ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/100ULTRAD-EN REV. F

# 100 ULTRA-D

## Digital pH/ORP sensor



# Measurement made easy

## The ¾ in digital pH/ORP sensor for use in high-purity applications

**Increased efficiency**
- ABB's glass formulation provides fast process response without compromising durability and robustness
- Close-coupled temperature measurement ensures high accuracy even with rapid temperature changes

**EZLink™ connectivity**
- Plug-and-play technology makes sensor integration fast and easy
- Advanced diagnostics providing end-of-life indication and fault analysis
- Improved measurement accuracy with digital communication

**Dependable performance**
- Maintenance-free, saturated KCl matrix providing extended operation in high-purity applications with minimal drift
- Large, porous PTFE junction reduces plugging and fouling effects while providing measurement stability
- Durable Kynar® body providing high chemical and abrasion resistance

**Modular design**
- Common ¾ in sensor design paired with intelligent accessories provides mounting flexibility with safety and convenience in mind

## Introduction

Making the right sensor selection for your application should be simple and easy. To help you make the right choice, we've divided our new family of pH/ORP sensors into three distinct ranges based on the applications they have been designed for: the 100, 500, and 700 ranges.

The 100 range has entry-level sensors designed for light duty use, while the 500 range offers a robust design for industrial applications. The 700 range is a specialty range for target applications.

Each electrode is clearly named and is also color-coded for ease of identification. This enables you to easily select the best sensor to meet your needs, ensuring optimal plant efficiency, performance, and lifetime—every time.

## The 100 ULTRA-D digital pH/ORP sensor

Part of the next generation of ABB's pH/ORP sensors, the digital 100 ULTRA-D is a cost-effective probe designed for ultra-pure water applications. Its maintenance-free design provides extended operation, stability and minimal drift in low conductivity samples down to 2 µS/cm.

The 100 ULTRA-D is suitable for use in:

- boiler water
- demineralized water
- power plants
- steam water analysis
- reverse osmosis
- condensate/feedwater

## Performance you can trust

Featuring a maintenance-free design, the digital 100 ULTRA-D incorporates a super-saturated electrolyte matrix to minimize the measurement drift typically associated with high-purity applications; enabling it to operate in samples down to 2 µS/cm. The large, porous PTFE junction gives added measurement stability and improved process response while providing excellent antifouling resistance.

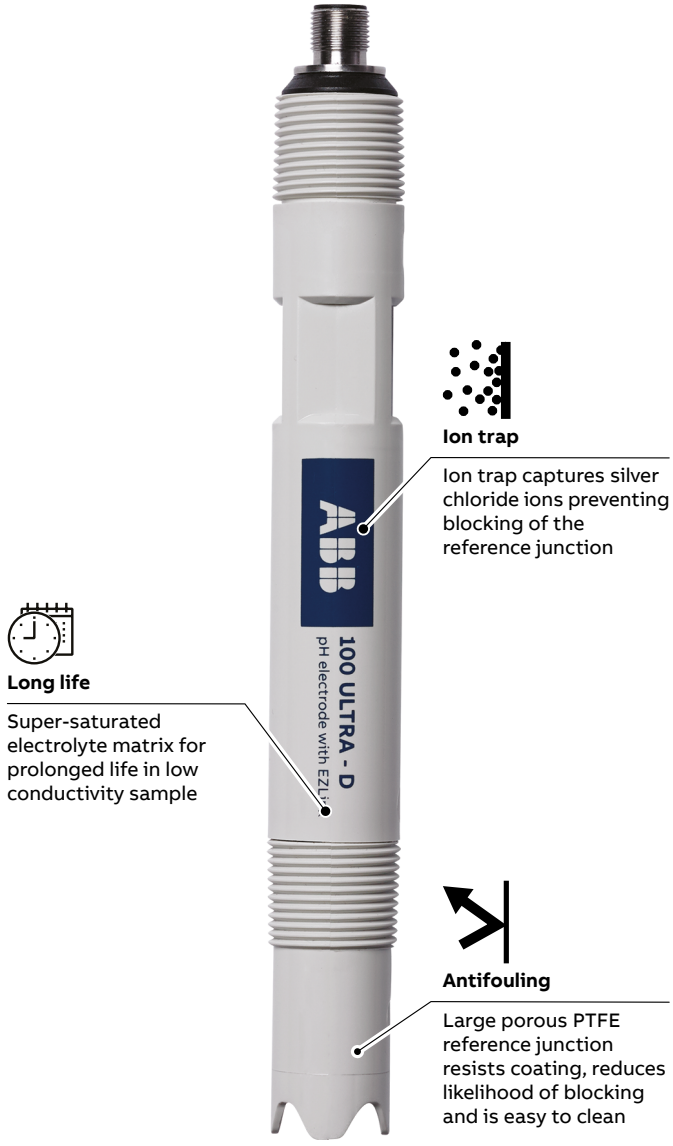



**Figure 1 Sensor features**

## Improved process efficiency

Varying sample temperature is one of the most common causes of pH measurement error due to its impact on sensor output. The 100 ULTRA-D is equipped with a close-coupled temperature element capable of rapid response to quickly changing process conditions, ensuring a high level of accuracy and confidence in your measurement.

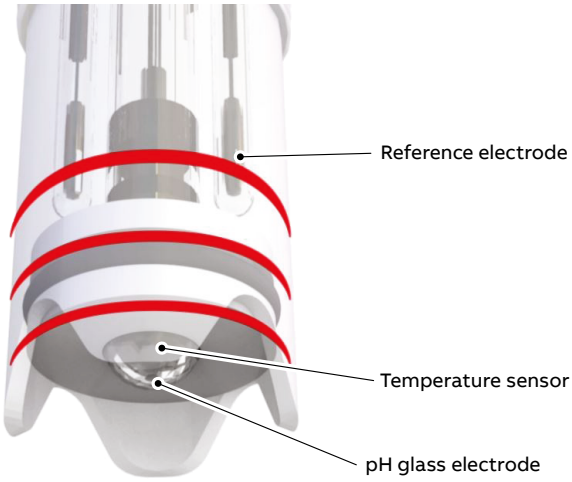



**Figure 2 Temperature element location**

## EZLink connectivity

Convenient EZLink technology enables seamless plug-and-play integration when using the 100 ULTRA-D. Automatically recognized, the sensor uploads calibration, diagnostic and manufacturing information to any of ABB's EZLink-capable transmitters within seconds; significantly reducing commissioning and product maintenance.

**Sensor health check**
The 100 ULTRA-D provides advanced sensor diagnostics such as the unique perpetual impedance monitoring (patent-pending) that detects electrode faults such as **Broken Glass** or **Out-of-Sample** in real-time without the need for a solution earth.

In addition, ABB's SMART reference electrode monitoring (REM) system provides early warning notification of electrolyte loss enabling the sensor to be replenished when required, saving money without risking process control.

**Enhanced accuracy**
Instantaneous signal conditioning from analog to digital ensures minimal electrical interference and strengthens signal strength, greatly improving measurement accuracy even with longer cable distances.

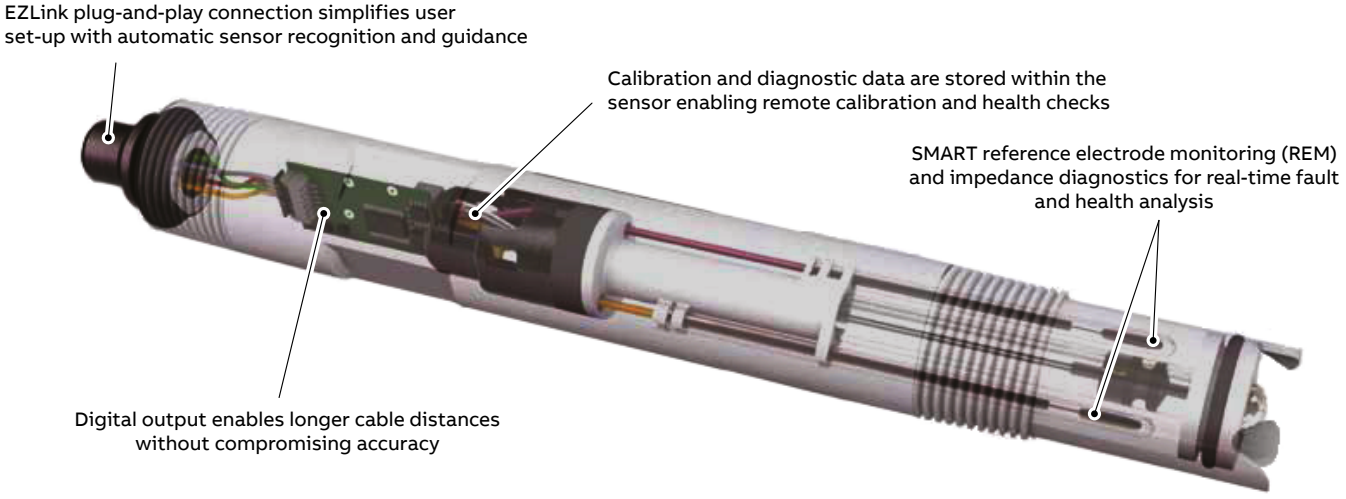



**Figure 3 Key features**

## Robust glassware

Utilizing ABB's experience in glass manufacturing dating back to the 1950s, the proprietary glass formulations used with the 100 ULTRA-D offer fast response without sacrificing durability. Selectable in several configurations, the robust glassware is made suitable for wide range of general-purpose applications.

**Low-temperature (LT) glass**
For measurement below 15 °C (59 °F), our low-temperature blue glass provides ultrafast response in applications such as municipal and industrial wastewater treatment. Available in bullet-style.

**High-performance (S) glass**
Our high-performance yellow glass provides fast response and accurate measurement over the entire pH range. With an extremely low sodium error, the glass can maintain its accuracy even at very high pH levels. Available in flat- or bullet-style.

**ORP platinum electrode**
Chemically inert, our platinum electrode is designed for conventional ORP/Redox measurement with an RTD element providing process temperature information.



**Figure 4 High performance (S) glass – flat with flush body**



**Figure 6 Low temperature (LT) glass with notched body**



**Figure 5 ORP electrode with notched body**

## Product adaptability

The 100 ULTRA-D is available in flush or notched-body design, helping extend sensor operation and maintainability in challenging applications.

**Flush-body design**
The flush-body design, when paired with a flat-shaped glass electrode, helps promote self-cleaning when installed perpendicular to sample flow. In addition, the minimal protrusion prevents unwanted buildup, especially in fouling applications.

**Notched-body design**
The notched-body design provides additional protection for bullet-style glass electrodes, especially from abrasive applications that can damage the glass electrode rendering it unresponsive.

**Intelligent accessories**
The 100 ULTRA-D is offered with mounting accessories designed to improve adaptability into your process while providing safe and convenient operation. Available with flowcell, quick-connect bayonet and dip pole assemblies, the 100 ULTRA-D utilizes modular accessories that are compatible with all ABB's next generation ¾ in threaded sensor bodies.

Optional autocleaning functionality is available as an added feature ensuring extended operation with minimal intervention.

**Extended storage**
We understand most customers maintain stock of pH/ORP sensors in case of unexpected demand. Ensuring peak performance, even after extended storage, is critical in maintaining product availability and keeping your process running.

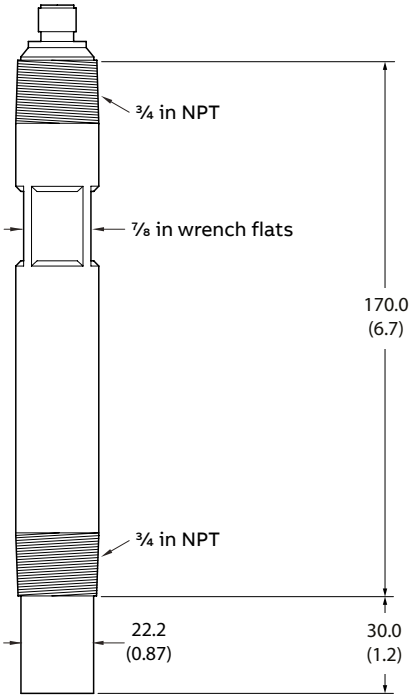
The 100 ULTRA-D is stored in a specially formulated solution with added antimicrobial agent, keeping the sensor active for up to two years when stored as recommended.



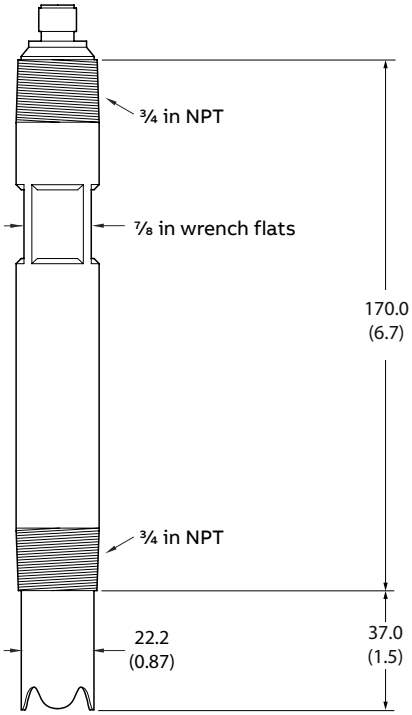
## Dimensions

Dimensions in mm (in)

**Flush sensor body**




**Notched sensor body**




ASME B1.20.1 ¾ in NPT thread is compatible with ASME B16.11 ¾ in NPT threaded fittings including: couplings, half couplings, bosses, couplets.

## Electrical connections

All digital sensors come with EZLink connectivity.

# Specifications

## Measurements

- pH/ORP (platinum)
- Temperature

## Measurement range

**High performance (S) glass**
0 to 14 pH
**Low temperature (LT) glass**
0 to 10 pH
**ORP**
-2,000 to 2,000 mV

## Temperature range

**High performance (S) glass (bullet)**
0 to 100 °C (32 to 212 °F)
(typical glass impedance at 25 °C [77 °F] = 250 MΩ)
**High performance (S) glass (flat)**
5 to 100 °C (41 to 212 °F)
(typical glass impedance at 25 °C [77 °F] = 600 MΩ)
**Low temperature (LT) glass**
-5 to 50 °C (23 to 122 °F)
(typical glass impedance at 25 °C [77 °F] = 25 MΩ)
**ORP platinum electrode**
0 to 60 °C (32 to 140 °F)

## Temperature sensor

Pt1000 (Class B, IEC 60751)

## Maximum pressure

6 bar (90 psi)

## Recommended minimum sample conductivity

2 µS/cm

## Recommended sample flowrate

≥100 mL/min

## Recommended sensor storage

Between 15 and 35 °C (59 and 95 °F)

## Isothermal point at 25 °C (77 °F)

pH 7

## Cable

**EZLink digital sensor connector IP rating**
IP67 (when connected)
**Extension cable options**
1, 3, 5, 10, 15, 25, 50 m (3.3, 9.8, 16.4, 32.8, 49.2, 82, 164 ft)
**Maximum length (including optional extension cable)**
Up to 210 m (689 ft)

## Reference system

Ag/AgCl with KCl gel electrolyte, double junction plus ion trap

## Process connections

¾ in NPT

## Wetted materials

**Electrode body**
PVDF (Kynar)
**Reference junction system**
Porous PTFE and Viton O-rings
**Measure system**
pH: Glass
ORP: Platinum

## Approvals, certification and safety

**CE Mark**
Covers EMC+LV directives
(including latest version of EN61010)
**Regulation 31**

| | |
|---|---|
| Drinking water approval: | Complies to DWI Regulation 31(4)(b) |
| Additional tests: | BS6920 parts 2.2 and 2.4 on all wetted parts |

**EMC**
Meets requirements of IEC61326 for an industrial environment

**CRN approval**
Maximum allowable working pressure (MAWP): 5.58 bar (81 psi)
Design temperature: -5 °C to 105 °C (23 °F to 221 °F)
CRN number: 0F22557

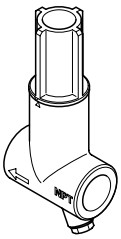
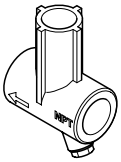
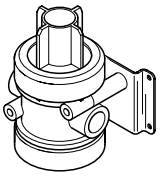
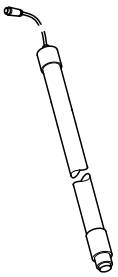
# Ordering information

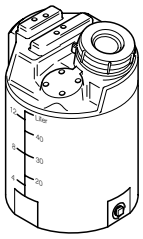
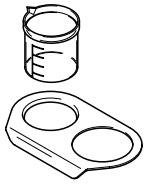
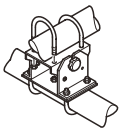
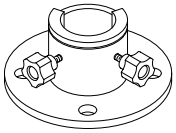
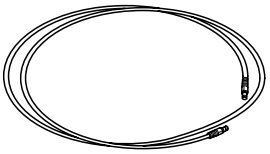
| **100 ULTRA-D ¾ in pH/ORP electrode (EZLink digital)** | **APS132/** | **XX** | **XX** | **X** | **XX** | **Option** |
|---|---|---|---|---|---|---|
| **Sensor type** | | | | | | |
| pH – bullet glass for standard applications: high performance (S) glass | | P2 | | | | |
| pH – flat glass for in-line, fouling applications: high performance (S) glass | | P3 | | | | |
| pH – low temperature (LT) glass | | P4 | | | | |
| ORP (Redox) – platinum | | R2 | | | | |
| **Body style** | | | | | | |
| ¾ in threaded insertion/immersion – no sensor guard (flush) | | | K1 | | | |
| ¾ in threaded insertion/immersion – notched sensor guard | | | K2 | | | |
| **Connection type** | | | | | | |
| EZLink digital | | | | D | | |
| **Integral cable length** | | | | | | |
| None | | | | | 00 | |
| 1 m (3.3 ft) | | | | | 01 | |
| 3 m (10 ft) | | | | | 03 | |
| 5 m (16 ft) | | | | | 05 | |
| 10 m (33 ft) | | | | | 10 | |

**Optional order code**
Add one or more of the following codes after the standard ordering information to select any additional options if required

| | |
|---|---|
| **Operating instructions** | |
| English | M5 |
| **EZLink digital extension cable** | |
| 1 m (3.3 ft) | E01 |
| 5 m (16.4 ft) | E05 |
| 10 m (32.8 ft) | E10 |
| 15 m (49.2 ft) | E15 |
| 25 m (82 ft) | E25 |
| 50 m (164 ft) | E50 |

# Accessories

| Part number | Description | |
|---|---|---|
| 3KXA163000L0002 | 1 in BSP bayonet polycarbonate T-piece |  |
| 3KXA163000L0004 | 1 in NPT bayonet polycarbonate T-piece | |
| 3KXA163000L0006 | 1 in BSP screw polycarbonate T-piece |  |
| 3KXA163000L0008 | 1 in NPT screw polycarbonate T-piece | |
| 3KXA163000L0012 | ½ in NPT polycarbonate flowcell and ¾ in adapter |  |
| 3KXA163000L0011 | ½ in NPT stainless steel flowcell and ¾ in adapter | |
| 3KXA163000L0024 | Protective shroud for ¾ in body |  |
| | 1¼ in NB dip pole assembly |  |
| 3KXA163000L0021 | 2.5 m (8.2 ft) | |
| 3KXA163000L0022 | 1 m (3.3 ft) | |
| 3KXA163000L0023 | Dip pole kit (customer-supplied 1¼ in NB tube) |  |

| Part number | Description | |
|---|---|---|
| 3KXA163000L0025 | Automatic cleaning system (liquid) |  |
| 3KXA163000L0026 | T-piece cleaning adapter |  |
| 3KXA163000L0120 | Calibration kit (includes calibration beaker and holder) |  |
| ATS4000760 | Rail mounting kit (tilt only) |  |
| ATS4000785 | Open-tank flanged dip mount |  |
| | EZLink cable |  |
| AWT4009010 | 1 m (3.3 ft) | |
| AWT4009030 | 3 m (9.8 ft) | |
| AWT4009050 | 5 m (16.4 ft) | |
| AWT4009100 | 10 m (32.8 ft) | |
| AWT4009150 | 15 m (49.2 ft) | |
| AWT4009250 | 25 m (82 ft) | |
| AWT4009500 | 50 m (164 ft) | |

For a complete list of spares and accessories, refer to Operating Instruction OI/100/500.

## Acknowledgements


- EZLink is a trademark of ABB Limited
- Kynar is a registered trademark of Arkema Inc.
- Viton is a registered trademark of the Chemours Company

## Notes

## Notes

## Notes

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For more product information, visit:
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