

**HD3405.2**

pH mV °C °F

**HD3406.2**

χ Ω TDS NaCl °C °F

**HD3409.2**

mg/l %sat

**HD3456.2**

pH mV χ Ω TDS NaCl °C °F

**Medidor de Condutividade de Bancada Delta Ohm**

The instrument series HD34... is made up of 4 bench top instruments for electrochemical measures: **pH, conductivity, dissolved oxygen, and temperature.**

The displayed data can be stored (**datalogger**) and can be transferred to PC or serial printer thanks to the multi-standard serial ports RS232C and USB2.0 and software DeltaLog9 (Vers.2.0 and subsequent ones). The storing and printing parameters can be set from menu.

The **HD3405.2** measures **pH, redox potential (ORP)** in mV. It measures **temperature** with Pt100 or Pt1000 immersion, penetration or contact probes. The pH electrode calibration can be carried out on one, two or three points and the calibration sequence can be chosen from a list of 13 buffers.

The **HD3406.2** measures **conductivity, liquid resistivity in liquids, total dissolved solids (TDS)** and **salinity** using combined 4-ring and 2-ring conductivity/temperature probes. Temperature is measured by Pt100 or Pt1000 immersion, penetration or contact probes.

The probe calibration can be performed automatically in one or more of the 147μS, 1413μS, 12880μS or 111800μS/cm conductivity calibration solutions.

The **HD3409.2** measures the **concentration (in mg/l) of dissolved Oxygen in liquids**, the **saturation index (in %)** and the **temperature** using SICRAM combined probes of polarographic type with two or three electrodes and integrated temperature sensor. **Temperature** is measured by Pt100-SICRAM or direct 4 wire-immersion, penetration or contact probes.

Thanks to an internal pressure sensor, the instruments automatically compensate for barometric pressure. The instrument anticipates automatic compensation of the Oxygen probe membrane permeability and of the salinity of the liquid being examined. The dissolved Oxygen probe's quick calibration function guarantees timely correctness of the performed measurements.

The **HD3456.2** measures **pH, mV, redox potential (ORP), conductivity, resistivity in liquids, total dissolved solids (TDS)**, and **salinity** using combined 4-ring and 2-ring conductivity/temperature probes. **Temperature** is measured by Pt100 or Pt1000 immersion, penetration or contact probes.

The pH electrode calibration, as well as manual, can be carried out on one, two or three points and the calibration sequence can be chosen from a list of 13 buffers.

The probe calibration can be performed automatically in one or more of the 147μS, 1413μS, 12880μS or 111800μS/cm conductivity calibration solutions.

The display shows continually the temperature in °C or °F and one selectable parameter according to the connected probe type, i.e. in case of conductivity probe it is possible to select between χ or Ω or TDS or g/l.

Other common function of this instrument series include: Max, Min and Avg function, the Auto-HOLD function, the automatic turning off which can also be disabled.

**The instruments have IP66 protection degree.**





## Technical characteristics of the instrument series HD34...

### Common technical data

<p>► <b>Instrument</b></p>	
Dimensions (Length x Width x Height)	220x120x55mm
Weight	460g (complete with batteries)
Materials	ABS, rubber
Display	2x4½ characters plus symbols visible area: 52x42mm
<p>► <b>Operating conditions</b></p>	
Working temperature	-5 ... 50°C
Stocking temperature	-25 ... 65°C
Working relative humidity	0 ... 90% RH without condensation
<b>Protection degree</b>	<b>IP66</b>
<p>► <b>Power</b></p>	
Batteries	3 batteries 1.5V type AA
Autonomy (only batteries)	100 hours with 1800mAh alkaline batteries
Mains (cod. <b>SWD10</b> )	Output mains adapter 100-240Vac/ 12vdc-1A
<p>► <b>Security of memorized data</b></p>	
	Unlimited
<p>► <b>Selectable storage interval</b></p>	
	1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 1hour
<p>► <b>Time</b></p>	
Date and hour	Schedule in real time
Accuracy	1min/month max departure
<p>► <b>Serial interface RS232C</b></p>	
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
Selectable print interval	immediate or 1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 1ora
<p>► <b>USB Interface</b></p>	
Type	1.1 - 2.0 electrically isolated
<p>► <b>Common connections to all models</b></p>	
Serial interface and USB	8-pole MiniDin connector
Mains adapter (cod. <b>SWD10</b> )	2-pole connector (positive at centre) 12Vdc/1A
<p>► <b>EMC Standard regulations</b></p>	
Security	EN61000-4-2, EN61010-1 level 3
Electrostatic discharge	EN61000-4-2 level 3
Electric fast transients	EN61000-4-4 level 3, EN61000-4-5 level 3
Voltage variations	EN61000-4-11
Electromagnetic interference susceptibility	IEC1000-4-3
Electromagnetic interference emission	EN55020 class B

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# HD3406.2

## Technical characteristics HD3406.2 $\chi$ , $\Omega$ , TDS, NaCl, °C/°F measurement

### Measured values

$\chi$ ,  $\Omega$ , TDS, NaCl, °C, °F

### Storage of measured values

Type 2000 pages of 18 samples each  
Quantity 36,000 sets of measures made up of [ $\chi$  -  $\Omega$  or TDS or NaCl] and [°C- °F]

### Measurement connections

Input conductivity 8-pole male DIN45326 connector  
Input for temperature probes 8-pole male DIN45326 connector  
complete with TP47 modules

### Measurement of conductivity by instrument

Measurement range (Kcell=0.01) / Res. 0.000...1.999 $\mu$ S/cm / 0.001 $\mu$ S/cm  
Measurement range (Kcell=0.1) / Res. 0.00...19.99 $\mu$ S/cm / 0.01 $\mu$ S/cm  
Measurement range (Kcell=1) / Res. 0.0...199.9 $\mu$ S/cm / 0.1 $\mu$ S/cm  
200...1999 $\mu$ S/cm / 1 $\mu$ S/cm  
2.00...19.99mS/cm / 0.01mS/cm  
20.0...199.9mS/cm / 0.1mS/cm  
200...1999mS/cm / 1mS/cm  
Range di misura (Kcell=10) / Res. 200...1999mS/cm / 1mS/cm  
Accuracy (conductivity)  $\pm 0.5\% \pm 1$  digit



$\chi$



$\Omega$

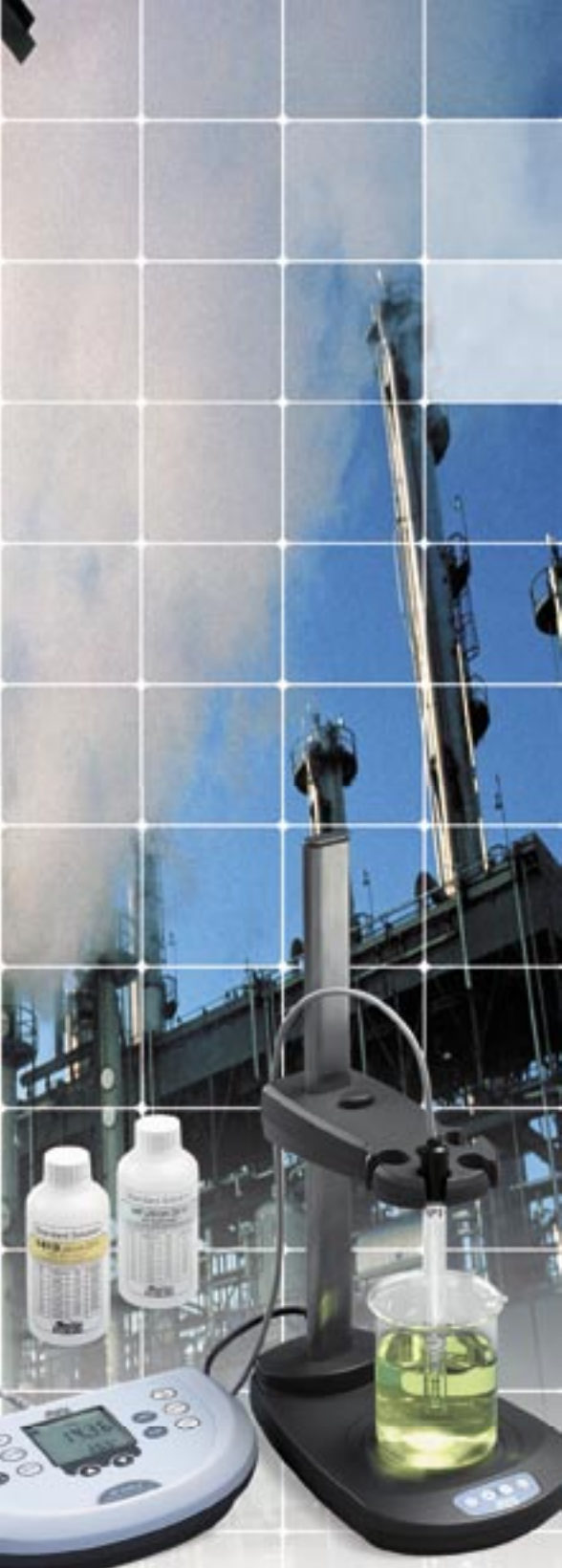


mg/l



NaCl





► **Measurement of resistivity by instrument**

Measurement range (Kcell=0.01) / Res.	Up to 1GΩ·cm / (*)
Measurement range (Kcell=0.1) / Res.	Up to 100MΩ·cm / (*)
Measurement range (Kcell=1) / Res.	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
Measurement range (Kcell=10) / Res.	0.5...5.0Ω·cm / 0.1Ω·cm
Accuracy (resistivity)	±0.5% ±1digit

► **Measurement of total dissolved solids (with coefficient  $\chi$ /TDS=0.5)**

Measurement range (Kcell=0.01) / Res.	0.00...1.999mg/l / 0.005mg/l
Measurement range (Kcell=0.1) / Res.	0.00...19.99mg/l / 0.05mg/l
Measurement range (Kcell=1) / Res.	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...99.9 g/l / 0.1 g/l
Measurement range (Kcell=10) / Res.	100...999 g/l / 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 20.0...199.9g/l / 0.1g/l
Accuracy (salinity)	±0.5% ±1digit

► **Temperature measurement by instrument**

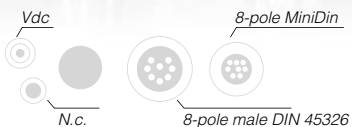
Measurement range Pt100	-50...+200°C
Measurement range Pt1000	-50...+200°C
Resolution	0.1°C
Accuracy	±0.25°C
Drift after 1 year	0.1°C/year

► **Automatic/manual temperature compensation**

	0...100°C with $\alpha_p = 0.00...4.00\%/^{\circ}\text{C}$
Reference temperature	20°C or 25°C selectable from menu
Conversion factor $\chi$ /TDS	0.4...0.8
Cell constant K (cm <sup>-1</sup> )	0.01 - 0.1 - 0.7 - 1.0 - 10.0

► **Standard solutions automatically detected (@25°C)**

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



(\*) 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
...	...	...	...

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► 2 and 4 electrode conductivity probes for HD3406.2 and HD3456.2

ORDERING CODE	MEASUREMENT RANGE AND USE	DIMENSIONS
SP06T	K=0.7 5µS/cm ...200mS/cm 0...90°C 4-electrode cell in Pocan/Platinum Probe material Pocan General use No heavy tasks	
SPT401.001	K=0.01 0.04µS/cm ...20µS/cm 0...120°C 2-electrode cell in AISI 316 Ultrapure water Measurement in closed-cell	
SPT01G	K=0.1 0.1µS/cm ...500µS/cm 0...80°C 2-electrode cell in Platinum-wire Probe material glass Pure water	
SPT1G	K=1 10µS/cm ...10mS/cm 0...80°C 2-electrode cell in Platinum wire Probe material glass General heavy use, average conductivity	
SPT10G	K=10 500µS/cm ...200mS/cm 0...80°C 2-electrode cell in Platinum wire Probe material glass General heavy use, high conductivity	

## ► Temperature probes

### *Temperature probes with Pt100 sensor complete with SICRAM module*

Modell	Type	Application range	Accuracy
<b>TP87</b>	Immersion	-50°C...+200°C	±0.25°C (-50°C...+200°C)
<b>TP472I.0</b>	Immersion	-50°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
<b>TP473P.0</b>	Penetration	-50°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
<b>TP474C.0</b>	Contact	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
<b>TP475A.0</b>	Air	-50°C...+250°C	±0.3°C (-50°C...+250°C)
<b>TP472I.5</b>	Immersion	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
<b>TP472I.10</b>	Immersion	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)

Temperature drift @20°C 0.003%/°C

### *Pt100 4 - wire probes and Pt1000 2-wire probes complete with TP47 module*

Modell	Type	Application range	Accuracy
<b>TP47.100</b>	Pt100 4-wire	-50...+200°C	Class A
<b>TP47.1000</b>	Pt1000 2-wire	-50...+200°C	Class A
<b>TP87.100</b>	Pt100 4-wire	-50...+200°C	Class A
<b>TP87.1000</b>	Pt1000 2-wire	-50...+200°C	Class A

Temperature drift @20°C 0.005%/°C

**TP47:** Module for the connection of Pt100 4-wire and Pt1000 2-wire probes to instrument series HD34..., without amplifying electronics and linearization.

► **Ordering codes for instrument series HD34...**

**HD3406.2K:** The kit is composed of: instrument HD3406.2 **datalogger**, for measurement of conductivity - resistivity - TDS - salinity - temperature, 3 1.5V alkaline batteries, operating manual and **DeltaLog9 version 2.0**.

**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.**

► **Common Accessories for instruments series HD34...**

**HD2110CSNM:** 8-pole connection cable Mini Din - Sub D 9-pole female for RS232C, for connection to PC without USB input.

**HD2101/USB:** Connection cable USB 2.0 connector type A - 8-pole Mini Din for connection to PC with USB input.

**SWD10:** Stabilized power supply at 230Vac/9Vdc-300mA mains voltage.

**S'print-BT:** Portable, serial input, 24 column thermal printer, 58mm paper width.

**HD2110CSP:** Connection cable for instruments series HD34...to printer **S'print-BT**

**HD22.2:** Laboratory electrode holder composed of basis plate with incorporated magnetic stirrer, staff and replaceable electrode holder. Height max. 380mm.

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

**TP47:** Module for the connection of Pt100 4-wire and Pt1000 2-wire probes to instrument series HD34..., without amplifying electronics and linearization.

► **Accessories for instruments HD3406.2 and HD3456.2 with input for conductivity measurement**

► **Combined conductivity and temperature probes**

**SP06T:** Combined conductivity and temperature 4-electrode cell in Platinum, body in Pocan. Cell constant K = 0.7. Measurement range 5µS/cm ...200mS/cm, 0...90°C.

**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..

**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.

**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.

**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.

► **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 for HD3406.2 and HD3456.2 complete with TP47 module**

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

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

**TP87.100:** Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 70mm. 4 wire connection cable with connector, length 1 metre.

**TP87.1000:** Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 70mm. 2 wire connection cable with connector, length 1 metre.

► **Common Accessories for instruments of the series HD34...**

**TP47:** Module for the connection of Pt100 4-wire and Pt1000 2-wire probes to instrument series HD34..., without amplifying electronics and linearization.