DIFFERENTIAL pH AND ORP SENSORS

Applications
- Drinking Water
- Wastewater
- Industrial Water
- Power

Wide range pH glass
(HF resistant glass also available)

The smart choice for accurate, reliable, and dependable pH/ORP measurement.

Hach Digital pHD sc sensors are available in convertible (PEEK® or Ryton®), insertion, and sanitary body styles. Three electrodes are used in these sensors to increase measurement accuracy and eliminate sensor ground loops.

Differential Electrode Measurement Technique

This field-proven technique uses three electrodes instead of the two normally used in conventional pH sensors. Process and reference electrodes measure the pH differentially with respect to a third ground electrode. The end result is unsurpassed measurement accuracy, reduced reference junction potential, and elimination of sensor ground loops. These sensors provide greater reliability, resulting in less downtime and maintenance.

Patented Technology

The former GLI, now a Hach Company brand, invented the Differential Electrode Technique for pH measurement in 1970. The pHD™ sensor series (U.S. Patent Number 6395158B1, May 28, 2002) takes this field-proven technology to a new level.

Replaceable Salt Bridge/Protector

The unique, replaceable salt bridge holds an extraordinary volume of buffer to extend the working life of the sensor by protecting the reference electrode from harsh process conditions.

Built-in Encapsulated Preamp

Encapsulated construction protects the sensor's built-in preamp from moisture and humidity, ensuring reliable sensor operation. The preamp in the pHD analog sensor produces a strong signal, enabling the sensor to be located up to 1000 m (3280 ft.) from the analyzer.

Durable Body Materials

Both the digital and analog pH and ORP differential sensors feature a durable PEEK® body for chemical compatibility with most process solutions. For less aggressive solutions, Hach offers a Ryton® sensor in a convertible style for pH and ORP measurement. A sensor with a stainless steel body is available for immersion applications.

Versatile Mounting Styles

Sensors are available in four mounting styles—convertible, insertion, immersion, and sanitary.

Differential Sensor Warranty

Hach Company offers an outstanding warranty on its differential sensors. We will replace any differential sensor that fails due to defects in materials or workmanship within one year from the date of shipment, and up to 30 months on a prorated basis for any failure.

HACH®
Be Right™

Specifications*

pH Sensors

Some industrial applications require accurate measurement and control below 2 or above 12 pH. In these special cases, please contact Hach Technical Support for further details.

Measuring Range	-2 to 14 pH
Sensitivity	±0.01 pH
Stability	0.03 pH per 24 hours, non-cumulative
Operating Temperature	Digital Sensor: -5 to 70ºC (23 to 158ºF) Analog Sensor with Digital Gateway: 5 to 105ºC (23 to 221ºF) Immersion Sensor: 0 to 50ºC (32 to 122ºF)
Flow Rate	3 m (10 ft.) per second, maximum
Sensor Pressure/ Temperature Limits	Digital: 6.9 bar at 70ºC (100 psi at 158ºF) Analog: 6.9 bar at 105ºC (100 psi at 221ºF)
Built-in Temperature Element	NTC 300 ohm thermistor for automatic temperature compensation and analyzer temperature readout
Transmission Distance	100 m (328 ft.), maximum 1000 m (3280 ft.), maximum when used with a termination box
Sensor Cable (integral)	4 conductor cable with one shield and polyurethane jacket; rated to 105ºC (221ºF); 10 m (33 ft.) standard length
Wetted Materials	PEEK® or Ryton® (PVDF), salt bridge of matching material with Kynar® junction, glass process electrode, titanium ground electrode, and Viton® O-ring seals (Please contact Hach Technical Support for available wetted O-ring materials.)

ORP (Redox) Sensors

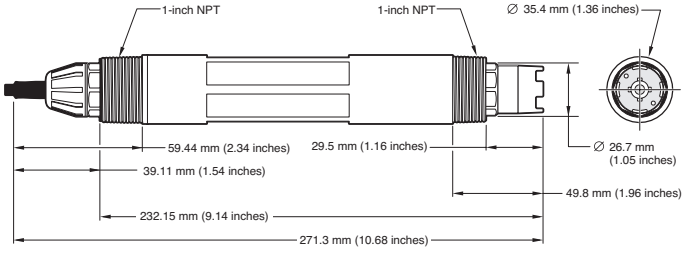
For best ORP measuring results in solutions containing zinc, cyanide, cadmium or nickel, Hach recommends using the pHD sc ORP sensor equipped with an optional gold electrode.

Measuring Range	-1500 to +1500 mV
Sensitivity	±0.5 mV
Stability	2 mV per 24 hours, non-cumulative
Operating Temperature	Digital Sensor: -5 to 70ºC (23 to 158ºF) Analog Sensor with Digital Gateway: -5 to 105ºC (23 to 221ºF) Immersion Sensor: 0 to 50ºC (32 to 122ºF)
Flow Rate	3 m (10 ft.) per second, maximum
Sensor Pressure/ Temperature Limits	Digital: 6.9 bar at 70ºC (100 psi at 158ºF) Analog: 6.9 bar at 105ºC (100 psi at 221ºF)
Built-in Temperature Element	NTC 300 ohm thermistor for analyzer temperature readout only—no automatic temperature compensation necessary for ORP measurement
Transmission Distance	100 m (328 ft.), maximum 1000 m (3280 ft.), maximum when used with a termination box
Sensor Cable (integral)	4 conductor cable with one shield and polyurethane jacket; rated to 105ºC (221ºF); 10 m (33 ft.) standard length
Wetted Materials	PEEK® or Ryton® (PVDF), salt bridge of matching material with Kynar® junction, glass and platinum (or plastic and gold) process electrode, titanium ground electrode, and Viton® O-ring seals

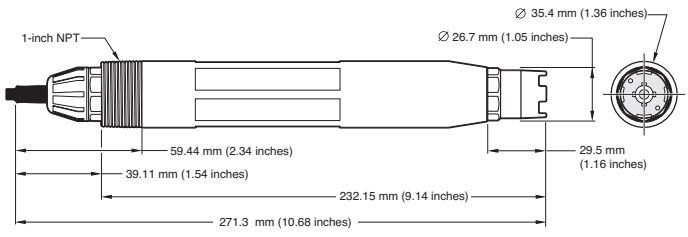
**Subject to change without notice.*

Dimensions

Convertible Style



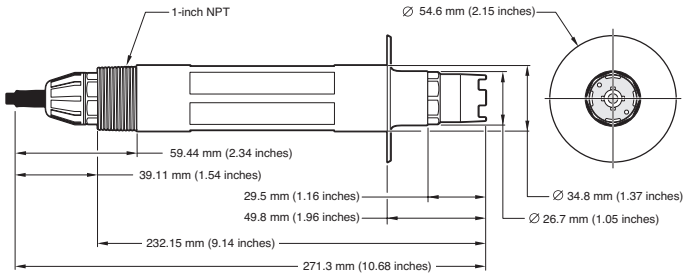
Insertion Style



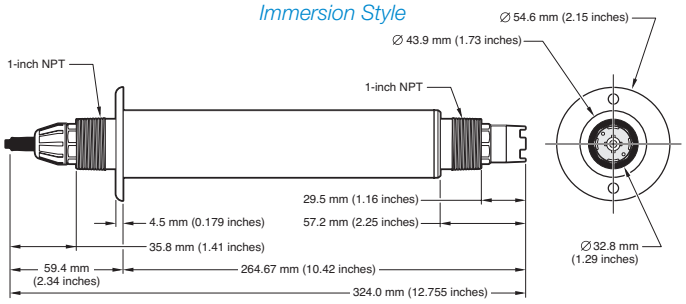
Continued on next page.

Dimensions *continued*

SanitaryStyle



Immersion Style



Ordering Information

pHD sc Digital Differential pH/ORP Sensors

All digital sensors include built-in digital electronics and integral 10 m (33 ft.) cable terminated with connector for the Hach sc Digital Controllers.

pH Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
DPD1P1	PEEK[1]	Convertible	Glass, General Purpose	70ºC (158ºF)
DPD1P3	PEEK[1]	Convertible	Glass, HF-resistant	70ºC (158ºF)
DPD2P1	PEEK[1]	Insertion	Glass, General Purpose	70ºC (158ºF)
DPD3P1	PEEK[1]	Sanitary	Glass, General Purpose	70ºC (158ºF)
DPD1R1	Ryton[2]	Convertible	Glass, General Purpose	70ºC (158ºF)
DPD1R3	Ryton[2]	Convertible	Glass, HF-resistant	70ºC (158ºF)
DPS1	Stainless Steel	Immersion	Glass, General Purpose	50ºC (122ºF)

[1]Polyetheretherketone [2]Polyphenelene Sulfide

ORP Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
DRD1P5	PEEK[1]	Convertible	Platinum	70ºC (158ºF)
DRD1P6	PEEK[1]	Convertible	Gold	70ºC (158ºF)
DRD2P5	PEEK[1]	Insertion	Platinum	70ºC (158ºF)
DRD1R5	Ryton[2]	Convertible	Platinum	70ºC (158ºF)
DRD1R6	Ryton[2]	Convertible	Gold	70ºC (158ºF)
DRS5	Stainless Steel	Immersion	Platinum	50ºC (122ºF)

[1]Polyetheretherketone [2]Polyphenelene Sulfide

Digitl Gateway

6120500 Digital Gateway, convert pHD analog sensors to digital output for connecting to sc1000 digital controller

pHD Analog Sensors

All analog sensors include built-in preamplifier and integral 4.5 m (15 ft.) cable terminated with stripped and tinned wires.

pH Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
PD1P1	PEEK[1]	Convertible	Glass, General Purpose	95ºC (203ºF)
PD1P3	PEEK[1]	Convertible	Glass, HF-resistant	95ºC (203ºF)
PD2P1	PEEK[1]	Insertion	Glass, General Purpose	95ºC (203ºF)
PD3P1	PEEK[1]	Sanitary	Glass, General Purpose	95ºC (203ºF)
PD1R1	Ryton[2]	Convertible	Glass, General Purpose	95ºC (203ºF)
PD1R3	Ryton[2]	Convertible	Glass, HF-resistant	95ºC (203ºF)

[1]Polyetheretherketone [2]Polyphenelene Sulfide

ORP Sensors

Prod. No.	Body Material	Body Style*	Electrode Material	Max Temp
RD1P5	PEEK[1]	Convertible	Platinum	95ºC (203ºF)
RD1P6	PEEK[1]	Convertible	Gold	95ºC (203ºF)
RD2P5	PEEK[1]	Insertion	Platinum	95ºC (203ºF)
RD1R5	Ryton[2]	Convertible	Platinum	95ºC (203ºF)
RD1R6	Ryton[2]	Convertible	Gold	95ºC (203ºF)

[1]Polyetheretherketone [2]Polyphenelene Sulfide

**Definitions of body styles:*

- *Convertible – 1-inch NPT threads at both ends, designed for tee-mounting or other flow through mountings, and pipe mounting for immersion*
- *Insertion – no threads on the electrode end, designed for use with insertion valve assembly*
- *Sanitary – 2-inch flange for a tri-clover style fitting*
- *Immersion – used with chain mounting or pipe mounting*

Continued on next page.

Ordering Information *continued*

pHD sc Digital and pHD Analog Sensor Accessories

Cables

Extension cables are used only with digital sensors or digital gateways when connecting to an sc Digital Controller.

6122400	Digital Extension Cable, 1 m (3.2 ft.)
5796000	Digital Extension Cable, 7.7 m (25 ft.)
5796100	Digital Extension Cable, 15 m (50 ft.)
5796200	Digital Extension Cable, 31 m (100 ft.)

Interconnect cables are used only with analog sensors, junction box, and controller.

1W1100	Analog Interconnect Cable, order per foot

Digital Termination Box

Required when the cable between the sensor/gateway and sc Digital Controller is 100 m (328 ft.) to 1000 m (3280 ft.)

5867000	Digital Termination Box

Analog Junction Box

Required when the cable between the analog sensor and controller is greater than standard sensor cable. Includes terminal strip and gasket.

60A2053	Junction Box, Surface-mount, aluminum (includes mounting hardware)
60A9944	Junction Box, Pipe-mount, PVC (for 1/2-inch diameter pipe, includes mounting hardware)
60G2052	Junction Box, Pipe-mount, PVC (for 1-inch diameter pipe, includes mounting hardware)
76A4010-001	Junction Box, NEMA 4X (no mounting hardware included)

Salt Bridges

The double junction salt bridge on the standard cell of all Hach pHD sensors is field-replaceable.

SB-P1SV	PEEK Sensor and Salt Bridge Body, Kynar (PVDF) Outer Junction
SB-P2SV	PEEK Sensor and Salt Bridge Body, Ceramic Outer Junction
SB-P1SP[1]	PEEK Sensor and Salt Bridge Body, Kynar (PVDF) Outer Junction
SB-R1SV	RytonSensor and Salt Bridge Body Kynar (PVDF) Outer Junction

[1] *Special perfluoroelastomer O-ring in place of the Viton® O-ring*

pHD Sensor Reagents and Standards

25M1A1025-115	Standard Cell Solution, 500 mL
25M8A1002-101	Gel Powder, for high temperature applications, 2 g

pH Buffers

2283549	pH 7, 500 mL (1 pint)
2283449	pH 4, 500 mL (1 pint)
2283649	pH 10, 500 mL (1 pint)

ORP Reference Solutions (in resealable plastic bottles)

25M2A1001-115	200 mV	500 mL (1 pint)
25M2A1002-115	600 mV	500 mL (1 pint)

Mounting Hardware for pHD sc Differential Sensors

Sanitary Mount

MH018S8SZ 316 SS

Includes 2-inch sanitary tee and heavy-duty clamp. Cap and EPDM compound gasket supplied with sensor; can be ordered separately.

Union Mount

6131300	CPVC
6131400	316 SS

Includes standard 1-1/2 inch tee, union pipe with adapter, sealing hub, and lock ring and Viton® O-ring.

Flow-through Mount

MH334N4NZ	CPVC
MH314N4MZ	316 SS

Includes a standard 1-inch tee in respective material.

Insertion Mount

Digital		*Analog*	
5646300	CPVC	**5646400**	CPVC
5646350	316 SS	**5646450**	316 SS

Includes a 1-1/2 inch ball valve, 1-1/2 inch NPT close nipple, sensor adapter with two Viton® O-rings and wiper, extension pipe, pipe adapter, back tube, and lock ring.

Immersion Mount

Standard Hardware

Digital		*Analog*	
6136400	CPVC	**MH434A00B**	CPVC
6136500	316 SS	**MH414A00B**	316 SS

Includes 1-inch by 4 ft. pipe and 1-inch x 1-inch NPT coupling. (Pipe-mount junction box with terminal strip included in analog hardware.)

Handrail Hardware

MH236B00Z CPVC

Includes 1-1/2 inch by 7.5 ft. CPVC pipe, and swivel/pivot/ pipe clamp assembly.

Chain Mount Hardware

2881900 316 ss

Includes stainless steel bail, nuts, and washers. Does not include chain. To be used with stainless steel immersion sensor only.

Ball Float Hardware

6131000 CPVC

Includes 1-1/2 inch by 7.5 ft. CPVC pipe, ball float assembly, and swivel/pivot/ pipe clamp assembly.

HACH COMPANY World Headquarters: Loveland, Colorado USA

United States:	800-227-4224 tel	970-669-2932 fax	orders@hach.com
Outside United States:	970-669-3050 tel	970-461-3939 fax	int@hach.com

hach.com

LIT2467 Rev 2
A13 Printed in U.S.A.

HACH® Be Right™