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# PORTABLES pH METERS - CONDUCTIVITY METERS

## HD2156.1 HD2156.2 pHmeters-Conductivitymeters-Thermometers

The **HD2156.1** and **HD2156.2** are portable instruments with a large LCD display. They measure pH, mV, redox potential (ORP), conductivity, liquid resistivity, total dissolved solids (TDS) and salinity using combined 4-ring and 2-ring conductivity/ temperature probes. Temperature only is measured by Pt100 or Pt1000 immer- sion, 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 buff- ers. The probe calibration can be performed automatically in one or more of the 147µS, 1413µS, 12880µS or 111800µS/cm conductivity calibration solutions. The HD2156.2 instrument is a **datalogger.** It memorizes up to 20,000 sets of three measurements composed of pH or mV, conductivity or resistivity or TDS or salinity and temperature: these data 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 confi gured using the menu. The HD2156.1 and HD2156.2 models are fi tted with an RS232C serial port and can transfer the acquired measurements to a PC 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 Auto-HOLD function and the automatic turning off which can also be disabled.
**The instruments have IP67 protection degree.**

**ORDER CODES**

**HD2156.1K:** The kit is composed of: instrument HD2156.1, **KP30 electrode**, **SP06T conductivity/temperature combined probe**, **TP87 temperature probe**, 4.01pH and 6.86pH buffer solutions, conductivity solution 12.880µS/ cm HD8712, connection cable for serial output **HD2110CSNM**, 4 1.5V alka- line batteries, operating manual, case and DeltaLog9 software.
**Other pH electrodes, conductivity and temperature probes must be ordered separately.**

**HD2156.2K:** The kit is composed of: instrument HD2156.2 **datalogger**, **KP30 electrode**, **SP06T conductivity/temperature combined probe**, **TP87 temperature probe**, 4.01pH and 6.86pH buffer solutions, conductivity solu- tion 12.880µS/cm HD8712, connection cable for serial output **HD2101/USB**, 4 1.5V alkaline batteries, operating manual, case and DeltaLog9 software.
**Other pH electrodes, conductivity and temperature probes must be ordered separately.**

**HD2110CSNM:** 8-pole connection cable MiniDin - Sub D 9-pole female for RS232C.
**HD2101/USB:** Connection cable USB 2.0 connector type A - 8-pole MiniDin (not suitable for HD2156.1K).
**DeltaLog9:** Software for download and management of the data on PC using Windows 98 to XP operating systems.
**AF209.60:** Stabilized power supply at 230Vac/9Vdc-300mA mains voltage.
**S'print-BT:** On request, portable, serial input, 24 column thermal printer, 58mm paper width.

**TECHNICAL CHARACTERISTICS**

| | |
|---|---|
| Instrument | |
| Dimensions | (Length x Width x Height) 185x90x40mm |
| Weight | 470g (complete with batteries) |
| Materials | ABS, rubber |
| Display | 2x4½ digits plus symbols<br>Visible area: 52x42mm |
| Operating conditions | |
| Working temperature | -5…50°C |
| Storing temperature | -25…65°C |
| Working relative humidity | 0…90%RH without condensation |
| Power | |
| Batteries | 4 1.5V type AA batteries |
| Autonomy | 200 hours with 1800mAh alkaline batteries |
| Power absorbed | with instrument off 20µA |
| Mains | Output mains adapter 9Vdc / 250mA |
| Security of memorized data | Unlimited, independent of battery charge conditions |
| Time | |
| Date and time | Schedule in real time |
| Accuracy | 1min/month max error |
| Measured values storage - model **HD2156.2** | |
| Type | 2000 pages containing 10 samples each |
| Quantity | 20,000 sets of three measurements com-posed of pH or mV, χ or Ω or TDS or salinity and temperature. |
| Storage interval | 1s…3600s (1hour) |
| 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 |
| Immediate print interval | 1s…3600s (1hour) |

**ORDER CODES**

**pH Electrodes**

**KP20:** Combined pH electrode, gel-fi lled, with screw connector S7, body in Epoxy, Ag/AgCl sat. KCl.
**KP30:** Combined pH electrode, cable 1m, gel-fi lled, body in Epoxy, Ag/AgCl sat. KCl.
**KP60:** Combined pH electrode, 1 diaphragm, gel-fi lled, with screw connector S7, body in glass, Ag/AgCl sat. KCl.
**KP 61:** Combined pH electrode, 3 diaphragms for milk, cream, etc. gel-fi lled, with screw connector S7, body in glass, Ag/AgCl sat. KCl.
**KP 62:** Combined pH electrode, 1 diaphragm for pure water, paints, etc. gel-fi lled, with screw connector S7, body in glass, Ag/AgCl sat. KCl.
**KP 70:** Combined pH electrode, micro diam. 6 x L=70mm, gel-fi lled, with screw connector S7, body in glass, Ag/AgCl sat. KCl.
**KP 80:** Combined pointed pH electrode, gel-fi lled, with screw connector S7, body in glass, Ag/AgCl sat. KCl.
**CP:** Extension cable 1.5m with BNC connectors on one side and S7 on the other side for electrode without cable. **CE:** Screw connector S7 for pH electrode.
**BNC** Female BNC for electrode extension.

**ORP Electrodes**

**KP90:** REDOX PLATINUM electrode, with screw connector S7, gel-fi lled, 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.

**Conductivity probes**

Please see the order codes reported in the probes' technical specifi cations.

**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**

**TP47.100:** Direct 4 wire Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. 4 wire connection cable with connector, length 2 metres.
**TP47.1000:** Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 230mm. 2 wire connection cable with connector, length 2 metres.
**TP87.100:** Pt100 sensor immersion probe. Probe's stem Ø 3mm, length 70mm. Connection cable 4 wires with connector, length 1 metre.
**TP87.1000:** Pt1000 sensor immersion probe. Probe's stem Ø 3mm, length 70mm. Connection cable 2 wires with connector, length 1 metre.
**TP47:** Only connector for probe connection: direct 4 wire Pt100, 2 wire Pt1000.

USB interface - model **HD2156.2**

| | |
|---|---|
| Type | 1.1 - 2.0 electrically isolated |

Connections

| | |
|---|---|
| pH/mV input | Female BNC connector |
| Conductivity input | 8-pole male DIN45326 connector |
| Serial interface and USB | 8-pole MiniDin connector |
| Mains adapter | 2-pole connector (positive at centre) |

Measurement of pH by Instrument

| | |
|---|---|
| Measurement range | -2.000…+19.999pH |
| Resolution | 0.01 or 0.001pH selectable from menu |
| Accuracy | ±0.001pH ±1digit |
| Input impedance | >1012Ω |
| Calibration error @25°C | \|Offset\| > 20mV |
| | Slope > 63mV/pH or Slope < 50mV/pH |
| | Sensitivity > 106.5% or Sensitivity < 85% |

Measurement of mV by Instrument

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

Measurement of conductivity by Instrument

| | |
|---|---|
| Resolution with K cell=0.1 | 0.01µS/cm in range 0.00…19.99µS/cm |
| Measurement range (K cell=1) | |
| Resolution | 0.0…199.9µS/cm / 0.1µS/cm |
| | 200…1999µS/cm / 1µS/cm |
| | 2.00…19.99mS/cm / 0.01mS/cm |
| | 20.0…199.9mS/cm / 0.1mS/cm |
| Accuracy (conductivity) | ±0.5% ±1digit |

Measurement of resistivity by Instrument

| | |
|---|---|
| Measurement range / Resolution | |
| | 4.0…199.9Ω / 0.1Ω |
| | 200…999Ω / 1Ω |
| | 1.00k…19.99kΩ / 0.01kΩ |
| | 20.0k…99.9kΩ / 0.1kΩ |
| | 100k…999kΩ / 1kΩ |
| | 1…10MΩ / 1MΩ |
| Accuracy (resistivity) | ±0.5% ±1digit |

Measurement of total dissolved solids (with coeffi cient χ/TDS=0.5)

| | |
|---|---|
| Resolution with K cell=0.1 | 0.05mg/l in range 0.00…19.99mg/l |
| Measurement range (K cell=1) / Resolution | |
| | 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 |
| 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 |
| Accuracy (total dissolved solids) | ±0.5% ±1digit |

Automatic/manual temperature compensation

| | |
|---|---|
| | 0…100°C with αT that can be selected from 0.00 to 4.00%/°C |
| Reference temperature | 20°C or 25°C |
| χ/TDS conversion factor | 0.4…0.8 |
| Cell constant K (cm-1) | 0.1, 0.7, 1.0 and 10.0 |

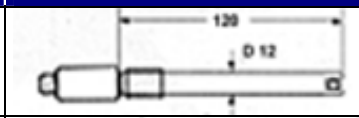
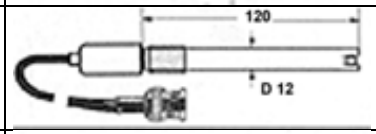
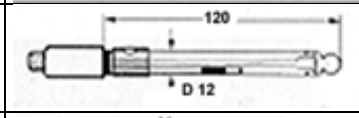
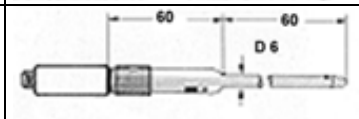
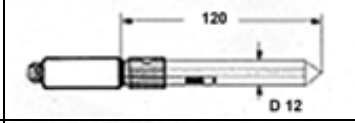
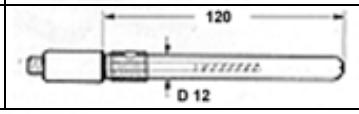
Standard solutions automatically detected (@25°C)

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

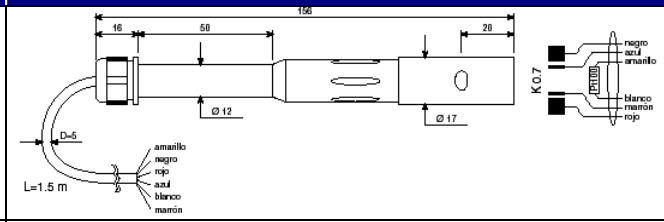
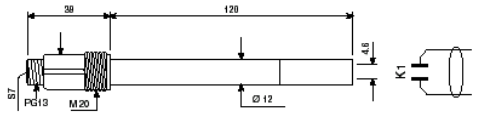
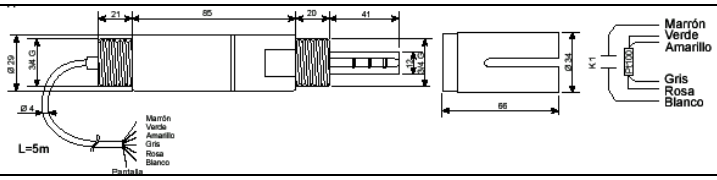
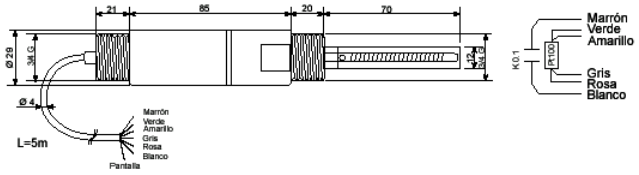
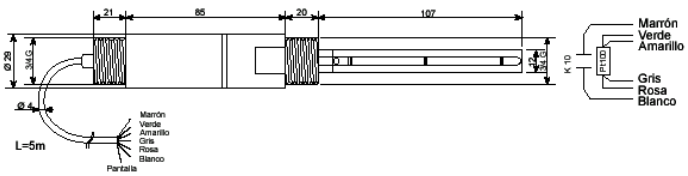
Measurement of temperature by Instrument

| | |
|---|---|
| Pt100 measurement range | -50…+200°C |
| Pt1000 measurement range | -50…+200°C |
| Resolution | 0.1°C |
| Accuracy | ±0.25°C |
| Drift after 1 year | 0.1°C/year |

## Electrodes pH for portables instruments

| Model | Range ºC | Internal Ref | Material | Electrolyte | | Aplicatión |
|---|---|---|---|---|---|---|
| **KP 20** | 0 ... + 80 ºC | Ag/AgCl | Epoxy. | Gel |  | General Use, Agriculture |
| **KP 30** | 0 ... + 80 ºC | Ag/AgCl | Epoxy. | Gel |  | General Use, Agriculture |
| **KP 60** | 0 . + 100 ºC | Ag/AgCl | Glass | Gel |  | Jellies |
| **KP 61** | | | | | | Milk, cream |
| **KP 62** | | | | | | Water, paintings |
| **KP 70** | 0 . + 100 ºC | Ag/AgCl | Glass | Gel |  | Laboratory Mini-electrodes |
| **KP 80** | 0 . + 100 ºC | Ag/AgCl | Glass | Gel |  | Meta and Fish |
| **KP 90** | 0 . + 100 ºC | Ag/AgCl | Glass | Gel |  | Redox Platinum |
| **CP** | BNC |  | | | | Extensión cable |

## Probes for portables conductivity meters

| Model | Range | Cell Constant | Material | Electrodes | |
|---|---|---|---|---|---|
| **SP06T** | 5 µS/cm to 200 mS/cm 0…90 ºC | K = 0,7 | Procan | 4 Platinumm |  |
| **SPT01G** | 0,1 µS/cm to 500 µS/cm 0…80 ºC | K = 0,1 | Glass | 2 Platinum |  |
| **SPT1** | 10 µS/cm to 10 mS/cm 0…50 ºC | K = 1 | Epoxi | 2 Graphite |  |
| **SPT1G** | 10 µS/cm to 10 mS/cm 0…80 ºC | K = 1 | Glass | 2 Platinum |  |
| **SPT10G** | 50 µS/cm to 200 mS/cm 0…80 ºC | K = 10 | Glass | 2 Platinum |  |




**TECHNICAL DATA PROBES**

**4 wire Pt100 and 2 wire Pt1000 Temperature probes**

| Model | Type | Range | Acuracy |
|---|---|---|---|
| **TP47.100** | Pt100 4 wires | -50 to 200 ºC | Class A |
| **TP47.1000** | Pt1000 2 wires | -50 to 200 ºC | Class A |
| **TP87.100** | Pt 100 4wires | -50 to 200 ºC | Class A |
| **TP87.1000** | Pt1000 2 wires | -50 to 200 ºC | Class A |

Common characteristics Resolution 0.1°C
Temperature drift @20°C 0.005%/°C