

HD2124.1, HD2124.2



HD2124.1, HD2124.2 MANOMETER - THERMOMETER HANDHELD - COMMUNICATION - DATA LOGGING

HD2124.1 and HD2124.2 are **two inputs** portable instruments with LCD display. They perform measure of absolute, relative, differential pressure and temperature.

In order to measure the pressure you use the electronic module PP471 that works as an interface between the instrument and Delta OHM probes series TP704 and TP705. Temperature is measured by means of Pt100 with SICRAM module or direct 4-wire Pt100 probes for immersion, penetration, contact or air. Temperature probes are equipped with SICRAM module and factory calibration data are stored inside so that when the instrument is on it soon recognizes them.

The **HD2124.2 is a data logger**. It stores up to 32.000 samples which can be transferred into a PC connected to the RS232C and USB 2.0 or into a portable printer.

It is possible to configure the storage interval, the printing and the baud rate by the menu.

Functions Max, Min and Avg calculate maximum, minimum and average values. Peak function detects the presence of pressure peaks; A-B calculates the difference of the pressures or temperatures measured by the two input channels A and B. Further functions are: REL relative measure, HOLD and automatic turning off (excludable).

The instruments have IP66 protection degree.

Technical specifications	
For all pressure specifications, see table at page 13	
Measurement of temperature	
Pt100 measurement range	-200...+650 °C
Resolution	0.1 °C
Instrument accuracy	±0.1 °C
Drift after 1 year	0.1 °C/year
Measuring unit	°C - °F - Pa - hPa - mbar - bar -mmHg - mmH ₂ O - kgf/cm ² - PSI - inchHg
Measured values storage - model HD2124.2	
Type	2000 pages of 16 samples each
Quantity	32000 pairs of sample
Storage interval	1,5,10,15,30 s; 1,2,5,10,15,20,30 min; 1 hour
Security of data stored	Unlimited, independently of battery charge conditions
Power supply	
Batteries	4 x 1.5V type AA batteries
Autonomy	200 hours with 1800 mAh alkaline batteries
Current consumption with instrument off	20 µA
Mains	Mains adapter 12 Vdc /1000 mA output
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 15 m
Print interval	Immediate or 1,5,10,15,30 s; 1,2,5,10,15,20,30 min; 1 hour
USB interface - model HD2124.2	
Type	1.1 - 2.0 electrically isolated
Connection	
Input module for the probes	2 8-pole male DIN45326 connectors
Serial interface	8-pole MiniDin connector
USB interface - (only) HD2124.2	Mini USB type B
Mains adapter	2-pole connector (positive at centre)
Operating conditions	
Operating temperature	-5 ... 50 °C
Storage temperature	-25 ... 65 °C
Working relative humidity	0...90% RH without condensation
Protection degree	IP66
General characteristics	
Dimensions (Length x Width x Height)	185x90x40 mm

Weight	470g (complete with batteries)
Materials	ABS, rubber
Display	2 rows 4½ digits plus symbols Visible area: 52x42 mm
Time	
Date and time	In real time
Accuracy	1 min/month max drift

ORDERING CODES

HD2124.1: The kit consists of instrument HD2124.1, 4 x 1.5V alkaline batteries, instruction manual, case and **DeltaLog9 software** downloadable from Delta OHM website. **Probes, PP471 module and cables have to be ordered separately.**

HD2124.2: The kit consists of instrument HD2124.2 **data logger**, 4 x 1.5V alkaline batteries, CP23 USB cable, instruction manual, case and **DeltaLog9 software** downloadable from Delta OHM website. **Probes, PP471 module have to be ordered separately.**

Accessories

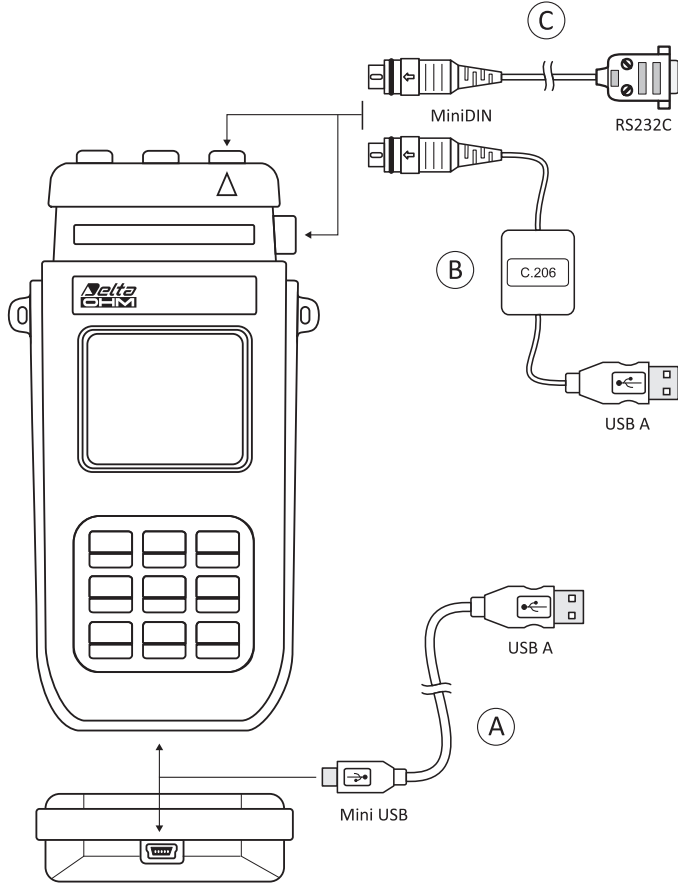
HD2110CSNM: 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.

C.206: Cable for the instrument HD2124.1 to connect directly to USB input of PC.

SWD10: Stabilized 230 Vac/12 Vdc-1000 mA mains adapter

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

For all pressure probes, PP471 module and temperature probes see from pag. 13 onwards.



A The portable data logger **HD2124.2** is equipped with HID (Human Interface device) type USB port with mini USB connector.

For the connection to a PC with the CP23 cable it is not necessary to load any USB driver.

B For the connection of the models **HD2124.1** to the USB port of a PC the C.206 USB/serial converter is necessary. The converter is supplied with its own drivers which must be installed before the connection of the converter to the PC.

C The port with the miniDin connector 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.



CP23

PRESSURE PROBE

Full scale pressure	Maximum overpressure	Resolution	ORDERING CODES			Accuracy From 20 to 25°C	Working temperature	Connection
			Differential pressure	Relative pressure (compared to atmosphere)	Absolute pressure			
			NON insulated membrane	Insulated membrane	Insulated membrane			
10.0 mbar	20.0 mbar	0.01 mbar	• TP705-10MBD			0.5 % f.s.	0..+60 °C	Tube Ø 5 mm
20.0 mbar	40.0 mbar	0.01 mbar	• TP705-20MBD			0.5 % f.s.	0..+60 °C	Tube Ø 5 mm
50.0 mbar	100 mbar	0.01 mbar	TP705-50MBD			0.5 % f.s.	0..+60 °C	Tube Ø 5 mm
100 mbar	200 mbar	0.1 mbar	TP705-100MBD			0.25 % f.s.	0..+60 °C	Tube Ø 5 mm
				TP704-100MBGI		0.25 % f.s.	-30..+80 °C	¼ BSP
200 mbar	400 mbar	0.1 mbar	TP705-200MBD			0.25 % f.s.	0..+60 °C	Tube Ø 5 mm
				TP704-200MBGI		0.25 % f.s.	-30..+80 °C	¼ BSP
400 mbar	1000 mbar	0.1 mbar		TP704-400MBGI		0.25 % f.s.	-40..+125 °C	¼ BSP
500 mbar	1000 mbar	0.1 mbar	TP705-500MBD			0.25 % f.s.	0..+60 °C	Tube Ø 5 mm
600 mbar	1000 mbar	0.1 mbar		TP704-600MBGI		0.25 % f.s.	-40..+125 °C	¼ BSP
			TP705-1BD			0.25 % f.s.	0..+60 °C	Tube Ø 5 mm
					TP705BARO	0.25 % f.s.	0..+60 °C	Tube Ø 5 mm
1.00 bar	2.00 bar	1 mbar		TP704-1BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-1BAI	0.25 % f.s.	-40..+125 °C	¼ BSP
			TP705-2BD			0.25 % f.s.	0..+60 °C	Tube Ø 5 mm
2.00 bar	4.00 bar	1 mbar		TP704-2BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-2BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
5.00 bar	10.00 bar	1 mbar		TP704-5BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-5BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
10.00 bar	20.0 bar	0.01 bar		TP704-10BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-10BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
20.0 bar	40.0 bar	0.01 bar		TP704-20BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-20BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
50.0 bar	100.0 bar	0.01 bar		TP704-50BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-50BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
100 bar	200 bar	0.1 bar		TP704-100BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-100BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
200 bar	400 bar	0.1 bar		TP704-200BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
					TP704-200BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP
500 bar	1000 bar	0.1 bar		TP704-500BGI		0.25 % f.s.	-40..+125 °C	¼ BSP
	700 bar	0.1 bar			TP704-500BAI *	0.25 % f.s.	-25..+85 °C	¼ BSP

* Ceramic diaphragm

• Only report of calibration, no Accredia certificate

All TP704 and TP705 series Delta OHM probes can be connected to the PP471 module.

Technical characteristics of PP471 module

Accuracy	±0.05% of full scale
Peak duration	≥ 5ms
Peak accuracy	±0.5% of full scale
Peak dead band	≤ 2% of full scale

PRESSURE UNITS OF MEASUREMENTS

CONVERSION FACTORS

kPa	Mpa	bar	mbar	mmH ₂ O	Torr mmHg	at Kg/cm ²	Atm	Inch H ₂ O	Inch Hg	Psi lbf/in ²
1	1•10 ⁻³	1•10 ⁻³	10	102.0	7.501	10.20•10 ⁻³	9.869•10 ⁻³	4.016	0.2953	0.14505
1•10 ³	1	10	1•10 ⁴	102.0•10 ³	7501	10.20	9.869	4016	295.3	145.05
100	0.1	1	1•10 ³	10.20•10 ³	750.1	1.020	0.9869	401.6	29.53	14.505
0.1	1•10 ⁻⁴	1•10 ⁻³	1	10.20	0.7501	1.020•10 ⁻³	0.9869•10 ⁻³	0.4016	29.53•10 ⁻³	14.505•10 ⁻³
9.807•10 ⁻³	9.807•10 ⁻⁶	9.807•10 ⁻⁶	9.807•10 ⁻³	1	73.56•10 ⁻³	1•10 ⁻⁴	9.678•10 ⁻⁶	0.03937	2.896•10 ⁻³	1.4224•10 ⁻³
0.13332	133.32•10 ⁻³	1.333•10 ⁻³	1.333	13.59	1	1.359•10 ⁻³	1.316•10 ⁻³	0.5351	3.937•10 ⁻²	0.01934
98.07	98.07•10 ⁻³	0.9807	980.7	1•10 ⁴	735.6	1	0.9678	393.7	28.96	14.224
101.3	0.1013	1.013	1013	10.33•10 ³	760	1.033	1	406.7	29.92	14.68
0.2491	0.2491•10 ⁻³	2.491•10 ⁻³	2.491	25.4	1.8684	2.54•10 ⁻³	2.458•10 ⁻³	1	7.355•10 ⁻²	36.126•10 ⁻³
3.386	3.386•10 ⁻³	3.386•10 ⁻²	33.86	345.3	25.4	3.453•10 ⁻²	3.342•10 ⁻²	13.60	1	0.4912
6.8948	6.8948•10 ⁻³	6.8948•10 ⁻²	68.948	703.1	51.715	70.31•10 ⁻³	68.948•10 ⁻³	27.68	2.036	1



TEMPERATURE PROBES – RESISTANCE THERMOMETERS

Delta OHM offers a wide choice of Platinum resistance thermometers with resistance equal to 100 Ω at 0 °C and temperature coefficient α as defined by the IEC 60751 standard: Pt100, R₀=100 Ω, α= 3.851·10⁻³ °C⁻¹.

For particular applications, probes with Pt1000 sensor or with a thermistor sensor are available. The response time τ_{0.63} indicated for each probe is the response time of the sensor to a temperature variation, with a variation of the measured signal corresponding to the 63% of the total variation. The response times are referred:

- in water at 100 °C for immersion probes;
- to the contact with a metal surface at 200 °C for surface probes;
- to an air temperature of 100 °C for air probes.

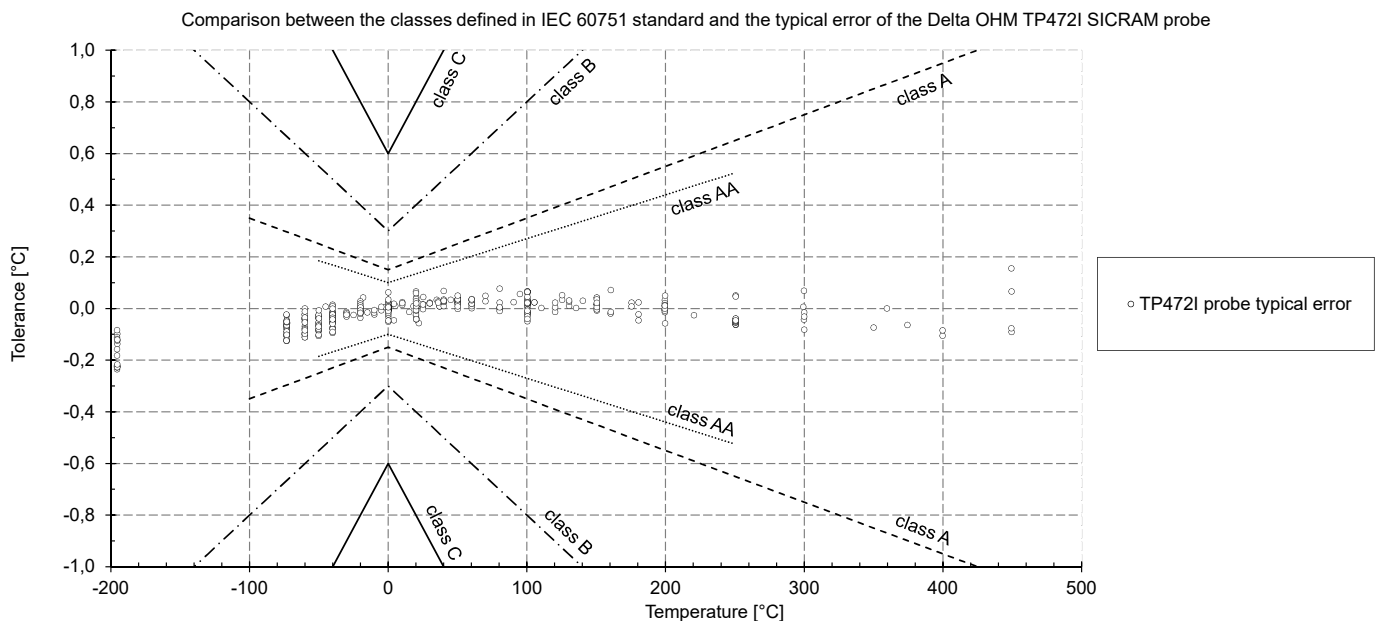
The IEC 60751:2008 standard defines the tolerance classes of the resistance thermometers as summarized in the following table:

Tolerance class	Temperature Range		Tolerance [°C]
	WIRE WOUND sensor	THIN FILM sensor	
classe AA (1/3 DIN)	from -50 °C to 250 °C	from 0 °C to 150 °C	±(0.1+0.0017· t)
classe A	from -100 °C to 450 °C	from -30 °C to 300 °C	±(0.15+0.002· t)
classe B	from -196 °C to 600 °C	from -50 °C to 500 °C	±(0.3+0.005· t)
classe C	from -196 °C to 600 °C	from -50 °C to 600 °C	±(0.6+0.01· t)

On request, the probes can be assembled with a compatible connector chosen from TP471 and TP47.

The TP471 connector developed by Delta OHM contains an electronic module (SICRAM) that allows the probe error to be adjusted. During the Quality Control, the probes provided with this module are individually checked in our laboratories, linearizing the characteristic and allowing more stringent accuracy over the entire working range.

The following graph shows the Delta OHM SICRAM module probe TP472I typical error values obtained from the calibrations performed in our ISO17025 calibration laboratory. The graph highlights the effectiveness of the linearization performed on the probes.



Tolerance as a function of temperature. The temperature range refers to the platinum wire wound probes.

Tolerance [°C]	Temperature [°C]										
	-196	-100	-50	0	100	250	300	350	450	500	600
class AA	---	± 0.27	± 0.19	± 0.10	± 0.27	± 0.53	± 0.61	± 0.70	---	---	---
class A	---	± 0.35	± 0.25	± 0.15	± 0.35	± 0.65	± 0.75	± 0.85	± 1.05	---	---
class B	± 1.28	± 0.80	± 0.55	± 0.30	± 0.80	± 1.55	± 1.80	± 2.05	± 2.55	± 2.80	± 3.30
class C	± 2.56	± 1.60	± 1.10	± 0.60	± 1.60	± 3.10	± 3.60	± 4.10	± 5.10	± 5.60	± 6.60
accuracy TP472I	± 0.30	± 0.30	± 0.20	± 0.10	± 0.20	± 0.20	± 0.30	± 0.30	± 0.30	± 0.30	---

By means of the calibration, the purchased instrument can be metrologically characterized, determining the systematic error of the thermometer and ensuring at the same time the traceability to international standards. Delta OHM Laboratories are able to provide this service by issuing calibration reports according to ISO 9001 or ACCREDIA LAT certificates in compliance with ISO/IEC 17025 standard, recognized internationally through ILAC MRA agreements.


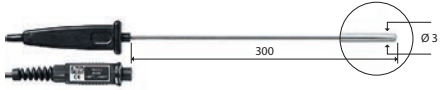
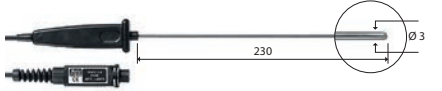


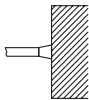



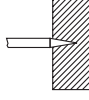



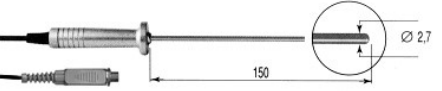
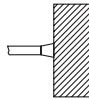
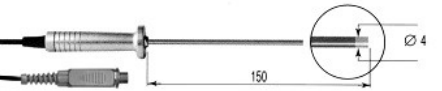

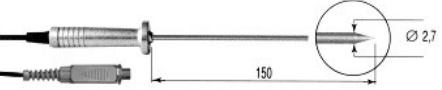

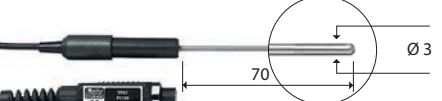


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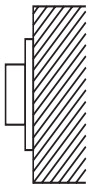
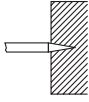
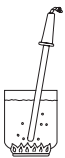
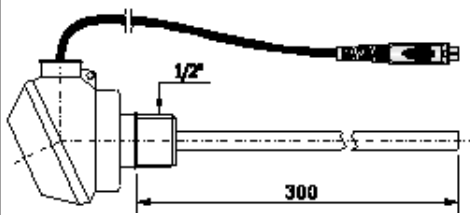
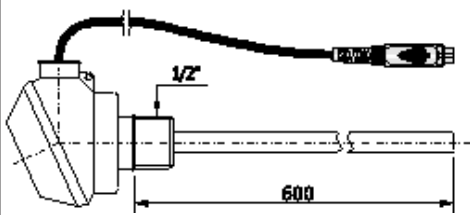


Temperature - Humidity - Pressure - Air speed
Photometry/Radiometry - Acoustics



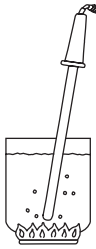
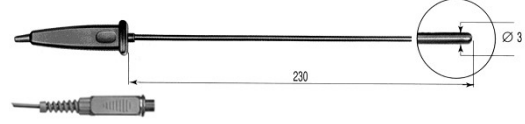
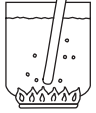
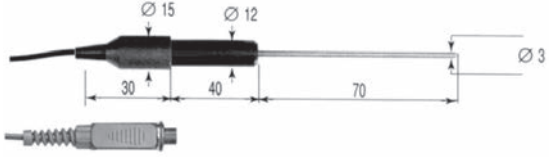
Pt100 PROBES WITH TP471 SICRAM MODULE

CODE	T (°C)	ACCURACY	USE	$\tau_{0.63}$	DIMENSIONS
TP472I	-196 +500	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		3s	
TP472I.O	-50 +300	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		3s	
TP473P.I	-50 +400	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		5s	
TP473P.O	-50 +300	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)			
TP474C.O	-50 +300	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		5s	
TP475A.O	-50 +250	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)		12s	
TP472I.5	-50 +400	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		3s	
TP472I.10	-50 +400	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		3s	
TP49A.I	-70 +250	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		3,5s	
TP49AC.I	-70 +250	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		5,5s	
TP49AP.I	-70 +250	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)		4s	
TP87.O	-50 +200	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)		3s	



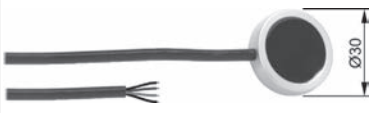
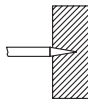
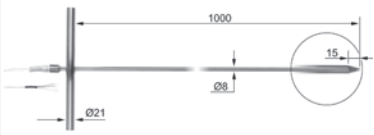
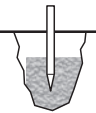
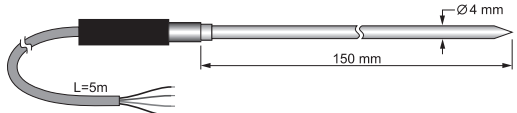
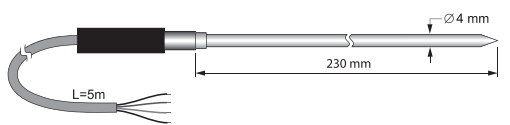
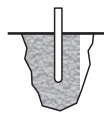
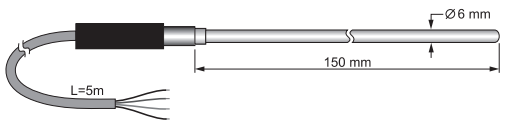

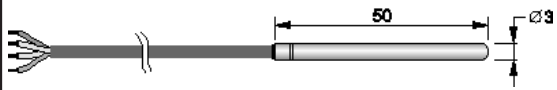
Pt100 PROBES WITH TP471 SICRAM MODULE

CODE	T (°C)	ACCURACY	USE	$\tau_{0.63}$	DIMENSIONS
TP878.O	-40 +85	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)		60s	Contact probe for solar panels, with SICRAM module. Cable L = 2 m
TP878.1.O	-40 +85	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)			Contact probe for solar panels, with SICRAM module. Cable L = 5 m
TP879.O	-20 +120	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)		60s	Penetration probe for compost, with SICRAM module. Cable L = 5 m
TP880/300.I	-50 +450	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		60s	Mignon head, cable length = 2m 
TP880/600.I	-50 +450	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		60s	Mignon head, cable length = 2m 
TP35.5AF.5S	-110 +180	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C) ± 0.3 °C (t < -50 °C; t > 250 °C)		3s	 Cable L = 5 m. Shield in Inox + PTFE
TP875.I					Globe-thermometer probe for measurement of radiant heat with $\varnothing 150$ mm. Accuracy according to ISO 7243 ISO 7726. Pt100 sensor, 4-wire cable L=2 m. Supplied with SICRAM module.
TP876.I	-30 +120	± 0.1 °C (@ 0 °C) ± 0.2 °C (-50 °C \leq t \leq 250 °C)		15'	Globe-thermometer probe for measurement of radiant heat with $\varnothing 50$ mm. Accuracy according to ISO 7243 ISO 7726. Pt100 sensor, 4-wire cable L=2 m. Supplied with SICRAM module.


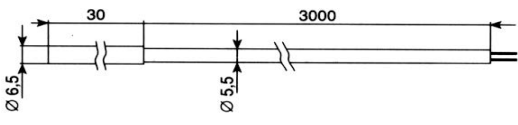

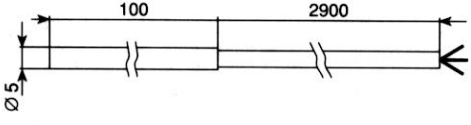
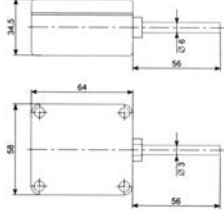
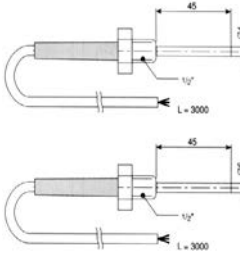
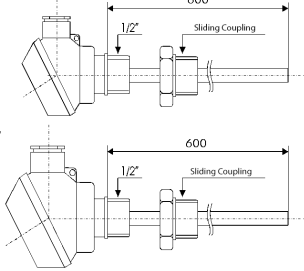
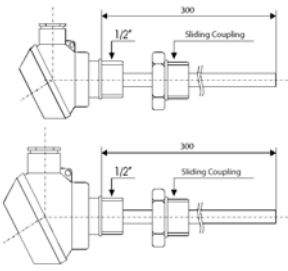
Pt100/Pt1000 PROBES WITH TP47 CONNECTOR WITHOUT SICRAM MODULE

CODE	T (°C)	CLASS	USE	$\tau_{0.63}$	DIMENSIONS
TP47.100.O (Pt100)	-50 +250	Class A		3s	
TP47.1000.O (Pt1000)					
TP87.100.O (Pt100)	-50 +200	Class A		3s	
TP87.1000.O (Pt1000)					


Pt100 PROBES ENDING WITH FREE WIRES

TP875.1.I	-30 +120	Class A		15s	Globe-thermometer probe for measurement of radiant heat with Ø150mm. Accuracy according to ISO 7243 ISO 7726. Pt100 sensor, 4-wire cable L=2 m.
TP876.1.I					Globe-thermometer probe for measurement of radiant heat with Ø50mm. Accuracy according to ISO 7243 - ISO 7726. Pt100 sensor, 4-wire cable L=2 m.
TP878.1SS.O	-40 +85	Class A		60s	Contact probe for solar panels 4-wire cable L = 5 m 
TP879.1.O	-20 +120	Class A		60s	Penetration probe for compost 4-wire cable L = 5 m 
TP32MT.1P.I	-40 +100	Class A		40s	
TP32MT.1P.2	-50 +250	Class A		40s	
TP32MT.2.I	-40 +100	Class A		60s	
TP35.5AF.5	-110 +180	Class A		3s	 Cable L = 5 m. Shield in Inox + PTFE

TEMPERATURE PROBES FOR INDUSTRIAL USE

CODE	T (°C)	CLASS	USE	$\tau_{0.63}$	DIMENSIONS
HD882/EK (KTY81)	-40 +150	Not applicable		5s	
HD882/ E/100 (Pt100)	-50 +300	Class A		5s	
HD882/GK (KTY81)	-50 +100	Not applicable	Environmental	5s	
HD882/G100 (Pt100)	-50 +100	Class A	Environmental	5s	
HD882/L104 (Pt100)	0 +250	Class A	Process Thread	7s	
HD882/L106 (Pt100)	0 +250	Class A	Process Thread	15s	
HD882M100/600 (Pt100)	-50 +450	Class A	Process Thread - Miniature Head	15s	
HD882DM100/600 (Pt100)	-50 +450	Class A	Process Thread - DIN B Head	15s	
HD882M100/300 (Pt100)	-40 +100	Class A	Process Thread - Miniature Head	15s	
HD882DM100/300 (Pt100)	-50 +250	Class A	Process Thread - DIN B Head	15s	

CONNECTORS

TP47	Connector without SICRAM module. It can be connected to 4-wire Pt100 probes (and 3-wire with some instruments) or 2-wire Pt1000 probes.	
TP471	Connector with SICRAM electronic module for the connection of resistance thermometers and the correction of the characteristic of the sensor. It can be connected to 3-wire or 4-wire Pt100Ω platinum temperature probes. assembling and calibration only in Delta OHM	