

## TEMPERATURE PROBES – RESISTANCE THERMOMETERS

Delta OHM offers a wide choice of Platinum resistance thermometers with resistance equal to  $100 \Omega$  at  $0^\circ\text{C}$  and temperature coefficient  $\alpha$  as defined by the IEC 60751 standard: Pt100,  $R_0=100 \Omega$ ,  $\alpha=3.851 \cdot 10^{-3} \text{ }^\circ\text{C}^{-1}$ .

For particular applications, probes with Pt1000 sensor or with a thermistor sensor are available. The response time  $\tau_{0.63}$  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  $100^\circ\text{C}$  for immersion probes;
- to the contact with a metal surface at  $200^\circ\text{C}$  for surface probes;
- to an air temperature of  $100^\circ\text{C}$  for air probes.

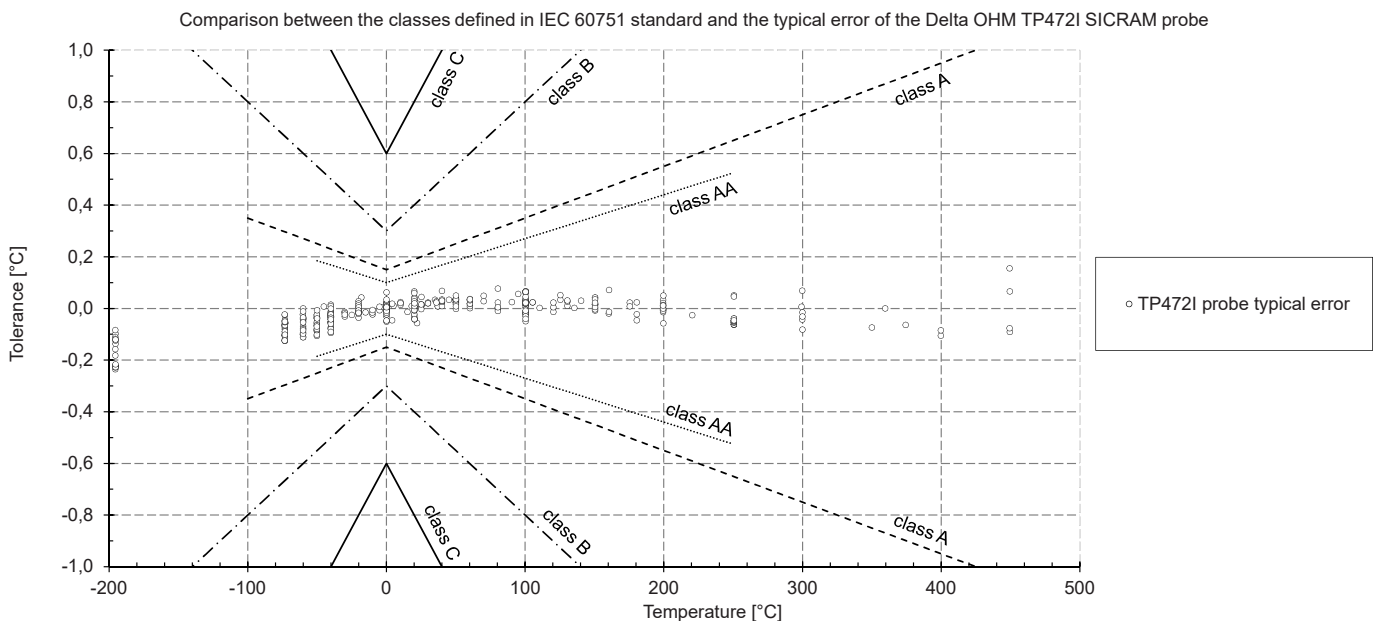
The IEC 60751:2008 standard defines the tolerance classes of the resistance thermometers as summarized in the following table:

Tolerance class	Temperature Range		Tolerance [ $^\circ\text{C}$ ]
	WIRE WOUND sensor	THIN FILM sensor	
classe AA (1/3 DIN)	from $-50^\circ\text{C}$ to $250^\circ\text{C}$	from $0^\circ\text{C}$ to $150^\circ\text{C}$	$\pm(0.1+0.0017 \cdot  t )$
classe A	from $-100^\circ\text{C}$ to $450^\circ\text{C}$	from $-30^\circ\text{C}$ to $300^\circ\text{C}$	$\pm(0.15+0.002 \cdot  t )$
classe B	from $-196^\circ\text{C}$ to $600^\circ\text{C}$	from $-50^\circ\text{C}$ to $500^\circ\text{C}$	$\pm(0.3+0.005 \cdot  t )$
classe C	from $-196^\circ\text{C}$ to $600^\circ\text{C}$	from $-50^\circ\text{C}$ to $600^\circ\text{C}$	$\pm(0.6+0.01 \cdot  t )$

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.



LAT N° 124

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



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**Lazo de Control**

Automatización y Medio Ambiente


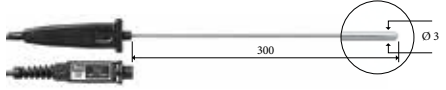
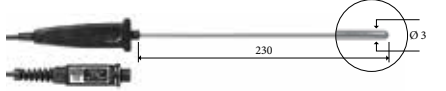
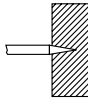

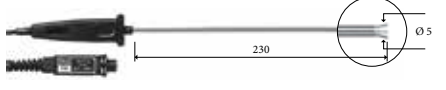
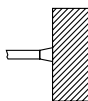
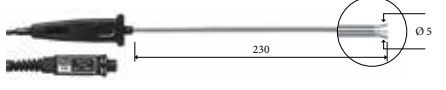

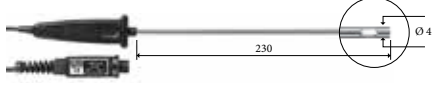
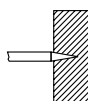
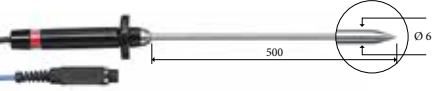



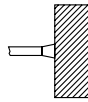
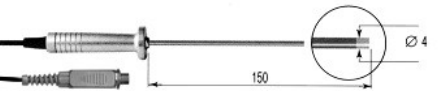
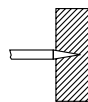
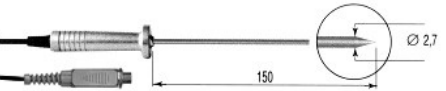

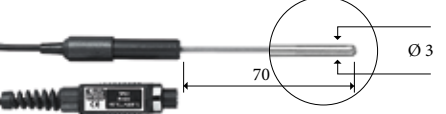
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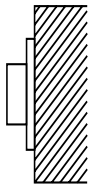

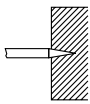
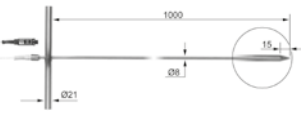
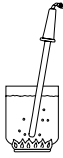
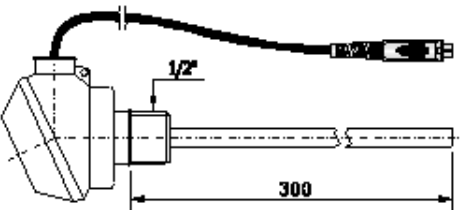
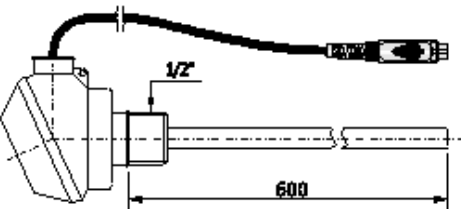


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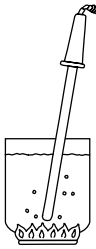

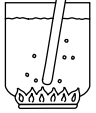
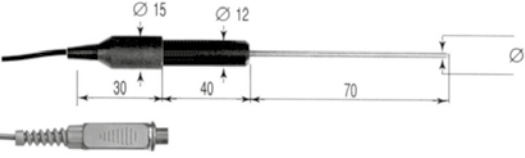
Pt100 PROBES WITH TP471 SICRAM MODULE

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


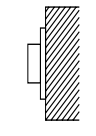
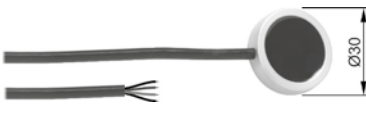
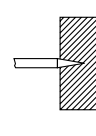
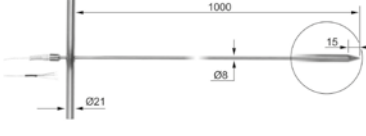
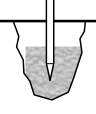
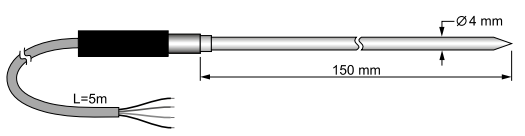
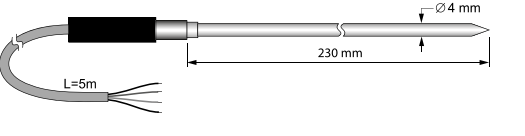
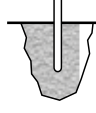
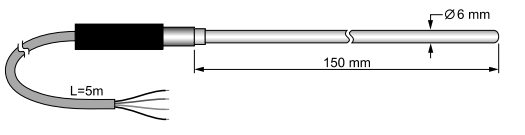
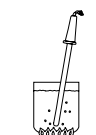
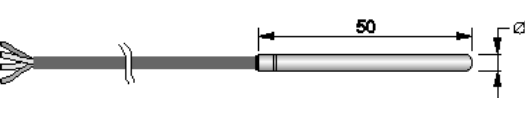
**Pt100 PROBES WITH TP471 SICRAM MODULE**

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

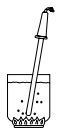
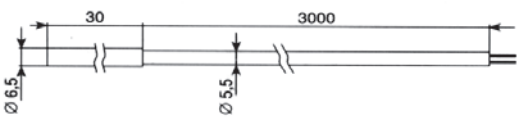
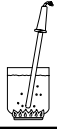

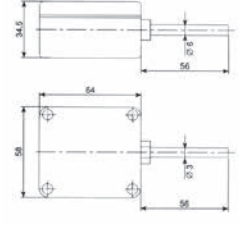
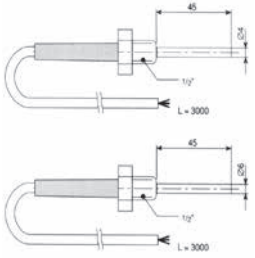
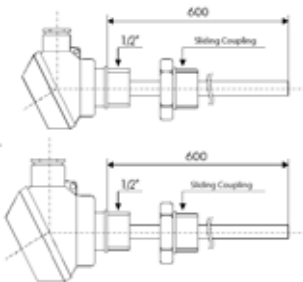
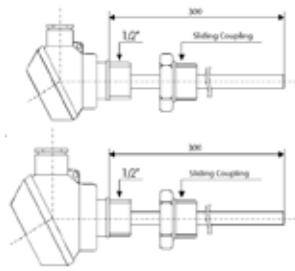
**Pt100/Pt1000 PROBES WITH TP47 CONNECTOR WITHOUT SICRAM MODULE**

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 +250	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	