Member of GHM GROUP

HD2328.0

HD2328.0
TWO INPUTS THERMOCOUPLE THERMOMETER

HD2328.0 with **two inputs** is a portable instrument with a large LCD display. It measures temperature by means of immersion, penetration, contact or air probes. Its sensor can be a K, J, T or E thermocouple type.

Functions Max, Min and Avg calculate maximum, minimum and average values.

Further functions are: REL relative measure, HOLD, automatic switching-off system (excludable) and the A-B difference of the two input channels.

The instrument has IP67 protection degree.

Technical specifications	
Measurement of temperature	
TC measuring range: K	-200...+1370°C
TC measuring range: J	-100...+750°C
TC measuring range: T	-200...+400°C
TC measuring range: E	-200...+750°C
Resolution	0.1°C
Instrument accuracy Accuracy is referred to the instrument only; error due to the thermocouple or to the cold junction reference sensor is not included	
Thermocouple K	±0.1°C up to 600°C ±0.2°C over 600°C
Thermocouple J	±0.1°C up to 400°C ±0.2°C over 400°C
Thermocouple T	±0.1°C
Thermocouple E	±0.1°C up to 300°C ±0.2°C over 300°C
Temperature drift @20°C	0.02%/°C
Drift after 1 year	0.1°C/year
Unit of measurement	°C - °F
Power Supply	
Batteries	3 Batteries 1.5V type AA
Autonomy	200 hours with 1800mAh alkaline batteries
Current consumption with instrument off	< 20µA
Connections	
Probes input	2 per 2-pole female polarized standard miniature connector
Operating conditions	
Operating Temperature	-5...50°C
Storage temperature	-25 … 65°C
Working relative humidity	0 … 90% RH, no condensation
Protection degree	IP67
General characteristics	
Dimensions (Length x Width x Height)	140x88x38mm
Weight	160g (complete with batteries)
Materials	ABS
Display	2 rows 4½ digits plus symbols Visible area: 52x42mm

ORDERING CODES

HD2328.0: The kit consists of two inputs instrument HD2328.0, 3 per 1.5V alkaline batteries, instruction manual, case. Probes have to be ordered separately.

For all thermocouples probes, see from **pag.36** onwards.

TEMPERATURE PROBES – THERMOCOUPLES

Delta OHM offers a wide choice of K-type thermocouples, meeting the characteristics defined by the IEC 60584 standard..

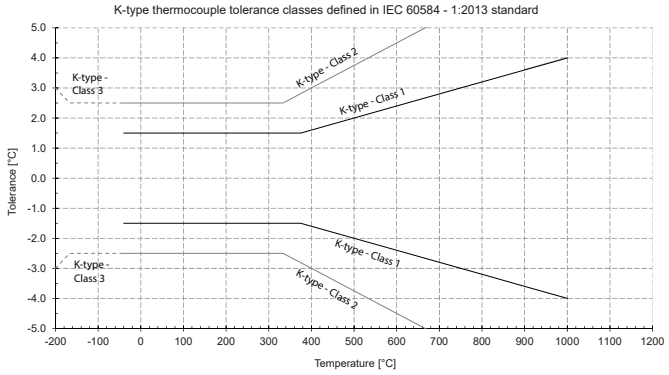
The response time $\tau_{0.63}$ indicated for each probe is the reaction time of the sensor to a temperature variation, with a variation of the measured signal corresponding to the 63% of the total variation. The response times are referred:

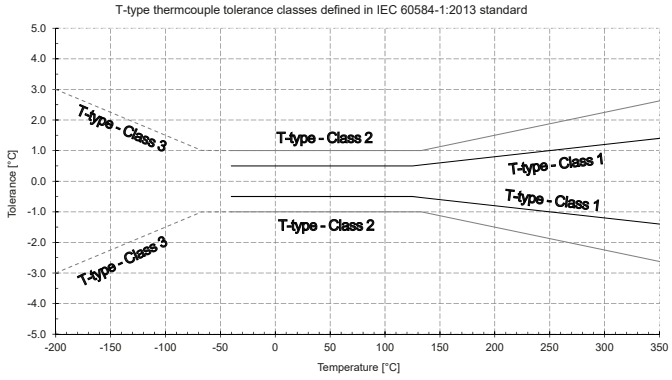
- in water at 100 °C for immersion probes;
- to the contact with a metal surface at 200 °C for surface probes;
- to an air temperature of 100 °C for air probes.

The IEC 60584-1:2013 standard defines the tolerance classes of the thermocouples as summarized in the following table:

	Class 1		Class 2		Class 3	
Thermocouple Type	Tolerance[1]	Temp. range	Tolerance[1]	Temp. range	Tolerance[1]	Temp. range
T	0.5 °C or 0.004·|t|	-40 °C...+350 °C	1 °C or 0.0075·|t|	-40 °C...+350 °C	1 °C or 0.015·|t|	-200 °C...+40 °C
E	1.5 °C or 0.004·|t|	-40 °C...+800 °C	2.5 °C or 0.0075·|t|	-40 °C...+900 °C	2.5 °C or 0.015·|t|	-200 °C...+40 °C
J		-40 °C...+750 °C		-40 °C...+750 °C	---	---
K		-40 °C...+1000 °C		-40 °C...+1200 °C	2.5 °C or 0.015·|t|	-200 °C...+40 °C
N		-40 °C...+1000 °C		-40 °C...+1200 °C		-200 °C...+40 °C
R	1 °C [1+0.003·(t-1100)]	0 °C...+1100 °C	1.5 °C or 0.0025·|t|	0 °C...+1600 °C	---	---
S		+1100 °C...+1600 °C		0 °C...+1700 °C	---	---
B	---	---		+600 °C...+1700 °C	4 °C or 0.005·|t|	600 °C...+1700 °C
C	---	---	0.01·|t|	+426 °C...+2315 °C	---	---
A	---	---		+1000 °C...+2500 °C	---	---

[1] Tolerance is expressed as a numerical value or as a function of temperature. The greater of the two values is valid





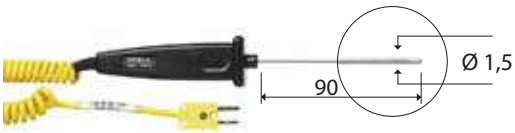
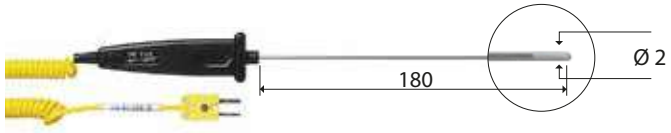
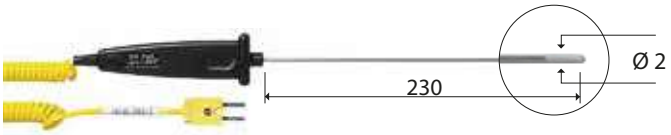
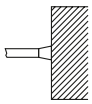
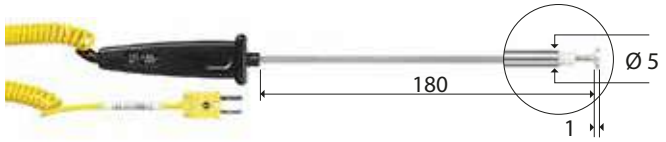
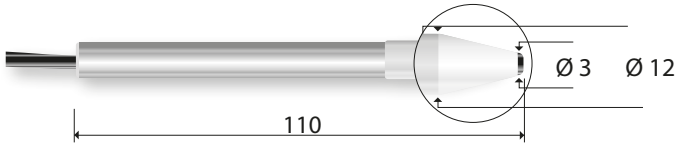
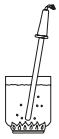
The elements that make up the thermocouple wires, with their respective polarity, are shown below.

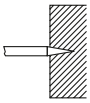
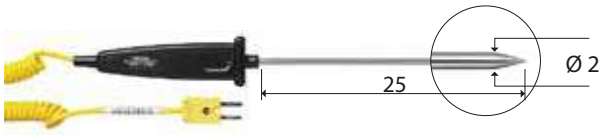
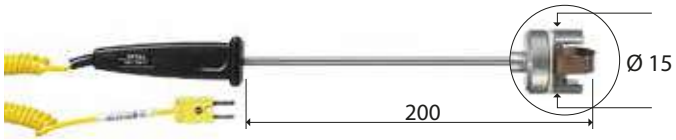
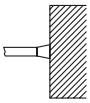
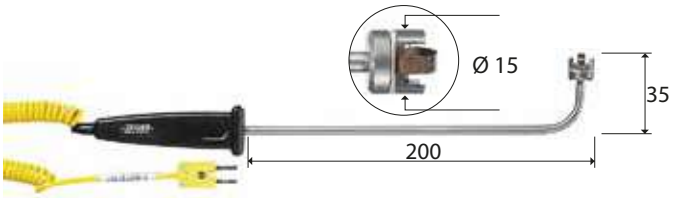
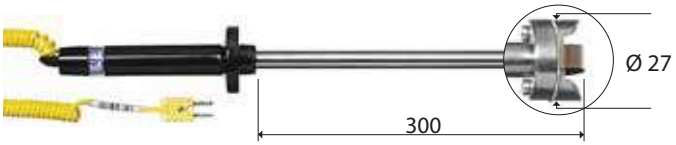
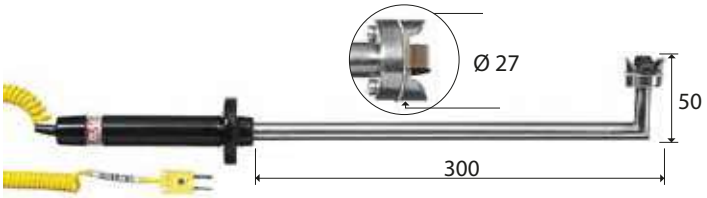
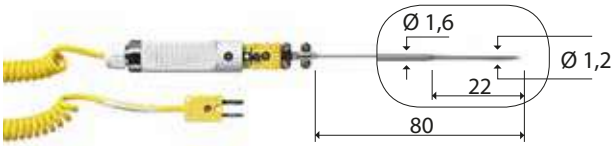
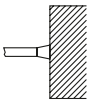
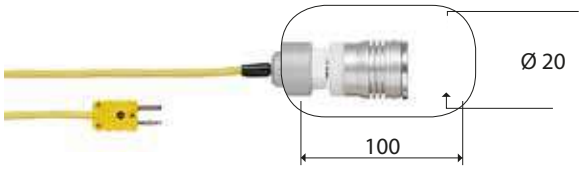
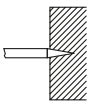
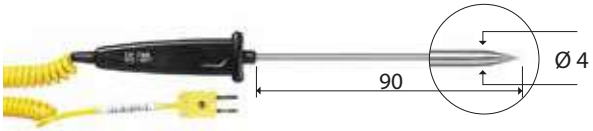
	Alloy standard elements and composition	
Thermocouple type	Positive conductor	Negative conductor
R	Platinum – 13 % Rhodium	Platinum
S	Platinum – 10 % Rhodium	Platinum
B	Platinum – 30 % Rhodium	Platinum
J	Iron	Copper - Nickel
T	Copper	Copper - Nickel
E	Nickel - Chrome	Copper - Nickel
K	Nickel - Chrome	Nickel - Aluminium
N	Nickel - Chrome - Silicon	Nickel - Silicon
C	Tungsten - 5 % Rhenium	Tungsten - 26 % Rhenium
A	Tungsten - 5 % Rhenium	Tungsten - 20 % Rhenium

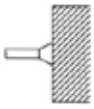
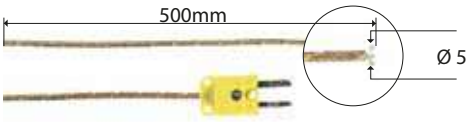
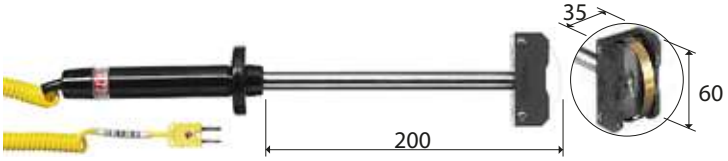
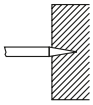
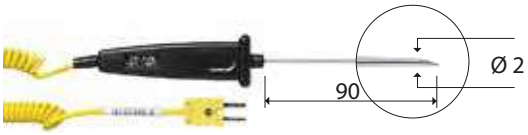
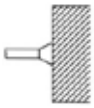
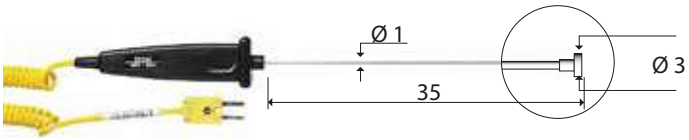
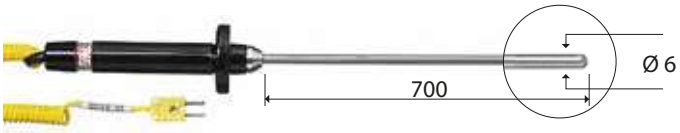
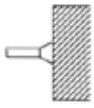
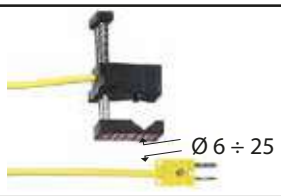
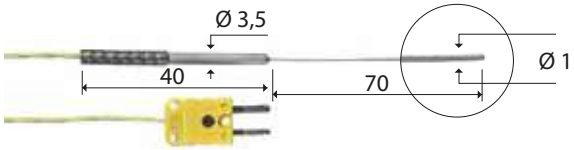
By means of the calibration, the purchased instrument can be metrologically characterized, determining the systematic error of the thermometer and ensuring at the same time the traceability to international standards. Delta OHM Laboratories are able to provide this service by issuing calibration reports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

ACCREDIA
L'ENTE ITALIANO DI ACCREDITAMENTO
LAT N° 124

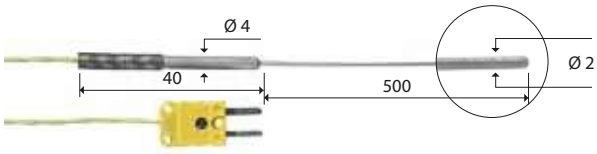
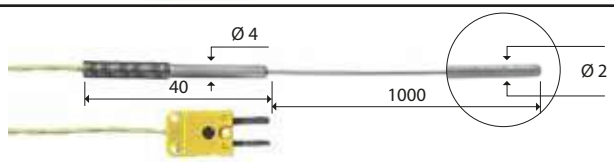
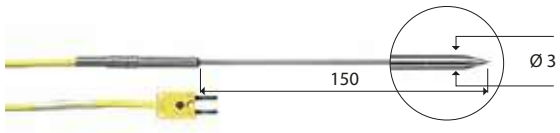
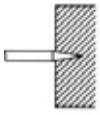
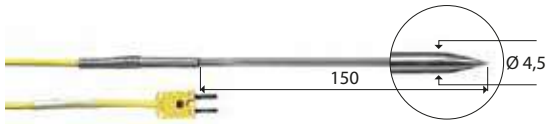
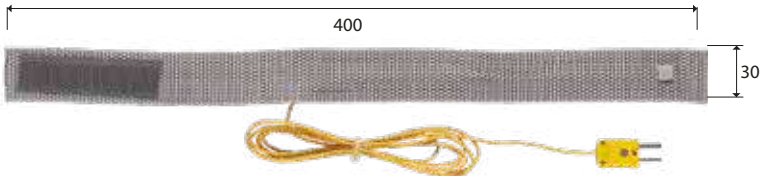
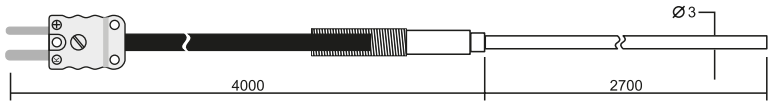
Temperature - Humidity - Pressure - Air speed
Photometry/Radiometry - Acoustics

"K" type THERMOCOUPLES - Chromel (Ni-Cr) / Alumel (Ni-Al) - Class 1				
CODE	T_{max}(°C)	USE	$\tau_{0.63}$	DIMENSIONS
TP741	+800		2s	
TP741/1	+400		2s	
TP741/2	+800		2s	
TP742	+800		2s	
TP742/1	+400		2s	
TP742/2	+800		2s	
TP743	+800		3s	
TP744	+400		4s	
TP745	+500		5s	
TP746	+250		2s	
TP750	+1000		3s	
TP750.0	+800		3s	

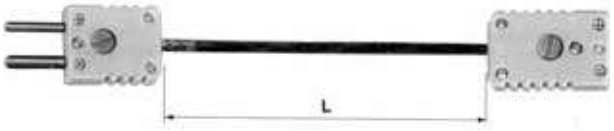
"K" type THERMOCOUPLES - Chromel (Ni-Cr) / Alumel (Ni-AI) - Class 1				
CODE	T_{max}(°C)	USE	$\tau_{0.63}$	DIMENSIONS
TP751	+200		2s	
TP754	+500		2s	
TP754/9	+500		2s	
TP755	+800		2s	
TP755/9	+800		2s	
TP756	+200		2s	
TP757	+180		30s	Magnetic probe for contact measurements on magnetic metal surfaces 
TP758	+400		4s	
TP758.1	+400		4s	

"K" type THERMOCOUPLES - Chromel (Ni-Cr) / Alumel (Ni-Al) - Class 1				
TP772	+400		3s	
TP774	+250		2s	
TP776	+200		2s	
TP777	+200		3s	
TP647	+300		2s	Fiberglass cable 
TP647/2				
TP647/3				
TP647/5				
TP647/10				
TP647/20				
TP651	+1200		6s	
TP652	+1200		6s	
TP655	+180		2s	
TP656	+200		1s	

"K" type THERMOCOUPLES - Chromel (Ni-Cr) / Alumel (Ni-Al) - Class 1

CODE	T_{max}(°C)	USE	$\tau_{0.63}$	DIMENSIONS
TP656/1	+1000		1s	
TP656/2	+1000		1s	
TP657/1	+100		5s	
TP659	+400		3s	
TP660	+400		4s	
TP661	+50		30s	
TP662	+180		120s	 Strap probe with velcro for measurements on pipes with Ø max 110 mm
TP663	+1050		3s	

THERMOCOUPLE CONNECTORS AND CABLES

CM CS	"K"	 CS  CM
PW	"K"	 Cable Lenght: 2m/5m/10m/15m/20m