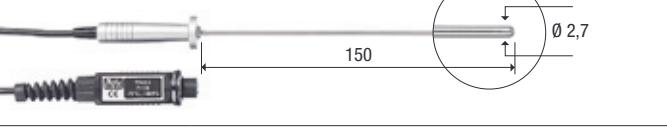
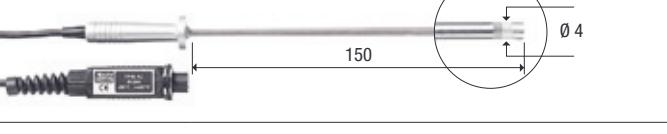
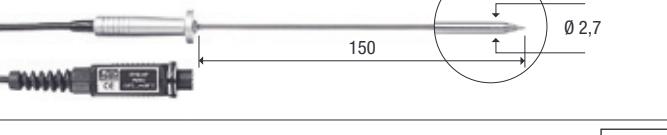
## PITOT TUBES

Stainless steel Pitot tubes to measure air speed and temperature for models provided with 'K' thermocouple.  
They can be connected to the SICRAM modules AP473S1, AP473S2, AP473S3, AP473S4 and to the instruments HD2114P... and HD2134P...



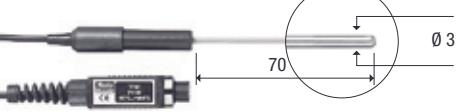
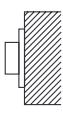
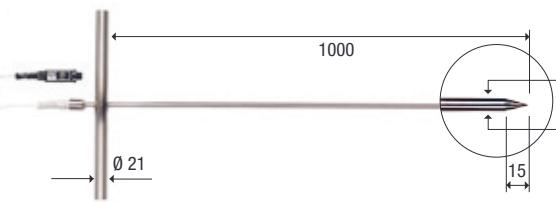
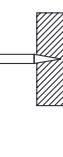
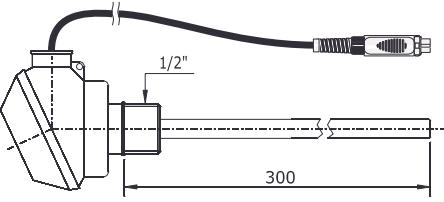
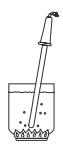
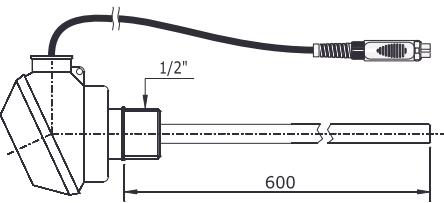
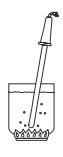
	d mm	d <sub>1</sub> mm	D mm	L mm	L <sub>1</sub> mm	L <sub>2</sub> mm	Temp. °C	Thermocouple K	Material
<b>T1-300</b>	3	1	6	300	30	72	0...600°C	---	AISI 316
<b>T2-400</b>	5	2	8	400	45	120		---	
<b>T2-600</b>	5	2	8	600	45	120		---	
<b>T3-500</b>	8	3.2	8	500	---	192		---	
<b>T3-800</b>	8	3.2	8	800	---	192		---	
<b>T3-800TC</b>	8	3.2	8	800	---	192		TC	
<b>T4-500</b>	10	4.0	10	500	---	240		---	
<b>T4-800</b>	10	4.0	10	800	---	240		---	
<b>T4-800TC</b>	10	4.0	10	800	---	240		TC	
<b>T4-1000</b>	10	4.0	10	1000	---	240		---	
<b>T4-1000TC</b>	10	4.0	10	1000	---	240		TC	

## Pt100 PROBES FOR PORTABLE INSTRUMENTS EQUIPPED WITH SICRAM MODULE

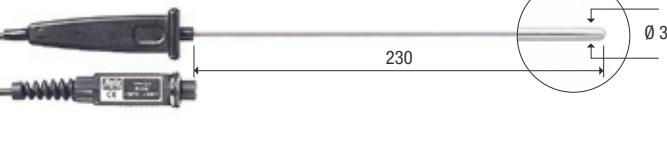
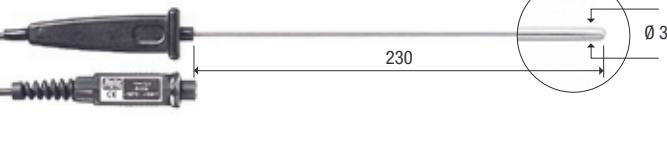
CODE	°C max	τ s	DIMENSIONS	USE
TP 472 I	-196 +500	3s		
TP 472 I.O 1/3 DIN Thin Film	-50 +300	3s		
TP 473 P.I	-50 +400	5s		
TP 473 P.O 1/3 DIN Thin Film	-50 +300	5s		
TP 474 C.I	-50 +400	5s		
TP 474 C.O 1/3 DIN Thin Film	-50 +300	5s		
TP 475 A.O 1/3 DIN Thin Film	-50 +250	12s		
TP 472 I.5	-50 +400	3s		
TP 472 I.10	-50 +400	3s		
TP 49 A.O Class A Thin Film	-70 +250	3,5s		
TP 49 AC.O Class A Thin Film	-70 +250	5,5s		
TP 49 AP.O Class A Thin Film	-70 +250	4s		

Air speed

## Pt100 PROBES FOR PORTABLE INSTRUMENTS EQUIPPED WITH SICRAM MODULE

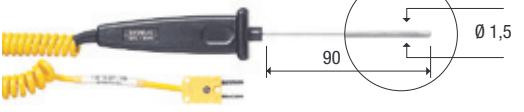
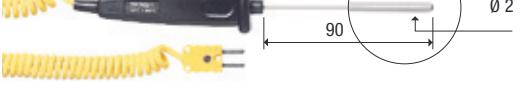
CODE	°C max	τ s	DIMENSIONS	USE	
TP 87.0 1/3 DIN	-50 +200	3s			
TP 878.0 1/3 DIN Thin Film	+4 +85	60s	Contact probe for solar panels equipped with SICRAM module. Cable L = 2m.		
TP 878.1.0 1/3 DIN Thin Film	+4 +85	60s	Contact probe for solar panels equipped with SICRAM module. Cable L = 5m.		
TP 878.1.0 1/3 DIN Thin Film	-20 +120	60s	Penetration probe for compost equipped with SICRAM module. Cable L = 2m		
TP 880/300.I	-50 +450	60s	Mini DIN head. Cable L = 2m		
TP 880/600.I	-50 +450	60s	Mini DIN head. Cable L = 2m		
TP 875.I	-30 +120	15'	Globe-thermometer probe for measuring radiant heat Ø150 mm. (ISO7243, ISO7726). 4 wires Pt100 Sensor cable L=2m. <b>Equipped with SICRAM module.</b>		
TP 876.I	-30 +120	15'	Globe-thermometer probe for measuring radiant heat Ø50 mm. (ISO7243, ISO7726). 4 wires Pt100 Sensor cable L=2m. <b>Equipped with SICRAM module.</b>		

## Pt100 / Pt1000 SENSOR PROBES WITH TP 47 MODULE

CODE	°C max	τ s	DIMENSIONS	USE
TP 47.100.0 (Pt100) 1/3 DIN Thin Film	-50 +250	3s		
TP 47.1000.0 (Pt1000) 1/3 DIN Thin Film	-50 +250	3s		
TP 47			Only connector for connection of probes without SICRAM module: direct 3 and 4 wires Pt100, 2 wires Pt1000.	

## THERMOCOUPLE PROBES FOR PORTABLE INSTRUMENTS

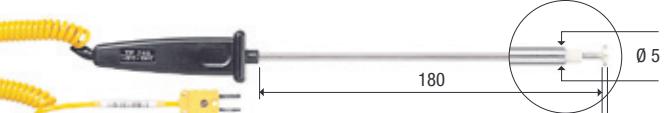
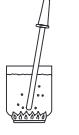
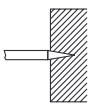
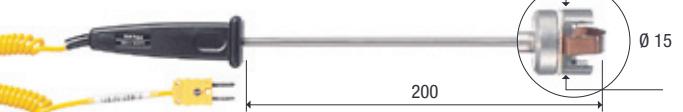
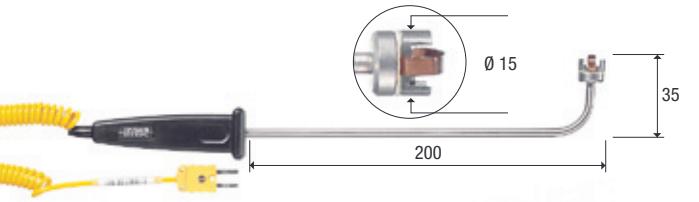
### TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

CODE	°C max	$\tau$ s	DIMENSIONS	USE
TP 741	800	2s		
TP 741/1	400	2s		
TP 741/2	800	2s		
TP 742	400	2s		
TP 742/1	400	2s		
TP 742/2	800	2s		
TP 743	800	3s		

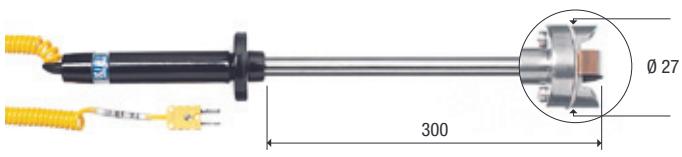
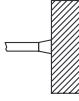
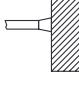
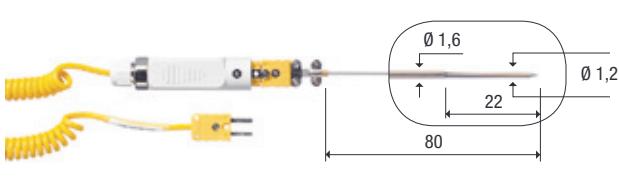
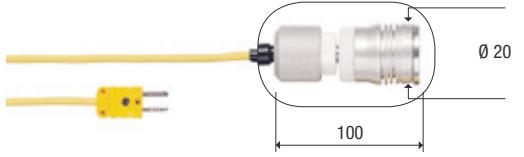
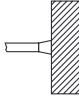
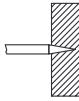
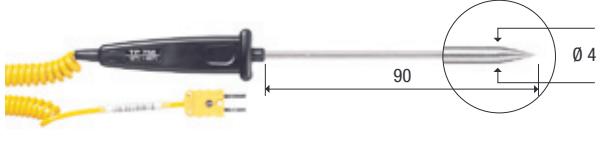
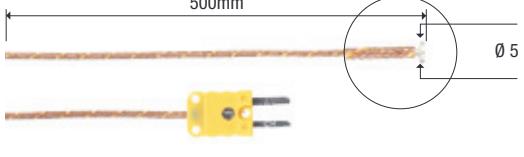


Air speed

### TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

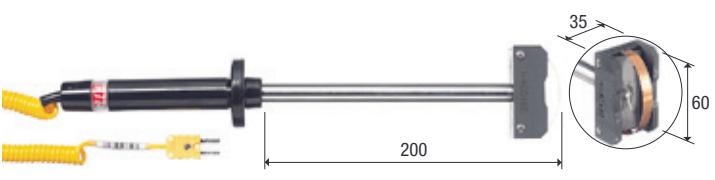
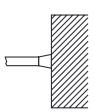
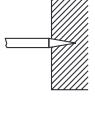
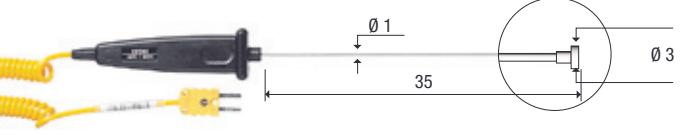
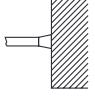
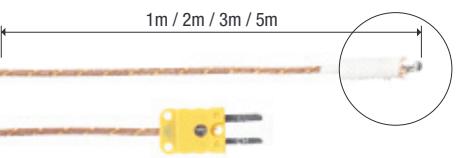
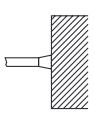
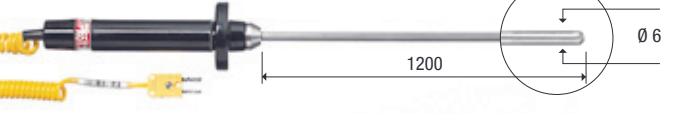
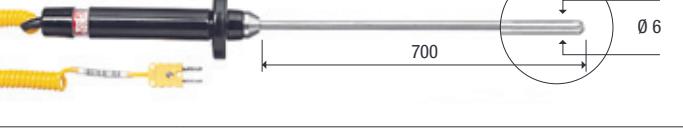
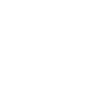
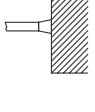
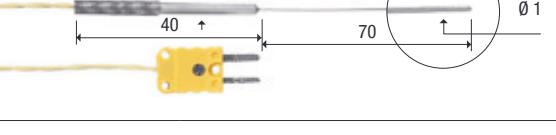
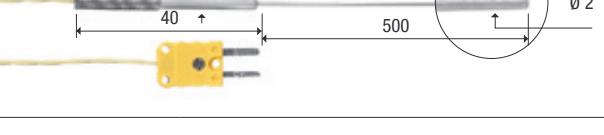
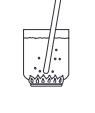
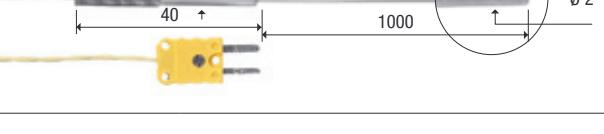
CODE	°C max	$\tau$ s	DIMENSIONS	USE
TP 744	400	4s		
TP 745	500	5s		
TP 746	250	2s		
TP 750	1000	3s		
TP 750.0	800	3s		
TP 751	200	2s		
TP 754	500	2s		
TP 754/9	500	2s		

### TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

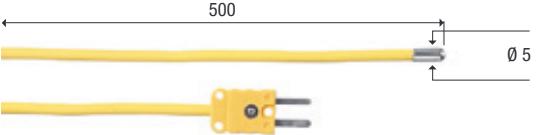
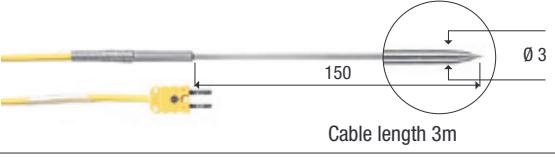
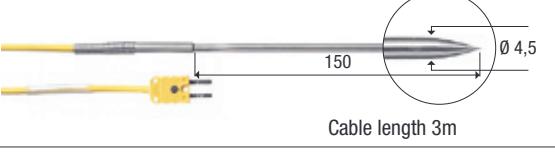
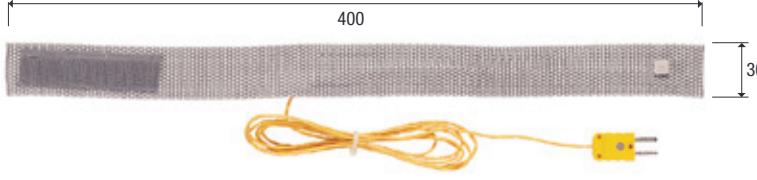
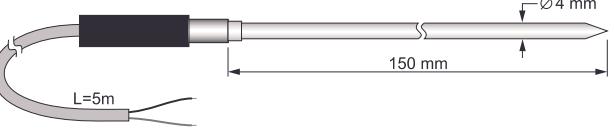
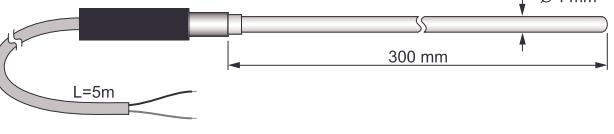
CODE	°C max	$\tau$ s	DIMENSIONS	USE
TP 755	800	2s		
TP 755/9	800	2s		
TP 756	200	2s		
TP 757	180	30s	MAGNETIC PROBE FOR CONTACT MEASURE ON MAGNETIC METALLIC SURFACES 	
TP 758	400	4s		
TP 758.1	400	4s		
TP 772	400	3s		



### TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

CODE	°C max	$\tau$ s	DIMENSIONS	USE
TP 774	250	2s		
TP 776	200	2s		
TP 777	200	3s		
TP 647 TP 647/2 TP 647/3 TP 647/5	300 300 300 300	2s 2s 2s 2s	<p>For ACCREDIA calibration up to 300°C.</p> 	
TP 651	1200	6s		
TP 652	1200	6s		
TP 655	180	2s		
TP 656	200	1s		
TP 656/1	1000	1s		
TP 656/2	1000	1s		

### TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

CODE	°C max	$\tau$ s	DIMENSIONS	USE
TP 657/1	100	5s		 
TP 659	400	3s		
TP 660	400	4s		
TP 661	-60 +50	30s		
TP 662	110	120s	<p>PROBE WITH VELCRO TAPE FOR MEASURES ON PIPES MAX 110 DIAM.</p> 	
TP 32MT.11P	-40 +100	4s		
TP 32MT.12	-40 +100	4s		
CM CS	"K"			
PW	"K"			

#### Response time for a 63% variation ( $\tau_{0.63}$ )

The response time  $\tau$  s is the reaction time of the sensor to a temperature variation, with a signal variation when measuring that corresponds to a given percentage (63%) of the variation.

Response times are referred to:

Immersion probes when into water at 100°C.

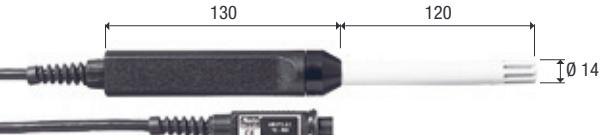
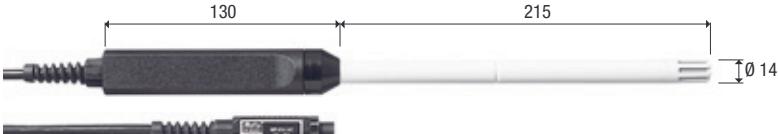
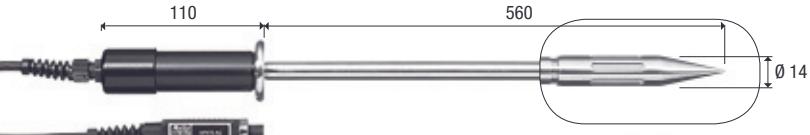
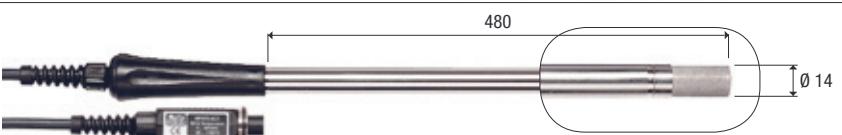
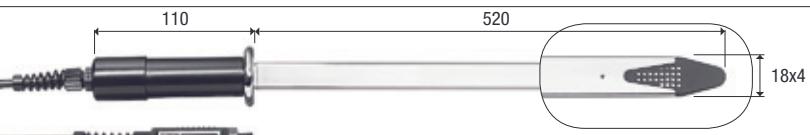
Contact probes when in contact with a metallic surface at 200°C.

Air probes at air temperature of 100°C.

At temperature above 400°C avoid violent impact or thermal shocks. The probe can be irreparably damaged.

Air speed

## RELATIVE HUMIDITY AND TEMPERATURE PROBES FOR PORTABLE INSTRUMENTS - ACCESSORIES

CODE	Sensors	Range RH - Temp.	USE	
HP472ACR	RH Pt100	0...100%RH -20°C...+80°C		
HP572ACR	RH TC.K			
HP473ACR	RH Pt100			
HP474ACR				
HP475ACR				
HP475AC1R				
HP477DCR				
HP478ACR				
HP480	RH Pt100	0...100% RH -40°C...+60°C		

## SATURATED SOLUTIONS AND PROTECTIONS

COD.			USE
HD75 HD33	Probe fixing adapter 24x1,5 Probe fixing adapter 12x1		
P1 P2 P3 P4	Ø 26	M 24x1,5	
P6 P7 P8	Ø 14	M 12x1	

## PRESSURE PROBES: RELATIVE, ABSOLUTE, DIFFERENTIAL, FOR PORTABLE INSTRUMENTS

CODE	Differential pressure f.s.	Max. overpressure	
PP472 Barometric	800...1100 mbar absolute	3 bar	
PP473S1	10 mbar		
PP473S2	20 mbar	200 mbar	
PP473S3	50 mbar		
PP473S4	100 mbar	300 mbar	
PP473S5	200 mbar		
PP473S6	500 mbar	1 bar	
PP473S7	1000 mbar	3 bar	
PP473S8	2000 mbar	6 bar	

Air speed

# HD2903T... HD29V3T... HD2937T... HD29V37T... HD29371T... HD29V371T...



**HD 2903T..., HD 29V3T..., HD 2937T..., HD 29V37T...**

**HD 29371T..., HD 29V371T...**

## TEMPERATURE, RELATIVE HUMIDITY AND AIR SPEED TRANSMITTERS

The family of transmitters series HD29 ... are employed in the control of air speed in the air conditioning and ventilation (HVAC / BEMS) in the pharmaceutical, museum, clean rooms, ventilation ducts, industrial sectors and households, crowded places, cafeterias, auditoriums, gymnasiums or on farms with large numbers of animals. The sensors in combination with an accurate electronics guarantee precise and reliable measurements in the time.

The sensor for the air speed is thin film, the probe sheath is AISI304, the filter relative humidity of 20µ wire mesh, materials that allow the use in hostile areas. There are two possible installations: in the TO version, the horizontal probe is joined to the electronics enclosure while in the TC version the probe is con-

nected to the electronics through a cable.

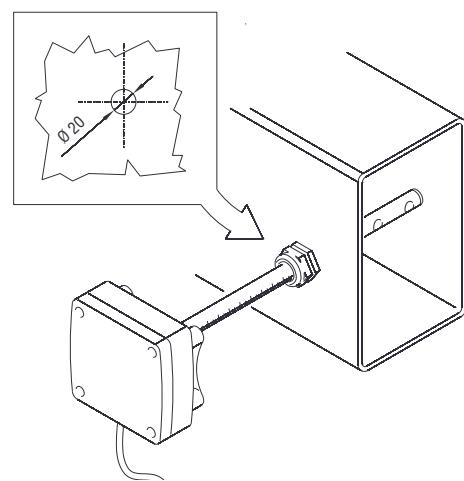
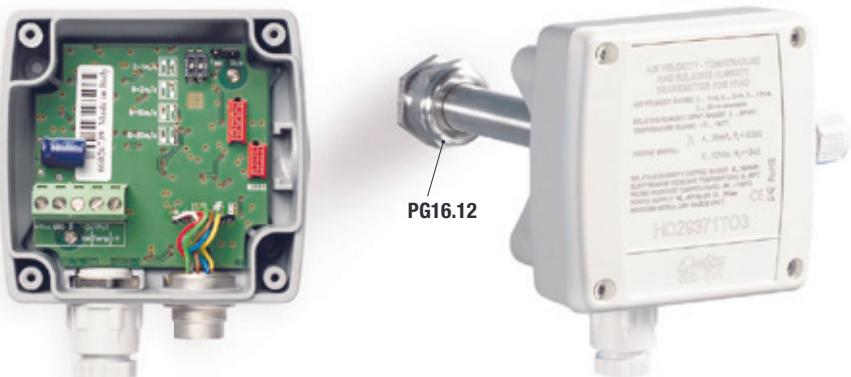
In the TO version, the duct probe is fixed to the electronics enclosure and it is available in three different lengths. To fix the probe to the duct, you can use, for example, the HD9008.31.12 flange, a 3/8" universal biconical connection or a PG16.12 metal cable gland (Ø10...14mm).

In the TC version, the probe together with the sensors is equipped with a cable which can be 2, 5 or 10 meters long. The probes are available in three different lengths.

Common technical specifications		Notes
Air speed Measuring range	0.05...1m/s 0.1...2m/s 0.20...10m/s 0.20...20m/s	The measuring range can be selected by dip-switch.
Air speed Accuracy range 0...1m/s range 0...2m/s range 0...10m/s range 0...20m/s	±(0.1m/s+3% of measurement) ±(0.15m/s+3% of measurement) ±(0.5m/s+3% of measurement) ±(0.7m/s+3% of measurement)	at 50%RH and 1013hPa
Temperature Measuring range	-10...+60°C	HD2937, HD29V37, HD29371 and HD29V371 models
Temperature Accuracy	±0.3°C	
Relative Humidity Measuring range	0...100%RH	
Relative Humidity Accuracy	±1.5%RH (10...90%RH) ±2.0%RH (in the remaining range) for T= 15...35°C ----- ±(1.5+1.5% of the displayed value) %RH in the remaining temperature range	HD29371 and HD29V371 models
Relative Humidity Output Range	0...100%RH	
Output (according to the models)	4...20mA 0...10Vdc	R <sub>L</sub> < 500Ω R <sub>L</sub> > 10kΩ
Power supply	16...40Vdc or 12...24Vac±10%	
Response time (selected by jumper)	0.2s 2.0s	Fast Slow
Operating temperature electronics probe	0...+60°C -10...+80°C	
Compensation temperature	0...+80°C	
Storage temperature	-10...+70°C	
Electronics protection class	IP67	
Sensor working conditions	Clean air, RH<80%	
Case dimensions	80x84x44	Without probe

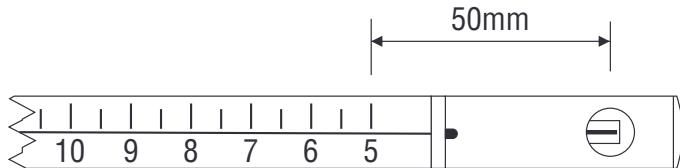
### Model description

Model	Output		Measured parameters		
	4...20mA	0...10Vdc	Air speed	Temperature	Relative Humidity
HD2903T...	✓			✓	
HD29V3T...		✓	✓		
HD2937T...	✓		✓		✓
HD29V37T...		✓	✓	✓	
HD29371T...	✓		✓	✓	✓
HD29V371T...		✓	✓	✓	✓



## Installation notes

- The window of the sensor (or of the sensors) must be oriented in the direction of flow. To facilitate the proper positioning of the probe, eg. inside of a pipe, a graduated scale, engraved along the stem, indicates the depth of introduction of the window speed sensor in the channel. To properly orient the sensor to the flow, once introduced into the channel, the air speed window and line on the base of the scale are on the same axis.



- To fix the probe inside a ventilation duct, a pipe, etc. you can use, for example, HD9008.31.12 flange, a PG16.12 metal cable gland ( $\varnothing 10\ldots 14$ mm) or a 3/8" universal biconical connection.

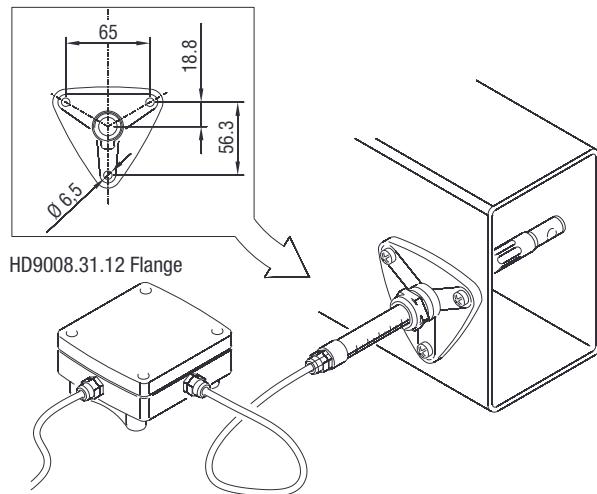
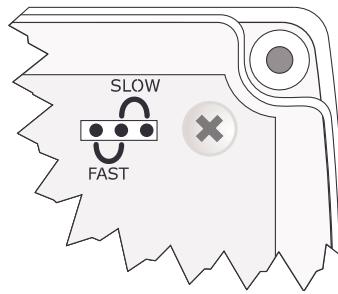
	<b>HD9008.31.12 Flange</b>
	<b>PG16.12 metal cable gland</b> D = 10...14mm L = 6.5mm H = 23mm A = PG16
	<b>Universal biconical connector</b> L = 35mm D = 14mm A = 3/8"

- The transmitters are factory calibrated and no further adjustments are required.
- To select the air speed **output range** by using the dual dip-switch on the board, please see the chart below:

Output range	0...1m/s	0...2m/s	0...10m/s	0...20m/s
Dip-switch position				

- Dip-switch should always be at the end of its final limit in both directions.

- The jumper on the board selects an **integrated response time in 0.2s in the FAST position and in 2s in the SLOW position**. Please set the integration time at **SLOW** in case of turbulence, otherwise please select the **FAST** position.



## Electrical connections

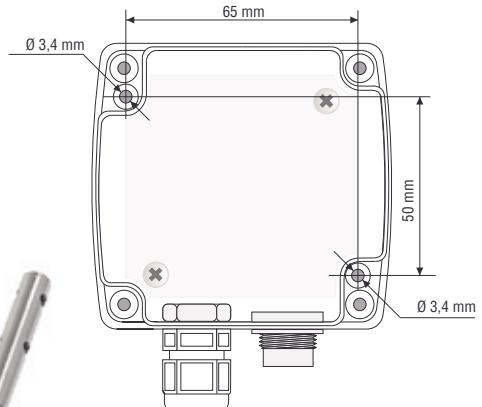
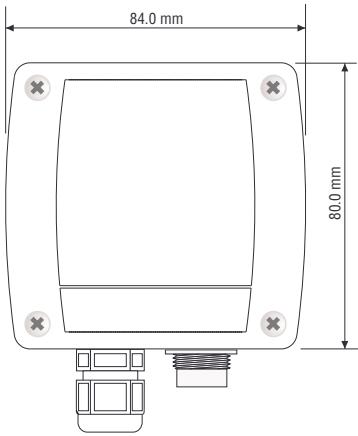
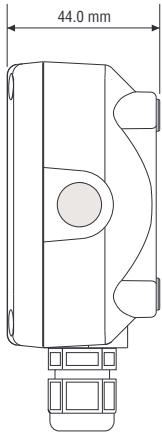
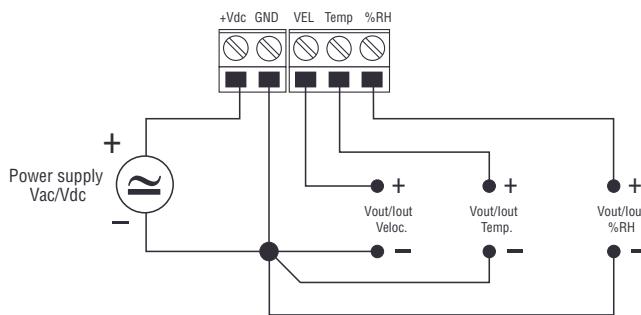
### Power supply

Power the instrument at the voltage shown in the electrical specifications: power supply terminals are marked as +Vdc and GND.

### Analogue output

According to the model, the output signal comes from:

- VEL and GND terminals for air speed transmitters,
- VEL and GND, Temp and GND terminals for temperature / air speed transmitters,
- VEL and GND, Temp and GND, %RH and GND terminals for temperature / relative humidity / air speed transmitters.



## HD2903T... and HD29V3T... ORDERING CODES

**HD2903T...**: Active transmitter for measuring air speed in ducts, 4...20mA output.

AISI 304 steel probe, diameter 12mm, compact unit HD2903TO... version with probe joined to the electronics enclosure, HD2903TC... version with probe connected to the electronics through a cable. Air speed range 0.05...1m/s - 0.1...2m/s - 0.20...10m/s - 0.20...20m/s selected by jumper. Power supply 16...40Vdc or 12...24Vac. Air probe operating temperature -10...+80°C.

**HD29V3T...**: Active transmitter for measuring air speed in ducts, 0...10Vdc output.

AISI 304 steel probe, diameter 12mm, compact unit HD29V3TO... version with probe joined to the electronics enclosure, HD29V3TC... version with probe connected to the electronics through a cable. Air speed range 0.05...1m/s - 0.1...2m/s - 0.20...10m/s - 0.20...20m/s selected by jumper. Power supply 16...40Vdc or 12...24Vac. Air probe operating temperature -10...+80°C.

**HD29 3 T**

Cable length (... TC ... models only)

2 = 2m  
5 = 5m  
10 = 10m

Probe length

T01 = 150mm  
T02 = 250mm  
T03 = 350mm  
TC1 = 145mm  
TC2 = 245mm  
TC3 = 345mm

3 = Air speed

0 = 4...20mA analogue output  
V = 0...10Vdc analogue output

## HD2937T... and HD29V37T... ORDERING CODES

**HD2937T...**: Active transmitter for measuring air speed and temperature in ducts, 4...20mA outputs. AISI 304 steel probe, diameter 12mm, compact

unit HD2937TO... version with probe joined to the electronics enclosure, HD2937TC... version with probe connected to the electronics through a cable. Air speed range 0.05...1m/s - 0.1...2m/s - 0.20...10m/s - 0.20...20m/s selected by jumper, fixed temperature range -10...+60°C. Power supply 16...40Vdc or 12...24Vac. Air probe operating temperature -10...+80°C.

**HD29V37T...**: Active transmitter for measuring air speed and temperature in

ducts, 0...10Vdc outputs. AISI 304 steel probe, diameter 12mm, compact unit HD29V37TO... version with probe joined to the electronics enclosure, HD29V37TC... version with probe connected to the electronics through a cable. Air speed range 0.05...1m/s - 0.1...2m/s - 0.20...10m/s - 0.20...20m/s selected by jumper, fixed temperature range -10...+60°C. Power supply 16...40Vdc or 12...24Vac. Air probe operating temperature -10...+80°C.

**HD29 3 7 T**

Cable length (... TC ... models only)

2 = 2m  
5 = 5m  
10 = 10m

Probe length

T01 = 180mm  
T02 = 275mm  
T03 = 375mm  
TC1 = 175mm  
TC2 = 275mm  
TC3 = 375mm

7 = Temperature output  
3 = Air speed

No sign = 4...20mA analogue output  
V = 0...10Vdc analogue output

## HD29371T... and HD29V371T... ORDERING CODES

**HD29371T...**: Active transmitter for measuring air speed, temperature and

relative humidity in ducts, 4...20mA outputs. AISI 304 steel probe, diameter 14mm, compact unit HD29371TO version... with probe joined to the electronics enclosure, HD29371TC... version with probe connected to the electronics through a cable. Air speed range 0.05...1m/s - 0.1...2m/s - 0.20...10m/s - 0.20...20m/s selected by jumper, fixed temperature range -10...+60°C, relative humidity range 0...100%RH. Power supply 16...40Vdc or 12...24Vac. Air probe operating temperature -10...+80°C.

**HD29V371T...**: Active transmitter for measuring air speed, temperature and

relative humidity in ducts, 0...10Vdc outputs. AISI 304 steel probe, diameter 14mm, compact unit HD29V371TO... version with probe joined to the electronics enclosure, HD29V371TC... version with probe connected to the electronics through a cable. Air speed range 0.05...1m/s - 0.1...2m/s - 0.20...10m/s - 0.20...20m/s selected by jumper, fixed temperature range -10...+60°C, relative humidity range 0...100%RH. Power supply 16...40Vdc or 12...24Vac. Air probe operating temperature -10...+80°C.

**HD29 3 7 1 T**

Cable length (... TC ... models only)

2 = 2m  
5 = 5m  
10 = 10m

Probe length

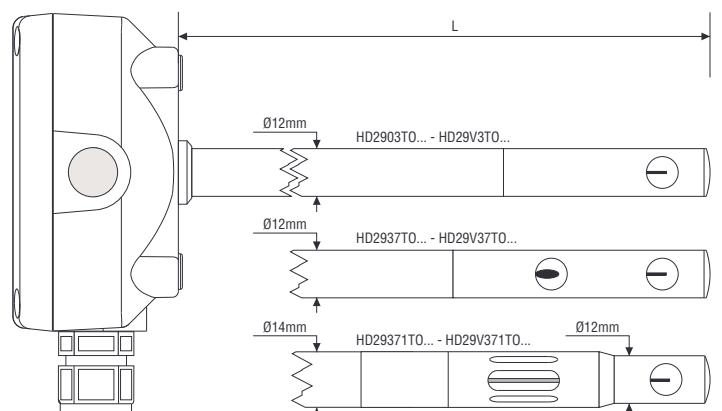
T01 = 215mm  
T02 = 415mm  
T03 = 565mm  
TC1 = 215mm  
TC2 = 415mm  
TC3 = 570mm

1 = %RH output  
7 = Temperature output  
3 = Air speed

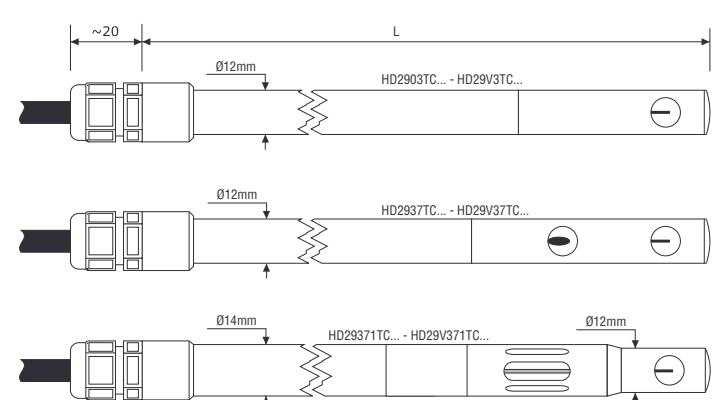
No sign = 4...20mA analogue output  
V = 0...10Vdc analogue output

### Probe dimensions:

#### TO series



#### TC series



Air speed



### HD 403TS... AND HD 4V3TS... ACTIVE HOTWIRE AIR SPEED TRANSMITTERS

The HD403TS... series of hotwire air speed transmitters are used for measuring and controlling air speed in ventilation ducts, clean rooms, extractor fans, as well as monitoring air quality (IAQ), etc. These transmitters are equipped with a hotwire sensor, in the directional or omnidirectional version. The HD403TS... series of transmitters have a 4...20mA output, while the HD4V3TS... series have a 0...10Vdc output.

Two measuring ranges are available: 0.20...40m/s for ...S1 and ...S3 models with directional probe and 0.1...5.00m/s for ...S2 and ...S4 models with omnidirectional probe.

Technical specifications		Notes
Air speed	0.1...5.00m/s	...S2 and ...S4 models
Standard measuring range	0.20...40.0m/s	...S1 and ...S3 models
Measurement accuracy	$\pm(0.2\text{m/s}+3\%\text{f.s.})$	
Response time (integration) selected by jumper	0.2s 2.0s	Fast Slow
Operating temperature electronics probe	0...+60°C 0...+80°C	
Compensation temperature	0...+80°C	
Storage temperature	-10...+80°C	
Electronics protection class	IP67	
Sensor working conditions	Clean air, RH<80%	
Case dimensions	58x65x35	Without probe
Standard cable length	2m	

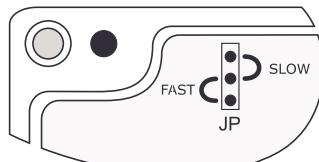
Model	Output	Power supply	Load resistance
HD403TS...	4...20mA	12...40Vdc or 24Vac	$R_L < 500\Omega$
HD4V3TS...	0...10Vdc	16...40Vdc or 24Vac	$R_L > 10k\Omega$

#### Installation notes

- The probe must be used with clean air only and humidity below 80%.
- In ...S1 and ...S3 directional probes, the sensor hole must be oriented in the same direction as the flow: turn the probe so that the displayed speed will be the highest, at constant flow.
- To fix the probe of ...S1, ...S2 and ...S3 models inside a ventilation duct, a pipe ,etc. use a PG9 or PG11 metal cable gland according to the shape or a connection equipped with a  $\frac{1}{4}$ " rubber ring.

	<b>PG9</b> D = 4...8mm L = 6mm H = 20mm A = PG9		<b>PG11</b> D = 5...10mm L = 6mm H = 21mm A = PG11
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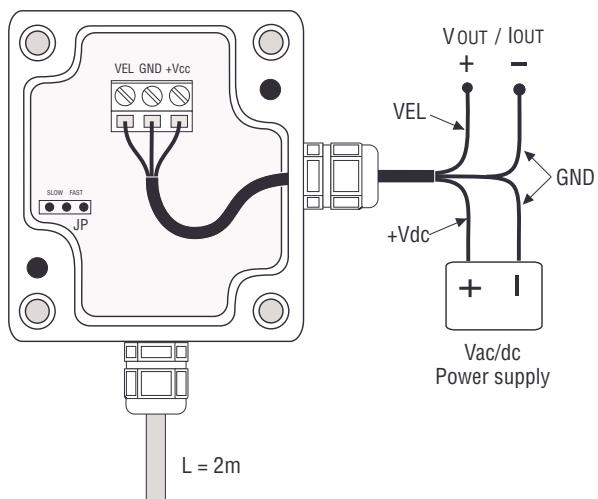
- The transmitters are factory calibrated and no further adjustments are required.
- Select the **response time** by using the JP jumper: in the FAST position, the response time is 0.2s, in the SLOW position is 2s. Set the jumper on SLOW in case of turbulence, otherwise please select the FAST position.



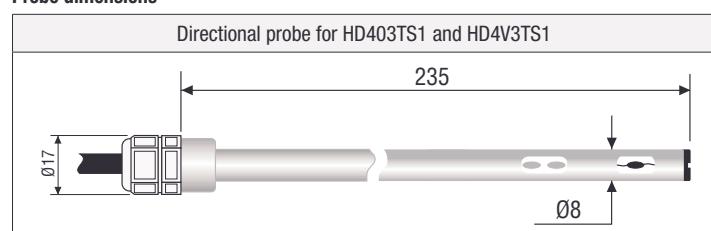
#### Electrical connections

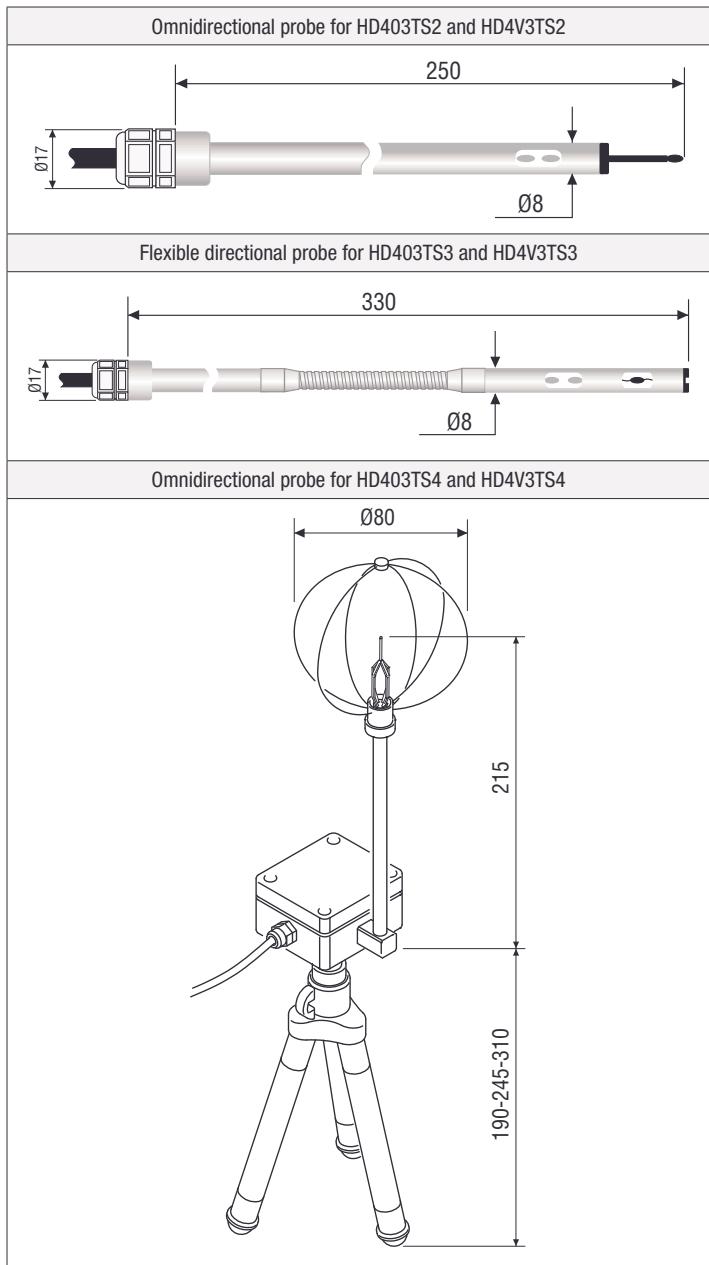
##### Power supply and output

Power the instrument at the voltage shown in the electrical specifications: power supply terminals are marked as +Vcc and GND. The output signal comes from VEL and GND terminals. To make the connection, please use a three-wire cable as shown in the drawing below.



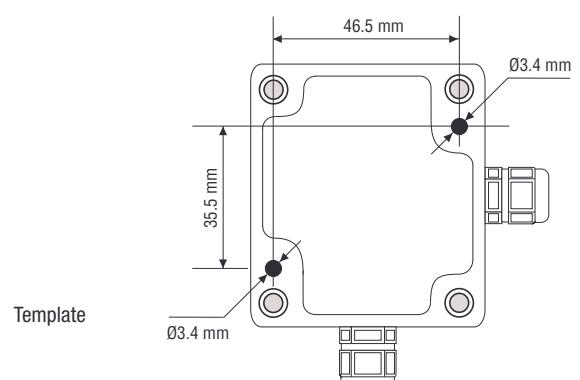
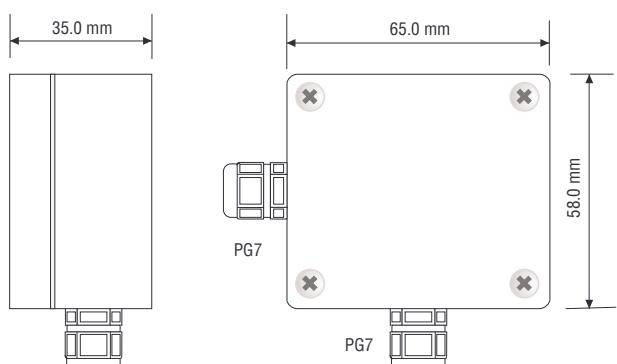
#### Probe dimensions



**ORDERING CODES****HD403TS1:** Active hotwire air speed transmitter with 4...20mA output. Measuring range: 0.20...40m/s. Directional probe Ø=8mm, cable L=2m.**HD4V3TS1:** Active hotwire air speed transmitter with 0...10Vdc output. Measuring range: 0.20...40m/s. Directional probe Ø=8mm, cable L=2m.**HD403TS2:** Active hotwire air speed transmitter with 4...20mA output. Measuring range: 0.1...5.00m/s. Omnidirectional probe Ø=8mm, cable L=2m.**HD4V3TS2:** Active hotwire air speed transmitter with 0...10Vdc output. Measuring range: 0.1...5.00m/s. Omnidirectional probe Ø=8mm, cable L=2m.**HD403TS3:** Active hotwire air speed transmitter with 4...20mA output. Measuring range: 0.20...40m/s. Flexible directional probe, Ø=8mm, cable L=2m.**HD4V3TS3:** Active hotwire air speed transmitter with 0...10Vdc output. Measuring range: 0.20...40m/s. Flexible directional probe, Ø=8mm, cable L=2m.**HD403TS4:** Active hotwire air speed transmitter with 4...20mA output. Measuring range: 0.1...5.00m/s. Omnidirectional probe with wired protective cover Ø=80mm. Equipped with tripod.**HD4V3TS4:** Active hotwire air speed transmitter with 0...10Vdc output. Measuring range: 0.1...5.00m/s. Omnidirectional probe with wired protective cover Ø=80mm. Equipped with tripod.**How to compose your purchasing code****HD4□3TS□**

- 1 = Directional probe
- 2 = Omnidirectional probe
- 3 = Flexible directional probe
- 4 = Omnidirectional probe with tripod

- 0 = 4...20mA signal output
- V = 0...10Vdc signal output

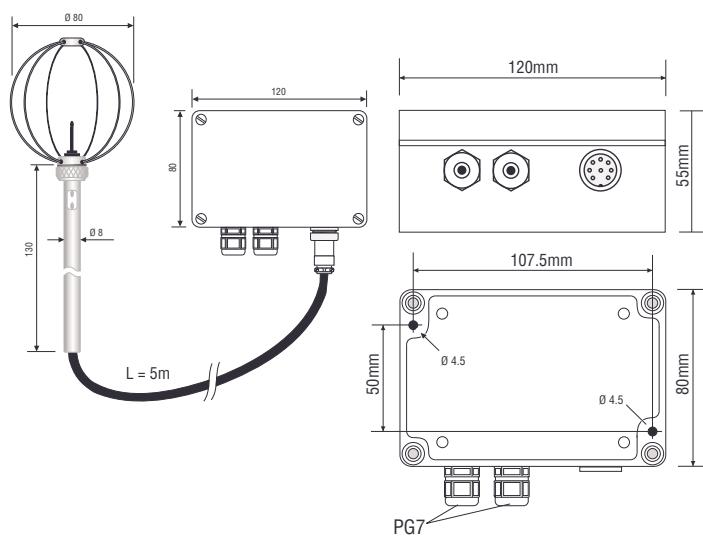
**Dimensions**



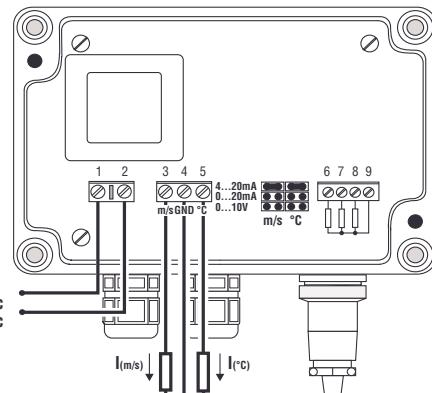
## HD 103T.0 ACTIVE AIR SPEED TRANSMITTER

The HD103T.0 measures air speed by using an omnidirectional hotwire probe. It has three configurable analogue outputs: 4...20mA and 0...20mA current outputs and 0...10Vdc voltage output (0...1Vdc or 0...5Vdc outputs can be supplied on request). The output can be chosen by using the jumpers inside the instrument.

The sensor set at the top of the probe is very delicate and must be protected with the special protection provided with the instrument. During transport, the sensor is enclosed in a cylinder screwed on the top of the probe; during installation, remove the protection and apply the protective cover in its place.



Technical specifications		Notes
Air speed Measuring range	0.1...5m/s	
Air speed Accuracy range 0.1...0.99m/s range 1...5m/s	±0.1m/s ±0.4m/s	at 50%RH and 1013hPa
Temperature measuring range	-10...+80°C	
Temperature Accuracy range 0...70°C remaining range	±0.3°C ±0.4°C	
Output (for both temperature and air speed)	4...20mA 0...20mA 0...10Vdc	0...5Vdc and 0...1Vdc outputs on request
Load resistance	$R_L < 500\Omega$ $R_L > 100k\Omega$	for current outputs for voltage outputs
Power supply	24Vac ±10%, 50...60Hz	110Vac or 230Vac on request
Operating temperature electronics probe	-5...+50°C -10...+80°C	5...75%RH
Compensation temperature	0...+80°C	
Storage temperature	-10...+80°C	
Electronics protection class	IP67	
Sensor working conditions	Clean air, RH<80%	
Case dimensions	120 x 80 x 55	Without probe
Probe cable length	L=5m	



### Installation notes

- Select the type of air speed and temperature **output** by using the jumpers placed on the board.
- The probe must be used with clean air only and humidity below 80%.
- The transmitters are factory calibrated and no further adjustments are required.
- Each instrument is calibrated with its own probe. Don't mix up probes and instruments: the calibration will have to be repeated.

### Electrical connections

#### Power supply

Power the instrument at the voltage shown in the electrical specifications.

#### Analogue output

The output signal comes from m/s and GND terminals for air speed, from °C and GND for temperature.

### ORDERING CODES

**HD103T.0:** Active air speed and temperature transmitter. Analogue outputs: 4...20mA, 0...20mA and 0...10Vdc selected by jumper. Omnidirectional probe with wired protective cover Ø=80mm connected to the electronics through a 5-metre cable. Air speed range 0.1...5m/s. Temperature output range -20...+80°C. Power supply 24Vac (115 and 230Vac on request). Probe operating temperature -10...+80°C, electronics operating temperature -5...+50°C.



## **HD 404T VERY LOW PRESSURE TRANSMITTER**

The series of HD404T transmitters is able to measure relative pressures with reference to the atmosphere or differential in the range from 50 to 1000 Pa (0.2" H<sub>2</sub>O to 5" H<sub>2</sub>O). HD404T transmitters use a silicon "micromachined" type sensor compensated in temperature that has an excellent linearity, repeatability and stability over time. The output signal from the sensor is amplified and converted into a standard analogical output in current (4...20mA) and in one in voltage (0...10V), which, then, can be transmitted over long distances with a high immunity to noise.

In each model it's possible to choose, via a dip switch, between two measurement ranges in order to select the optimal scale for each application.

Usually the low pressure transmitters are susceptible to the guidance by which they are mounted. In HD404T series there is available a special auto-zero circuit, which periodically equalize the differential pressure at the input sensor and corrects the offset; the transmitters, provided with this circuit, are insensitive to the mounting position. In addition, the circuit compensates autozero aging and the deviation of the zero of the sensor to temperature changes: virtually eliminates maintenance.

It's available the (L) "display" option, in which the pressure is visualized on a display with 4 digits in the selected measurement unit.

The (SR) "square root" is especially useful if the transmitter is connected to a Pitot or Darcy tube, as the output is directly proportional to the speed of airflow. The SR version with L option also allows to display, in addition to the pressure measured, the speed of airflow calculated. The SR version is configurable by the user by connecting the transmitter to a PC and sending serial commands via a standard communication software. It is possible to set the coefficient of the Pitot or Darcy tube used, the parameters for the calculation of the speed (airflow temperature, barometric pressure, differential static pressure in the duct), the speed unit of measurement (m/s or ft/s) and the speed full scale for the analog output.

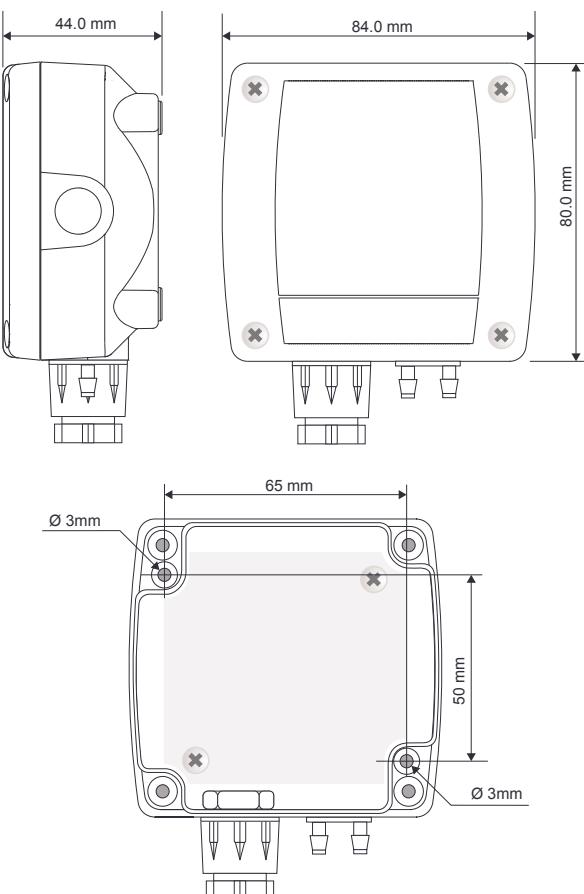
The transmitters are ready to use and are supplied calibrated at 3 points by the manufacturer. Typical applications for HD404T series are clean room monitoring, filters' control, flow measures (matched with the Pitot tube), the air conditioning control and the ventilation one.

### **TRANSMITTER WITH SR OPTION CONNECTED TO A PITOT TUBE TECHNICAL COMMON FEATURES @ 20°C AND 24VDC**

Sensor	Piezoresistive
Measurement range	from 0...50 Pa (0...0,2" H <sub>2</sub> O) to 0...1000 Pa (0...4" H <sub>2</sub> O) relative and differential (see table) For the SR models, the speed measurement ranges depend on the tube constant, the temperature and the pressure (see table)
Output signal	0...10 Vdc R <sub>L</sub> > 10 kΩ and 4...20 mA R <sub>L</sub> < 500 Ω
Accuracy	It depends on the model (see table)
Response time	1 s (fast) or 4 s (slow) selectable through jumper
Over-pressure limit	25 kPa
Compatible media	Only air and non-aggressive gases
Power supply	24 Vac ± 10% or 16...40 Vdc
Absorption	< 1 W
Pressure fit	With Ø 5 mm flexible tube
Electrical connections	Terminal board with screws, max 1.5 mm <sup>2</sup> , PG9 conduit for input cable
Working conditions	-10...+60 °C (-5...+50 °C for models with auto-zero AZ), 0...95% RH
Storage temperature	-20...+70 °C
Case sizes	80 x 84 x 44 mm
Degree of protection	IP67

### **INSTALLATION**

In all the models, the sensor and the electronic are contained in a sturdy plastic case with an IP67 protection degree. Opening the lid are available 3 mm diameter holes that let you set the base of the transmitter directly to a panel or a wall.

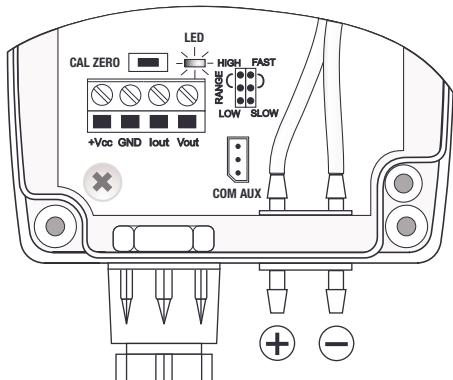


HD404T can be mounted in any position, but typically on a vertical wall with the pressure inlets facing downwards. The gap from zero due to the mounting position can be compensated by using CAL ZERO button. The procedure to follow for manual calibration of zero is the following one:

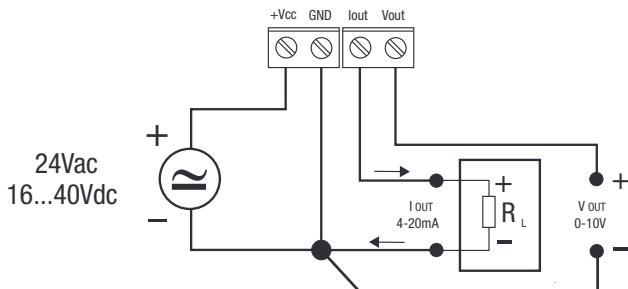
- Make sure that the transmitter is powered by at least 1 hour;
- Disconnect both tubes from the + and - pressure inlets;
- Press CAL ZERO button until the red LED starts to flash;
- When the red led turns off, the zero procedure is completed and you can reconnect the tubes to pressure fits.

We suggest you to perform the auto-zero procedure at least once a year under normal working conditions.

In models with auto-zero circuit (AZ option), this procedure is regularly performed every 15 minutes without disconnecting the hoses from pressure taps. During the reset, which takes about 4 seconds, the analogical outputs and the display will remain frozen at the measured value. Models with auto-zero have virtually no need for maintenance.



**CAL ZERO button and configuration jumpers**



#### Electrical connections

#### CONFIGURATION

**Setting the output range:** the RANGE jumper allows you to choose one of this output ranges: with LOW you choose the low range, with HIGH the extended range.

**Response time setting:** the FAST SLOW jumper lets you choose the response time of the transmitter: in FAST position the measurement is integrated over 1 s, while in SLOW position is integrated over 4 s. SLOW position is recommended if there are conditions of turbulence or disruption of air flow.

**Setting of the parameters in the SR versions:** the transmitters are preset by the factory. To change the settings, proceed as follows:

- Connect the transmitter COM AUX serial output to the PC RS232 (through the **RS27** cable) or USB (through the **CP27** cable) port. If the CP27 cable is used, install in the PC the related USB drivers.
- In the PC, run a serial communication software (e.g. Hyperterminal), set the baud rate to 115200 and the communication parameters to 8N2.
- To change the display configuration (commands 03E, 03D, 04E, 04D, 05E, 05D) it is necessary to send the CAL START command to enter the configuration mode. It is not necessary to send the CAL START command to change the parameters related to the speed measurement (tube coefficient, temperature, pressure, full scale for the analog output).
- Send the commands in the following table to set or read the configuration parameters of the transmitter:

Command	Reply	Description
03E	&	Shows alternately speed and pressure on display
03D	&	Disables the alternating display of speed and pressure
04E	&	Automatic change of speed resolution on display (0,1 or 0,01) depending on the measured value <sup>(1)</sup>
04D	&	Fixed centesimal speed resolution on display <sup>(1)</sup>
05E	&	Sets ft/s as speed unit of measurement on display <i>Note:</i> the symbol ft/s does not appear on display
05D	&	Sets m/s as speed unit of measurement on display (default)

Command	Reply	Description
CK n.n...	&	Sets the Pitot or Darcy tube coefficient to the value n.n... The value must be between 0.6 and 1.2 (default = 1.0)
RK	n.nnnnnl	Reads the value of the tube coefficient set in the transmitter
CB nn... nn...	&	Sets the barometric pressure to the value nn...nn... mbar The value must be between 500 and 1500 mbar (default = 1013.25 mbar)
RB	nnnn.nnnl	Reads the value of the barometric pressure in mbar set in the transmitter
CT n...	&	Sets the airflow temperature in tenths of °C (default = 160 → 16.0 °C) The value must be between -999 (-99.9 °C) and 2000 (→ 200.0 °C)
RT	n...l	Reads the value of the temperature, in tenths of °C, set in the transmitter
CP nnnn...	&	Sets the differential static pressure <sup>(2)</sup> in mbar (default = 0)
RP	nnnn...l	Reads the value of the differential static pressure <sup>(2)</sup> set in the transmitter
CS nnnn	&	Sets the full scale speed, in hundredths of m/s, for the analog output (default = see table). The max settable value is 10000 (→ 100.00 m/s)
RS	nn.nnl	Reads the speed full scale value, in m/s, for the analog output
SV	nn.nnl	Prints the max measurable speed as a function of the transmitter full scale pressure and values set for the parameters. The value is in the speed unit of measurement set in the transmitter.

<sup>(1)</sup> The speed is calculated from the pressure measure through a quadratic relationship. For this reason, the speed resolution is lower for low pressure values measured, and the change of the speed measurement on the display appears rather discontinuous if the fixed centesimal resolution is used. If a more uniform speed change on display is desired, enable the automatic speed resolution change as a function of the measured value.

<sup>(2)</sup> The differential static pressure is equal to the difference between the absolute static pressure inside the duct and the barometric pressure. The differential static pressure is zero if the duct is open (in contact with the atmosphere), while it can be different from zero in case of closed ducts.

To exit the configuration mode after sending the CAL START command, send the CAL END command (the transmitter automatically exits the configuration mode after 5 minutes from the last command sent).

#### DISPLAY

Models with L suffix are provided with a LCD display with 4 digits.

#### Pressure display resolution:

50 - 100 - 250 - 500 Pa	→	0.5 Pa
1000 Pa	→	1 Pa
5 - 10 - 25 - 50 mmH <sub>2</sub> O	→	0.05 mmH <sub>2</sub> O
100 mmH <sub>2</sub> O	→	0.1 mmH <sub>2</sub> O
0.2 - 0.4 - 1 - 2 - 4 inchH <sub>2</sub> O	→	0.002 inchH <sub>2</sub> O

**Speed display resolution in the SR models:** for all the ranges, the speed resolution can be centesimal fixed or with automatic change from decimal to centesimal as a function of the measured value. The selection between the two options is made via the serial commands 04E and 04D.

#### Error reporting:

Undr	→	it appears if the measured value is smaller than the minimum value that can be measured
OvEr	→	it appears if the measured value exceeds the maximum value that can be measured
CAL Error	→	it appears when the zero calibration is finished if the maximum offset value that can be corrected is exceeded.

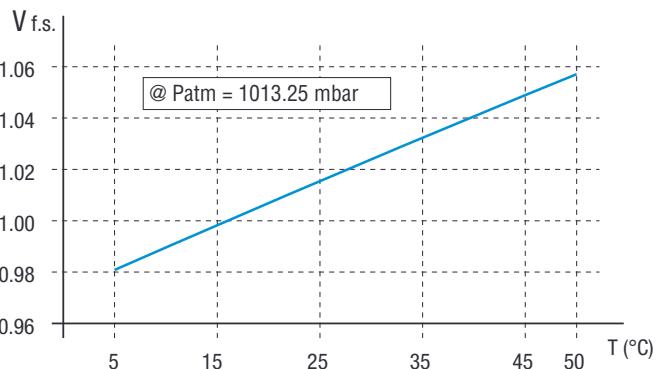


HD404T1PG-AZ-L

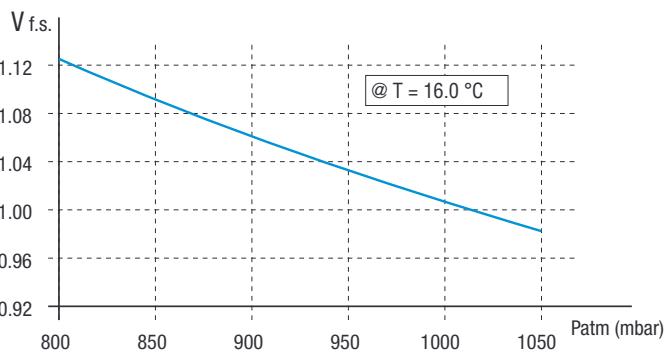
## SPEED FULL SCALE IN THE SR MODELS

In the SR models, the maximum speed measurable depends on the coefficient of the tube used, the temperature, the barometric pressure and the differential static pressure set in the transmitter. The serial command SV allows to read the maximum speed measurable as a function of the parameters setting. The following table shows the maximum speed measurable by the various models with the values of the parameters preset by the factory: tube coefficient  $K = 1.0$ , temperature  $T = 16.0^\circ\text{C}$ , barometric pressure  $\text{Patm} = 1013.25 \text{ mbar}$ , differential static pressure  $\text{Ps} = 0$ .

The following graphs show the change of the maximum measurable speed value (normalized to 1 for  $T=16.0^\circ\text{C}$  and  $\text{Patm}=1013.25 \text{ mbar}$ ) with the change of the temperature and barometric pressure.



Change of the full scale speed with the temperature at constant barometric pressure



Change of the full scale speed with the barometric pressure at constant temperature

## SUMMARY TABLE OF MODELS AND PRECISION

MODEL	RANGE		ACCURACY %F.S. RANGE HIGH (0...+50 °C)	LONG TERM STABILITY (1 YEAR)		
	Pa			AZ	NO AZ	
	LOW	HIGH				
HD404T1PG-AZ(-L-SR)	0...50 Pa	0...100 Pa	±3%	≤±1Pa		
HD404T2PG-AZ(-L-SR)	0...100 Pa	0...250 Pa	±1,5%	≤±1Pa		
HD404T3PG(-AZ-L-SR)	0...250 Pa	0...500 Pa	±1%	≤±1Pa	≤±8Pa	
HD404T4PG(-AZ-L-SR)	0...500 Pa	0...1000 Pa	±1%	≤±1Pa	≤±8Pa	
HD404T1PD-AZ(-L)	-50...+50 Pa	-100...+100 Pa	±1,5%	≤±1Pa		
HD404T2PD-AZ(-L)	-100...+100 Pa	-250...+250 Pa	±1%	≤±1Pa		
HD404T3PD(-AZ-L)	-250...+250 Pa	-500...+500 Pa	±1%	≤±1Pa	≤±8Pa	
HD404T4PD(-AZ-L)	-500...+500 Pa	-1000...+1000 Pa	±1%	≤±1Pa	≤±8Pa	
<b>mmH<sub>2</sub>O</b>						
HD404T1MG-AZ(-L-SR)	0...5 mmH <sub>2</sub> O	0...10 mmH <sub>2</sub> O	±3%	≤±0,1 mmH <sub>2</sub> O		
HD404T2MG-AZ(-L-SR)	0...10 mmH <sub>2</sub> O	0...25 mmH <sub>2</sub> O	±1,5%	≤±0,1 mmH <sub>2</sub> O		
HD404T3MG(-AZ-L-SR)	0...25 mmH <sub>2</sub> O	0...50 mmH <sub>2</sub> O	±1%	≤±0,1 mmH <sub>2</sub> O	≤±0,8 mmH <sub>2</sub> O	
HD404T4MG(-AZ-L-SR)	0...50 mmH <sub>2</sub> O	0...100 mmH <sub>2</sub> O	±1%	≤±0,1 mmH <sub>2</sub> O	≤±0,8 mmH <sub>2</sub> O	
HD404T1MD-AZ(-L)	-5...+5 mmH <sub>2</sub> O	-10...+10 mmH <sub>2</sub> O	±1,5%	≤±0,1 mmH <sub>2</sub> O		
HD404T2MD-AZ(-L)	-10...+10 mmH <sub>2</sub> O	-25...+25 mmH <sub>2</sub> O	±1%	≤±0,1 mmH <sub>2</sub> O		
HD404T3MD(-AZ-L)	-25...+25 mmH <sub>2</sub> O	-50...+50 mmH <sub>2</sub> O	±1%	≤±0,1 mmH <sub>2</sub> O	≤±0,8 mmH <sub>2</sub> O	
HD404T4MD(-AZ-L)	-50...+50 mmH <sub>2</sub> O	-100...+100 mmH <sub>2</sub> O	±1%	≤±0,1 mmH <sub>2</sub> O	≤±0,8 mmH <sub>2</sub> O	
<b>inchH<sub>2</sub>O</b>						
HD404T1IG-AZ(-L-SR)	0...0.2 inchH <sub>2</sub> O	0...0.4 inchH <sub>2</sub> O	±3%	≤±0,04 inchH <sub>2</sub> O		
HD404T2IG-AZ(-L-SR)	0...0.4 inchH <sub>2</sub> O	0...1 inchH <sub>2</sub> O	±1,5%	≤±0,04 inchH <sub>2</sub> O		
HD404T3IG(-AZ-L-SR)	0...1 inchH <sub>2</sub> O	0...2 inchH <sub>2</sub> O	±1%	≤±0,04 inchH <sub>2</sub> O	≤±0,04 inchH <sub>2</sub> O	
HD404T4IG(-AZ-L-SR)	0...2 inchH <sub>2</sub> O	0...4 inchH <sub>2</sub> O	±1%	≤±0,04 inchH <sub>2</sub> O	≤±0,04 inchH <sub>2</sub> O	
HD404T1ID-AZ(-L)	-0.2...+0.2 inchH <sub>2</sub> O	-0.4...+0.4 inchH <sub>2</sub> O	±1,5%	≤±0,04 inchH <sub>2</sub> O		
HD404T2ID-AZ(-L)	-0.4...+0.4 inchH <sub>2</sub> O	-1...+1 inchH <sub>2</sub> O	±1%	≤±0,04 inchH <sub>2</sub> O		
HD404T3ID(-AZ-L)	-1...+1 inchH <sub>2</sub> O	-2...+2 inchH <sub>2</sub> O	±1%	≤±0,04 inchH <sub>2</sub> O	≤±0,04 inchH <sub>2</sub> O	
HD404T4ID(-AZ-L)	-2...+2 inchH <sub>2</sub> O	-4...+4 inchH <sub>2</sub> O	±1%	≤±0,04 inchH <sub>2</sub> O	≤±0,04 inchH <sub>2</sub> O	

In the SR models, the serial command "CS nnnn" allows to associate to the full scale of the analog output a speed value chosen by the user, even different from the maximum value actually measurable by the transmitter.

## ORDERING CODES

MODEL	MAX SPEED MEASURABLE (@ K = 1, T = 16°C, Patm = 1013.25 mbar, Ps = 0)	DEFAULT FULL SCALE FOR THE ANALOG OUTPUT (changeable with the CS command)
	LOW	HIGH
HD404T1PG-AZ(-L-SR)	9,06 m/s	12,82 m/s
HD404T2PG-AZ(-L-SR)	12,82 m/s	20,27 m/s
HD404T3PG(-AZ-L-SR)	20,27 m/s	28,67 m/s
HD404T4PG(-AZ-L-SR)	28,67 m/s	40,55 m/s
HD404T1MG-AZ(-L-SR)	8,98 m/s	12,70 m/s
HD404T2MG-AZ(-L-SR)	12,70 m/s	20,08 m/s
HD404T3MG(-AZ-L-SR)	20,08 m/s	28,39 m/s
HD404T4MG(-AZ-L-SR)	28,39 m/s	40,16 m/s
HD404T1IG-AZ(-L-SR)	9,05 m/s	12,80 m/s
HD404T2IG-AZ(-L-SR)	12,80 m/s	20,24 m/s
HD404T3IG(-AZ-L-SR)	20,24 m/s	28,62 m/s
HD404T4IG(-AZ-L-SR)	28,62 m/s	40,48 m/s

## ACCESSORIES

Supplied:

- N°1 piece of Ø3.2/Ø6.4 silicone tube 2m long
- N°2 HD434T.5 plastic fittings
- 

Under request:

**HD3719:** Flow offtake for square or cylindrical channel. Two pieces of Ø3.2/Ø6.4 tube 1m long.

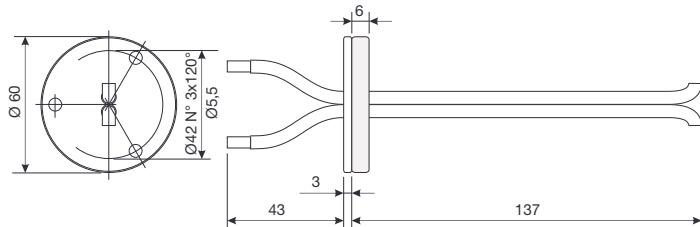
**HD3721:** Flow offtake for plastic material cylindrical channel. Two pieces of Ø3.2/Ø6.4 tube 1m long.

**RS27:** RS232 null-modem serial connection cable with 9-pole SubD connector for the PC and 3-pole connector for the COM AUX port of the instrument.

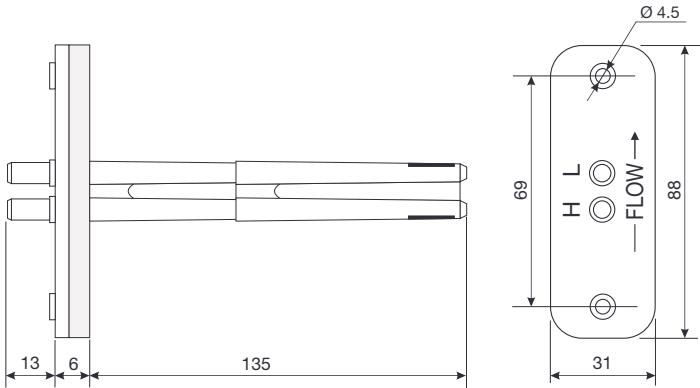
**CP27:** Serial connection cable with USB connector for the PC and 3-pole connector for the COM AUX port of the instrument. The cable has a builtin USB/RS232 converter and connects the transmitter directly to the USB port of the PC.

**Pitot tubes:** see list and dimensions at next page.

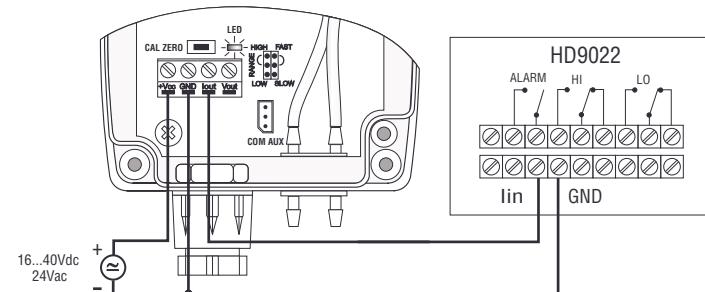
AP3719 duct probe



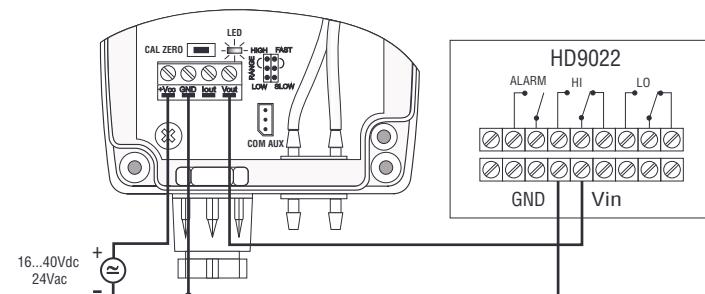
AP3721 duct probe:



Examples of connection with HD9022 indicator regulator



Current output 4...20mA

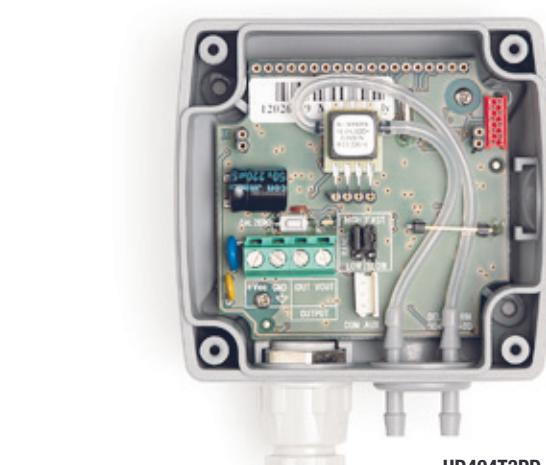


Voltage output 0...10Vdc

**PITOT TUBES**

Stainless steel Pitot tubes for air speed measurement, supplied with silicone tube Ø 6mm external, Ø 4mm internal, length 2m.

	d mm	d <sub>1</sub> mm	D mm	L mm	L <sub>1</sub> mm	L <sub>2</sub> mm	Temp. °C	Material
T1-300	3	1	6	300	30	72		
T2-400	5	2	8	400	45	120		
T2-600	5	2	8	600	45	120		
T3-500	8	3,2	8	500	---	192		
T3-800	8	3,2	8	800	---	192		
T4-500	10	4,0	10	500	---	240		
T4-800	10	4,0	10	800	---	240		
T4-1000	10	4,0	10	1000	---	240		



HD434T.5

HD404T 1P - G - AZ - L - SR

SR = with square root output  
(not available for type D versions)

L = with LCD display

AZ = with auto-zero circuit

D = differential pressure -f.s...+f.s.

G = relative pressure with reference to the atmosphere 0...+f.s.

Nominal full scale (f.s.):

1P = 100Pa, 2P = 250Pa, 3P = 500Pa, 4P = 1000Pa

1M = 10mmH<sub>2</sub>O, 2M = 25mmH<sub>2</sub>O, 3M = 50mmH<sub>2</sub>O, 4M = 100mmH<sub>2</sub>O

1I = 0.4inchH<sub>2</sub>O, 2I = 0.8inchH<sub>2</sub>O, 3I = 2inchH<sub>2</sub>O, 4I = 4inchH<sub>2</sub>O





## 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.
- Up to 12 further analogue current or voltage outputs, with different measuring ranges.
- 4 Serial Communication interfaces: RS232, RS422, Multidrop RS485 and AoXnd
- Configurable output rate of digital output data string.
- Configurable average periods 1÷60sec and 1÷60min. for all output quantities.
- Algorithmic raw date processing and validation, assuring  $\pm 1\%$  precision to anemometric quantities.
- Digital high frequency data acquisition mode with 50Hz data output, or high frequency analogue data acquisition within 5Hz and 20Hz.
- 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.
- (**On request**) **RS422 Option**: full duplex 4-wire integrated circuit for RS422 communication.

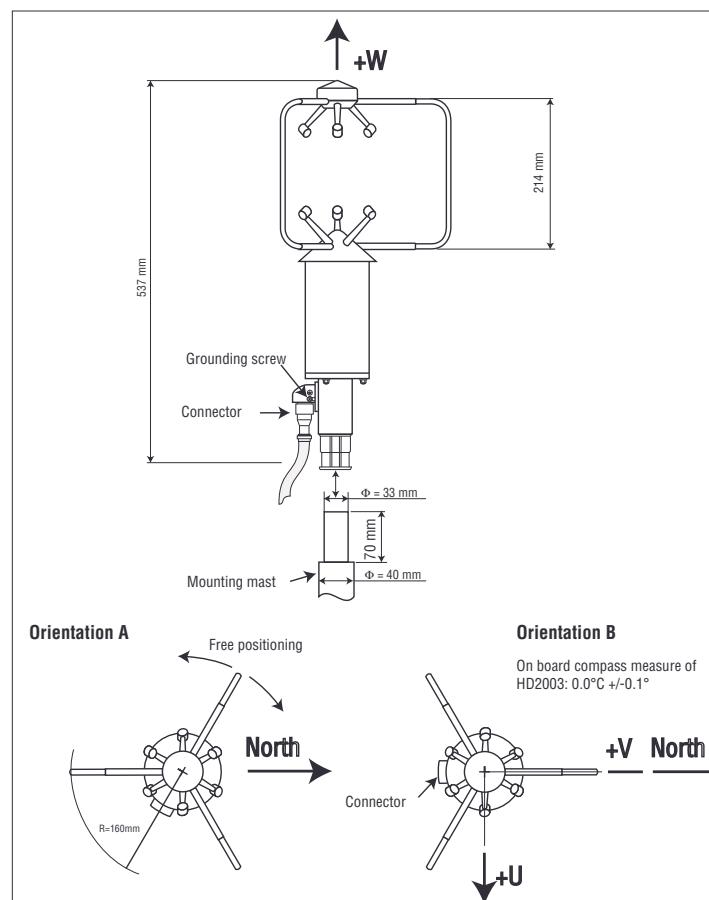
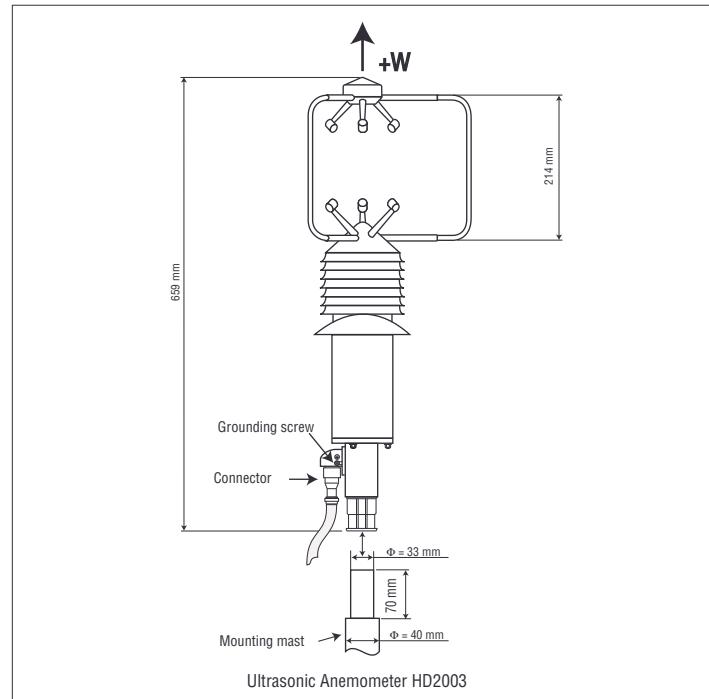
### Typical applications:

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

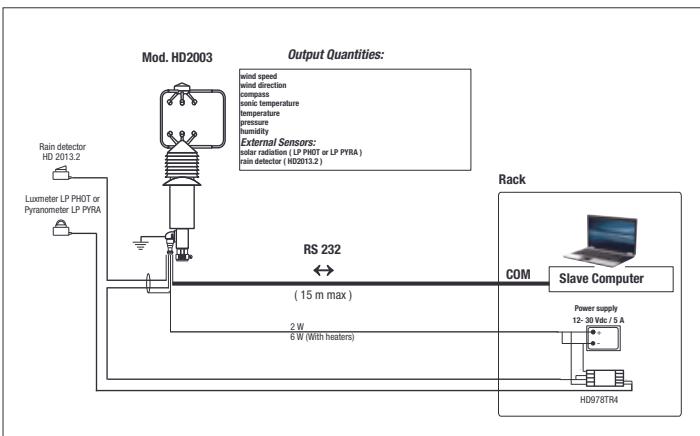
### Technical specifications

#### 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, RS422 or RS485)



Air speed



### Wind Speed

- Measuring unit
- Range
- Resolution
- Accuracy

m/s, cm/s, km/h, knots, mph  
0÷70 m/s (252 km/h)  
0.01 m/s  
± 1% of reading

### Wind Direction

- Range
- Resolution
- Accuracy

Azimuth: 0÷360° Elevation: ± 60°  
0.1°  
± 1°

### Sound speed

- Range
- Resolution
- Accuracy

300 ÷ 380 m/s  
0.01 m/s  
± 1% of reading

### Sonic Temperature

- Range
- Resolution
- Accuracy

-40 + 60°C  
0.1 °C  
± 1°C

### Compass

- Range
- Resolution
- Accuracy

0 ÷ 360° (measurement in tenths of degree)  
0.1 °  
± 1°

### Digital Outputs

- Communications
- Baud Rate
- Output Rate
- Measured data

RS232 and RS422 full duplex, Multidrop RS-485 and AoXand half duplex  
9600 ÷ 115200 bit/sec.  
Normal functioning mode: 1 ÷ 3600 sec  
Digital high frequency: 1/50 sec

### Analog Outputs

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

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

### Extended Analog Outputs (with ICP DAS I-7024 @ module - on request when placing the order)

- Number
  - Range
  - Resolution
  - Output rate
- Normal mode (slow): 1 ÷ 3600s  
Analogue High frequency (fast): from 5Hz to 20Hz, depending on the baud rate

### Power supply

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

### Heaters Option (On request, when placing the order)

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

### RS422 Option

Integrated circuit for 4-wire RS422 full duplex communication

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

#### Temperature

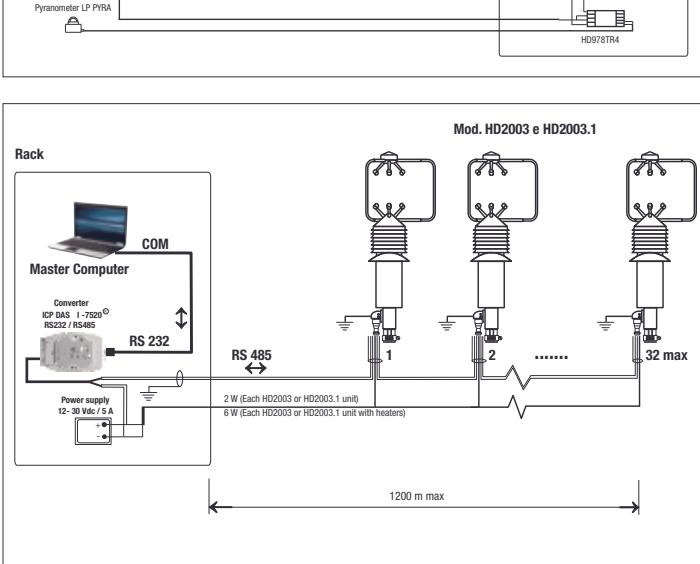
Pt100 sensor  
Analog output 0÷20mA, 4÷20mA, 0÷1V, 0÷5V, 1÷5V, 0÷10V  
Extended analog output (AoXand): 0÷20mA, 4÷20mA, 0÷5V, 0÷10V  
Range: -40...+ 60°C  
Resolution 0.1°C  
Accuracy ± 0.2°C ± 0.15% of reading

#### Relative Humidity

Capacitive sensor  
Analog output ( 0 ÷ 100% RH): 0÷20mA, 4÷20mA, 0÷1V, 0÷5V, 1÷5V, 0÷10V  
Extended analog output (AoXand): 0÷20mA, 4÷20mA, 0÷5V, 0÷10V  
Range: 0 ÷ 100% RH  
Resolution 0.1 % RH  
Accuracy ± 2% RH @ 23°C in 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  
Extended analog output (AoXand): 0÷20mA, 4÷20mA, 0÷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



### Mod. HD2003 e HD2003.1

- Number
- Range
- Resolution
- Output rate

Normal mode (slow): 1 ÷ 3600s

Analogue High frequency (fast): from 5Hz to 20Hz, depending on the baud rate

### Power supply

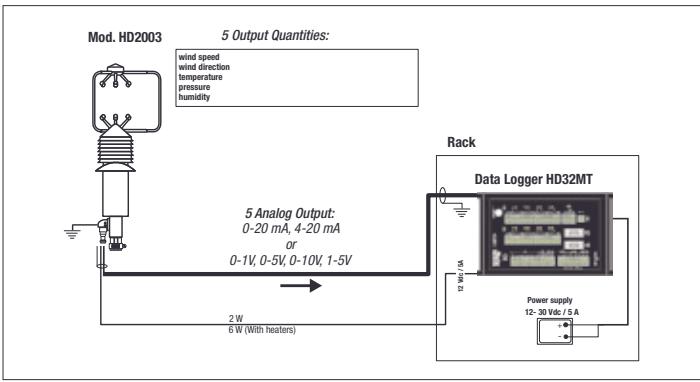
- Range
- Power

12 ÷ 30 VDC  
<2W (typically 110mA @ 15Vdc)

<6W Models with heaters and environment temperature not lower than -10°C

### Heaters Option (On request, when placing the order)

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



### Mod. HD2003.1

- Number
- Range
- Resolution
- Output rate

Normal mode (slow): 1 ÷ 3600s

Analogue High frequency (fast): from 5Hz to 20Hz, depending on the baud rate

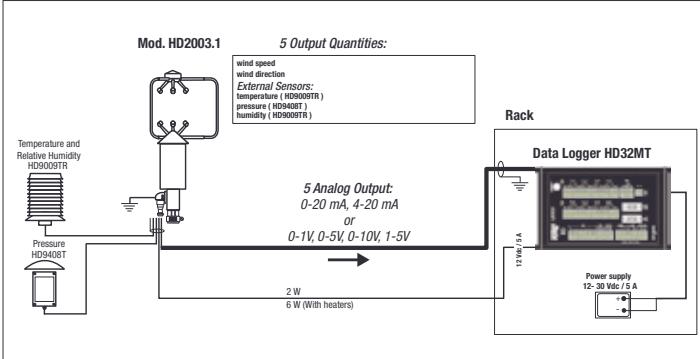
On request: 600 ÷ 1100 mbar

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 RS232, RS485, RS422 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 RS232, RS485, RS422. 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.

**HD2003.1R:** 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

**RS2003:** Cable with USB connector at one side and watertight connector 26-pole connector at the other end, with 12Vdc power inlet for mains supply.

**ICP DAS I-7024CR®:** Module for extended analog output mode. Indicate how many modules (up to a maximum of 3) and which configuration is required.

**ICP DAS I-7520CR®:** Module for RS232/RS485 conversion for RS485 Multidrop mode and extended analog output mode.

**C.205M:** USB/RS232 converter cable, with USB connector at one side and 9-pole male connector at the other end.

**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 (HD2003.77C - HD2003.79)

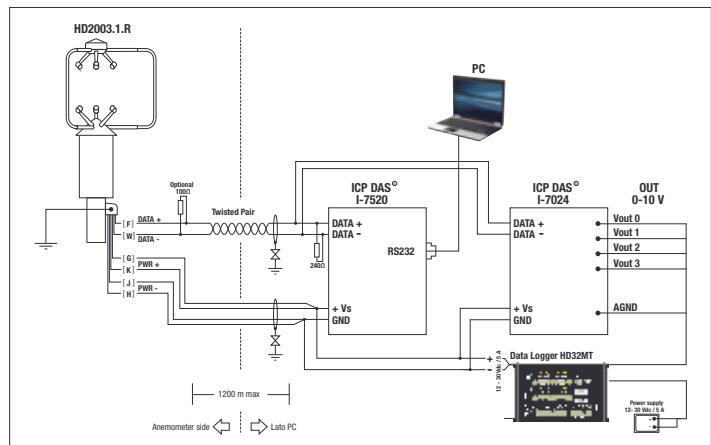
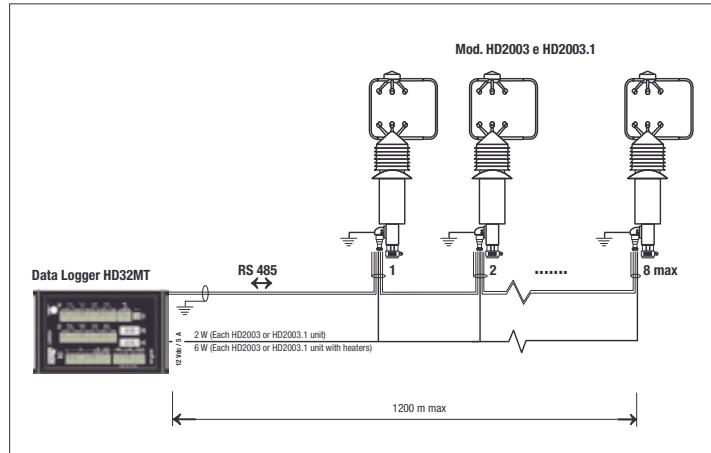
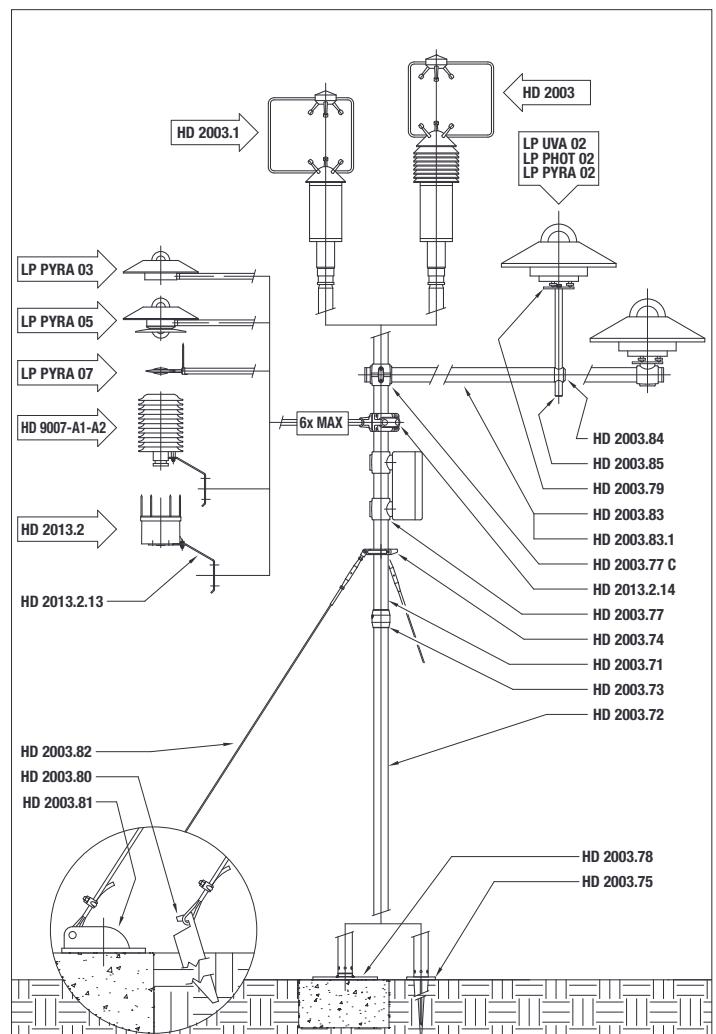
**HD2003.83:** Transverse mast L=150 cm

**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 (depending on the selected model):

- **Model HD2003 and HD2003.1:** integrated circuit for 4-wire full duplex RS422 communication.
- **Model HD2003:** if the extension of the analog outputs is required, by additional external sensors with **0÷1V analog output**. 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 the extension of the analog outputs is required by additional external sensors with **0÷1V analog output**. 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.





## HD52.3D 2 AXES ULTRASONIC ANEMOMETERS

### 2 axes ultrasonic Anemometers series HD 52.3D....

The instruments of the series HD52.3D... are 2 axes ultrasonic static anemometers for measuring:

- Wind speed and direction, U-V Cartesian components of wind speed,
- Relative Humidity and Temperature (**optional, code '17'**),
- Diffuse Solar Radiation (**optional, code 'P'**),
- Barometric pressure (**optional, code '4'**).

All models are equipped with compass.

RS232, RS485, RS422 and SDI-12 serial interfaces are available with **NMEA**, **MODBUS-RTU** and **SDI-12** communication protocols.

All versions have two analogical outputs, both for wind speed and for direction, factory configurable among 4÷20mA (**standard**), 0÷1V, 0÷5V, 0÷10V (**to be specified when ordering**).

Optionally available, (ACCREDIA) **ILAC-MRA** traceable factory calibration.

#### Advantages:

- The absence of moving parts minimizes maintenance;
- High sensitivity for detecting very low speeds, which are not detectable by traditional methods;
- The low power of the instrument allows installation in remote sites, with power from solar panel and battery;
- The heating option 'R' prevents the accumulation of snow and ice from forming, allowing accurate measurements in all environmental conditions;
- Fast and easy installation (on 40mm diameter pole, optional installation kit HD2004.20), alignment facilitated by built-in compass;
- The available measurement options join together in one single, compact and lightweight instrument, the main variables of interest in weather stations;
- MODBUS-RTU output allows instrument networking.

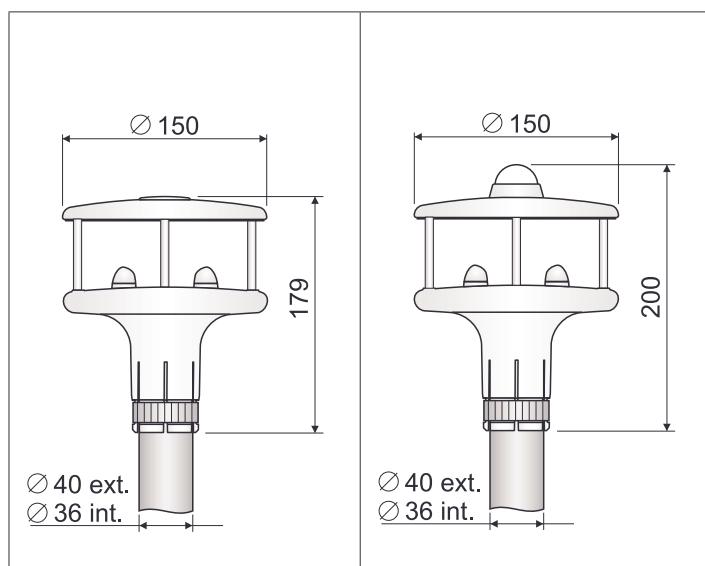
#### Typical applications:

- Weather stations
- Environmental monitoring
- Agriculture
- Sports facility
- Marine and Harbour applications
- Airports
- HVAC
- Construction
- Renewable energy
- Building automation

#### Technical specifications:

Wind speed	
Employed sensor type	Ultrasonic
Measuring Range	0...60 m/s
Resolution	0.01 m/s
Accuracy	Whichever is greater ± 0,2 m/s or ± 2%, (0...35 m/s) ± 3% (> 35 m/s)
Wind direction	
Employed sensor type	Ultrasonic
Measuring Range	0...360°
Resolution	0.1°
Accuracy	± 2° RMSE from 1.0 m/s
Compass	
Employed sensor type	Magnetic
Measuring Range	0...360°
Resolution	0.1°
Accuracy	± 1°
Air temperature (option 17 is requested)	
Employed sensor type	PT100
Measuring Range	-40...+60 °C
Resolution	0.1 °C
Accuracy	± 0,15°C ± 0,1% of the measure
Relative Humidity (option 17 is requested)	
Employed sensor type	Capacitive
Measuring Range	0...100%RH
Resolution	0.1%
Accuracy (@ T = 15...35 °C)	± 1.5%UR (0...90%RH), ± 2%RH (remaining field)
Accuracy (@ T = -40...+60 °C)	± (1.5 + 1.5% of the measure)%RH
Barometric Pressure (option 4 is requested)	
Principle	Piezoresistive
Measuring Range	600...1100 hPa
Resolution	0.1 hPa
Accuracy	± 0.5 hPa @ 20°C
Solar Radiation (option P is requested)	
Employed sensor type	Thermopile
Measuring Range	0...2000 W/m²
Resolution	1 W/m²
Accuracy	2 <sup>nd</sup> class Pyranometer
General features	
Power supply	10...30 Vdc
Power Consumption	26mA @ 12Vdc without heater, 6W with heater
Serial Outputs	RS232, RS485, RS422 and SDI-12
Communication Protocols	NMEA, MODBUS-RTU, SDI-12
Analog Outputs	2 analog outputs for wind speed and direction. Output type to be specified when ordering among 4...20mA (standard), 0...1V, 0...5V and 0...10V ( <b>option 0...10V requires power supply 15...30Vdc</b> )
Electrical connection	male connector M23 19 poles
Working temperature	-40...+60 °C
Dimensions	H=179mm, Ø =150mm (HD52.3D, HD52.3D4) H=200mm, Ø =150mm (HD52.3DP, HD52.3DP4) H=336mm, Ø =150mm (HD52.3D17, HD52.3D147) H=357mm, Ø =150mm (HD52.3DP17, HD52.3DP147)
Weight	about 1 Kg (full version, HD52.3DP147)
Housing	Plastic material: LURAN®S (ASA) Metallic parts made of AISI 316
Protection degree	IP66

## DIMENSIONS (mm)



### HD 52.3D

Wind speed and direction.

### HD 52.3D4

Wind speed, wind direction and barometric pressure.

### HD 52.3DP

Wind speed, wind direction and solar radiation.

### HD 52.3DP4

Wind speed, wind direction, solar radiation and barometric pressure.

## ORDERING CODES

**HD 52.3D** [ ]

R = heater option  
Blank = not heated

P = solar radiation option (pyranometer)

4 = barometric pressure option

17 = relative humidity and temperature option

P4 = solar radiation and barometric pressure option

P17 = solar radiation, relative humidity and temperature option

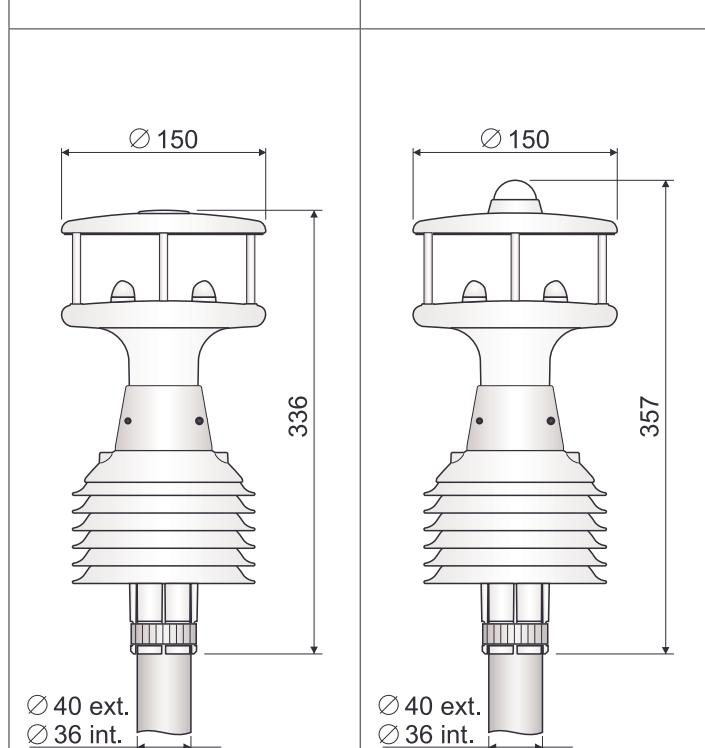
147 = barometric pressure, relative humidity and temperature option

P147 = solar radiation, barometric pressure, relative humidity and temperature option

No characters = basic version: wind speed and direction

Analog outputs for wind speed and direction: 4...20mA standard; to be requested: 0...1V, 0...5V or 0...10V (0...10V option requires power supply 15...30Vdc).

**HD52.3D...:** 2 axes ultrasonic static anemometers for the measure of wind speed and direction, U-V Cartesian components of wind speed, relative humidity and temperature (**optional**), diffuse solar radiation (**optional**) and barometric pressure (**optional**). A compass is supplied. RS232, RS485, RS422 and SDI-12 serial outputs, NMEA, MODBUS-RTU and SDI-12 communication protocols. Two analogical outputs, for wind speed and direction, factory configurable among 4÷20mA (**standard**), 0÷1V, 0÷5V or 0÷10V (**to be specified when ordering**). Heater option is available. Power supply: 10...30Vdc (15...30Vdc for 0÷10V analog outputs). Installation on a pole: external Ø 40mm and internal Ø 36mm. Input with M23 19-pin male connector and M23 19-pin female flying connector. **Optional 5m or 10m cable with a connector on one side and open wires on the other.**



### HD 52.3D17

Wind speed, wind direction, temperature and relative humidity.

### HD 52.3D147

Wind speed, wind direction, temperature, relative humidity and barometric pressure.

### HD 52.3DP17

Wind speed and direction, solar radiation, temperature, relative humidity.

### HD 52.3DP147

Wind speed, wind direction, solar radiation, temperature, relative humidity and barometric pressure.



Air speed



#### ACCESSORIES

**HD52.3D-S:** Further copy of CD-ROM with HD52.3D-S software for PC connection, instrument configuration and monitor. For Windows® operating systems.

**RS 52 :** Serial connection cable with built-in USB/RS232 converter. USB connector for the PC and screw terminals on the instrument side. The cable is used to configure the instrument before the installation. Length 1.5 m.

**CP52.5:** Connection cable with M23 19-pin female flying connector on one side, free wires on the other. 5m long.

**CP52.10:** Connection cable with M23 19-pin female flying connector on one side, free wires on the other. 10m long.

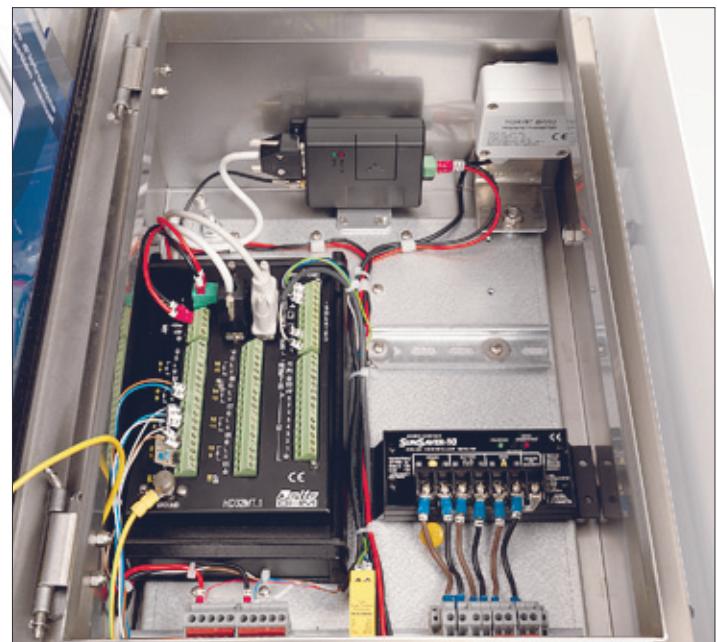
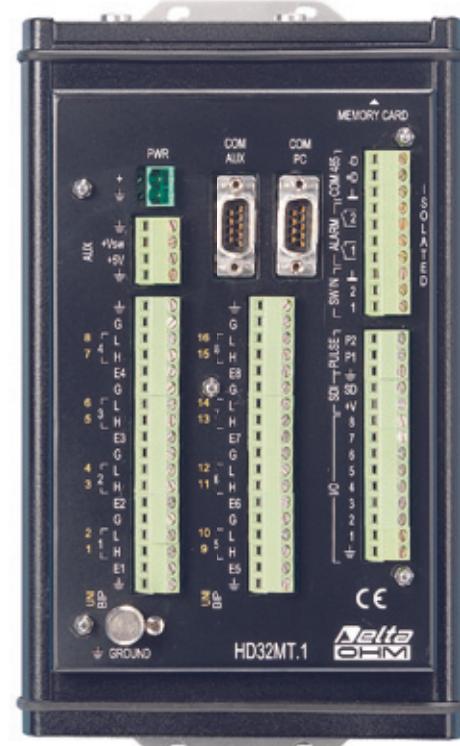
**CP52.15:** Connection cable with M23 19-pin female flying connector on one side, free wires on the other. 15m long.

**CP52.20:** Connection cable with M23 19-pin female flying connector on one side, free wires on the other. 20m long.

**CP52.C:** Further M23 19-pin female flying connector.

**HD2004.20:** Tripod kit for installing anemometers on a flat base. Height 3m.

**HD2004.22:** 1200x530x34mm Solar panel mounting kit to a Ø 40÷50mm pole. AISI 304 stainless steel.



**HD2004.30:** 80W monocrystalline solar panel. Dimensions 1200 x 530 x 34 mm.

Model MD5000080 – CS EVOLUTION.

**HD32.35:** Outdoor-box for complete weather station acquisition system. **Material:**

**AISI 304 stainless steel.** Screen to protect the box from solar radiations. Powder-coated, anodized aluminium white colour. Double lock, one with a key. Dimensions: 450 x 300 x 210 mm. Protection degree: IP66. Equipped with the accessories to mounting on a mast diameter 36 ÷ 52 mm. Provided for 100÷240Vac mains power supply, includes: HD32MT.1 datalogger, power supply unit AC / DC with battery charger, rechargeable 12V battery, surge protection, breakers, power distribution terminals and connectors for connection to external sensors.

**HD32.35FP:** Outdoor-box for complete weather stations acquisition system.

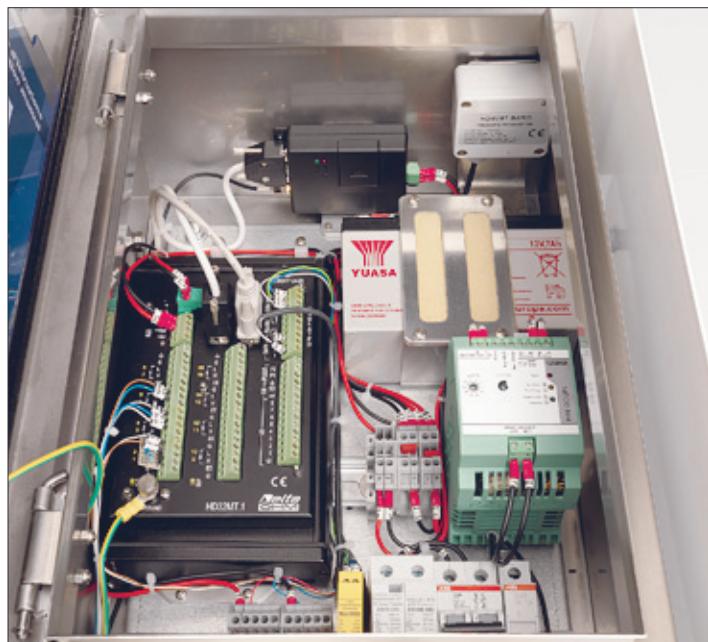
**Material: AISI 304 stainless steel.** Screen to protect the box from solar radiations. Powder-coated, anodized aluminium white colour. Double lock, one with a key. Dimensions: 450 x 300 x 210 mm. Protection degree: IP66. Equipped with the accessories to mounting on a mast diameter 36 ÷ 52 mm. For power supply by solar panel, includes: HD32MT.1 logger, solar panel charge controller, and power distribution terminal block connectors for connection to external sensors.

**HD32.36:** Outdoor-box for complete weather stations acquisition system. **Material:**

**Polyester reinforced with hot-moulding Fiberglass.** Screen to protect the box from solar radiations. Powder-coated, anodized aluminium. White colour. Key lock. Dimensions: 415 x 310 x 170 mm. Protection degree: IP66. Equipped with the accessories to mounting on a mast diameter 36 ÷ 52 mm. Provided for 100÷240Vac mains power supply, includes: HD32MT.1 datalogger, power supply unit AC / DC with battery charger, rechargeable 12V battery, surge protection, breakers, power distribution terminals and connectors for connection to external sensors.

**HD32.36FP:** Outdoor-box for complete weather stations acquisition system. **Material:**

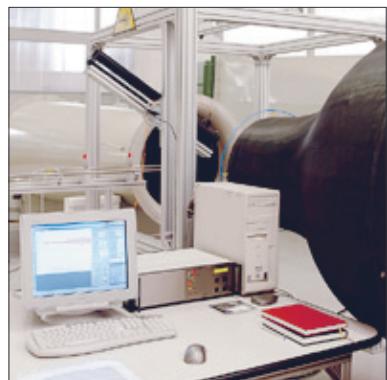
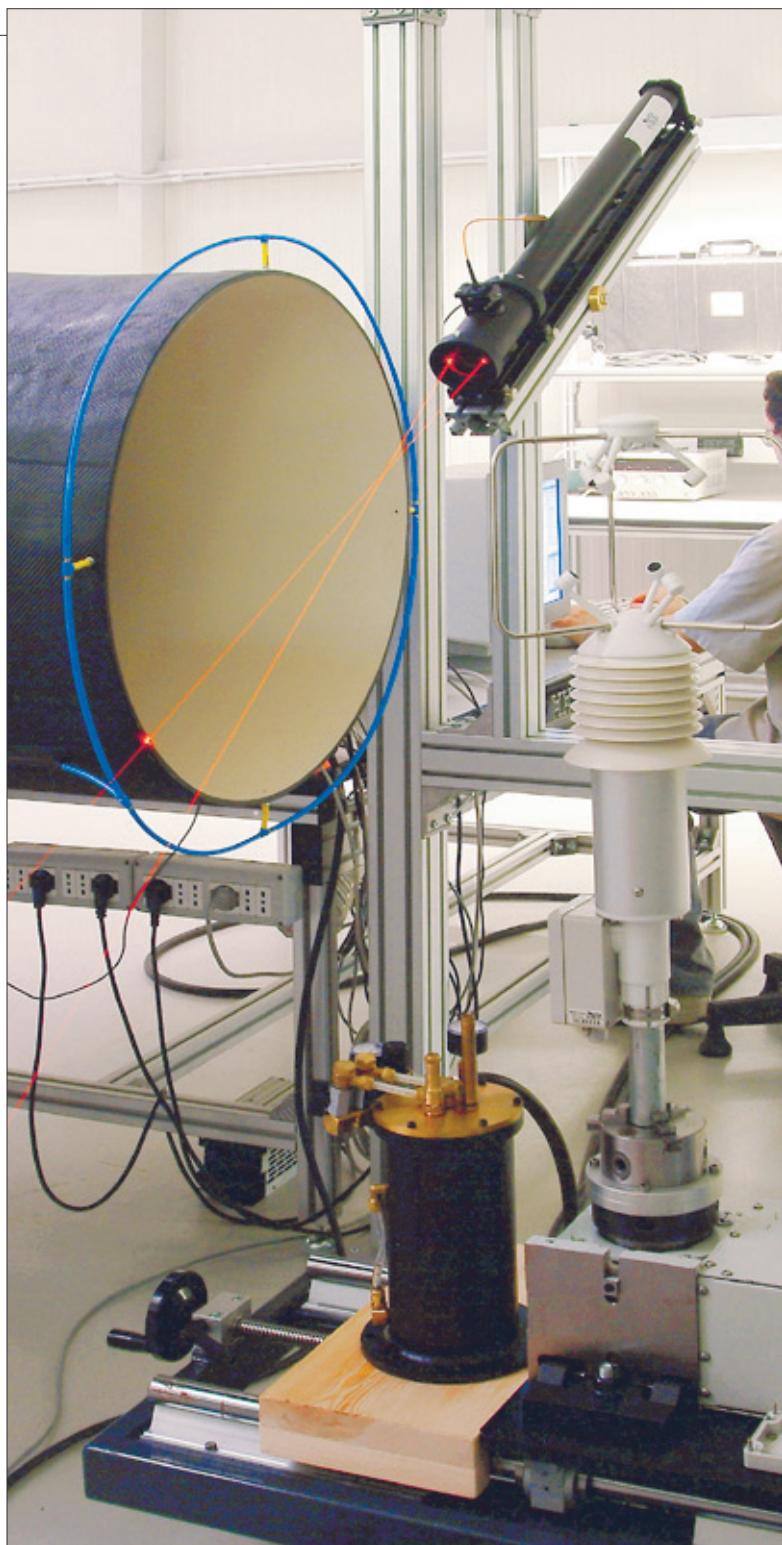
**Polyester reinforced with hot-moulding Fiberglass.** Screen to protect the box from solar radiations. Powder-coated, anodized aluminium. White colour. Key lock. Dimensions: 415 x 310 x 170 mm. Protection degree: IP66. Equipped with the accessories to mounting on a mast diameter 36 ÷ 52 mm. For power supply by solar panel, includes: HD32MT.1 logger, solar panel charge controller, and power distribution terminal block connectors for connection to external sensors.



HD 32.35



ACCREDIA LAT N° 124 laboratory - Air speed





## Laboratory LAT N° 124

DELTA OHM s.r.l.  
Via G. Marconi, 5  
35030 CASELLE DI SELVAZZANO (PD) - ITALIA

Tel.: +39 049 89 77 150 - fax: +39 049 63 55 96  
E-mail: info@deltaohm.com  
URL http://www.deltaohm.com

### Permanent Laboratory

### ACCREDITATION TABLE

Quantity	Instruments to be calibrated	Measuring range	Uncertainty (*)		Notes
			①	②	
Air speed	Anemometers	0,1 m/s	13 %		---
		0,15 m/s	9 %		
		0,2 m/s	6 %		
		0,3 m/s	4 %		
		0,5 m/s	2,8 %		
		0,7 m/s	2,8 %		
		1 m/s	2,4 %	4,2 %	
		2,5 m/s	2,4 %	2,7 %	
		5 m/s	2,0 %	2,6 %	
		7,5 m/s	2,0 %	1,5 %	
		10 m/s	2,0 %	1,5 %	
		15 m/s	2,0 %	1,5 %	
		20 m/s	2,0 %	1,5 %	
		25 m/s	2,0 %	2,4 %	
		30 m/s	2,0 %	2,4 %	
		35 m/s	2,0 %	2,4 %	
		40 m/s		2,4 %	
		50 m/s		2,4 %	
		60 m/s		2,4 %	

(\*) The measurement uncertainty is expressed in relative mode to the measured value and is declared as expanded uncertainty corresponding to the level of confidence of 95%.

① Type of instrument: hot wire, vane (diameter ≤ 60mm)

② Type of instrument: Cup anemometer, ultrasonic, Pitot tube, vane (diameter > 60mm)

Air speed





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