

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

Introduction

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.

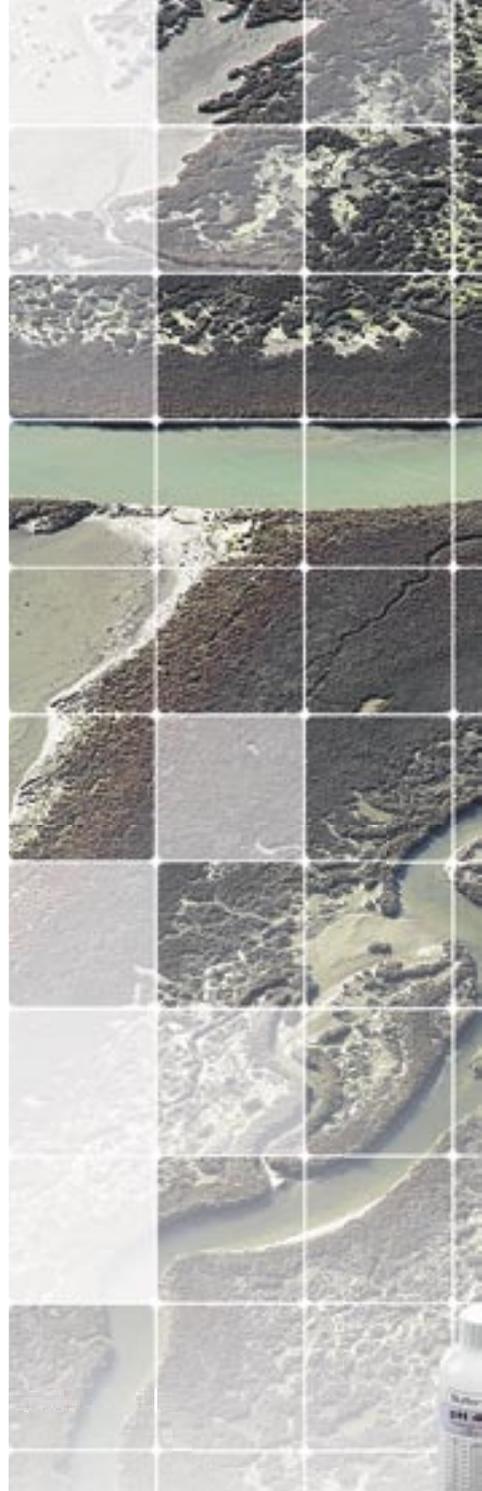
The instruments have IP66 protection degree.



pH



χ





Technical characteristics of the instrument series HD34...

Common technical data

- ▶ **Instrument**

Dimensions (Length x Width x Height)	220x120x55mm
Weight	460g (complete with batteries)
Materials	ABS, rubber
Display	2x4½ characters plus symbols visible area: 52x42mm

- ▶ **Operating conditions**

Working temperature	-5 ... 50°C
Stocking temperature	-25 ... 65°C
Working relative humidity	0 ... 90% RH without condensation
Protection degree	IP66

- ▶ **Power**

Batteries	3 batteries 1.5V type AA
Autonomy (only batteries)	100 hours with 1800mAh alkaline batteries
Mains (cod. SWD10)	Output mains adapter 100-240Vac/ 12vdc-1A

- ▶ **Security of memorized data**

	Unlimited
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- ▶ **Selectable storage interval**

	1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 1hour
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- ▶ **Time**

Date and hour	Schedule in real time
Accuracy	1min/month max departure

- ▶ **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
Selectable print interval	immediate or 1s, 5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min and 1ora

- ▶ **USB Interface**

Type	1.1 - 2.0 electrically isolated
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- ▶ **Common connections to all models**

Serial interface and USB	8-pole MiniDin connector
Mains adapter (cod. SWD10)	2-pole connector (positive at centre) 12Vdc/1A

- ▶ **EMC Standard regulations**

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

HD3405.2

Technical characteristics HD3405.2 pH - mV - °C/°F measurement

Measured values

pH, mV, °C, °F

Storage of measured values

Type 2000 pages of 17 samples each
Quantity 34,000 sets of measures made up of [pH or mV] or and [°C or °F].

Measurement connections

Temperature probe input with SICRAM module or TP47 module
pH/mV input 8-pole male DIN45326 connector
female BNC

pH Measurement

Measurement range -2.000...+19.999pH
Resolution 0.01 or 0.001pH selectable from menu
Accuracy $\pm 0.001\text{pH} \pm 1\text{digit}$
Input impedance $> 10^{12}\Omega$
Calibration error @25°C |Offset| > 20mV
Slope < 50mV/pH or Slope > 63mV/pH
Sensitivity < 85% or Sensitivity > 106.5%
Automatic / manual temperature compensation -50...+150°C





► *mV Measurement*

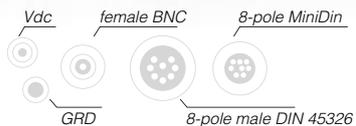
Measurement range	-1999.9...+1999.9mV
Resolution	0.1mV
Accuracy	±0.1mV ±1digit
Drift after 1 year	0.5mV/year

► *Temperature Measurement*

Pt100 measurement range	-200...+650°C
Pt1000 measurement range	-200...+650°C
Ni1000 measurement range	-50...+250°C
Resolution	0.1°C
Accuracy	±0.1°C ±1digit
Drift after 1 year	0.1°C/year

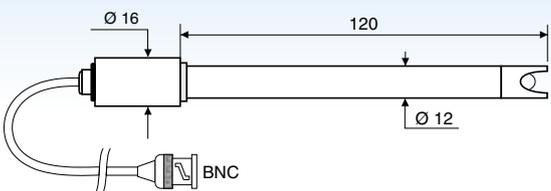
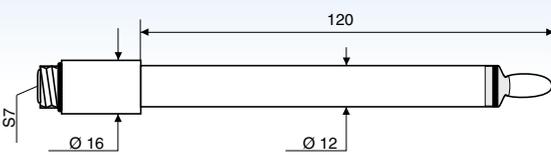
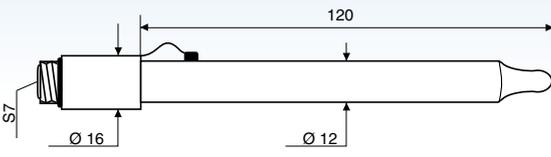
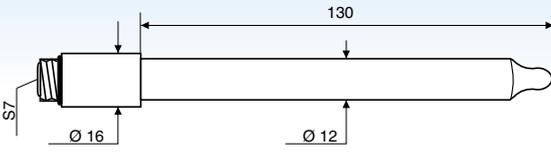
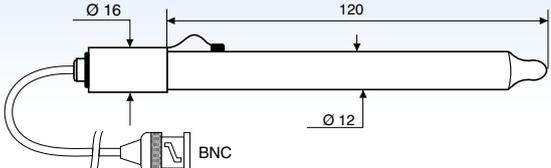
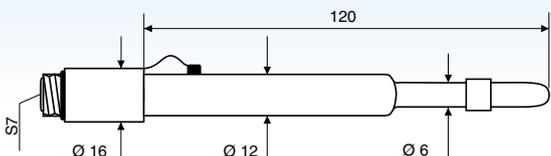
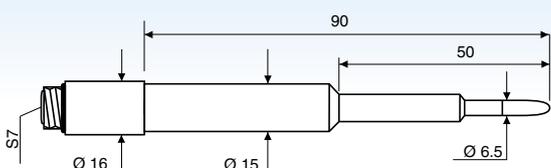
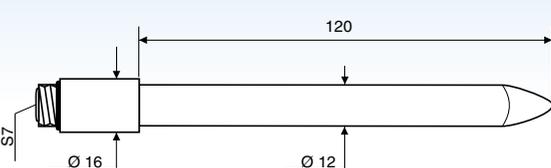
► *Automatically detected pH standard solutions (@25°C)*

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

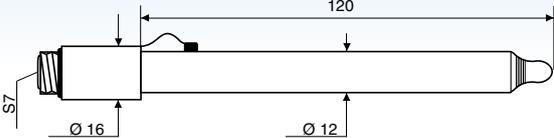
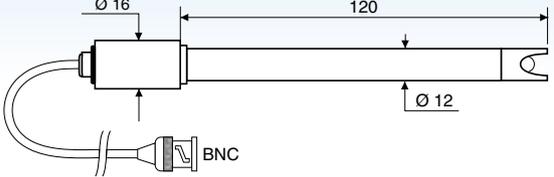


Technical data of probes and modules equipped with instruments of the series HD34...

► pH Electrodes for HD3405.2 and HD3456.2

ORDERING CODE	MEASUREMENT RANGE AND USE	DIMENSIONS
KP20	0...14pH / 0...80°C / 3bar Body in Epoxy - GEL filled 1 ceramic diaphragm Waste water, drinking water, paints, water emulsions, galvanic baths, fruit juices, water suspensions, titration, varnishes.	
KP30	0...14pH / 0...80°C / 3bar Body in Epoxy - GEL filled 1 ceramic diaphragm Cable L=1m with BNC Waste water, drinking water, water emulsions, galvanic baths, paints, varnishes, water suspensions, fruit juices, titration.	
KP50	0...14pH / 0...80°C / 3bar Body in glass - GEL filled 1 Teflon ring diaphragm Varnishes, cosmetics, water emulsions, galvanic baths, creams, deionised water, TRIS solutions, drinking water, fruit juices, low-ion-content solutions, mayonnaise, preserved food, paints, titration, titration in non-water solutions, water suspensions, detergents, waste water, viscous samples.	
KP61	2...14pH / 0...80°C / 3bar Body in glass Liquid reference filling Triple ceramic diaphragm Waste water, paste, bread, fruit juices, varnishes, cosmetics, creams, deionised water, drinking water, water emulsions, galvanic baths, detergents, yoghurt, milk, titration, preserved food, titration in non-water solutions, water suspensions, mayonnaise, wine, low ion-content solution, butter, proteic substances, paints, viscous samples	
KP62	0...14pH / 0...80°C / 3bar Body in glass - GEL filled 1 ceramic diaphragm Paints, varnishes, drinking water, water emulsions, fruit juices, galvanic baths, water suspensions, titration, waste water.	
KP63	0...14pH / 0...80°C / 1bar Body in glass Reference filling solution KCl 3M 1 ceramic diaphragm Cable L=1m with BNC Paints, varnishes, drinking water, water solutions, fruit juices, galvanic baths, water suspensions, titrations, waste water.	
KP64	0...14pH / 0...80°C / 0.1bar Body in glass Liquid reference KCl 3M Teflon collar diaphragm Paints, varnishes, cosmetics, creams, deionised water, drinking water, water emulsions, fruit juices, detergents, low ion-content solutions, preserved food, water suspensions, titration, titration in non-water solutions, TRIS solutions, waste water, viscous samples, wine.	
KP70	2...14pH / 0...50°C / 0.1bar Body in Epoxy - GEL filled 1 open junction Paste, bread, paints, varnishes, cosmetics, creams, drinking water, water emulsions, fruit juices, galvanic baths, detergents, mayonnaise, preserved foods, cheese, milk, water suspensions, viscous samples, waste water, butter, yoghurt.	
KP80	2...14pH / 0...60°C / 1bar Body in glass - GEL filled 1 open junction Paste, bread, paints, varnishes, cosmetics, creams, drinking water, water emulsions, fruit juices, galvanic baths, detergents, mayonnaise, preserved food, water suspensions, titration, titration in non-water solutions, viscous samples, waste water, yoghurt, milk, butter.	

► Redox Electrodes for HD3405.2 and HD3456.2

ORDERING CODE	MEASUREMENT RANGE AND USE	DIMENSIONS
KP90	±2000mV 0...80°C 5bar Body in glass Reference filling solution KCl 3M General use	
KP91	±1000mV 0...60°C 1bar Body in Epoxy - GEL Cable L=1m with BNC General use No heavy tasks	

► Temperature probes

Temperature probes with Pt100 sensor complete with SICRAM module

Modell	Type	Application range	Accuracy
TP87	Immersion	-50°C...+200°C	±0.25°C (-50°C...+200°C)
TP472I.0	Immersion	-50°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP473P.0	Penetration	-50°C...+400°C	±0.25°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP474C.0	Contact	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP475A.0	Air	-50°C...+250°C	±0.3°C (-50°C...+250°C)
TP472I.5	Immersion	-50°C...+400°C	±0.3°C (-50°C...+350°C) ±0.4°C (+350°C...+400°C)
TP472I.10	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
TP47.100	Pt100 4-wire	-50...+200°C	Class A
TP47.1000	Pt1000 2-wire	-50...+200°C	Class A
TP87.100	Pt100 4-wire	-50...+200°C	Class A
TP87.1000	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...

HD3405.2K: The kit is composed of: instrument HD3405.2 **datalogger**, for measurement of pH - redox - 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 instrument series HD3405.2 and HD3456.2 with input for pH measurement

► pH Electrodes

KP20: Combined pH electrode for common use, gel filled with screw connector S7 body in Epoxy.

KP30: Combined pH electrode for common use, cable 1 m, gel filled, body in Epoxy.

KP50: Combined pH electrode with Teflon collar diaphragm, for emulsions, deionised water, S7 screw connector, gel filled, body in glass.

KP 61: Combined pH electrode, 3 diaphragms for milk, cream, etc. electrolyte, with screw connector S7, body in glass.

KP 62: Combined pH electrode, 1 diaphragm for pure water, paints, etc. gel-filled, with screw connector S7, body in glass.

KP 63: Combined pH electrode for common use, varnish, cable 1 m, electrolyte KCl 3M body in glass.

KP 64: Combined pH electrode for water, varnish, emulsions, etc., electrolyte KCl 3M with screw connector S7, body in glass.

KP 70: Combined pH micro electrode diam. 4.5 x L=25 mm. Gel filled with screw connector, body in glass.

KP 80: Combined pointed pH electrode, gel filled with screw connector S7, 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.

CE: S7 screw connector for pH electrode.

BNC: Female BNC for electrode extension.

► ORP Electrodes

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.

► 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: 50cc 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.

► Accessories for instruments with Temperature input

► Temperature probes HD3405.2 and HD3409.2 complete with SICRAM module

TP87: Pt100 sensor immersion probe. Stem Ø 3 mm, length 70 mm. Cable length 1 metre.

TP4721.0: Pt100 sensor immersion probe. Stem Ø 3 mm, length 230 mm. Cable length 2 metres.

TP473P.0: Pt100 sensor penetration probe. Stem Ø 4mm, length 150 mm. Cable length 2 metres.

TP474C.0: Pt100 sensor contact probe. Stem Ø 4mm, length 230mm, contact surface Ø 5mm. Cable length 2 metres.

TP475A.0: Air probe, sensor Pt100. Stem Ø 4mm, length 230mm. Cable length 2 metres.

TP4721.5: Immersion probe, sensor Pt100. Stem Ø 6mm, length 500 mm. Cable length 2 metres.

TP4721.10: Immersion probe, sensor Pt100. Stem Ø 6mm, length 1,000mm. Cable length 2 metres.

► Temperature probes for HD3405.2 complete with TP47module

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.