HD 2108.1
HD 2108.2
HD 2128.1
HD 2128.2

	HD2108.1	HD2108.2	HD2128.1	HD2128.2
TC input:	1	1	2	2
Storage capacity	----	76000 samples	----	38000 couples of temperature
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   **IP67**

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

Time
Date and time   Schedule 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   1s … 3600s (1 hour)

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 15m
Immediate print interval   1s … 3600s (1 hour)

*USB interface - model **HD2108.2** and **HD2128.2***
Type   1.1 - 2.0 electrically isolated

Connections
Probes input   2-pole female polarized standard miniature
connector
Serial interface and USB   8-pole MiniDin connector
Mains adapter   2-pole connector (positive at centre)

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 a multi-standard RS232C serial port and a 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, into 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 IP67 protection degree.

HD2108

HD2128

SWD10

HD2110CSNM

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 · ltr	from -40 to +133°C ± 1°C from 133 to 350°C ± 0.0075 · ltr	from -67 to+40°C ± 1°C from -200 to -67°C ± 0.015 · ltr
Type E Temperature interval Tolerance Temperature interval Tolerance	from -40 to +375°C ± 1.5°C from 375 to 800°C ± 0.004 · ltr	from -40 to +333°C ± 2.5°C from 333 to 900°C ± 0.0075 · ltr	from -167 to +40°C ± 2.5°C from -200 to -167°C ± 0.015 · ltr
Type J Temperature interval Tolerance Temperature interval Tolerance	from -40 to +375°C ± 1.5°C from 375 to 750°C ± 0.004 · ltr	from -40 to +333°C ± 2.5°C from 333 to 750°C ± 0.0075 · ltr	- - - -
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 · ltr	from 40 to +333°C ± 2.5°C from 333 to 1200°C ± 0.0075 · ltr	from -167 to +40°C ± 2.5°C from -200 to -167°C ± 0.015 · ltr
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-1 100)] °C	from 0 to +600°C ± 1.5°C from 600 to 1600°C ± 0.0025 · ltr	- - - -
Type B Temperature interval Tolerance Temperature interval Tolerance	- - - -	- - from 600 to 1700 °C ± 0.0025 · ltr	from +600 to +800C + 4°C from 800 to 1700°C ± 0.005 · ltr

[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.

PURCHASING CODES
HD2108.1: The kit consists of **one input** instrument HD2108.1, 4 per 1.5V alkaline Batteries, instruction manual, case and DeltaLog9 software. **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, case and DeltaLog9 software. **Probes and cables 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 DeltaLog9 software. **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, case and DeltaLog9 software. **Probes and cables 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 and .2 to connect directly to USB input of PC.
HD2101/USB: Connection cable USB 2.0 connector type A - 8-pole MiniDin.
DeltaLog9: Software for download and management of the data on PC using Windows 98 to XP and Vista operating systems.
SWD10: Stabilized power supply at 230Vac/12Vdc-300mA-1000mA mains voltage.
HD40.1: Upon request, portable, serial input, 24 column thermal printers, 58mm paper width.

Thermocouple probes
Any thermocouple probe with standard miniature connector available on the price list can be connected to these instruments.
Please see pages from 17 to 21.

HD2101/USB

HD40.1