700 ULTRA-D
Digital pH/ORP sensor
Measurement made easy
The 12 mm digital pH/ORP sensor for use in ultra-pure 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
• Refillable KCl reservoir providing maximum usability and extended operation in high purity applications with minimal drift
• Triple ceramic junction reduces plugging while providing improved measurement stability and speed of response

Modular design
• Modular 12 mm 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 are entry-level sensors designed for light duty use, while the 500 range offer a robust design for industrial applications. The 700 range are 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 700 ULTRA-D
digital pH/ORP sensor

Part of the next generation of ABB’s pH/ORP sensors, the digital 700 ULTRA-D is a high-performance electrode designed for ultra-pure water applications. Its reservoir-fed rechargeable design provides extended operation and minimal drift for applications down to 0.2 μS/cm.

The 700 ULTRA-D is designed for use in:
- boiler water
- demineralized water
- power plants
- steam water analysis
- reverse osmosis
- condensate/feedwater

Performance you can trust

Featuring a rechargeable reservoir-fed design, the 700 ULTRA is capable of extended operation in ultra-pure applications down to 0.2 μS/cm, minimizing the frequency of sensor replacement due to loss of electrolyte. With an enhanced triple ceramic junction design, the 700 ULTRA has improved speed of response while maintaining measurement stability in the most demanding high purity applications.
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 700 ULTRA-D is equipped with a close-coupled temperature element capable of rapid response to quickly changing process conditions thus ensuring a high level of accuracy and confidence in your measurement.

Temperature sensor
Reference electrode
pH glass electrode

Temperature element location

EZLink connectivity

Convenient EZLink technology enables seamless plug-and-play integration when using the 700 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 700 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.

Calibration and diagnostic data are stored within the sensor enabling remote calibration and health checks

Key features
Robust glassware

Utilizing ABB’s experience in glass manufacturing dating back to the 1950s, the proprietary glass formulations used with the 700 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 design for conventional ORP/Redox measurement with an RTD element providing process temperature information.

Product adaptability

While some of our customers prefer to integrate their ABB products themselves, ABB has developed a range of easy- and ready-to-install systems using industry-standard components and best practice in fitting design. Our panel-mounted analyzers include:

- standard-sized backboard for wall- or rail-mounting
- 700 ULTRA sensors, flow-chambers and pipework
- pre-drilled panel and transmitter mounting holes
- isolation and flow control valves with indicators
- pH sensor calibration pot and bracket for easy calibration

Optional sampling panel

The 700 ULTRA-D is offered with additional mounting accessories designed to improve adaptability into your process while providing safe and convenient operation. The additional accessories include:

- flow-cell
- quick-connect bayonet

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 700 ULTRA-D is stored in a specially-formulated solution with added anti-microbial agent keeping the sensor active for up to 2 years when stored as recommended.
**Dimensions**

Dimensions in mm (in)

- **Sampling panel**
  - 41.5 (1.6)
  - 233.6 (9.2)
  - 118.2 (4.7)
  - Ø 12.0 (0.5)
  - 400.0 (15.75)
  - 600.0 (23.6)
  - 115.0 (4.53)

- **Dimensions**
  - 233.6 (9.2)
  - 118.2 (4.7)
  - Ø 12.0 (0.5)
Reservoir/flow-cell assembly
Electrical connections

All digital sensors are supplied with EZLink connectivity
Specification

Measurements
• pH/ORP (platinum)
• Temperature

Measurement range
High performance (S) glass
  0 to 14 pH
Low temperature (LT) glass
  0 to 10 pH
ORP
  –2000 to 2000 mV

Temperature range
High performance (S) glass
  0 to 100 °C (32 to 212 °F)
  (typical glass impedance at 25 °C [77 °F] = 250 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
Atmospheric

Recommended minimum sample conductivity
0.2 μS/cm

Recommended sample flowrate
100 to 500 ml/min

Recommended sensor storage
Between 15 and 35 °C (59 and 95 °F)

Isothermal point at 25 °C (77 °F)
  pH 7

Reference system
Flowing KCl electrolyte with Ag/AgCl double junction

Process connections
PG 13.5

Wetted materials
Electrode body
  Glass
Reference junction system
  Ceramic
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
## Ordering information

700 ULTRA-D 12 mm flowing junction pH/ORP electrode (EZLink digital)  

<table>
<thead>
<tr>
<th>Sensor type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH – bullet glass for standard applications: high performance (S) glass</td>
<td>P2</td>
</tr>
<tr>
<td>pH – low temperature (LT) glass</td>
<td>P4</td>
</tr>
<tr>
<td>ORP (Redox) – platinum</td>
<td>R2</td>
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<table>
<thead>
<tr>
<th>Connection type</th>
<th>Code</th>
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<tbody>
<tr>
<td>EZLink digital</td>
<td>D</td>
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<table>
<thead>
<tr>
<th>Integral cable length</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>None</td>
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<tr>
<td>1 m (3.3 ft)</td>
<td>01</td>
</tr>
<tr>
<td>3 m (10 ft)</td>
<td>03</td>
</tr>
<tr>
<td>5 m (16 ft)</td>
<td>05</td>
</tr>
<tr>
<td>10 m (33 ft)</td>
<td>10</td>
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</table>

<table>
<thead>
<tr>
<th>Optional order code</th>
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</thead>
<tbody>
<tr>
<td>Flow-cell systems</td>
</tr>
</tbody>
</table>
| Panel-mounted system for ultra-pure water applications.  
  Includes: flow-cell, reservoir, flow meter, flow alarm and calibration cup holder mounted on a stainless steel panel (1/4 in NPT process connections)  
  F05                                 |
| Stainless steel flow-cell kit for ultra-pure water applications.  
  Includes: flow-cell, reservoir, calibration cup holder and mounting kit  
  F01                                 |
| Polypropylene flow-cell kit for general process applications.  
  Includes: flow-cell, reservoir, calibration cup holder and mounting kit  
  F02                                 |

<table>
<thead>
<tr>
<th>Operating instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
</tr>
</tbody>
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| M5 |
## Accessories

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
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<tbody>
<tr>
<td>3KXA163000L0013</td>
<td>⅛ in NPT stainless steel flow-cell + PG13.5 adapter</td>
</tr>
<tr>
<td>3KXA163000L0014</td>
<td>⅛ in NPT polycarbonate flow-cell + PG13.5 adapter</td>
</tr>
<tr>
<td>3KXA163700L0001</td>
<td>Reservoir complete with mounting bracket assembly</td>
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<tr>
<td>3KXA163000L0120</td>
<td>Calibration kit (includes calibration beaker and holder)</td>
</tr>
<tr>
<td>3KXA163700L0005</td>
<td>⅛ in NPT stainless steel flow-cell + reservoir + calibration kit</td>
</tr>
<tr>
<td>3KXA163700L0006</td>
<td>⅛ in NPT polycarbonate flow-cell + reservoir + calibration kit</td>
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<table>
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<tr>
<th>Part number</th>
<th>Description</th>
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<td>EWT4009050</td>
<td>5 m (16.4 ft)</td>
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<tr>
<td>EWT4009100</td>
<td>10 m (32.8 ft)</td>
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<tr>
<td>EWT4009150</td>
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<tr>
<td>EWT4009250</td>
<td>25 m (82 ft)</td>
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<tr>
<td>EWT4009500</td>
<td>50 m (164 ft)</td>
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<tr>
<td>3KXA163700L0002</td>
<td>700ULTRA panel assembly</td>
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</tbody>
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For a complete list of spares and accessories refer to Operating Instruction OI/700-EN