

## 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 IP66**

#### 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

<i>Measuring unit</i>	°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
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<i>Security of memorized data</i>	Unlimited, independent of battery charge conditions
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<i>Time</i>	
Date and time	in real time
Accuracy	1min/month max drift

<i>Measured values storage - models HD2114P.2 and HD2134P.2</i>	
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

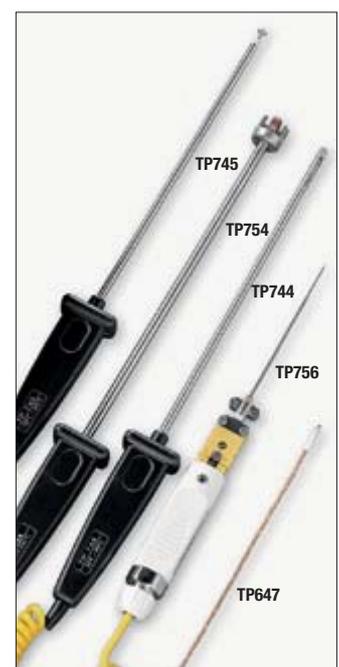
<i>Serial interface RS232C - models HD2114P.2 and HD2134P.2</i>	
Type	RS232C electrically isolated
Baud rate	Can be set from 1200 to 38400 baud
Data bit	8
Parity	None
Stop bit	1
Flow Control	Xon/Xoff
Serial cable length	Max 15m
Print interval	Immediate or 1,5,10,15,30 sec.; 1,2,5,10,15,20,30 min.; 1 hour

<i>USB interface - models HD2114P.2 and HD2134P.2</i>	
Type	1.1 - 2.0 electrically isolated

<i>Connections</i>	
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 - 0.01·10 <sup>3</sup> m <sup>3</sup> /h - 0.01·10 <sup>3</sup> cfm	
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
<b>Automatic air temperature compensation</b>	-200...+600°C	
<b>Manual air temperature compensation</b>	-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 - m <sup>3</sup> /h - cfm	
Temperature	°C / °F	
<b>Pipeline section for flow rate calculation</b>	0.0001...1.9999 m <sup>2</sup>	
<b>Fluid contacting the membrane</b>	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	from -40 to +125°C	from -40 to +133°C	from -67 to +40°C
Tolerance	± 0.5°C	± 1°C	± 1°C
Temperature interval	from 125 to 350°C	from 133 to 350°C	from -200 to -67°C
Tolerance	± 0.004 · t	± 0.0075 · t	± 0.015 · t
<b>Type E</b>			
Temperature interval	from -40 to +375°C	from -40 to +333°C	from -167 to +40°C
Tolerance	± 1.5°C	± 2.5°C	± 2.5°C
Temperature interval	from 375 to 800°C	from 333 to 900°C	from -200 to -167°C
Tolerance	± 0.004 · t	± 0.0075 · t	± 0.015 · t
<b>Type J</b>			
Temperature interval	from -40 to +375°C	from -40 to +333°C	-
Tolerance	± 1.5°C	± 2.5°C	-
Temperature interval	from 375 to 750°C	from 333 to 750°C	-
Tolerance	± 0.004 · t	± 0.0075 · t	-
<b>Type K, type N</b>			
Temperature interval	from -40 to +375°C	from 40 to +333°C	from -167 to +40°C
Tolerance	± 1.5°C	± 2.5°C	± 2.5°C
Temperature interval	from 375 to 1000°C	from 333 to 1200°C	from -200 to -167°C
Tolerance	± 0.004 · t	± 0.0075 · t	± 0.015 · t
<b>Type R, type S</b>			
Temperature interval	from 0 to +1100°C	from 0 to +600°C	-
Tolerance	± 1°C	± 1.5°C	-
Temperature interval	from 1100 to 1600°C	from 600 to 1600°C	-
Tolerance	± [1 + 0.003 (t-1100)] °C	± 0.0025 · t	-
<b>Type B</b>			
Temperature interval	-	-	from +600 to +800°C
Tolerance	-	-	+ 4°C
Temperature interval	-	from 600 to 1700 °C	from 800 to 1700°C
Tolerance	-	± 0.0025 · t	± 0.005 · t

<sup>(1)</sup> 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.

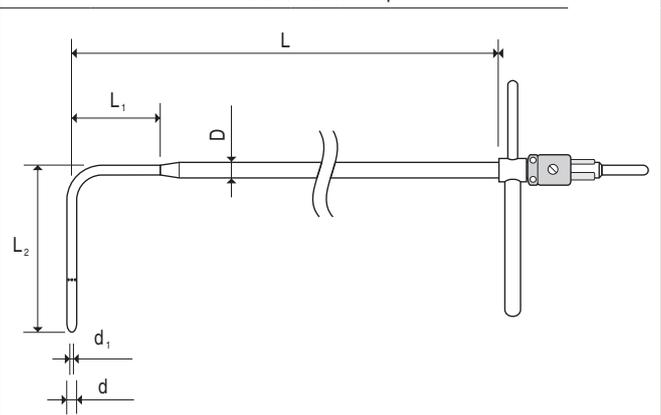
#### K type thermocouple probes

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
<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	