



**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 HD2114P.2 and HD2134P.2	Output mains adapter 12Vdc / 1000mA

<i>Measuring unit</i>	°C - °F - Pa - mbar - mmH ₂ O - PSI - m/s km/h - ft/m - mph - knot - l/s - m ³ /h - cfm
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<i>Security of memorized data</i>	Unlimited, independent of battery charge conditions
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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

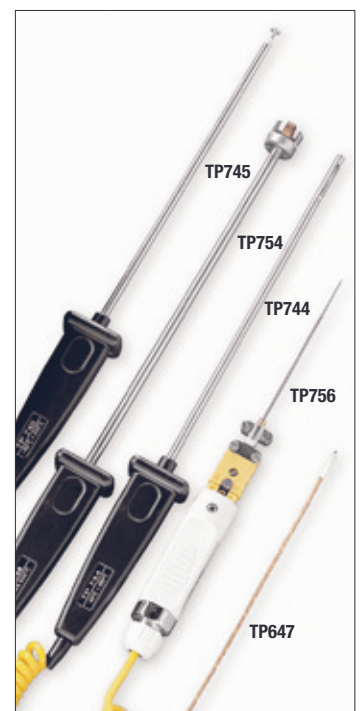
Pressure inputs	2 quick couplings Ø 5mm
TC type K Temperature input	2-pole female polarized standard miniature connector

Serial interface - models HD2114P.2 and HD2134P.2	8-pole MiniDin connector
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USB interface - models HD2114P.2 and HD2134P.2	MiniUSB type B connector
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Mains adapter - models HD2114P.2 and HD2134P.2	2-pole connector (positive at centre)
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Measurement of pressure, wind speed and flow rate calculated by the internal sensor, and



Air speed

temperature measured using thermocouple K

	HD2114P.0 HD2114P.2	HD2134P.0 HD2134P.2
Measurement range		
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
Maximum overpressure	±300mbar	±1bar
Resolution		
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 ³ m ³ /h - 0.01·10 ³ cfm	
Temperature	0.1°C	
Accuracy		
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
Minimum speed	2 m/s	2 m/s
Automatic air temperature compensation	-200...+600°C	
Manual air temperature compensation	-200...+600°C	
Unit of Measurement		
Differential pressure	Pa - mbar - mmH ₂ O - PSI	
Speed	m/s - km/h - ft/min - mph - knots	
Flow rate	l/s - m ³ /h - cfm	
Temperature	°C / °F	
Pipeline section for flow rate calculation	0.0001...1.9999 m ²	
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 ⁽¹⁾
Type T			
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
Type E			
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
Type J			
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	-
Type K, type N			
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
Type R, type S			
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	-
Type 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

⁽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.

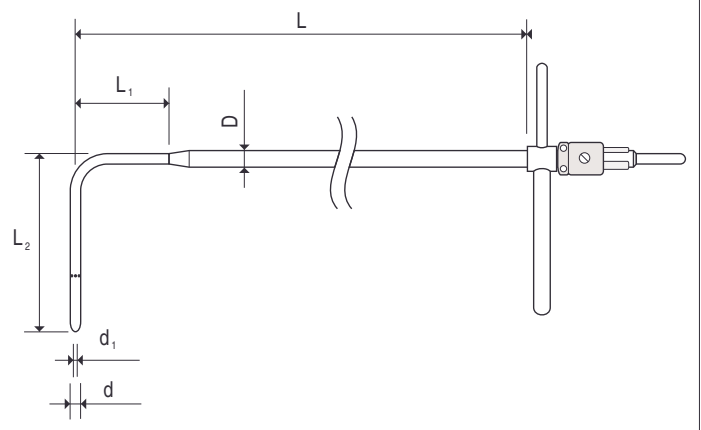
K type thermocouple probes

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 ₁ mm	D mm	L mm	L ₁ mm	L ₂ mm	Temp. °C	Thermocouple 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	

AIR SPEED PROBES WITH SICRAM MODULE FOR PORTABLE INSTRUMENTS

Code	Range m/s	Range Temp. °C	
HOT-WIRE			
AP471S1	0.1÷40	-25÷80	
AP471S2	0.1÷5		
AP471S3	0.1÷40		
AP471S4	0.1÷5	0÷80	
VANE			
AP472S1	0.6÷25	-25÷80	
AP472S2	0.5÷20		
AST1	Telescopic shaft min. length 220 mm Telescopic shaft max. length 870 mm		

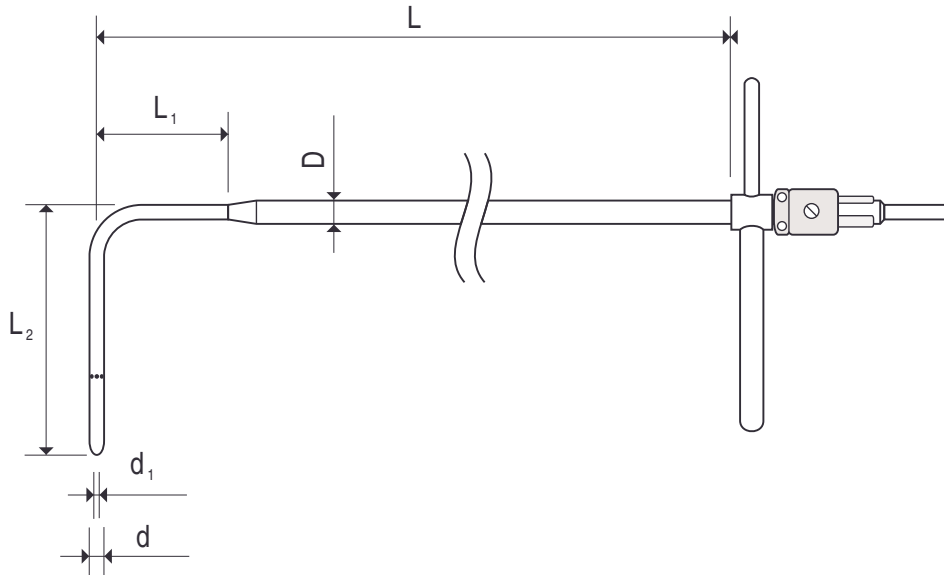
Air speed

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		

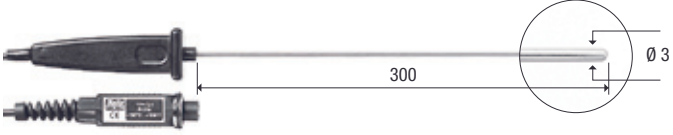
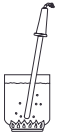
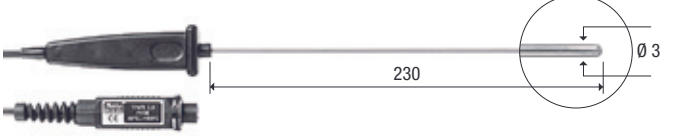

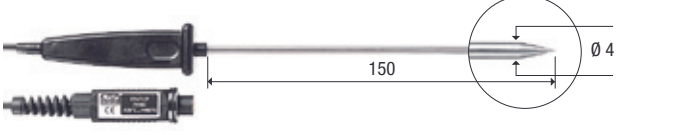

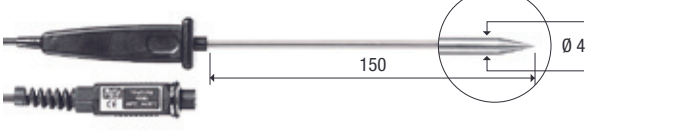

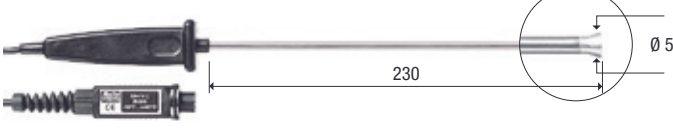
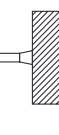

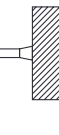
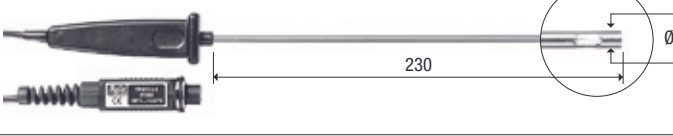

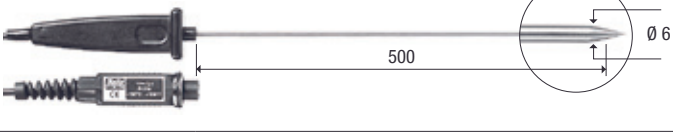

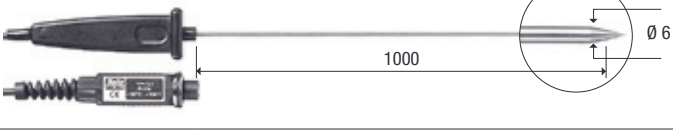

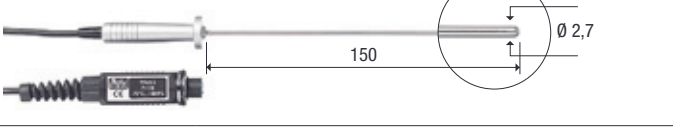

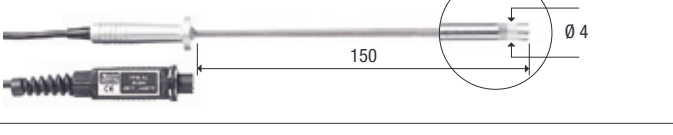

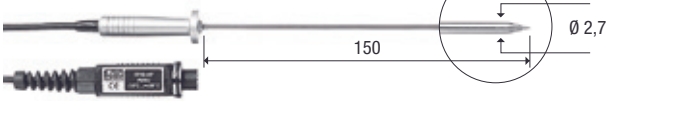

PITOT TUBES

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...



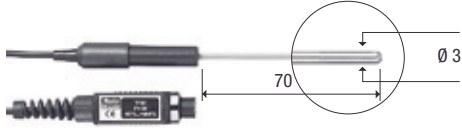
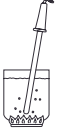
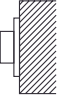
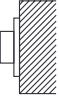

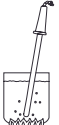



	d mm	d ₁ mm	D mm	L mm	L ₁ mm	L ₂ mm	Temp. °C	Thermocouple K	Material
T1-300	3	1	6	300	30	72	0...600°C	---	AISI 316
T2-400	5	2	8	400	45	120		---	
T2-600	5	2	8	600	45	120		---	
T3-500	8	3.2	8	500	---	192		---	
T3-800	8	3.2	8	800	---	192		---	
T3-800TC	8	3.2	8	800	---	192		TC	
T4-500	10	4.0	10	500	---	240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

Pt100 PROBES FOR PORTABLE INSTRUMENTS EQUIPPED WITH SICRAM MODULE


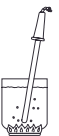

CODE	°C max	τ s	DIMENSIONS	USE
TP 472 I	-196 +500	3s		
TP 472 I.0 1/3 DIN Thin Film	-50 +300	3s		
TP 473 P.I	-50 +400	5s		
TP 473 P.O 1/3 DIN Thin Film	-50 +300	5s		
TP 474 C.I	-50 +400	5s		
TP 474 C.O 1/3 DIN Thin Film	-50 +300	5s		
TP 475 A.O 1/3 DIN Thin Film	-50 +250	12s		
TP 472 I.5	-50 +400	3s		
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 A.P.O Class A Thin Film	-70 +250	4s		

Air speed

Pt100 PROBES FOR PORTABLE INSTRUMENTS EQUIPPED WITH SICRAM MODULE

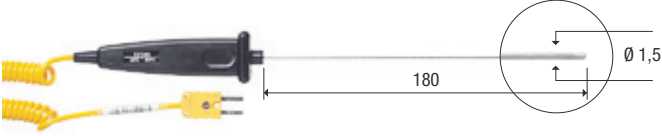

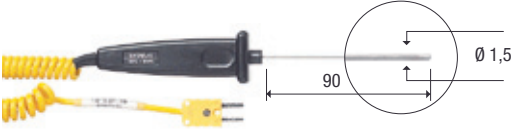
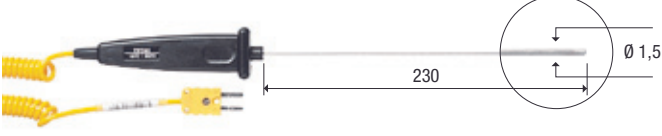
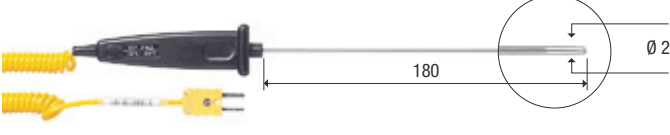
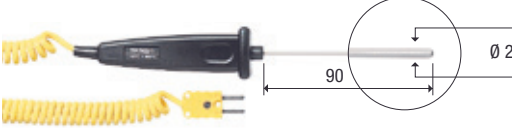

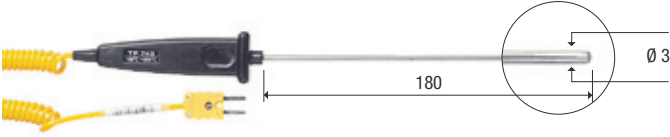
CODE	°C max	τ s	DIMENSIONS	USE
TP 87.0 1/3 DIN	-50 +200	3s		
TP 878.0 1/3 DIN Thin Film	+4 +85	60s	Contact probe for solar panels equipped with SICRAM module. Cable L = 2m.	
TP 878.1.0 1/3 DIN Thin Film	+4 +85	60s	Contact probe for solar panels equipped with SICRAM module. Cable L = 5m.	
TP 878.1.0 1/3 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 \varnothing 150 mm. (ISO7243, ISO7726). 4 wires Pt100 Sensor cable L=2m. Equipped with SICRAM module.	
TP 876.I	-30 +120	15'	Globe-thermometer probe for measuring radiant heat \varnothing 50 mm. (ISO7243, ISO7726). 4 wires Pt100 Sensor cable L=2m. Equipped with SICRAM module.	

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	τ 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		

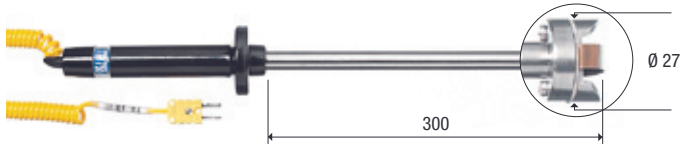
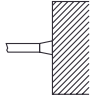
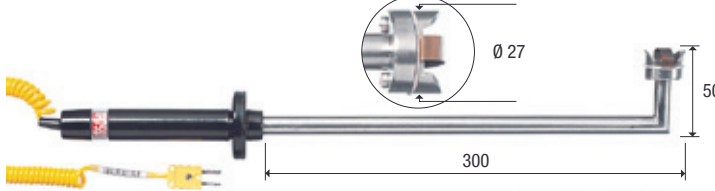
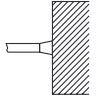
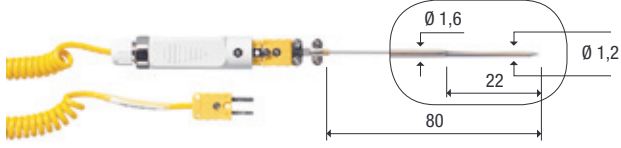

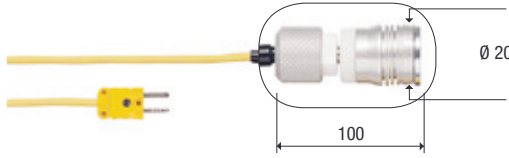
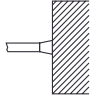
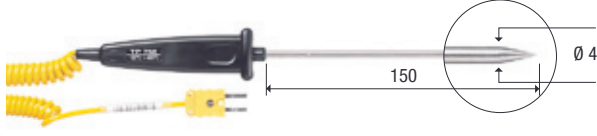
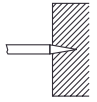
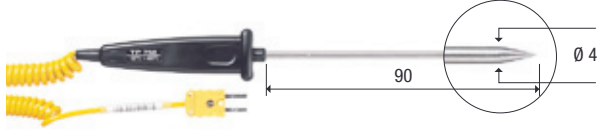
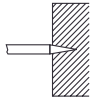
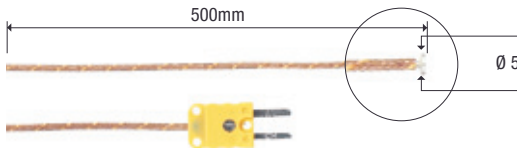
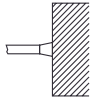
Air speed



TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

CODE	°C max	τ 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		

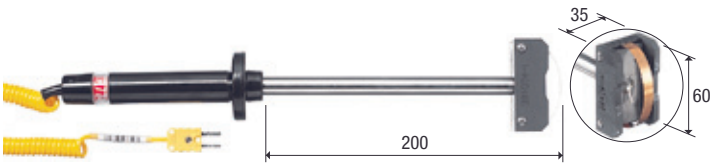

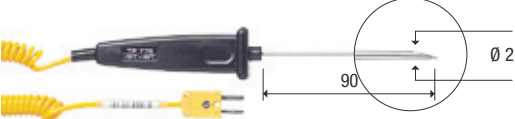

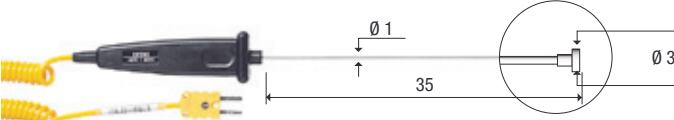

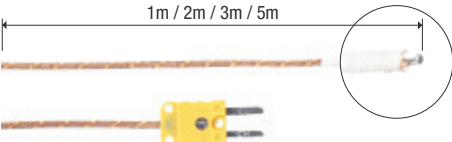





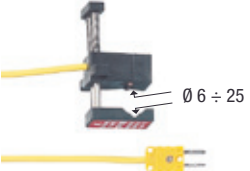

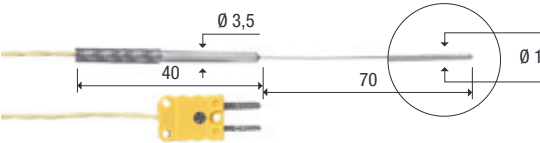
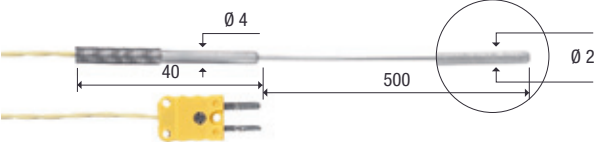

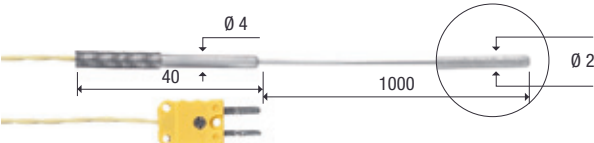
TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

CODE	°C max	τ 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		

Air speed



TYPE "K" (CHROMEL - ALUMEL) THERMOCOUPLE PROBES

CODE	°C max	τ 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	For ACCREDIA calibration up to 300°C. 	
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	τ 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 style="text-align: center;">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"		<p style="text-align: center;">Cable length = 2m, 5m, 10m, 15m, 20m.</p>	

Air speed

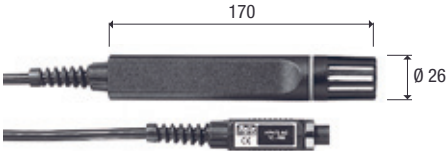
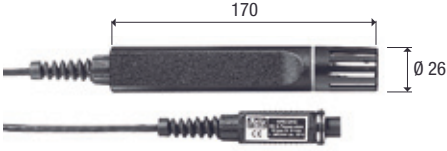
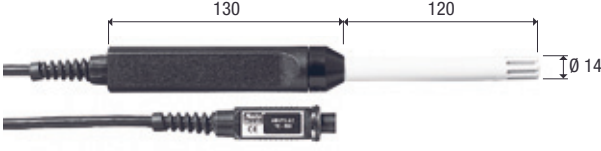
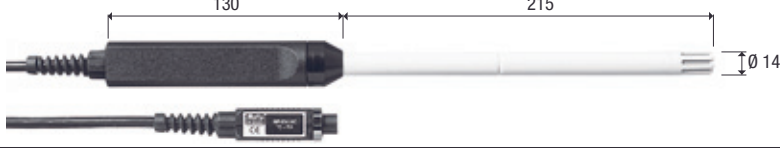
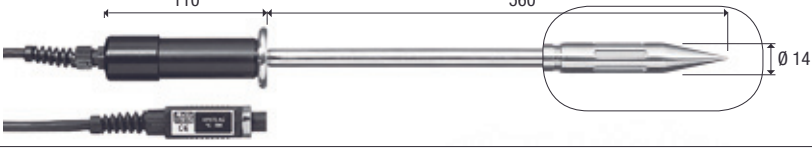
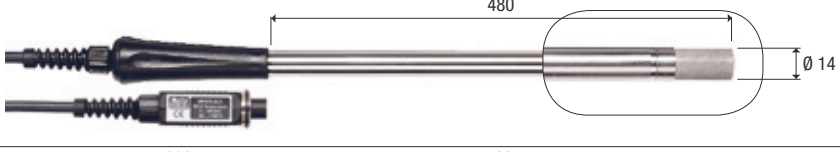
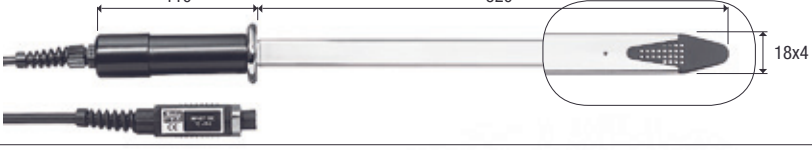
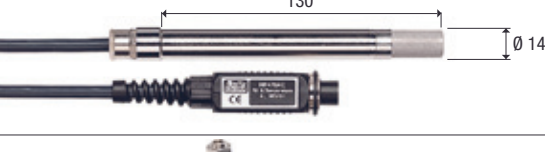

Response time for a 63% variation ($\tau_{0.63}$)

The response time τ 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.



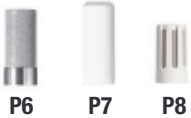
- Response times are referred to:
- Immersion probes when into water at 100°C.
 - Contact probes when in contact with a metallic surface at 200°C.
 - Air probes at air temperature of 100°C.

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










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			
HP474ACR		0...100%RH -40°C...+150°C (-40...+180°C for HP475AC1R)	
HP475ACR	RH Pt100		
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	∅ 26	M 24x1,5	
P6 P7 P8	∅ 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	200 mbar	
PP473S2	20 mbar		
PP473S3	50 mbar		
PP473S4	100 mbar		
PP473S5	200 mbar	1 bar	
PP473S6	500 mbar		
PP473S7	1000 mbar	3 bar	
PP473S8	2000 mbar	6 bar	

Air speed