

# pH/ORP Sensors



## WEL Series

Walchem's WEL Series electrodes are cost-effective differential pH and ORP electrodes for industrial applications. They are modular in design with a rugged CPVC housing that contains the electronics. pH and ORP cartridges can easily be connected or replaced in minutes without tools. The cartridges feature a unique threaded interlock connection and a double o-ring seal, ensuring a watertight fit and secure seating at all times.



The optional differential preamplifier and temperature compensation element are in the housing, and are not thrown away when the electrode needs replacement. The electrode is powered by the controller it is connected to, so the signal is always preamplified and there are no batteries to go dead. A titanium solution ground rod integral to the housing enables the differential measuring technique. This results in prolonged electrode life and reliable measurement, resistance to stray voltages and currents or ground loop problems.

### Summary of Key Benefits

- Differential preamp
- Universal mounting
- Easily replaceable electrode cartridges
- Electronics are not discarded with the electrode
- Optional ATC
- Easy to install
- Cartridge Styles:
  - Flat Surface
  - Bulb / Rod
  - HF Resistant
- Resistant to electronic noise, ground loops



### SPECIFICATIONS

#### pH/ORP Electrode

|                     |                                                                                                  |
|---------------------|--------------------------------------------------------------------------------------------------|
| Range               | 0 to 14 pH (0 to 12 without sodium ion error<br>±1999 mV (ORP))                                  |
| Response            | 95% in less than 5 seconds                                                                       |
| Operating Pressure  | 100 psig                                                                                         |
| Cartridge Impedance | Not to exceed 1000MΩ over temp range                                                             |
| Housing Impedance   | Preamplified versions - 100Ω<br>Non-preamplified versions - not to exceed 1000MΩ over temp range |

#### Temperature Range

|                               |                           |
|-------------------------------|---------------------------|
| Housings with preamplifier    | 32 to 158°F (0 to 70°C)   |
| Housings without preamplifier | 32 to 212°F (0 to 100°C)  |
| PHF, MVF, MVR & PHLI          | 50 to 212°F (10 to 100°C) |
| PHB cartridges                | 32 to 212°F (0 to 100°C)  |
| PHH cartridges                | 32 to 122°F (0 to 50°C)   |

Note: Electrode life is drastically reduced when used at temperatures above 122°F (50°C).

#### Wetted Materials of Construction

|                     |                              |
|---------------------|------------------------------|
| Electrode body      | CPVC                         |
| Electrode reference | HDPE                         |
| O-rings             | FKM                          |
| Electrode           | Glass (pH) or platinum (ORP) |

### ORDER INFORMATION



#### CARTRIDGE

|      |                                              |
|------|----------------------------------------------|
| PHF  | = Flat surface pH                            |
| PHB  | = Bulb pH                                    |
| PHH  | = HF resistant pH                            |
| MVF  | = Flat surface ORP                           |
| MVR  | = Rod style ORP                              |
| PHLI | = Flat pH, if sample is between 10 and 100μS |

#### MOUNTING STYLE

|   |                                                   |
|---|---------------------------------------------------|
| 1 | = Submersion mounting                             |
| 2 | = In-line mounting (3/4" NPTF tee)                |
| 3 | = Metric in-line mounting (G 1 1/4" male adapter) |
| 4 | = In-line mounting (1 1/4" NPT male adapter)      |

#### HOUSING

|   |                                                                             |
|---|-----------------------------------------------------------------------------|
| 1 | = Housing with preamplifier and Pt 1000 ATC, 20 ft. cable                   |
| 2 | = Housing with preamplifier, 20 ft. cable                                   |
| 3 | = Housing with Pt 1000 ATC, 20 ft. coaxial cable                            |
| 4 | = Housing, 20 ft. coaxial cable                                             |
| 7 | = Housing with preamplifier for W100, PT1000, 20 ft cable with tinned leads |
| 8 | = Housing with preamplifier for W100, 20 ft cable with tinned leads         |

**WALCHEM**

IWAKI America Inc.

## High Pressure & High Temperature pH & ORP Electrodes

The 102029 pH electrode and 102963 ORP electrode are designed to function where other electrodes cannot. In room temperature water, they can handle up to 500 psi. In low pressure installations, they can handle up to 275°F (135°C) without melting.

In all cases, pH/ORP electrode life will be maximized by operating at room temperature, and the expected life span at temperatures above 140°F (60°C) will be short. But if low temperature operation is impossible, these electrodes will fit the bill.



### Summary of Key Benefits

- Higher temperature rating
- Steam sterilizable
- High operating pressure
- Booted BNC, waterproof cable

### ORDER INFORMATION

|        |                                                                    |
|--------|--------------------------------------------------------------------|
| 102027 | Mounting Gland, SS, 3/4" NPT, High Temperature/Submersion (pH/ORP) |
| 102028 | Mounting Gland, SS, 3/4" NPT, High Temperature/In-line (pH/ORP)    |
| 102029 | Electrode, pH, High Temperature, 10 ft. cable                      |
| 102963 | Electrode, ORP, High Temperature, 10 ft. cable                     |

### SPECIFICATIONS

|                         |                                                                 |
|-------------------------|-----------------------------------------------------------------|
| Reference cell          | Double junction, Na <sub>2</sub> SO <sub>4</sub> + KCl, Ag/AgCl |
| Cable lead              | 10 ft. (3.05 m) length with BNC connector                       |
| Membrane impedance (pH) | 150 megaohms at 77°F (25°C)                                     |
| Zero potential (pH)     | 0 mV ±12 @ pH 7                                                 |
| Operating Temperature   | 23° to 275°F (-5° to 135°C) @ 200 PSI (1.38 MPa)                |
| Operating Pressure      | 500 PSI (3.45 MPa) @ 77°F (25°C)                                |
| Range                   | 0 to 14 pH, -1000 to 1000 mV                                    |
| Output voltage (pH)     | 58.7 ±0.3 mV per pH unit                                        |
| Drift                   | Less than 2 mV per week                                         |
| Sodium error (pH)       | Less than 0.5 pH unit typical in 0.1 Na+ @ 12.8 pH              |

### Dimensions

5" (127 mm) length x 0.47" (12 mm) diameter  
Gland thread size 3/4" NPTM (3/4" G)

### Materials of Construction

PFA junction  
Glass membrane (pH and ORP)  
Platinum (ORP)  
Polymer body  
SS mounting gland

# WDS Series

Walchem's WDS Series differential pH and ORP sensors will provide long-lasting and reliable performance in industrial and municipal applications.

The differential measurement technique uses two electrodes, one for the process measurement and the other for the reference measurement. Each electrode is measured differentially with respect to a third metal electrode. The reference electrode is constructed from pH glass and is embedded in pH 7 buffer within the sensor behind a porous, replaceable salt bridge. If the reference solution becomes contaminated, or the salt bridge becomes clogged, it is easily replaced. The glass electrode is not prone to chemical attack like a silver/silver chloride reference can be, adding to the reliability of the sensor.



## Summary of Key Benefits

- Replaceable salt bridge for long life
- Field proven differential design
- Transmits signal 3,000 feet (915 meters)
- Walchem preamplifier models are compatible with Walchem controllers
- Conventional preamplifier models are compatible with GLI and Aquamatrix (Lisle Metrix) controllers
- Resistant to ground loop problems

## SPECIFICATIONS

### Measurement Performance

Range 0 to 14 pH, -2000 to 2000 mV (ORP)

Sensitivity 0.001 pH, 0.1 mV

Stability 0.03 pH per day, non-cumulative, 2 mV per day, non-cumulative

Temperature -5 to 95°C (23 to 203°F)

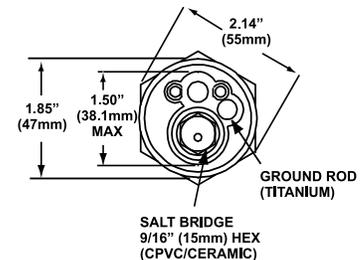
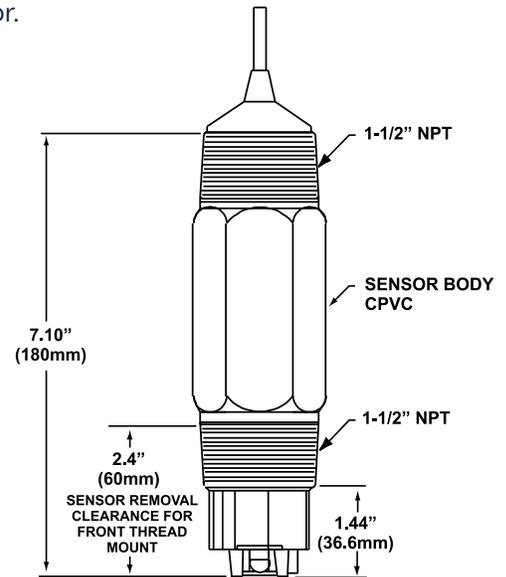
### Mechanical

Wetted Materials:

CPVC, Ceramic, Glass, EPDM, Platinum (ORP only) and Titanium Palladium alloy

|                        |                         |
|------------------------|-------------------------|
| Cable (Walchem preamp) | 3 twisted pair shielded |
| Cable (Conv. preamp)   | 5 conductor shielded    |
| Cable length           | 4.6 meters (15 ft)      |
| Maximum cable length   | 900 meters (1,000 ft)   |

|                   |                                    |
|-------------------|------------------------------------|
| Temperature Limit | -5 to 95°C (23 to 203°F)           |
| Pressure Limit    | 0.7 MPa (100 PSI)<br>@65°C (149°F) |



## ORDER INFORMATION

WDS —  sensor type     preamp type

### SENSOR TYPE

PH = pH sensor  
MV = ORP sensor

### PREAMPLIFIER TYPE

W = Walchem preamplifier  
C = Conventional preamplifier

The WDS Series (model numbers WDS-\*\*W, Walchem preamplifier only) sensors are in compliance with CE EMC EN 61326 standards.

## pH/ORP Preamplifier

The Walchem preamplifier offers a watertight way to extend the cable of any conventional combination pH/ORP electrode as far as 1000 feet (305 meters). Simply connect the electrode to the BNC connector, the optional ATC cable to the terminal block inside and run cable to the controller.

Walchem controllers provide the  $\pm 5\text{VDC}$  power required to operate the preamp. For connection to controllers that have only a BNC connector for the sensor input, specify the 190829 version, which includes a male BNC to connect to the controller end of the cable.



## Summary of Key Benefits

- NEMA 4X, epoxy coated, die-cast aluminum wall mount enclosure
- Boosts signal for reliable transmission up to 1,000 ft (305 m) via 22 AWG wire
- No temperature simulation resistor required when used with Walchem controllers

## SPECIFICATIONS

|                     |                                       |
|---------------------|---------------------------------------|
| Power               | $\pm 5\text{ VDC}$ , 5mA maximum      |
| Input Impedance     | $1 \times 10^{13}$ ohms               |
| Connections         | BNC for pH/ORP<br>Screw terminals     |
| Overall Dimensions  | 4 7/8" (L) x 3 1/8" (W) x 2 1/4" (H)  |
| Mounting Dimensions | 4 7/16" (L) x 2 1/16" (H)             |
| Enclosure           | Grey epoxy coated<br>Aluminum NEMA 4X |

## ORDER INFORMATION

- 190783 pH/ORP Preamplifier
- 190829 pH/ORP Preamplifier with additional BNC connector for controller connection
- 100084 Four conductor cable for use with manual temperature compensation
- 102535 Six conductor cable for use with automatic temperature compensation

## ABOUT US

Walchem integrates its advanced sensing, instrumentation, fluid pumping and communications technologies to deliver reliable and innovative solutions to the global water treatment market. Our in-house engineering is driven by quality, technology and innovation. For more information on the entire Walchem product line, visit: [www.walchem.com](http://www.walchem.com).