



**HD 2108.1, HD 2108.2, HD 2128.1, 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 logger**, 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.

All models are equipped with RS232C serial port and are able to transfer the acquired measures, in real time, to a PC or a portable printer.

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 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, no condensation
Protection degree	IP66

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

Unit of measurement

°C - °F - °K - mV - mV°C

Security of stored data

Unlimited, independent of battery charge conditions
1min/month max drift

Time

Date and time	In real time
Accuracy	1min/month max drift

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 couples of samples

Storage interval can be selected between 1,5,10,15,30 s.; 1,2,5,10,15,20,30 min.; 1 hour

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 selectable between 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 miniature connector
Serial interface	8-pole MiniDin connector
USB interface	Type B Mini USB connector
Mains adapter	2-pole connector (positive at centre)

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 up to 199.95°C
0.1°C from 200.0°C up to full scale

Instrument accuracy

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

Accuracy is referred to the instrument only; 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

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.

The tolerances refer to the operating temperature expected for the thermocouple, in agreement with the thermo-elements' diameter.

Those thermocouples that comply with the limits for temperatures over 0°C, do not necessarily comply with the limits for ranges below 0°C.

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 Tolerance Temperature interval Tolerance	from -40 to +125°C ± 0.5°C from 125 to 350°C ± 0.004 · t	from -40 to +133°C ± 1°C from 133 to 350°C ± 0.0075 · t	from -67 to +40°C ± 1°C from -200 to -67°C ± 0.015 · t
Type E Temperature interval Tolerance Temperature interval Tolerance	from -40 to +375°C ± 1.5°C from 375 to 800°C ± 0.004 · t	from -40 to +333°C ± 2.5°C from 333 to 900°C ± 0.0075 · t	from -167 to +40°C ± 2.5°C from -200 to -167°C ± 0.015 · t
Type J Temperature interval Tolerance Temperature interval Tolerance	from -40 to +375°C ± 1.5°C from 375 to 750°C ± 0.004 · t	from -40 to +333°C ± 2.5°C from 333 to 750°C ± 0.0075 · t	- - - -
Type K, type N Temperature interval Tolerance Temperature interval Tolerance	from -40 to +375°C ± 1.5°C from 375 to 1000°C ± 0.004 · t	from 40 to +333°C ± 2.5°C from 333 to 1200°C ± 0.0075 · t	from -167 to +40°C ± 2.5°C from -200 to -167°C ± 0.015 · t
Type R, type S Temperature interval Tolerance Temperature interval Tolerance	from 0 to +1100°C ± 1°C from 1100 to 1600°C ± [1 + 0.003 (t-1100)] °C	from 0 to +600°C ± 1.5°C from 600 to 1600°C ± 0.0025 · t	- - - -
Type B Temperature interval Tolerance Temperature interval Tolerance	- - - -	- - from 600 to 1700 °C ± 0.0025 · t	from +600 to +800C + 4°C from 800 to 1700°C ± 0.005 · t

⁽¹⁾ Materials for thermocouples are generally supplied so to comply with the factory tolerances specified in the table for temperatures over -40°C. However these materials can sometimes not comply with the factory tolerances for the low temperatures reported under Class 3, for thermocouples of T, E, K and N type, when thermocouples have to comply at the same time the limits of Class 3 and Class 1 and/or Class 2.



CP23



HD40.1

