



RTD – TC THERMOMETERS Pt100 AND TC INPUT

The **HD2178.1** and **HD2178.2** are portable instruments with a large LCD display. They measure the temperature using immersion, penetration air or contact probes with RTD or thermocouple sensor. A 3 or 4 wire Pt100 sensor or a 2 wire Pt100 sensor can be connected to the input B, while a thermocouple of type K, J, T, E, N to the input A.

The probes for input B, 8 pole DIN45326 connector, are equipped with automatic detection module with the factory calibration settings already being memorized inside. A miniature polarized connector for thermocouple is provided for input A. The instrument HD2178.2 is a **datalogger** which stores up to 80,000 samples. These data can be transferred from the instrument connected to a PC via the multi-standard RS232C serial port and USB 2.0. The storing interval, printing, and baud rate can be configured using the menu.

The models HD2178.1 and HD2178.2 are fitted with an RS232C serial port and can transfer the acquired measurements in real time to a PC or to a portable printer.

The *Max*, *Min* and *Avg* function calculate the maximum, minimum or average values.

Other functions include: the relative measurement REL, the HOLD function, and the automatic turning off that can also be disabled.

The instruments have IP67 protection degree.

INSTRUMENT TECHNICAL CHARACTERISTICS

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
Warehouse temperature	-25...65°C
Working relative humidity	0...90%RH without condensation
Protection degree	IP67

Power

Batteries	4 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	20µA
Mains	Output mains adapter 9Vdc / 250mA

Measuring unit °C - °F



Security of memorized data

Unlimited, independent of battery charge conditions

Time

Date and time	Schedule in real time
Accuracy	1min/month max departure

Measured values storage – model HD2178.2

Type	2000 pages containing 40 samples each
Quantity	Total of 80,000 samples
Storage interval	1s...3600s (1hour)

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 (1hour)

USB interface - model HD2178.2

Type	1.1 - 2.0 electrically isolated
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Connections

Input for probes	8 pole male DIN45326 connector
Serial interface and USB	8-pole MiniDin connector
Mains adapter	2-pole connector (positive at centre)

Measurement of temperature by Instrument – RTD sensors

Pt100 measurement range	-200 ... +650°C
Pt1000 measurement range	-200 ... +650°C
Resolution	0.1°C
Accuracy	±0.05°C
Drift after 1 year	0.1°C/year

Measurement of temperature by Instrument - Tc

TC measurement range: K	-200 ... +1370°C
TC measurement range: J	-100 ... +750°C
TC measurement range: T	-200 ... +400°C
TC measurement range: N	-200 ... +1300°C
TC measurement range: E	-200 ... +750°C

Resolution	0.1°C
Instrument accuracy	
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 N	±0.1°C up to 600°C ±0.2°C over 600°C
Thermocouple E	±0.1°C up to 300°C ±0.2°C over 300°C



HD2101/USB

The accuracy only refers to the instrument. 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

Accuracy of the thermocouple probes:

The 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 thermocouples conforming to regulations must comply with one of the following tolerance levels, the values of which are reported in the table.

G I (special tolerances)

G II (normal tolerances)

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

Tolerance of thermocouples:

Type of thermocouple	Range °C	G I*	G II*
K	0...+1370°C	±1.1°C or ±0.4%	±2.2°C or ±0.75%
J	0...+750°C	±1.1°C or ±0.4%	±2.2°C or ±0.75%
T	0...+400°C	±0.5°C or ±0.4%	±1°C or ±0.75%
N	0...+1300°C	±1.1°C or ±0.4%	±2.2°C or ±0.75%
E	0...+750°C	±1°C or ±0.4%	±1.7°C or ±0.5%
K**	-200...0°C	---	±2.2°C or ±2%
T**	-200...0°C	---	±1°C or ±1.5%
E**	-200...0°C	---	±1.7°C or ±1%

* The higher of the two optional limits is the valid one. Example: at 200°C the percentage tolerance for type K thermocouple, tolerance G II, is ±0.75% and is equal to ±1.5°C. Therefore the limit of ±2.2°C is valid. On the other hand, at 600°C the percentage tolerance is equal to ±4.5°C and therefore this is the limit to use.

** The thermocouples that meet the limits for temperatures higher than 0°C do not necessarily meet the limits for the range under 0°C.



AF209.60



HD2110CSNM

TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT

Temperature probes Pt100 sensor with SICRAM module

Model	Type	Application range	Accuracy
TP472I	Immersion	-196°C...+500°C	±0.25°C (-196°C...+350°C) ±0.4°C (+350°C...+500°C)
TP472I.0	Immersion	-50°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP473P.0	Penetration	-50°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP474C.0	Contact	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP475A.0	Air	-50°C...+250°C	±0.3°C (-50°C...+250°C)
TP472I.5	Immersion	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP472I.10	Immersion	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP49A	Immersion	-70°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP49AC	Contact	-70°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP49AP	Penetration	-70°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP875	Globe thermometer Ø 150mm	-10°C...+100°C	±0.25°C

Common characteristics

Resolution 0.1°C
Temperature drift @ 20°C 0.003%/°C

4 wire Pt100 and 2 wire Pt1000 Probes

Model	Type	Application range	Accuracy
TP47.100	Pt100 4 wires	-50...+400°C	Class A
TP47.1000	Pt1000 2 wires	-50...+400°C	Class A

Common characteristics

Resolution 0.1°C
Temperature drift @ 20°C
Pt100 0.003%/°C
Pt1000 0.005%/°C

ORDER CODES

HD2178.1K: The kit is composed of the instrument HD2178.1, connection cable for serial output HD2110CSNM, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **The probes must be ordered separately.**

HD2178.2K: The kit is composed of the HD2108.2 datalogger, connection cable HD2101/USB, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **The probes must be ordered separately.**

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

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 operating systems.

AF209.60: Stabilized power supply at 230Vac/9Vdc-300mA mains voltage.

S'print-BT: On request, portable, serial input, 24 column thermal printer, 58mm paper width.

Probes complete with SICRAM module

TP472I: Immersion probe, sensor Pt100. Stem Ø 3 mm, length 300 mm. Cable length 2 metres.

TP472I.0: Immersion probe, sensor Pt100. Stem Ø 3 mm, length 230 mm. Cable length 2 metres.

TP473P.0: Penetration probe, sensor Pt100. Stem Ø 4mm, length 150 mm. Cable length 2 metres.

TP474C.0: Contact probe, sensor Pt100. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable length 2 metres.

TP475A.0: Air probe, sensor Pt100. Stem Ø 4mm, length 230mm. Cable length 2 metres.

TP472I.5: Immersion probe, sensor Pt100. Stem Ø 6mm, length 500 mm. Cable length 2 metres.

TP472I.10: Immersion probe, sensor Pt100. Stem Ø 6mm, length 1,000mm. Cable length 2 metres.

TP49A: Immersion probe, sensor Pt100. Stem Ø 2.7mm, length 150mm. Cable length 2 metres. Aluminium handle.

TP49AC: Contact probe, sensor Pt100. Stem \varnothing 4 mm, length 150mm. Cable length 2 metres. Aluminium handle.

TP49AP: Penetration probe, sensor Pt100. Stem \varnothing 2.7mm, length 150mm. Cable length 2 metres. Aluminium handle.

TP875: Globe thermometer \varnothing 150 mm with handle, complete with SICRAM module. Cable length 2 metres.

Temperature probes without SICRAM module

TP47.100: Direct 4 wires Pt100 sensor immersion probe. Probe's stem \varnothing 3mm, length 230mm. Connection cable 4 wires with connector, length 2 metres.

TP47.1000: Pt1000 sensor immersion probe. Probe's stem \varnothing 3mm, length 230mm. Connection cable 2 wires with connector, length 2 metres.

TP47: Only connector for probe connection: Pt100 direct 3 and 4 wires, Pt1000 2 wires and Ni1000 2 wires

Thermocouple probes

The instruments can be connected to all the thermocouple probes fitted with standard miniature connector available on our price-list.



S'print-BT

