

Приборы для проведения электрохимических измерений: рН, электропроводимости DELTA OHM HD22569.2

Технические характеристики

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HD22569.2



HD22569.2 BENCH-TOP METER FOR pH - CONDUCTIVITY - DISSOLVED OXYGEN

The instrument **HD22569.2** is a bench top instrument for electrochemical measures: **pH, conductivity, dissolved oxygen, and temperature**. It is are fitted with a large backlighted LCD display.

The **HD22569.2** measures **pH, mV, redox potential (ORP)** with pH, redox electrodes or electrodes with separate reference; **conductivity, resistivity** in liquids, **total dissolved solids (TDS)** and **salinity** with combined 4-ring and 2-ring conductivity/temperature probes with direct input or SICRAM module; **concentration of dissolved oxygen in liquids (in mg/l)** and **saturation index (in %)**, using SICRAM combined probes of polarographic type with two or three electrodes or galvanic type, and integrated temperature sensor.

The instruments is fitted with an 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 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.
- The dissolved Oxygen probe's quick calibration function guarantees timely correctness of the performed measurements.
- Conductivity, dissolved oxygen and temperature probes fitted with SICRAM module can store factory and calibration data inside.

The instruments HD22569.2 is a **datalogger**, it can memorize up to 2,000 samples of data: pH or mV, conductivity or resistivity or TDS or salinity, concentration of dissolved oxygen and temperature.

The data can be transferred from the instrument connected to a PC via the RS232C or 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 of HD22569.2

pH - mV - χ - Ω - TDS - NaCl - mg/l O₂ - %O₂ - mbar - °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

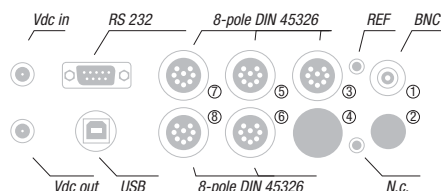
Mains adapter (cod. SWD10) 12Vdc/1A

Auxiliary socket

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

Security of memorized data

Unlimited



<i>Time</i>		<i>Measurement of resistivity by instrument</i>	<i>Resolution</i>
Date and hour	Real time schedule with backup battery	Measurement range (K cell=0.01)	Up to 1GΩcm
	3.6V - ½AA	Measurement range (K cell=0.1)	Up to 100MΩ·cm (*)
Accuracy	1min/month max drift	Measurement range (K cell=1)	5.0...199.9Ω·cm 200...999Ω·cm 1.00k...19.99kΩ·cm 20.0k...99.9kΩ·cm 100k...999kΩ·cm 1...10MΩ·cm
<i>Measured values storing</i>			0.1Ωcm 1Ω·cm 0.01kΩcm 0.1kΩcm 1kΩcm 1MΩ·cm
Quantity	2000 screens		
Storage interval	1s ... 999s		
<i>Calibration storage</i>		Measurement range (K cell=10)	0.5...5.0Ω·cm
Quantity	Last 8 calibrations of each physical quantity	Accuracy (resistivity) instrument	±0.5% ±1digit
<i>RS232C serial interface</i>		<i>Measurement of total dissolved solids (with coefficient $\chi/TDS=0.5$)</i>	<i>Resolution</i>
Type	RS232C electrically isolated	Measurement range (K cell=0.01)	0.00...1.999mg/l
Baud rate	Can be set from 1200 to 115200 baud	Measurement range (K cell=0.1)	0.00...19.99mg/l
Data bit	8	Measurement range (K cell=1)	0.0...199.9 mg/l
Parity	None		200...1999 mg/l
Stop bit	1		2.00...19.99 g/l
Flow Control	Xon/Xoff		20.0...199.9 g/l
Length of serial cable	Max 15m		100...999 g/l
<i>Serial data Interface</i>		Measurement range (K cell=10)	0.005mg/l
USB	1.1 - 2.0 electrically isolated	Accuracy (total dissolved solids) instrument	0.05mg/l
Bluetooth	optional		0.5 mg/l
<i>Connections</i>		<i>Measurement of salinity</i>	<i>Resolution</i>
Input for temperature probes with SICRAM modules ^⑤	8-pole male DIN45326 connector	Measurement range	0.000...1.999g/l
pH/mV input ^①	BNC female		2.00...19.99g/l
Input for SICRAM module pH/ temperature ^③	8-pole male DIN45326 connector	Accuracy (salinity) instrument	20.0...199.9 g/l
2/ 4- electrode direct conductivity input ^④	8-pole male DIN45326 connector		±0.5% ±1digit
Conductivity SICRAM module input ^②	8-pole male DIN45326 connector	<i>Automatic/manual temperature compensation</i>	0...100°C with $\alpha_t = 0.00...4.00\%/^{\circ}\text{C}$
Dissolved Oxygen input ^⑥	8-pole male DIN45326 connector	<i>Reference temperature</i>	0...50°C
Serial interface	DB9 connector (9- pole male)	<i>Conversion factor χ/TDS</i>	0.4...0.8
USB interface	USB connector type B	<i>Admitted cell constants K (cm⁻¹)</i>	0.01 - 0.1 - 0.5 - 0.7 - 1.0 - 10.0
Bluetooth	Optional	<i>Cell constants K (cm⁻¹) that can be set by user</i>	0.01...20.00
Mains adapter	2- pole connector (Ø5.5mm-2.1mm). Positive at centre	<i>Automatically detected standard solutions (@25°C)</i>	
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).		147µS/cm 1413µS/cm 12880µS/cm 111800µS/cm
<i>Measurement of pH by instrument</i>		<i>Measurement of concentration of dissolved oxygen</i>	
Measuring range	-9.999...+19.999pH	Measurement range	0.00...90.00mg/l
Resolution	0.01 o 0.001pH selectable from menu	Resolution	0.01mg/l
Accuracy	±0.001pH ±1digit	Accuracy instrument	±0.03mg/l ±1digit (0...90%,1013mbar, 20...25°C)
Input impedance	>10 ¹² Ω	<i>Measurement of saturation index of dissolved oxygen</i>	
Calibration error @25°C	lOffsetl > 20mV Slope > 63mV/pH or Slope < 50mV/pH Sensitivity > 106.5% or Sensitivity < 85%	Measurement range	0.0...600.0%
Calibration points	Up to 5 points from a list of 8 automatically detected buffers	Resolution	0.1%
Temperature compensation	-50...150°C	Accuracy instrument	±0.3% ±1digit (in the range 0.0...199.9%) ±1% ±1digit (in the range 200.0...600.0%)
Automatically detected standard solutions @25°C	1.679pH - 4.000pH - 4.010pH 6.860pH - 7.000pH - 7.648pH 9.180pH - 10.010pH	<i>Measurement of barometric pressure</i>	
<i>Measurement of mV by instrument</i>		Measuring range	0.0...1100.0mbar
Measuring range	-1999.9...+1999.9mV	Resolution	0.1mbar
Resolution	0.1mV	Accuracy	±2mbar±1digit between 18 and 25°C ±(2mbar+0.1mbar/°C) in the remaining range
Accuracy	±0.1mV ±1digit	<i>Salinity setting</i>	
Drift after 1 year	0.5mV/year	Setting	directly from menu or automatically by conductivity measurement
<i>Measurement of conductivity by instrument</i>		Setting range	0.0...70.0g/l
Measurement range (K cell=0.01)	0.000...1.999µS/cm	Resolution	0.1g/l
Measurement range (K cell=0.1)	0.00...19.99µS/cm	<i>Temperature measurement with the sensor inside the O₂ probe</i>	
Measurement range (K cell=1)	0.0...199.9µS/cm	Measurement range	0.0...50.0°C
	200...1999µS/cm	Resolution	0.1°C
	2.00...19.99mS/cm	Accuracy instrument	±0.1°C ±1digit
	20.0...199.9mS/cm	Drift after 1 year	0.1°C/year
Measurement range (K cell=10)	200...1999mS/cm	Automatic temperature compensation	0...50°C
Accuracy (conductivity) instrument	±0.5% ±1digit		

Measurement of temperature by instrument

Pt100 Measurement range	-50...+150°C
Pt1000 Measurement range	-50...+150°C
Resolution	0.1°C
Accuracy instrument	±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

ORDERING CODES

HD22569.2: The kit is composed of: instrument HD22569.2 for the measurement of pH - redox - conductivity - resistivity - TDS - salinity - concentration of dissolved oxygen, saturation index - temperature, **datalogger**, stabilized power supply at mains voltage 100-240Vac/12Vdc-1A, calibrator HD9709/20 (for polarographic probe) or DO9709/21 (for galvanic probe), instructions manual and software DeltaLog11.

pH/mV electrodes, conductivity probes, dissolved oxygen 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 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.**

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

pH electrodes without SICRAM module (Inputs 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.

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.

CP 10: 10m extension cable with BNC/S7 connector for electrode without cable, thread S7.

CP 15: 15m extension cable with BNC/S7 connector for electrode without cable, thread S7.

CE: S7 screw connector for pH electrode.

BNC: Female BNC for cable extension.

pH electrodes with SICRAM module (Input ③)

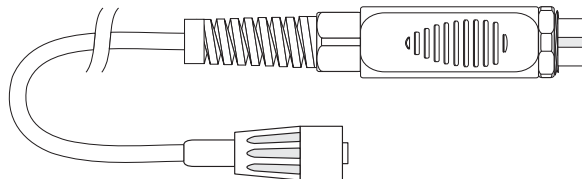
KP63TS: Combined pH/temperature electrode with SICRAM module, body in glass, 1m cable, 1 diaphragm, for general use, internal liquid reference.

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.



ORP Electrodes (Inputs ① and ②)

KP90: Redox Platinum electrode, with screw connector S7, liquid electrolyte, body in glass.

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

Electrode dimensions and characteristics at page WA-76

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: Ready for use solution for refilling of the electrodes.

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 ①)

SP06T: Combined conductivity and temperature 4-electrode cell, body in Pocan. 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. Cable 2m. 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 ©)

SPT16S: 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.

Probe characteristics at page WA-77

Standard 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.

Combined dissolved Oxygen/temperature probes

DO 9709 SS Polarographic combined oxygen and temperature probe with possibility of membrane replacement. Ø12mm x 120mm. 2m cable. The code includes: probe, 2 membranes, electrolyte solution and zero point solution.

DO 9709 SS.5 Polarographic combined oxygen and temperature probe with possibility of membrane replacement. Ø12mm x 120mm. 5m cable. The code includes: probe, 2 membranes, electrolyte solution and zero point solution.

DO 9709 SS.1 Galvanic combined oxygen and temperature probe with possibility of membrane replacement. Ø12mm x 120mm. Ø16mm tip with membrane. 2m cable. The code includes: probe, 2 membranes in total, electrolyte solution and zero point solution.

DO 9709 SS.5.1 Galvanic combined oxygen and temperature probe with possibility of membrane replacement. Ø12mm x 120mm. Ø16mm tip with membrane. 5m cable. The code includes: probe, 2 membranes in total, electrolyte solution and zero point solution.

Probe dimensions and characteristics at page WA-79

Accessories

DO 9709/20: Calibrator for polarographic probes DO 9709SS and DO 9709SS.5

DO 9709/21: Calibrator for galvanic probes DO 9709SS.1 and DO 9709SS.5.1

DO 9709 SSK: Kit of accessories for probes DO 9709SS and DO 9709SS.5: 3 membranes, zero point solution and electrolyte.

DO 9709/21K: Kit of accessories for probes DO 9709SS.1 and DO 9709SS.5.1: 3 membranes, zero point solution and electrolyte.

DO9700: zero oxygen solution.

DO9701: electrolyte solution for polarographic probes DO9709 SS and DO9709 SS.5.

DO9701.1: electrolyte solution for galvanic probes DO9709 SS.1 and DO9709 SS.5.1.

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 1mm, 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.

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