



Encapsulated Differential pH and ORP Sensors

Applications

- Drinking Water
- Wastewater
- Pure Water Applications
- Industrial Wastewater
- Environmental Monitoring
- Collection Systems
- Food and Beverage



Greater Reliability with 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.

Complete Encapsulation

Complete encapsulated construction protects the sensor's built-in electronics from moisture and humidity problems, extending the working life of the sensor.

Extending working life of the sensor with Encapsulated (LCP) Sensor

- Low drift sensor configuration for reliable readings
- Stable reference method for superior stability of the reference electrode

Longer Calibration Stability

- Larger surface area electrode
- Larger volume buffer capacity

Improved Measurement Accuracy

With the reduction in common interferences. Ground loop, electrical noise in readings.

Low Maintenance and Long Sensor Life

Rebuildable sensor and variety of electrodes/ materials available for multiple applications.

Technical Data*

Parameter	pH	ORP
Wetted Materials	LCP Sensor: LCP (liquid crystal polymer) body and salt bridge with PVDF (or ceramic) junction, glass process electrode, titanium ground electrode, and FKM/FPM O-ring process seals. Union-mount style sensor also has LCP adapter. pH sensor with optional antimony process electrode has stainless steel ground electrode. PPS Sensor: PPS body and salt bridge with PVDF (or ceramic) junction, glass process electrode, titanium ground electrode, and FKM/FPM O-ring process seals. Union-mount style sensor also has PPS adapter. pH sensor with optional antimony process electrode has stainless steel ground electrode.	LCP Sensor: LCP (liquid crystal polymer) body and salt bridge with PVDF (or ceramic) junction, glass and platinum (or glass and gold) process electrode, titanium ground electrode, and RTV sealant. Union-mount style sensor also has LCP adapter and FKM/FPM O-ring process seals. PPS Sensor: PPS body and salt bridge with PVDF (or ceramic) junction, glass and platinum (or glass and gold) process electrode, titanium ground electrode, and RTV sealant. Union-mount style sensor also has PPS adapter and FKM/FPM O-ring process seals.
Range	LCP and PPS Sensors 0 - 14 pH (See Note 1.)	-2000 - +2000 mV (See Note 2.)
Sensitivity	Less than 0.005 pH	Less than 0.5 mV
Drift	0.03 pH per 24 hours, non-cumulative	2 mV per 24 hours, non-cumulative
Output Span	Only with 2-wire transmitter: 0.95 mA per pH unit	Only with 2-wire transmitter: 16 mA per 1000 mV
Outputs	Offset (only with 2-wire transmitter): 12 mA occurs at 7.0 pH, ± 0.88 pH (See Note 3.)	Offset (only with 2-wire transmitter): -500 to 500 mV range: 12 mA occurs at 0 mV, ± 40 mV 0 to 1000 mV range: 12 mA occurs at 500 mV, ± 40 mV
Pressure Range	Temperature Limit: Sensor Only (no hardware): LCP Sensor -5 to 95 °C (23 to 203 °F) PPS Sensor -5 to 95 °C (23 to 203 °F) <i>NOTE: An LCP or PPS sensor that is mounted in a plastic flow-through tee has a higher pressure rating at maximum temperature than when it is mounted in a union tee. The temperature rating is increased to 95 °C (203 °F) at 100 psig when the sensor is mounted in a stainless steel flow-through or union tee, or a stainless steel cross.</i>	
Flow Rate	3 m/s (10 ft./s) maximum	
Load	At 20 mA (only with 2-wire transmitter): 450 ohms	
Transmission Distance	Sensor with Preamplifier: 914 m (3000 ft.) Sensor with 2-wire Transmitter: Limited only by wire resistance and power supply voltage	
Sensor Cable	Sensor with Preamplifier: 5 conductor (plus shield); 3 m (10 ft.) long Sensor with 2-wire Transmitter: 2 conductor (twisted pair); 3 m (10 ft.) long	
Warranty	12 months 13 - 18 months old, sensor is replaced at approx. ⅓ current list price (from date of shipment) 19 - 30 months old, sensor is replaced at approx. ⅔ current list price (from date of shipment)	

*Subject to change without notice

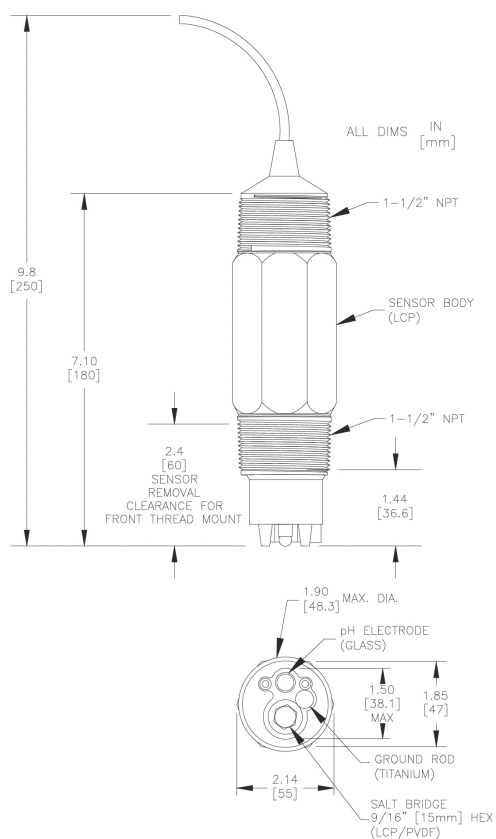
1. Most pH applications fall in the 2.5 to 12.5 pH range. General purpose pH glass electrodes perform well in this range. For pH applications below 4 or above 10 pH, GLI recommends using an LCP-bodied pH sensor. Some industrial applications require accurate measurement and control below 2 or above 12 pH. In these cases, please contact Hach for further details. Repeatability and speed of response of a pH sensor with an optional antimony process electrode is not as good as a sensor with a glass process electrode. Antimony electrodes are only linear between 3 and 8 pH, and should only be ordered when process conditions, such as the presence of hydrofluoric acid, dictate their use.

2. For ORP applications where zinc, cyanide, cadmium, or nickel are present, specify the optional gold electrode instead of the standard platinum electrode.

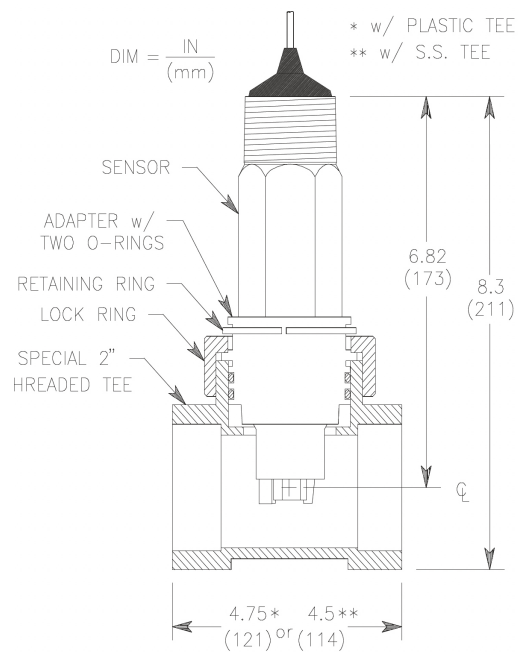
3. A pH sensor with a built-in two-wire transmitter provides a non-isolated and uncalibrated 4-20 mA output. The indicating instrument of the measuring system must be able to provide 24 VDC to power this sensor, and have adjustment means to calibrate for zero offset and span.

Dimensions

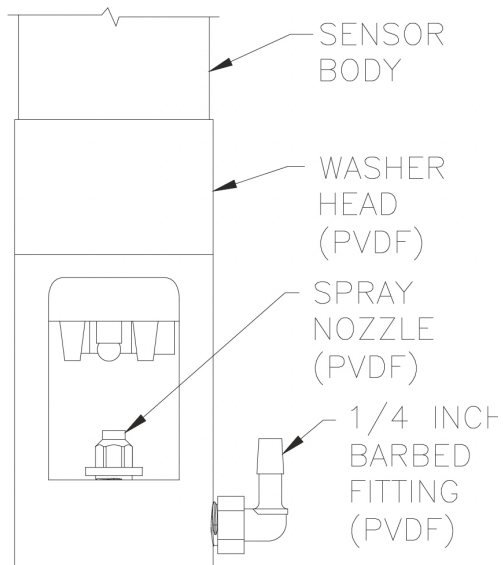
LCP or PPS Sensor



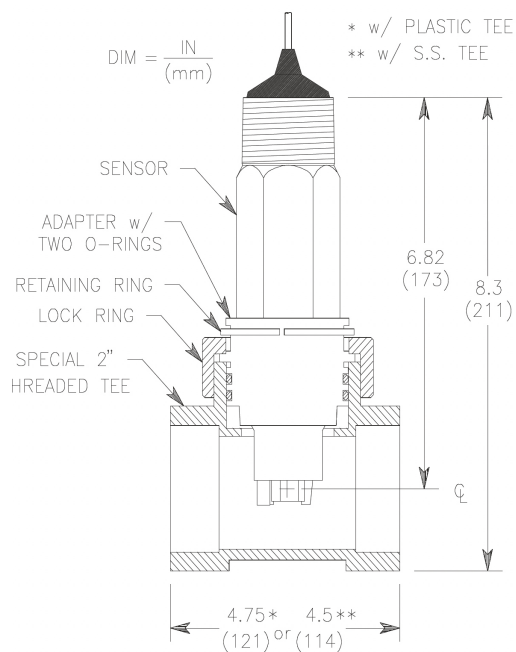
Flow-through Tee Mounting



*Sensor Cleaning Accessory
Air/Water Blast Cleaning Washer Head
P/N 1000A3335-001
(only for immersion applications)*



Union Tee Mounting



Order Information

Cleaning Systems for Encapsulated pH Differential Sensors

1000A3335-001	Air/Water Blast Cleaning Washer Head Only for immersion applications with user-supplied air or water wash system. PVDF washer head includes 1/4-inch barb fitting (see drawing on page 4).
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Sensor Accessories (order separately)

Interconnect Cables*

1W0980	Analog Interconnect Cable, order per foot, order with 1W1125 for PC/RC combination sensors with temperature compensation
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**Specify required length in whole feet.*

Spare Union Adapters**

60G9753-101	LCP adapter
60G9753-301	PPS adapter

***Each adapter includes two FKM/FPM O-rings and a retaining ring.*

pH Buffers (in resealable 1-pint plastic bottles)

2283526	Buffer Solution, pH 7.00, Color-coded Yellow, 50 mL
2283426	Buffer Solution, pH 4.01, Color-coded Red, 50 mL
2283626	Buffer Solution, pH 10.01, Color-coded Blue, 50 mL

Standard Cell Solution for Differential Sensors

25M1A1025-115	Standard cell solution, concentrated pH 7.0 buffer (equi-transferrant), 500 mL Use this pH 7 solution to replace the solution in the standard cell chamber when replacing the salt bridge. The solution is provided in a resealable 500 mL bottle.
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Sensor Mounting Hardware

MH474B	pH/ORP Immersion Mounting
MH434B	Submersion Mounting Hardware
MH376	Flow-Thru Mounting Hardware, PVC, pH/Orp
MH336	Mounting Hardware, Flow-Thru, CPVC, 1-1/2 inch
MH578N9A	2" PVC Union Mounting Tee, for 1.5" pH/ORP sensors
MH538N9A	2" CPVC Union Tee, for 1.5" pH/ORP Sensors
MH518N9A	Finished Mounting Hardware

Note: Hardware does not include the sensor or interconnect cable, which must be ordered separately

SC4500 Controller

Digital Options

LXV525.99A11551	SC4500 Controller, Prognosys, 5x mA Output, 2 Digital Sensors, 100-240 VAC, without power cord
LXV525.99A11511	SC4500 Controller, Prognosys, 5x mA Output, 1 Digital Sensor, 1 pH/ORP, 100-240 VAC, without power cord
LXV525.99Z12511	SC4500 Controller, Prognosys, Profibus DP, 1 Digital Sensor, 1 pH/ORP, 24 VDC, without power cord
LXV525.99AA1551	SC4500 Controller, Smart Monitoring enabled, 5x mA Output, 2 Digital Sensors, 100-240 VAC, without power cord

Analog Options

LXV525.99A11101	SC4500 Controller, Prognosys, 5x mA Output, 1 analog pH/ORP, 100-240 VAC, without power cord
LXV525.99P11111	SC4500 Controller, Prognosys, 5x mA Output, 2 analog pH/ORP, without power cord C1D2
LXV525.99A15101	SC4500 Controller, Prognosys, Modbus TCP+LAN, 1 analog pH/ORP, without power cord
LXV525.99AA1111	SC4500 Controller, Smart Monitoring enabled, 5x mA Output, 2 analog pH/ORP, 100-240 VAC, without power cord

Note: Other sensor combinations are available. Please contact Hach Technical Support or your Hach representative

Note: Communication options (Profibus DPV1, Profinet IO, Ethernet IP and Modbus RS) are available

Expansion Modules

LXZ524.97.00042	SC4x00 Input Module
LXZ525.99.D0002	SC4x00 mA Output Module (5 Outputs)
LXZ525.99.D0003	SC4500 pH/ORP Module
LXZ525.99.D0004	SC4500 Conductivity Module
LXZ525.99.D0006	SC4500 Ultrapure pH/ORP Module
LXZ525.99.D0007	SC4500 Ultrapure Conductivity Module

Accessories

LXZ525.99.C0002	SC4500 Ethernet IP Upgrade Kit
LXZ525.99.C0006	SC4500 Modbus TCP/IP Upgrade Kit - License Only
LXZ525.99.C0003	SC4500 LAN Connector Upgrade Kit
LXZ525.99.C0004	SC4500 Prognosys Upgrade Kit
LXZ524.99.00037	SC4x00 Sunroof with Visor

Order Information

ORP, 2-wire: 20*			
ORP, 5-wire: 24*			
pH, 5-wire: 60*	X	X	X
pH, 2-wire: 64*			
Mounting Style			
Convertible (immersion or flow-through mount)	2		
Union-mount (includes adapter, requires special 2-inch threaded tee)	5		
Sensor Body Material			
PPS (for elevated temperatures in high pH applications)		2	
LCP (liquid crystal polymer)		8	
Electrode Material			
Platinum (only for ORP)			R0
Gold (only for ORP)			R1
Glass (only for pH - general purpose)			P0
Antimony (only for pH)			P1
Low Conductivity			P4
Flush Electrode			P5
Low pH Glass (H-glass)			P6
Low Drift Glass (L-glass)			P8

Additional Ground Rod Options

Hastelloy

6028P025W30210N - pH Sensor, LCP, 25 ft. TFE Cable

Stainless Steel

6028P1 - pH Sensor, LCP, 5-wire, Antimony, 1

6028P140 - pH Sensor, LCP, 5-wire, Antimony

6428P010010000N - pH Sensor, LCP, 2-wire, FKM/FPM

Tantalum

2028R010020000N - ORP Sensor, LCP, TNLM



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