



## HD 2206.2 BENCH-TOP CONDUCTIVITY METER

The **HD2206.2** is a bench top instrument for electrochemical measures: **conductivity** and **temperature**. It is fitted with a large backlighted LCD display.

The **HD2206.2** measures **conductivity**, **resistivity** in liquids, **total dissolved solids (TDS)**, and **salinity** with combined 4-ring and 2-ring conductivity/temperature probes. The conductivity probes can have a direct input or with SICRAM module. The inputs are separate.

The instrument is fitted with input for the measurement of **temperature** with Pt100 or Pt1000 immersion, penetration or contact probes. The temperature probes are equipped with an automatic recognition module and factory calibration data are stored inside.

- The conductivity probe calibration can be performed automatically with automatically detected conductivity calibration solutions: 147µS/cm, 1413µS/cm, 12880µS/cm or 111800µS/cm or manually with calibration solutions having different values.
- Conductivity and temperature probes fitted with SICRAM module can store factory and calibration data inside.

The instrument HD2206.2 is a **datalogger**, it can memorize up to 2,000 samples of data of conductivity (or resistivity or TDS or salinity) and temperature.

The data can be transferred from the instrument connected to a PC via the RS232C and USB 2.0 serial ports. The storing parameters can be configured using the menu.

The RS232C serial port can be used to transfer the acquired measurements to a 24 column portable printer in real time (HD40.1 or HD40.2). The instruments equipped with **HD22BT** (Bluetooth) option can transfer data without any connection to a PC or printer fitted with Bluetooth input or through Bluetooth/RS232C converter. The software DeltaLog11 allows instrument management and configuration, and data processing on PC.

**The instruments have IP66 protection degree.**

### Technical characteristics HD2206.2

#### X - Ω - TDS - NaCl - °C - °F measurement

##### Instrument

Dimensions (Length x Width x Height)	265x185x70mm
Weight	490g
Materials	ABS, rubber
Display	Back lighted, matrix point display. 240x64 points, visible area: 128x35mm

##### Operating conditions

Working temperature	-5 ... 50°C
Storage temperature	-25 ... 65°C
Working relative humidity	0 ... 90% R.H. without condensate

##### Protection degree

**IP66**

##### Power

Auxiliary socket	Mains adapter (cod. SWD10) 12Vdc/1A For supplying of electrode holder with built-in stirrer HD22.2
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##### Security of memorized data

Unlimited

##### Time

Date and hour	Real time schedule with backup battery 3.6V - ½AA
Accuracy	1min/month max drift

##### Measured values storing

Quantity	2000 screens
Storage interval	1s ... 999s

##### Calibration storage

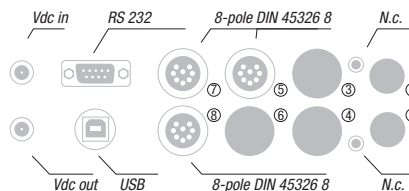
Quantity	Last 8 calibrations of each physical quantity
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##### RS232C serial interface

Type	RS232C electrically isolated
Baud rate	Can be set from 1200 to 115200 baud
Data bit	8
Parity	None
Stop bit	1
Flow Control	Xon/Xoff
Length of serial cable	Max 15m

##### Data Interface

USB	1.1 - 2.0 electrically isolated
Bluetooth Interface	optional



### Connections

Input for temperature probes with SICRAM module ⑤	8-pole male DIN45326 connector
2/4 ring direct conductivity input	8-pole male DIN45326 connector
Conductivity probe with SICRAM module input ⑦	8-pole male DIN45326 connector
Serial interface	DB9 connector (9-pole male)
USB interface	USB connector type B
Bluetooth	Optional
Mains adapter	2-pole (Ø5.5mm-2.1mm). Positive at centre
Socket for power supply of electrode holder with built-in magnetic stirrer	2-pole connector (Ø5.5mm-2.1mm). Positive at centre (output 12Vdc/200mA max).

### Measurement of conductivity by instrument

Measuring range (Kcell=0.01)	0.000...1.999µS/cm	Resolution	0.001µS/cm
Measuring range (Kcell=0.1)	0.00...19.99µS/cm		0.01µS/cm
Measuring range (K cell=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 by instrument

Measuring range (Kcell=0.01)	Up to 1GΩ-cm	(*)
Measuring range (Kcell=0.1)	Up to 100MΩ-cm	(*)
Measuring range (K cell=1)	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 $\chi$ /TDS=0.5)

Measuring range (Kcell=0.01)	0.00...1.999mg/l	0.005mg/l
Measuring range (Kcell=0.1)	0.00...19.99mg/l	0.05mg/l
Measuring range (K cell=1)	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
Measurement range (Kcell=10)	100...999 g/l	1 g/l
Accuracy (total dissolved solids)	±0.5% ±1digit	

### Measurement of salinity

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

### Automatic/manual temperature compensation

0...100°C with  $\alpha_T = 0.00...4.00\%/^{\circ}\text{C}$

### Reference temperature

0...50°C

### $\chi$ /TDS conversion factor

0.4...0.8

### Cell constants $K$ (cm<sup>-1</sup>) already set on the instrument

0.01 - 0.1 - 0.5 - 0.7 - 1.0 - 10.0

### Cell constants $K$ (cm<sup>-1</sup>) that can be set by user

0.01...20.00

### Standard solutions automatically detected (@25°C)

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

### Measurement of temperature by instrument

Pt100 measuring range	-50...+150°C
Pt1000 measuring range	-50...+150°C
Resolution	0.1°C
Accuracy	±0.1°C ±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 <sup>-1</sup>		K cell = 0.1 cm <sup>-1</sup>	
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	Photovoltaic	+4°C...+85°C	±0.25°C
TP878.1.0 1/3 DIN Thin Film			
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

#### ORDERING CODES

**HD2206.2:** The kit is composed of: instrument HD2206.2 for the measurement of conductivity - resistivity - TDS - salinity - temperature, **data logger**, stabilized power supply at mains voltage 100-240Vac/12Vdc-1A., instructions manual and software DeltaLog11.

**Conductivity probes, temperature probes, standard reference solutions, cables for data download to PC or printer have to be ordered separately.**

#### ACCESSORIES

**9CPRS232:** Connection cable SubD female 9- pole for serial output RS232C.

**CP22:** USB 2.0 connection cable - connector type A - connector type B.

**DeltaLog11:** Software for download and management of the data on PC using Windows operating systems.

**SWD10:** Stabilized power supply at 100...240Vac/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. Requires the cable 9CPRS232 (**optional**).

**HD40.2:** 24-column portable thermal printer, **Bluetooth and serial interface**, 57mm paper width, four NiMH 1.2V rechargeable batteries, SWD10 power supply, instruction manual, 5 thermal paper rolls. Requires the module HD22BT (**optional**) or the cable 9CPRS232 (**optional**).

**HD22.2:** Laboratory electrode holder composed of basis plate with incorporated magnetic stirrer, staff and replaceable electrode holder. Height max. 380mm. Powered by bench-top meters of the series HD22... with cable HD22.2.1 (**optional**) or supplier SWD10 (**optional**).

**HD22.3:** Laboratory electrode holder with metal basis plate. Flexible electrode holder for free positioning. For Ø 12mm probes.

**HD22BT:** Bluetooth module for wireless data transmission from instrument to PC. **The fitting of the module into the instrument is made exclusively by Delta Ohm, at the time of placing the order.**

#### Conductivity probes and combined conductivity and temperature probes without SICRAM module (Input Ⓞ)

**SPO6T:** Combined conductivity and temperature 4-electrode cell in Platinum, body in Poca. Cell constant K = 0.7. Measurement range 5µS/cm ...200mS/cm, 0...90°C. Max. pressure 5bar.

**SPT401.001:** Combined conductivity and temperature 2- electrode cell in stainless steel AISI 316. Cell constant K = 0.01. Measurement range 0.04µS/cm ...20µS/cm, 0...120°C. Measurement in closed-cell. Max.pressure 5bar.

**SPT01G:** Combined conductivity and temperature 2-electrode Platinum-wire cell, body in glass. Cell constant K = 0.1. Measurement range 0.1µS/cm ...500µS/cm, 0...80°C. Max.pressure 5bar.

**SPT1G:** Combined conductivity and temperature 2-electrode Platinum-wire cell, body in glass. Cell constant K = 1. Measurement range 10µS/cm ...10mS/cm, 0...80°C. Max. pressure 5bar.

**SPT10G:** Combined conductivity and temperature 2-electrode Platinum-wire cell, body in glass. Cell constant K = 10. Measurement range 500µS/cm ...200mS/cm, 0...80°C. Max.pressure 5bar.

#### Probe dimensions and characteristics at page WA-77

#### Combined conductivity / temperature probes with SICRAM module (Input Ⓞ)

**SPT1GS:** Combined conductivity /temperature 2-electrode Platinum- wire cell, body in glass with SICRAM module. Cell constant K = 1. Measuring range 10µS/cm ...10mS/cm, 0...80°C. Max.pressure 5bar.

#### Probe dimensions and characteristics at page WA-77

#### 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 complete 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:** 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:** 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

**TP471.00.0:** 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.



HD40.1

HD22.3