

HD2108.1, HD2108.2, HD2128.1, HD2128.2



**HD2108.1, HD2108.2, HD2128.1, HD2128.2
THERMOCOUPLE THERMOMETERS: K, J, T, N, R, S, B, E**

The HD2108.1 and HD2108.2 with one input and the HD2128.1 and HD2128.2 with two inputs are portable instruments with a large LCD display. They measure the temperature using immersion, penetration, air or contact probes. The sensor may be a thermocouple of type K, J, T, N, R, S, B or E.

Instruments HD2108.2 and HD2128.2 are data loggers, they store up to 76.000 samples the first and 38.000 couples of values the second. These data can be transferred into a PC connected to the instrument through the serial ports RS232C and USB 2.0. 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.

Further functions are: REL relative measure, HOLD and automatic switching-off system (excludable). HD2128.1 and HD2128.2 calculate A-B difference of the temperatures acquired by the two input channels.

Instruments have IP66 protection degree.

| | HD2108.1 | HD2108.2 | HD2128.1 | HD2128.2 |
|------------------|----------|-----------------|----------|-------------------------------|
| TC input: | 1 | 1 | 2 | 2 |
| Storage capacity | ---- | 76000 samples | ---- | 38000 couples of temperatures |
| PC interface | RS232C | RS232C + USB2.0 | RS232C | RS232C + USB2.0 |
| Data logger | NO | YES | NO | YES |
| A-B function | NO | NO | YES | YES |

| Technical specifications | |
|--|---|
| Measurement of temperature by instrument | |
| TC measuring range: K | -200...+1370°C |
| TC measuring range: J | -100...+750°C |
| TC measuring range: T | -200...+400°C |
| TC measuring range: N | -200...+1300°C |
| TC measuring range: R | +200...+1480°C |
| TC measuring range: S | +200...+1480°C |
| TC measuring range: B | +200...+1800°C |
| TC measuring range: E | -200...+750°C |
| Resolution | 0.05°C in the range ±199.95°C 0.1°C in the remaining range |
| 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 | ±0.05°C up to 400°C ±0.1°C over 400°C |
| Thermocouple T | ±0.1°C |
| Thermocouple N | ±0.1°C up to 600°C ±0.2°C over 600°C |
| Thermocouple R | ±0.25°C |
| Thermocouple S | ±0.3°C |
| Thermocouple B | ±0.35°C |
| Thermocouple E | ±0.1°C up to 300°C ±0.15°C over 300°C |
| Temperature drift @20°C | 0.02%/°C |
| Drift after 1 year | 0.1°C/year |
| Unit of measurement | °C - °F - K - mV - mV*°C |
| Measured values storage | |
| Model HD2108.2 | 2000 pages each one containing 38 samples, 76000 samples in total |
| Model HD2128.2 | 2000 pages each one containing 19 samples, 38000 samples in total |
| Storage interval can be selected among | 1,5,10,15,30 s; 1,2,5,10,15,20,30 min.; 1 hour |
| Security of stored data | Unlimited, independent of battery charge conditions. |
| Power Supply | |
| Batteries | 4 Batteries 1.5V type AA |
| Autonomy | 200 hours with 1800mAh alkaline batteries |
| Current consumption with instrument off | 20µA |
| Main | 12Vdc / 1000mA Output main adapter |
| Serial interface RS232C | |
| Type | RS232C galvanically 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 selectable among: 1,5,10,15,30 s; 1,2,5,10,15,20,30 min.; 1 hour |
| USB interface model HD2108.2 and HD2128.2 | |
| Type | 1.1 - 2.0 galvanically isolated |
| Connections | |
| Probes input | 2-pole female polarized standard miniatur connector |
| Serial interface | 8-pole MiniDin connector |
| USB interface | Type B Mini USB connector |
| 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, no condensation |
| Protection degree | IP66 |
| General characteristics | |
| Dimensions (Length x Width x Height) | 185x90x40mm |
| Weight | 470g (complete with batteries) |
| Materials | ABS, rubber |
| Display | 2 rows 4½ digits plus symbols Visible area: 52x42mm |
| Time | |
| Date and time | in real time |
| Accuracy | 1min/month max drift |

ORDERING CODES

HD2108.1: The kit consists of one input instrument HD2108.1, 4 per 1.5V alkaline batteries, instruction manual, case and Datalog9 software downloadable from Delta OHM website. Probes and cables have to be ordered separately.

HD2108.2: The kit consists of one input instrument HD2108.2, data logger, 4 per 1.5V alkaline batteries, instruction manual, CP23 USB cable, case and Datalog9 software downloadable from Delta OHM website. Probes have to be ordered separately.

HD2128.1: The kit consists of two inputs instrument HD2128.1, 4 per 1.5V alkaline batteries, instruction manual, case and Datalog9 software downloadable from Delta OHM website. Probes and cables have to be ordered separately.

HD2128.2: The kit consists of two inputs instrument HD2128.2, data logger, 4 per 1.5V alkaline batteries, instruction manual, CP23 USB cable, case and Datalog9 software downloadable from Delta OHM website. Probes have to be ordered separately.

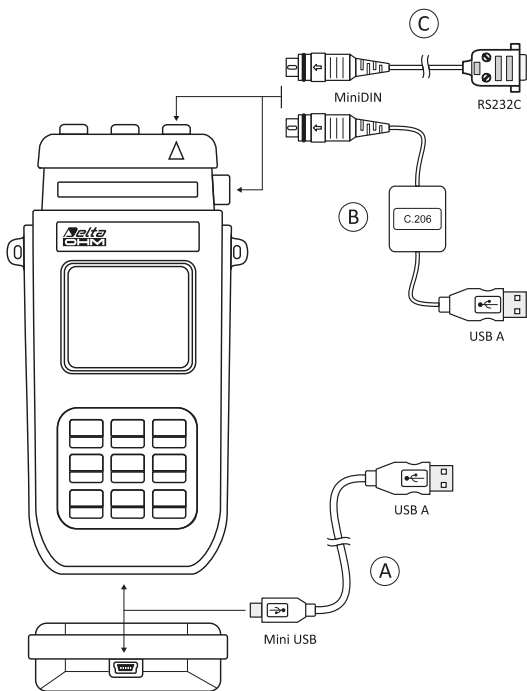
HD2110CSNM: 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.

C.206: Cable for instruments of the series HD21...1 to connect to USB input of PC.

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

HD40.1: Upon request, portable, serial input, 24 column thermal printer, 58mm paper width. Use cable HD2110CSNM (option).

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



A The portable data loggers HD2108.2 HD2128.2 are 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 HD2108.1 HD2128.1 to the USB port of a PC, is necessary the USB/serial converter C.206. The converter is supplied with its own drivers which must be installed before the connection of the converter to the PC (see details in the Cd-Rom supplied with the converter).

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.



HD2108



HD2128

TEMPERATURE PROBES – THERMOCOUPLES

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

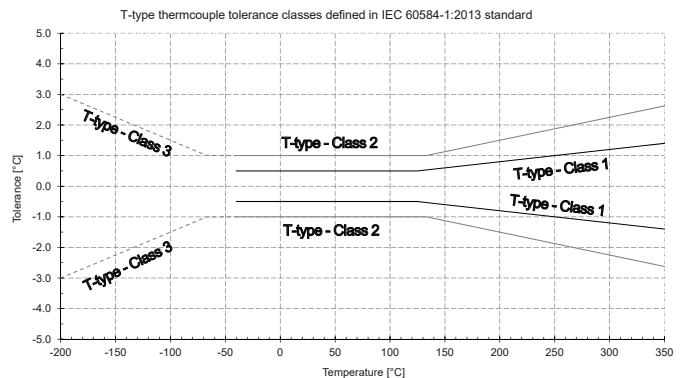
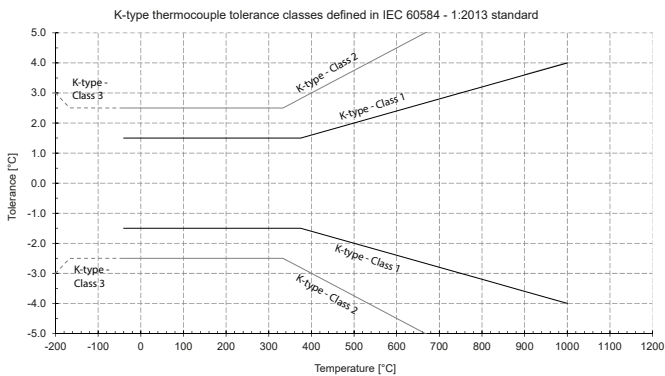
The response time $\tau_{0.63}$ indicated for each probe is the reaction time of the sensor to a temperature variation, with a variation of the measured signal corresponding to the 63% of the total variation. The response times are referred:

- 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:

| Thermocouple Type | Class 1 | | Class 2 | | Class 3 | |
|-------------------|------------------------|---------------------|------------------------|---------------------|------------------------|-------------------|
| | 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 | | --- | --- | |
| 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 | 0 °C...+1100 °C | 1.5 °C or 0.0025· t | 0 °C...+1600 °C | --- | --- |
| S | [1+0.003·(t-1100)] | +1100 °C...+1600 °C | | 0 °C...+1700 °C | --- | --- |
| B | --- | --- | | +600 °C...+1700 °C | 4 °C or 0.005· t | 600 °C...+1700 °C |
| C | --- | --- | | +426 °C...+2315 °C | --- | --- |
| A | --- | --- | 0.01· t | +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.

| Thermocouple type | Alloy standard elements and composition | |
|-------------------|---|-------------------------|
| | 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.



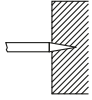
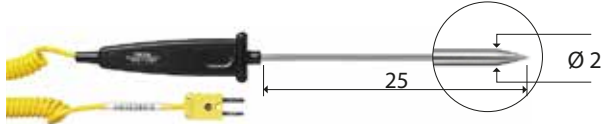
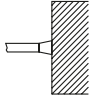

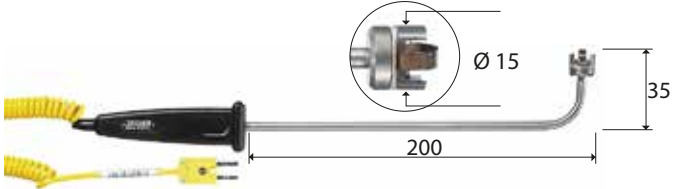
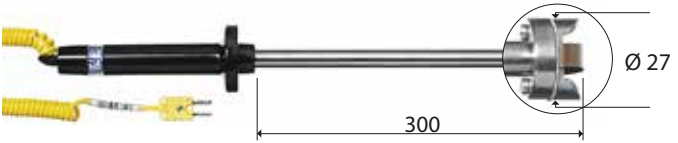
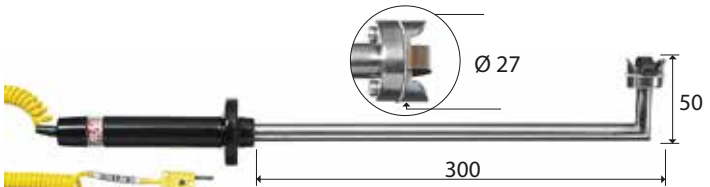

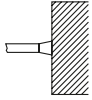
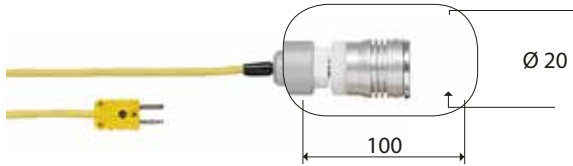

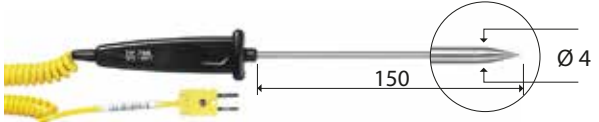
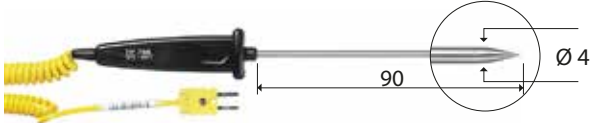
LAT N° 124

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

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

| CODE | T _{max} (°C) | USE | τ _{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 | | |


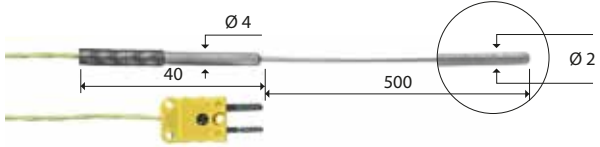
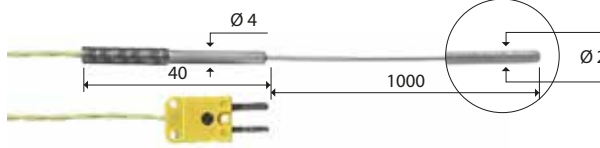

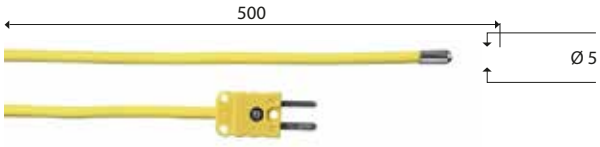
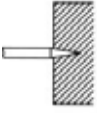
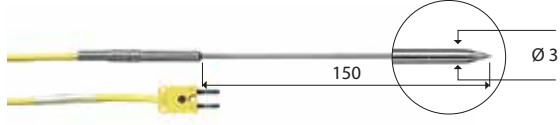
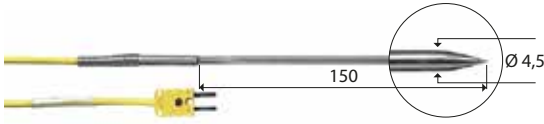


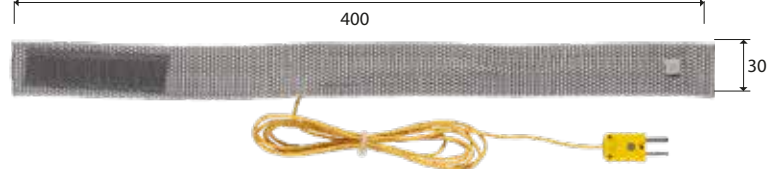

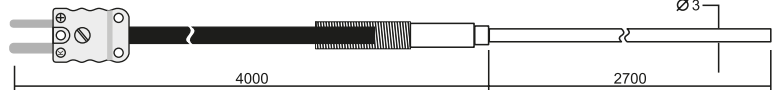
"K" type THERMOCOUPLES - Chromel (Ni-Cr) / Almel (Ni-Al) - Class 1

| CODE | T _{max} (°C) | USE | τ _{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 | | | | 1m / 2m / 3m / 5m / 10m / 20m |
| 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) / Almel (Ni-Al) - Class 1

| CODE | T _{max} (°C) | USE | τ _{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 Length: 2m/5m/10m/15m/20m | |