HD 2106.1
HD 2106.2

HD 2106.1, HD 2106.2
CONDUCTIVITY METERS - THERMOMETERS

The **HD2106.1** and **HD2106.2** are portable instruments with a large LCD display. They measure conductivity, liquid resistivity, total dissolved solids (TDS), and salinity using combined 4-ring and 2-ring conductivity/temperature probes. Temperature only is measured by Pt100 or Pt1000 immersion, penetration, contact or air probes. The probe calibration can be performed automatically in one or more than one of the 147µS, 1413µS, 12880µS or 111800µS/cm conductivity calibration solutions. The temperature probes are equipped with an automatic recognition module and factory calibration data are stored inside. The HD2106.2 is a **datalogger**. It memorizes up to 36,000 conductivity and temperature samples which can be transferred from the instrument connected to a PC via the RS232C and USB 2.0 serial ports. The storing interval, printing, and baud rate can be configured using the menu. Both models are fitted with an RS232C serial port and can transfer to a PC the acquired measurements or to a portable printer in real time. *The Max, Min* and *Avg* function calculates the maximum, minimum or average values. Other functions include: the relative measurement REL, the Auto-HOLD function, and the automatic turning off which can also be excluded.
The instruments have IP66 protection degree.


HD40.1


SWD10

INSTRUMENT TECHNICAL CHARACTERISTICS
Measured quantities: χ, Ω, TDS, NaCl, °C, °F

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

Working temperature	-5…50°C
Storage temperature	-25…65°C
Working relative humidity	0…90%RH without condensation
Protection degree	**IP66**

Power

Batteries	4 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	20µA
Mains (SWD10)	Output mains adapter 12Vdc / 1A

Security of memorized data — Unlimited, independent of battery charge conditions

Time

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

*Measured values storage - model **HD2106.2***

Type	2000 pages containing 18 samples each
Quantity	36000 pairs of measurements [χ-°C], [Ω-°C], [TDS-°C] or [Sal-°C]
Selectable storage interval	1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 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
Print interval	Immediate or selectable between: 1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 1hour

*USB interface - model **HD2106.2***

Type	1.1 - 2.0 electrically isolated

Connections

Conductivity input	8-pole male DIN45326 connector
Input module for the temperature probes	8-pole male DIN45326 connector
Serial interface and USB	8-pole MiniUSB type B
Mains adapter	2-pole connector (positive at centre)

Measurement of conductivity		*Resolution*
Measuring range Kcell=0.01	0.000…1.999µS/cm	0.001µS/cm
Measuring range Kcell=0.1	0.00…19.99µS/cm	0.01µS/cm
Measuring range Kcell=1	0.0…199.9µS/cm	0.1µS/cm
	200…1999µS/cm	1µS/cm
	2.00…19.99mS/cm	0.01mS/cm
	20.0…199.9mS/cm	0.1mS/cm
Measuring range Kcell=10	200…1999mS/cm	1mS/cm
Accuracy (conductivity)	±0.5%±1digit	

Measurement of resistivity		*Resolution*
Measuring range Kcell = 0.01	till 100GΩ·cm/(*)	
Measuring range Kcell=0.1	till 100MΩ·cm/(*)	
Measuring range Kcell	5.0…199.9Ω·cm	0.1Ω·cm
	200…999Ω·cm	1Ω·cm
	1.00k…19.99kΩ·cm	0.01kΩ·cm
	20.0k…99.9kΩ·cm	0.1kΩ·cm
	100k…999kΩ·cm	1kΩ·cm
	1…10MΩ·cm	1MΩ·cm
Measuring range Kcell=10	0.5…5.0Ω·cm	0.1Ω·cm
Accuracy (resistivity)	±0.5%±1digit	

Measurement of total dissolved solids (with coefficient χ/TDS=0.5)

Measuring range Kcell=0.01	0.000…19.999mg/l	0.005mg/l
Measuring range Kcell=0.1	0.00…19.99mg/l	0.05mg/l
Measuring range Kcell=1	0.0…199.9mg/l	0.5mg/l
	200…1999mg/l	1mg/l
	2.00…19.99g/l	0.01g/l
	20.0…99.9g/l	0.1g/l
Measuring range Kcell=10	100…999g/l	1g/l
Accuracy (total dissolved solids)	±0.5%±1digit	

Measurement of salinity

		Resolution
Measurement range	0.000…1.999g/l	1mg/l
	2.00…19.99g/l	10mg/l
	20.0…199.9g/l	0.1g/l
Accuracy (salinity)	±0.5%±1digit	

Temperature compensation automatic/manual	0…100°C with α_T selectable from 0.00 to 4.00%/°C
Reference temperature	20°C or 25°C
χ / TDS Conversion factor	0.4…0.8
Preset cell constant values:	K=0,01 - K=0,1 - K=0,7 - K=1 - K=10

Standard solutions automatically detected @25°C

147µS/cm
1413µS/cm
12880µS/cm
111800µS/cm

Measurement of temperature

Pt100 measuring range	-50…+200°C
Pt1000 measuring range	-50…+200°C
Resolution	0.1°C
Accuracy	±0.5%±1digit
Drift after 1 year	0.1°C/year

(*) The resistivity measurement is obtained from the reciprocal of conductivity measurement. Close to the bottom of the scale, the indication of resistivity appears like reported in the table below:

K cell = 0.01 cm^{-1}		**K cell = 0.1 cm^{-1}**	
Conductivity (µS/cm)	Resistivity (MΩ·cm)	Conductivity (µS/cm)	Resistivity (MΩ·cm)
0.001 µS/cm	1000 MΩ·cm	0.01 µS/cm	100 MΩ·cm
0.002 µS/cm	500 MΩ·cm	0.02 µS/cm	50 MΩ·cm
0.003 µS/cm	333 MΩ·cm	0.03 µS/cm	33 MΩ·cm
0.004 µS/cm	250 MΩ·cm	0.04 µS/cm	25 MΩ·cm

TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT

Temperature probes Pt100 sensor with SICRAM module

Model	Type	Application field	Accuracy
TP472I	Immersion	-196°C…+500°C	±0.25°C (-196°C…+300°C) ±0.5°C (+300°C…+500°C)
TP472I.0 1/3 DIN Thin Film	Immersion	-50°C…+300°C	±0.25°C (-50°C…+300°C)
TP473P.I	Penetration	-50°C…+400°C	±0.25°C (-50°C…+300°C) ±0.5°C (+300°C…+400°C)
TP473P.0 1/3 DIN Thin Film	Penetration	-50°C…+300°C	±0.25°C (-50°C…+300°C)
TP474C.I	Contact	-50°C…+400°C	±0.3°C (-50°C…+300°C) ±0.5°C (+300°C…+400°C)
TP474C.0 1/3 DIN Thin Film	Contact	-50°C…+300°C	±0.3°C (-50°C…+300°C)
TP475A.0 1/3 DIN Thin Film	Air	-50°C…+250°C	±0.3°C (-50°C…+250°C)
TP472I.5	Penetration	-50°C…+400°C	±0.3°C (-50°C…+300°C) ±0.6°C (+300°C…+400°C)
TP472I.10	Penetration	-50°C…+400°C	±0.30°C (-50°C…+300°C) ±0.6°C (+300°C…+400°C)
TP49A.0 Class A Thin Film	Immersion	-70°C…+250°C	±0.3°C (-70°C…-50°C) ±0.25°C (-50°C…+250°C)
TP49AC.0 Class A Thin Film	Contact	-70°C…+250°C	±0.3°C (-70°C…-50°C) ±0.25°C (-50°C…+250°C)
TP49AP.0 Class A Thin Film	Penetration	-70°C…+250°C	±0.3°C (-70°C…-50°C) ±0.25°C (-50°C…+250°C)
TP875.I	Globe-thermometer Ø150mm	-30°C…+120°C	±0.25°C
TP876.I	Globe-thermometer Ø50mm	-30°C…+120°C	±0.25°C
TP87.0 1/3 DIN Thin Film	Immersion	-50°C…+200°C	±0.25°C
TP878.0 1/3 DIN Thin Film TP878.1.0 1/3 DIN Thin Film	Photovoltaic	+4°C…+85°C	±0.25°C
TP879.0 1/3 DIN Thin Film	Compost	-20°C…+120°C	±0.25°C

Common characteristics

Temperature drift @ 20°C 0.003%/°C

4 wires Pt100 and 2 wires Pt1000 Probes

Model	Type	Application field	Accuracy
TP47.100.0 1/3 DIN Thin Film	4 wires Pt100	-50…+250°C	1/3 DIN
TP47.1000.0 1/3 DIN Thin Film	2 wires Pt1000	-50…+250°C	1/3 DIN
TP87.100.0 1/3 DIN Thin Film	4 wires Pt100	-50…+200°C	1/3 DIN
TP87.1000.0 1/3 DIN Thin Film	2 wires Pt1000	-50…+200°C	1/3 DIN

Common features

Temperature drift @20°C

Pt100 0.003%/°C

Pt1000 0.005%/°C

A For the models of portable data logger series **HD21XX.2** has been implemented with a new serial port miniUSB type HID (Human Interface Device).
When making the connection to the PC by the USB cable Type A - Mini USB B-type coded CP23, **no USB driver installation is requested**.

B For the connection of the models **HD21XX.1** to the RS232 port of your PC, the USB/serial converter is available (**code C.206**). The converter is equipped with its own drivers that have to be installed before connecting the converter to the PC (please see the details in the CDRom supplied with the converter).

C The port with the MiniDIN connector which is present on every model is an RS232C type. By means of the cable coded HD2110CSNM, an RS232 port of a PC or the HD40.1. printer can be connected.

ORDER CODES

HD2106.1: The kit is composed of: instrument HD2106.1, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software.

HD2106.2: The kit is composed of: instrument HD2106.2 **datalogger**, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software. **Conductivity probes, temperature probes, standard calibration solutions, cables for data transfer to PC or printer have to be ordered separately.**

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

C.206: Serial connection cable for HD2106.1 instruments with USB connector for PC and 8-pole MiniDin male connector for the instrument.

CP23: Serial connection cable with USB connector type A - MiniUSB type B (not suitable for HD2106.1).

DeltaLog9: Software for download and management of the data on PC using Windows operating systems.

SWD10: Stabilized power supply 100-240 Vac/12Vdc-1A mains voltage

HD40.1: 24-column portable thermal printer, serial interface, 57mm paper width, four NiMH 1.2V rechargeable batteries, SWD10 power supply, instruction manual, 5 thermal paper rolls It uses the HD2110CSNM cable (optional).

RCT: The kit includes 4 thermal paper rolls 57mm wide and 32mm in diameter.

BAT-40: Spare battery pack for HD40.1 printer with built-in temperature sensor.

HD22.2: Laboratory electrode holder composed of base plate with built-in magnetic stirrer, shaft and replaceable electrode holder. Suitable diameter 12mm. Powered by bench-top meters of the series **HD22…**with cable HD22.2.1 **(optional)** or power supplier SWD10 **(optional).**

HD22.3: Laboratory electrode holder composed of base plate. Flexible arm for free positioning. Suitable for electrodes with diameter 12mm.

Conductivity probes

Please see the order codes reported in the probes' technical specifications.

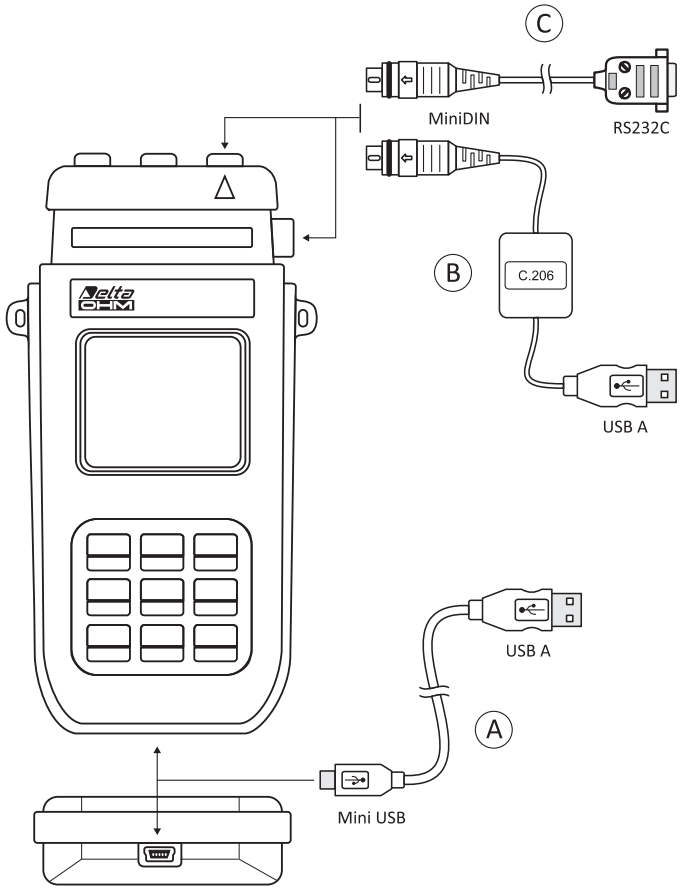
Standard conductivity calibration solutions

HD8747: Standard calibration solution 0.001mol/l equal to 147µS/cm @25°C, 200cc.

HD8714: Standard calibration solution 0.01mol/l equal to 1413µS/cm @25°C, 200cc.

HD8712: Standard calibration solution 0.1mol/l equal to 12880µS/cm @25°C, 200cc.

HD87111: Standard calibration solution 1mol/l equal to 111800µS/cm @25°C, 200cc.



Temperature probes equipped with SICRAM module

TP472I: Wire wound Pt100 sensor, immersion probe. Stem Ø 3 mm, length 300 mm. Cable length 2 m.

TP472I.0: Thin film Pt100 sensor, immersion probe. Stem Ø 3 mm, length 230 mm. Cable length 2 m.

TP473P.I: Wire wound Pt100 sensor, penetration probe. Stem Ø 4mm, length 150 mm. Cable length 2 m.

TP473P.0: Thin film Pt100 sensor, penetration probe. Stem Ø 4mm, length 150 mm. Cable length 2 m.

TP474C.I: Wire wound Pt100 sensor, contact probe. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable length 2 m.

TP474C.0: Thin film Pt100 sensor, contact probe. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable length 2 m.

TP475A.0:, Thin film Pt100 sensor, air probe. Stem Ø 4mm, length 230mm. Cable length 2 m.

TP472I.5: Thin film Pt100 sensor, penetration probe. Stem Ø 6mm, length 500 mm. Cable length 2 m.

TP472I.10: Thin film Pt100 sensor, penetration probe. Stem Ø 6mm, length 1000mm. Cable length 2 m.

TP49A.0: Thin film Pt100 sensor, immersion probe. Stem Ø 2,7mm, length 150mm. Cable length 2 m. Aluminium handle

TP49AC.0: Thin film Pt100 sensor, contact probe. Stem Ø 4mm, length 150mm. Cable length 2 m. Aluminium handle

TP49AP.0: Thin film Pt100 sensor, penetration probe. Stem Ø 2,7mm, length 150mm. Cable length 2 m. Aluminium handle

TP875.I: Wire wound Pt100 sensor, 150mm diameter globe-thermometer equipped with handle. Cable length 2 m.

TP876.I: Wire wound Pt100 sensor, 50mm diameter globe-thermometer equipped with handle. Cable length 2 m.

TP87.0: Thin film Pt100 sensor, immersion probe. Stem Ø 3 mm, length 70 mm. Cable length 2 m.

TP878.0: Thin film Pt100 sensor, contact probe for solar panels. Cable length 2 m.

TP878.1.0: Thin film Pt100 sensor, contact probe for solar panels. Cable length 5 m.

TP879.0: Thin film Pt100 sensor, penetration probe for compost. Stem Ø 8 mm, length 1000 mm. Cable length 2 m.

Temperature probes without SICRAM module

TP47.100.0: Thin film Pt100 sensor, immersion probe. Stem Ø 3mm, length 230mm. Connection cable 4 wires with connector, length 2 m.

TP47.1000.0: Thin film Pt1000 sensor, immersion probe. Probe's Stem Ø 3mm, length 230mm. Connection cable 4 wires with connector, length 2 m.

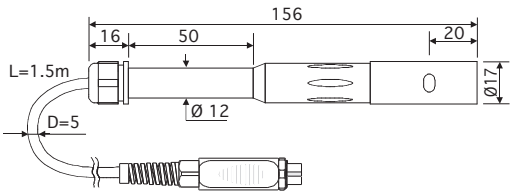
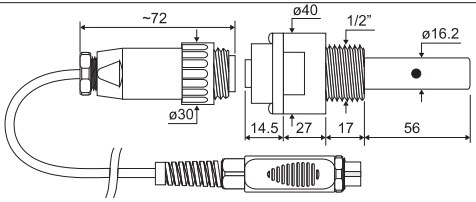
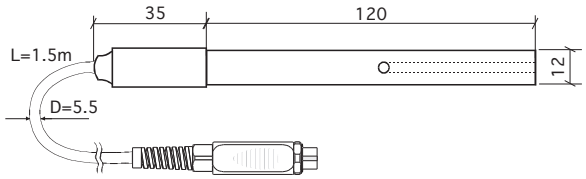
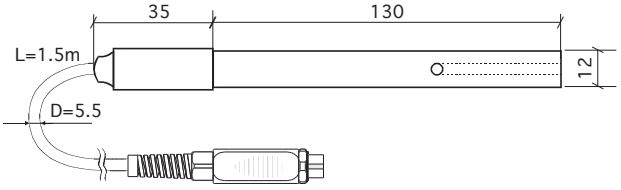
TP47: Connector for Pt100 4-wire and Pt1000 2-wire probes without SICRAM module.

TP87.100.0: Thin film Pt100 sensor, immersion probe. Stem Ø 3mm, length 70mm. 4-wires connection cable with connector, length 1 m.

TP87.1000.0: Thin film Pt1000 sensor, immersion probe. Stem Ø 3mm, length 70mm. 2-wires connection cable with connector, length 1 m.

TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT

2 and 4 electrode conductivity probes

ORDER CODE	MEASUREMENT RANGE	DIMENSIONS
SP06T	K=0.7 5µS…200mS/cm 0…90°C 4-electrode cell in Pocan/Platinum Max pressure 5bar	
SPT 401.001 not suitable for HD 2306.0	K=0.01 0,04…20µS/cm 0…120°C 2-electrode cell AISI 316 - Teflon Max pressure 5bar	
SPT01G	K=0.1 0.1µS…500µS/cm 0…80°C 2-electrode cell in Glass/Platinum Max pressure 5bar	
SPT1G	K=1 10µS…10mS/cm 0…80°C 2-electrode cell in Glass/Platinum Max pressure 5bar	
SPT10G	K=10 500µS…200mS/cm 0…80°C 2-electrode cell in Glass/Platinum Max pressure 5bar