

Кондуктометры–термометры стационарные DELTA OHM HD2256.2

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HD 2256.2



HD 2256.2 BENCH-TOP pH AND CONDUCTIVITY METER

The **HD2256.2** is a bench top instrument for electrochemical measures: **pH, conductivity and temperature**. It is fitted with a large backlit LCD display.

The **HD2256.2** measures **pH, mV, redox potential (ORP)** with pH, redox electrodes or electrodes with separate reference. **Conductivity and 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 pH electrode calibration can be carried out on one or more (up to five) points and the calibration sequence can be chosen from a list of 13 buffers Temperature compensation can be automatic or manual.

- 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, pH and temperature probes fitted with SICRAM module can store factory and calibration data inside.

The HD 2256.2 is a datalogger, it stores up to 2000 samples of: pH or mV, conductivity or resistivity or TDS or salinity and temperature.

The data can be transferred from the instrument connected to a PC via the multi-standard RS232C serial port and USB 2.0. 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 (HD40.2) 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 HD2256.2

pH - mV - χ - Ω - TDS - NaCl - °C - °F

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 supply

Mains adapter (cod. SWD10) 12Vdc/1A

Auxiliary socket

For supplying of electrode holder with built-in stirrer HD22.2

Security of memorized data

Unlimited

Time

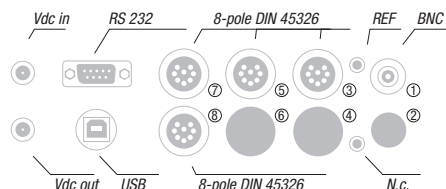
Date and hour Real time schedule with backup battery 3.6V - 1/2AA

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
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
Digital data Interface	
USB	1.1 - 2.0 electrically isolated
Bluetooth Interface	optional
Connections	
Input for temperature probes with SICRAM modules ^⑤	8-pole male DIN45326 connector
pH/mV input ^①	BNC female
Input for SICRAM module pH/ temperature ^③	8-pole male DIN45326 connector
2/ 4- electrode direct conductivity input ^⑥	8-pole male DIN45326 connector
Input conductivity electrodes with SICRAM module ^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 connector (Ø5.5mm-2.1mm). Positive at centre
Outlet 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).
pH measurement by instrument	
Measuring range	-9.999...+19.999pH
Resolution	0.01 or 0.001pH selectable from menu
Accuracy	±0.001pH ±1digit
Input impedance	>10 ¹² Ω
Calibration error @25°C	10offset > 20mV Slope > 63mV/pH or Slope < 50mV/pH Sensitivity > 106.5% or Sensitivity < 85%
Calibration points	Up to 5 points with 13 automatically detected buffer solutions
Standard solutions automatically detected (@25°C)	1.679pH - 2.000pH - 4.000pH - 4.008pH - 4.010pH 6.860pH - 6.865pH - 7.000pH - 7.413pH - 7.648pH 9.180pH - 9.210pH - 10.010pH
mV measurement by instrument	
Measuring range	-1999.9...+1999.9mV
Resolution	0.1mV
Accuracy	±0.1mV ±1digit
Drift after 1 year	0.5mV/year
Conductivity measurement by instrument	
Measuring range (Kcell=0.01)	0.000...1.999µS/cm
Measuring range (Kcell=0.1)	0.00...19.99µS/cm
Measuring range (K cell=1)	0.0...199.9µS/cm
	200...1999µS/cm
	2.00...19.99mS/cm
	20.0...199.9mS/cm
Measuring range (Kcell=10)	200...1999mS/cm
Accuracy (conductivity)	±0.5% ±1digit

Measurement of resistivity by instrument		Resolution
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 χ/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
Measuring range (Kcell=10)	100...999 g/l	1 g/l
Accuracy (total dissolved solids)	±0.5% ±1digit	

Measurement of salinity by instrument		
Measuring range	0.000...1.999g/l	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
Conversion factor χTDS	
	0.4...0.8
Cell constant K (cm⁻¹) already set on instrument	
	0.01 - 0.1 - 0.5 - 0.7 - 1.0 - 10.0
Cell constants K(cm⁻¹) 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 ⁻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

ORDERING CODES

HD2256.2: The kit is composed of: instrument HD2256.2 for the measurement of pH - redox - conductivity - resistivity - TDS - salinity - temperature, **datalogger**, stabilized power supply at mains voltage 100-240Vac/12Vdc-1A., instructions manual and software DeltaLog11.

pH/mV electrodes, conductivity probes, probes, temperature probes, standard reference solutions for different measurement types, connection cables for pH electrodes with S7 connector, 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 typo 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: Portable, serial input, 24 column thermal printer, 57mm paper width.

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.**

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

pH electrodes (Input ①)

KP 20: Gel pH combined electrode for general use, with S7 screw connector, EPOXY body.

KP 30: Gel pH combined electrode for general use, 1m cable with BNC, EPOXY body.

KP 50: Gel pH combined electrode, porous Teflon ring junction, suitable for emulsions, demineralised water and waste water with S7 screw connector, glass body.

KP 61: 3 diaphragm liquid filled pH combined electrode for wine, milk, cream, etc., S7 screw connector, liquid reference filling, glass body.

KP 62: 1 diaphragm gel pH combined electrode for general use, pure water, varnishes, gel filled, S7 screw connector, glass body.

KP 63: liquid filled pH combined electrode for general use, varnishes, 1m cable with BNC, glass body.

KP 64: Liquid filled pH combined electrode, Teflon ring diaphragm, for wine, varnishes, emulsions, S7 screw connector, glass body.

KP 70: Pointed gel combined pH microelectrode diam. 6 x L=70 mm., with S7 screw connector, EPOXY body, glass tip, open junction for meat and cheese.

KP 80: Pointed gel pH combined electrode, with S7 screw connector, glass body, for cream, milk, viscous material, open junction.

KP100: Flat membrane gel combined pH electrode with S7 screw connector, glass body, for skin, leather, paper.

Characteristics and dimensions of the probes on page WA-76.

pH electrodes with SICRAM module (Input ③)

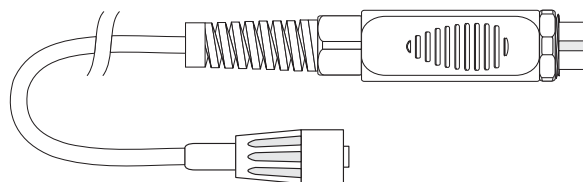
KP63TS: Combined pH/temperature electrode with SICRAM module, body in Epoxy, Ag/AgCl sat KCl, one diaphragm, for general purpose.

SICRAM Module with S7 input for pH electrodes (Input ③)

pH 471.1: SICRAM module for pH electrodes with S7 standard connection, cable L=1m.

pH 471.2: SICRAM module for pH electrodes with S7 standard connection, cable L=2m.

pH 471.5: SICRAM module for pH electrodes with S7 standard connection, cable L=5m.



mV, Ω, T

ORP Electrodes (Inputs ① and ②)

KP90: Redox Platinum electrode, with screw connector S7, electrolyte KCl 3M, body in glass.

KP91: Redox Platinum electrode with 1m cable, GEL filled, body in glass.

CP: Extension cable 1.5m with BNC connectors on one side and S7 on the other side for electrode with S7 connector.

CP5: Extension cable 5m with BNC connectors on one side and S7 on the other side for electrode with S7 connector.

CP10: Extension cable 10m with BNC connector on one side and S7 on the other side, for electrode without cable.

CP15: Extension cable 15m with BNC connector on one side and S7 on the other side, for electrode without cable.

CE: S7 screw connector for pH electrode.

BNC: Female BNC for electrode extension.

pH buffer solutions

HD8642: Buffer solution 4.01pH - 200cc.

HD8672: Buffer solution 6.86pH - 200cc.

HD8692: Buffer solution 9.18pH - 200cc.

Redox buffer solutions

HDR220: Redox buffer solution 220mV 0,5 l.

HDR468: Redox buffer solution 468mV 0,5 l.

Electrolyte solutions

KCL 3M: 100cc ready for use solution for electrode refilling.

Cleaning and maintenance

HD62PT: Diaphragm cleaning (tiourea in HCl) - 500ml.

HD62PP: Protein cleaning (pepsin in HCl) - 500ml.

HD62RF: Regeneration (fluorhydric acid) - 100ml.

HD62SC: Solution for electrode preservation - 500ml.

Conductivity probes and combined conductivity and temperature probes without SICRAM module (Input ②)

SPO6T: Combined conductivity and temperature 4-electrode cell in Platinum, body in Poca. Cell constant $K = 0.7$. Measurement range $5\mu\text{S}/\text{cm} \dots 200\text{mS}/\text{cm}$, $0 \dots 90^\circ\text{C}$. Max. working pressure 5bar.

SPT401.001: Combined conductivity and temperature 2- electrode cell in stainless steel AISI 316. Cell constant $K = 0.01$. Measurement range $0.04\mu\text{S}/\text{cm} \dots 20\mu\text{S}/\text{cm}$, $0 \dots 120^\circ\text{C}$. **Measurement in closed-cell.** Max. working pressure 5bar.

SPT01G: Combined conductivity and temperature 2-electrode Platinum-wire cell, body in glass. Cell constant $K = 0.1$. Measurement range $0.1\mu\text{S}/\text{cm} \dots 500\mu\text{S}/\text{cm}$, $0 \dots 80^\circ\text{C}$. Max. working pressure 5bar.

SPT1G: Combined conductivity and temperature 2-electrode Platinum-wire cell, body in glass. Cell constant $K = 1$. Measurement range $10\mu\text{S}/\text{cm} \dots 10\text{mS}/\text{cm}$, $0 \dots 80^\circ\text{C}$. Max. working pressure 5bar.

SPT10G: Combined conductivity and temperature 2-electrode Platinum-wire cell, body in glass. Cell constant $K = 10$. Measurement range $500\mu\text{S}/\text{cm} \dots 200\text{mS}/\text{cm}$, $0 \dots 80^\circ\text{C}$. Max. working pressure 5bar.

Combined conductivity / temperature probes with SICRAM module (Input ②)

SPT1GS: Combined conductivity /temperature 2-electrode Platinum- wire cell, body in glass with SICRAM module. Cell constant $K = 1$. Measuring range $10\mu\text{S}/\text{cm} \dots 10\text{mS}/\text{cm}$, $0 \dots 80^\circ\text{C}$. Max. working pressure 5bar.

pH electrode and conductivity probes characteristics at page WA-76

Standard conductivity calibration solutions

HD8747: Standard calibration solution 0.001mol/l equal to $147\mu\text{S}/\text{cm}$ @ 25°C - 200cc.

HD8714: Standard calibration solution 0.01mol/l equal to $1413\mu\text{S}/\text{cm}$ @ 25°C - 200cc.

HD8712: Standard calibration solution 0.1mol/l equal to $12880\mu\text{S}/\text{cm}$ @ 25°C - 200cc.

HD87111: Standard calibration solution 1mol/l equal to $111800\mu\text{S}/\text{cm}$ @ 25°C - 200cc.

Temperature probes complete with SICRAM module (Input ③)

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

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

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

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

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

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

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

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

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

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

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

TP49AP.0: Thin film Pt100 sensor, penetration probe. Stem \varnothing 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 \varnothing 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 \varnothing 8 mm, length 1000 mm. Cable length 2 m.

Temperature probes complete with TP47 module

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

TP47.1000.0: Thin film Pt1000 sensor, immersion probe. Probe's Stem \varnothing 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 \varnothing 3mm, length 70mm. 4-wires connection cable with connector, length 1 m.

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

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