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PORTABLES CONDUCTIVITY METERS

HD2306.0 Conductivity meter-Thermometer



The **HD2306.0** is a portable instrument with a large LCD display. It measures 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 or contact probes. The probe calibration can be performed automatically in one or more than one of the 147 μ S, 1413 μ S, 12880 μ S or 111800 μ S/cm conductivity calibration solutions. The temperature probe is fitted with an automatic detection module, with the factory calibration settings already being memorized inside. 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 disabled.

he instrument has IP67 protection degree.

TECHNICAL CHARACTERISTICS

Instrument

Dimensions	(Length x Width x Height) 140x88x38mm
Weight	160g (complete with batteries)
Materials	ABS
Display	2x4 1/2 digits plus symbols Visible area: 52x42mm

Operating conditions

Working temperature	-5...50°C
Storing temperature -	25...65°C
Working relative humidity	0...90%RH without condensation

Power

Batteries	3 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed	with instrument off 20 μ A

Connections

Conductivity input/ temperature probes	8-pole male DIN45326 connector
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Measurement of conductivity by Instrument

Resolution with K cell=0.1	0.01 μ S in range 0.00...19.99 μ S
Measurement range (K cell=1) /	
Resolution	0.0...199.9 μ S / 0.1 μ S 200...1999 μ S / 1 μ S 2.00...19.99mS / 0.01mS 20.0...199.9mS / 0.1mS
Accuracy (conductivity)	$\pm 0.5\%$ ± 1 digit

Measurement of resistivity by Instrument

Measurement range / Resolution	4.0...199.9 Ω / 0.1 Ω 200...999 Ω / 1 Ω 1.00k...19.99k Ω / 0.01k Ω 20.0k...99.9k Ω / 0.1k Ω 100k...999k Ω / 1k Ω 1...10M Ω / 1M Ω
Accuracy (resistivity)	$\pm 0.5\%$ ± 1 digit

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

Resolution with K cell=0.1	0.05mg/l in range 0.00...19.99mg/l
Measurement range (K cell=1) /	
Resolution	0.0...199.9 mg/l / 0.5 mg/l 200...1999 mg/l / 1 mg/l 2.00...19.99 g/l / 0.01 g/l 20.0...199.9 g/l / 0.1 g/l
Accuracy (total dissolved solids)	$\pm 0.5\%$ ± 1 digit



ORDER CODES

HD2306.0K: The kit is composed of: instrument HD2306.0, **conductivity/ temperature combined probe SP06T**, standard calibration solution HD8712 (12880 μ S/cm), 3 1.5V alkaline batteries, operating manual, case.

Other conductivity probes must be ordered separately.

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 147 μ S/cm @25°C, 200cc.

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

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

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

ORDER CODES

Temperature probes

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

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

TP87.100: Pt100 sensor immersion probe. Probe's stem \varnothing 3mm, length 70mm. Connection cable 4 wires with connector, length 1 metre.

TP87.1000: Pt1000 sensor immersion probe. Probe's stem \varnothing 3mm, length 70mm. Connection cable 2 wires with connector, length 1 metre.

TP47: Only connector for probe connection: direct 4 wire Pt100, 2 wire Pt1000.



Measurement of temperature by Instrument

Pt100 measurement range	-50...+200°C
Pt1000 measurement range	-50...+200°C
Resolution	0.1°C
Accuracy	±0.25°C
Drift after 1 year	0.1°C/year

Automatic/manual temperature compensation	0...100°C with $\alpha T = 0.00...4.00\%/^{\circ}\text{C}$
Reference temperature	20°C or 25°C
χ /TDS conversion factor	0.4...0.8
Cell constant K (cm-1)	0.1, 0.7, 1.0 and 10.0

Standard solutions automatically detected (@25°C)

147 $\mu\text{S/cm}$

1413 $\mu\text{S/cm}$

12880 $\mu\text{S/cm}$

111800 $\mu\text{S/cm}$

TECHNICAL DATA PROBES

4 wire Pt100 and 2 wire Pt1000 Temperature probes

Model	Type	Range	Accuracy
TP47.100	Pt100 4 wires	-50 to 200 °C	Class A
TP47.1000	Pt1000 2 wires	-50 to 200 °C	Class A
TP87.100	Pt 100 4wires	-50 to 200 °C	Class A
TP87.1000	Pt1000 2 wires	-50 to 200 °C	Class A

Common characteristics

Resolution 0.1°C

Temperature drift @20°C 0.005%/°C

Probes for portables conductivity meters

Model	Range	Cell Constant	Material	Electrodes	
SP06T	5 $\mu\text{S/cm}$ to 200 mS/cm 0...90 °C	K = 0,7	Procan	4 Platinum	
SPT01G	0,1 $\mu\text{S/cm}$ to 500 $\mu\text{S/cm}$ 0...80 °C	K = 0,1	Glass	2 Platinum	
SPT1	10 $\mu\text{S/cm}$ to 10 mS/cm 0...50 °C	K = 1	Epoxi	2 Graphite	
SPT1G	10 $\mu\text{S/cm}$ to 10 mS/cm 0...80 °C	K = 1	Glass	2 Platinum	
SPT10G	50 $\mu\text{S/cm}$ to 200 mS/cm 0...80 °C	K = 10	Glasum	2 Platinum	

HD2106.1 HD2106.2 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 or contact probes. The probe calibration can be performed automatically in one or more than one of the 147 μ S, 1413 μ S, 12880 μ S or 111800 μ S/cm conductivity calibration solutions. The temperature probes are fitted with an automatic detection module, with the factory calibration settings already being memorized inside. The HD2106.2 is a **data logger**. It memorizes up to 36,000 conductivity and temperature samples which 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 HD2106.1 and HD2106.2 models are fitted with an RS232C serial port and can transfer the acquired measurements to a PC 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 disabled.

The instruments have IP67 protection degree.

TECHNICAL CHARACTERISTICS

Instrument

Dimensions	(Length x Width x Height) 185x90x40mm
Weight	470g (complete with batteries)
Materials	ABS, rubber
Display	2x4 1/2 digits plus symbols Visible area: 52x42mm

Operating conditions

Working temperature	-5...50°C
Storing temperature	-25...65°C
Working relative humidity	0...90%RH without condensation

Power

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

Security of memorized data

Unlimited, independent of battery charge conditions

Time

Date and time	Schedule 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 [X-°C], [Ω -°C], [TDS-°C] or [Sal-°C]
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 HD2106.2

Type	1.1 - 2.0 electrically isolated
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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 MiniDin connector
Mains adapter	2-pole connector (positive at centre)

ORDER CODES

HD2106.1K: The kit is composed of: instrument HD2106.1, **conductivity/ temperature combined probe SP06T**, connection cable for serial output **HD2110CSNM**, standard calibration solution HD8712 (12880 μ S/cm), 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software.
Other conductivity probes must be ordered separately.

HD2106.2K: The kit is composed of: instrument HD2106.2 **data logger**, **conductivity/temperature combined probe SP06T**, connection cable for serial output **HD2101/USB**, 4 1.5V alkaline batteries, standard calibration solution HD8712 (12880 μ S/cm), operating manual, case and DeltaLog9 software.
Other conductivity probes must be ordered separately.

ORDER CODE

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 (not suitable for HD2106.1K).

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.

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

TP47.100: Direct 4 wire Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. 4 wire connection cable with connector, length 2 metres.

TP47.1000: Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. 2 wire connection cable with connector, length 2 metres.

TP87.100: Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 70mm. Connection cable 4 wires with connector, length 1 metre. **T**

P87.1000: Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 70mm. Connection cable 2 wires with connector, length 1 metre.

TP47: Only connector for probe connection: direct 4 wire Pt100, 2 wire Pt1000. directa de 4 hilos y de la sonda Pt1000 de 2 hilos.

Measurement of conductivity by Instrument

Measurement range (K cell=0.1)

Resolution	0.00...19.99µS/cm / 0.01µS/cm (with K cell=0.1) 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
Accuracy (conductivity)	±0.5% ±1digit

Measurement of resistivity by Instrument

Measurement range / Resolution

4.0...199.9Ω / 0.1Ω
200...999Ω / 1Ω
1.00k...19.99kΩ / 0.01kΩ
20.0k...99.9kΩ / 0.1kΩ
100k...999kΩ / 1kΩ
1...10MΩ / 1MΩ
Accuracy (resistivity) ±0.5% ±1digit

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

Measurement range (K cell=1) 0.00...19.99mg/l / 0.05mg/l

Resolution	0.0...199.9 mg/l / 0.5 mg/l (with K cell=0.1) 200...1999 mg/l / 1 mg/l 2.00...19.99 g/l / 0.01 g/l 20.0...199.9 g/l / 0.1 g/l
Accuracy (total dissolved solids)	±0.5% ±1digit

Measurement of salinity

Measurement range / Resolution 0.000...1.999g/l / 1mg/l
2.00...19.99g/l / 10mg/l

Accuracy (total dissolved solids) ±0.5% ±1digit

Measurement of temperature by Instrument

Pt100 measurement range	-50...+200°C
Pt1000 measurement range	-50...+200°C
Resolution	0.1°C
Accuracy	±0.25°C
Drift after 1 year	0.1°C/year

Automatic/manual

temperature compensation	0...100°C with αT=0.00...4.00%/°C
Reference temperature	20°C or 25°C
γ/TDS conversion factor	0.4...0.8
Cell constant K (cm-1)	0.1, 0.7, 1.0 and 10.0

Standard solutions automatically detected (@25°C)

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



The technical data of the temperature probes, and electrodes conductivity are on page 2 of this booklet.

The full range of Conductivity uses the same probes and electrodes