



**HD 2109.1, HD 2109.2  
DISSOLVED OXYGEN - TEMPERATURE METERS**

The **HD2109.1** and **HD2109.2** are portable instruments with a large LCD display. They measure 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 only 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 dissolved Oxygen and the temperature probes are equipped with an automatic recognition module and factory calibration data are stored inside. The HD2109.2 is a **datalogger**. It stores up to 18,000 dissolved Oxygen concentration, saturation index measurements, barometric pressure and temperature samples which can be transferred from the instrument connected to a PC via the multi-standard RS232C serial port and USB 2.0. The storing interval, printing, and baud rate can be configured using the menu. The HD2109.1 and HD2109.2 models are fitted with an RS232C serial port and can transfer to a PC the acquired measurements or to a portable printer in real time. The *Max*, *Min* and *Avg* function calculates the maximum, minimum or average values. Other functions include: the relative measurement REL, the Auto-HOLD function, and the automatic turning off which can also be excluded.

**The instruments have IP67 protection degree.**



**INSTRUMENT TECHNICAL CHARACTERISTICS**

**Measured quantities:** mg/l O<sub>2</sub>, sat.% O<sub>2</sub>, mbar, °C, °F

<i>Instrument</i>	
Dimensions (Length x Width x Height)	185x90x40mm
Weight	470g (complete with batteries)
Materials	ABS, rubber
Display	2x4½ digits plus symbols Visible area: 52x42mm
<i>Operating conditions</i>	
Working temperature	-5...50°C
Storage temperature	-25...65°C
Working relative humidity	0...90%RH without condensation
<b>Protection degree</b>	<b>IP67</b>

<i>Power</i>	
Batteries	4 1.5V type AA batteries
Autonomy	200 hours with 1800mAh alkaline batteries
Power absorbed with instrument off	20µA
<b>With dissolved oxygen probe</b>	40µA
Mains (SWD10)	Output mains adapter 12Vdc / 1A

*Security of memorized data* Unlimited, independent of battery charge conditions

<i>Time</i>	
Date and time	Schedule in real time
Accuracy	1min/month max error

<i>Measured values storage - model HD2109.2</i>	
Type	2000 pages containing 9 samples each
Quantity	18,000 samples composed of 4 parameters: mg/l O <sub>2</sub> - %O <sub>2</sub> - mbar - (°C or °F)
Selectable storage interval	1s, 5s, 10s, 15s, 30s, 60s (1min), 120s (2min), 300s (5min), 600s (10min), 900s (15min), 1200s (20min), 1800s (30min) and 3600s (1hour)

<i>Serial interface RS232C</i>	
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	1s, 5s, 10s, 15s, 30s, 60s (1min), 120s (2min), 300s (5min), 600s (10min), 900s (15min), 1200s (20min), 1800s (30min) and 3600s (1hour)

<i>USB interface - model HD2109.2</i>	
Type	1.1 - 2.0 electrically isolated

<i>Connections</i>	
Input for Oxygen and temperature probes	8-pole male DIN45326 connector
Serial and USB interface	8-pole MiniDin connector
Mains adapter	2-pole connector (positive at centre)

<i>Measurement of the concentration of dissolved Oxygen</i>	
Measurement range	0.00...90.00mg/l
Resolution	0.01mg/l
Accuracy (60...110%, 1013mbar, 20...25°C)	±0.03mg/l±1 digit



HD40.1



SWD10

### Measurement of the saturation index of dissolved Oxygen

Measurement range	0.0...600.0%
Resolution	0.1%
Accuracy	±0.3% ±1digit (in the range 0,0...199,9%) ±1% ±1digit (in the range 200,0...600,0%)

### Measurement of barometric pressure

Measurement range	0.0...1100.0mbar
Resolution	0.1mbar
Accuracy	±2mbar±1digit between 18 and 25°C ±(2mbar+0.1mbar/°C) in the remaining range

### Setting the salinity

Setting range	0.0...70.0mg/l
Resolution	0.1mg/l

### Temperature measurement with the sensor inside the dissolved Oxygen probe

Measurement range	0...+45°C
Resolution	0.1°C
Accuracy	±0.1°C
Drift after 1 year	0.1°C/year

### Temperature measurement by Instrument with Pt100 probe

Pt100 measurement range	-200...+650°C
Resolution	0.1°C
Accuracy	±0.21°C
Drift after 1 year	0.1°C/year
Automatic temperature compensation	0...50°C

### TECHNICAL DATA OF PROBES AND MODULES EQUIPPED WITH INSTRUMENT Temperature probes Pt100 sensor using SICRAM module

Model	Type	Working range	Accuracy
TP87	Immersion	-50°C...+200°C	±0.25°C (-50°C...+200°C)
TP472I	Immersion	-196°C...+500°C	±0.25°C (-196°C...+350°C) ±0.4°C (+350°C...+500°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)
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

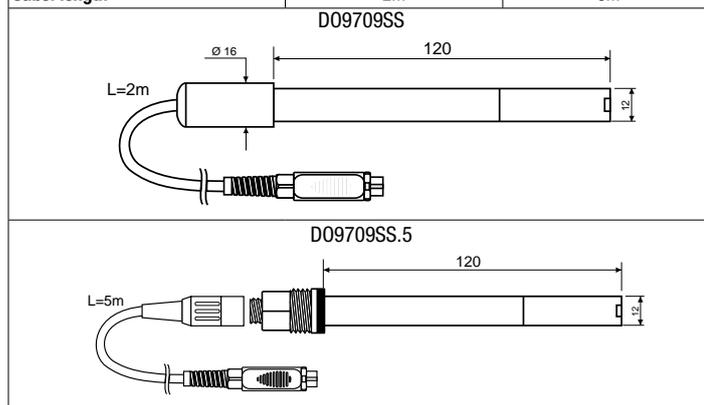
### Direct 4 wire Pt100 probes

Model	Type	Working range	Accuracy
TP47.100	4 wire Pt100	-50...+400°C	Class A

Temperature drift @20°C 0.003%/°C

### Oxygen probe – dimensions and characteristics

Model	D09709SS	D09709SS.5
Type	Polarographic probe, Silver anode, Platinum cathode	
Application range		
Oxygen concentration	0.00...60.00mg/l	
Functioning temperature	0...45°C	
Accuracy instrument with probe	1% FS	
Membrane	Replaceable	
Cabel length	2m	5m



### ORDER CODES

**HD2109.1:** The kit is composed of: instrument HD2109.1, calibrator D09709/20, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software.

**The probes and data transfer cable must be ordered separately.**

**HD2109.2:** The kit is composed of: instrument HD2109.2 **datalogger**, calibrator D09709/20, connection cable for serial output **HD2101/USB**, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software.

**The probes and data transfer cable must be ordered separately.**

**HD2110CSNM:** 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.

**C.206:** Serial connection cable with USB connector for PC and 8-pole MiniDin male connector for the instrument

**HD2101/USB:** Connection cable USB 2.0 connector type A - 8-pole MiniDin (not suitable for HD2109.1K).

**DeltaLog9:** Software for download and management of the data on PC using Windows 98 to Vista operating systems.

**SWD10:** Stabilized power supply 100-240 Vac/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.

**RCT:** The kit includes 4 thermal paper rolls 57mm wide and 32mm in diameter.

**BAT-40:** Spare battery pack for HD40.1 printer with built-in temperature sensor.

**HD22.2:** Laboratory electrode holder composed of base plate with built-in magnetic stirrer, shaft and replaceable electrode holder. Suitable diameter 12mm. Powered by bench-top meters of the series HD22...with cable HD22.2.1 (**optional**) or power supplier SWD10 (**optional**).

**HD22.3:** Laboratory electrode holder composed of base plate. Flexible arm for free positioning. Suitable for electrodes with diameter 12mm.

### Solutions

**D09700:** zero solution.

**D09701:** electrolyte solution.

### Combined dissolved Oxygen/temperature probes

**D09709 SS:** The kit includes: combined probe for measurement of O<sub>2</sub> and temperature with replaceable membrane, three membranes, 50ml of zero solution, 50ml of electrolyte solution. Cable length 2m. Ø12mm x 120mm.

**D09709 SS.5:** The kit includes: combined probe for measurement of O<sub>2</sub> and temperature, replaceable membrane, Ø 12mm x Ø 12mm. Cable length 5m, three membranes, 50ml of zero solution, 50ml of electrolyte solution.

### Temperature probes complete with SICRAM module

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

**TP472I.0:** Pt100 sensor immersion probe. Stem Ø 3 mm, length 230 mm. Cable length 2 m.

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

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

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

**TP472I.5:** Immersion probe, sensor Pt100. Stem Ø 6mm, length 500 mm. Cable length 2 m.

**TP472I.10:** Immersion probe, sensor Pt100. Stem Ø 6mm, length 1,000mm. Cable length 2 m.

### Temperature probes without SICRAM 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 m.

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

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

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

**TP47:** Module for the connection of Pt100 4-wire and Pt1000 2-wire probes



D09700

D09701