

ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/700ULTRA-EN REV. J

# 700 ULTRA

Analog pH/ORP sensor



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## Measurement made easy

The 12 mm analog pH/ORP sensor for use in ultrapure 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

### 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 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 700 ULTRA analog pH/ORP sensor

Part of the next generation of ABB's pH/ORP sensors, the analog 700 ULTRA is a high-performance electrode designed for ultrapure water applications. Its reservoir-fed rechargeable design provides extended operation and minimal drift for applications down to 0.055  $\mu\text{S}/\text{cm}$ .

The 700 ULTRA 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 ultrapure applications down to 0.055  $\mu\text{S}/\text{cm}$ , 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.

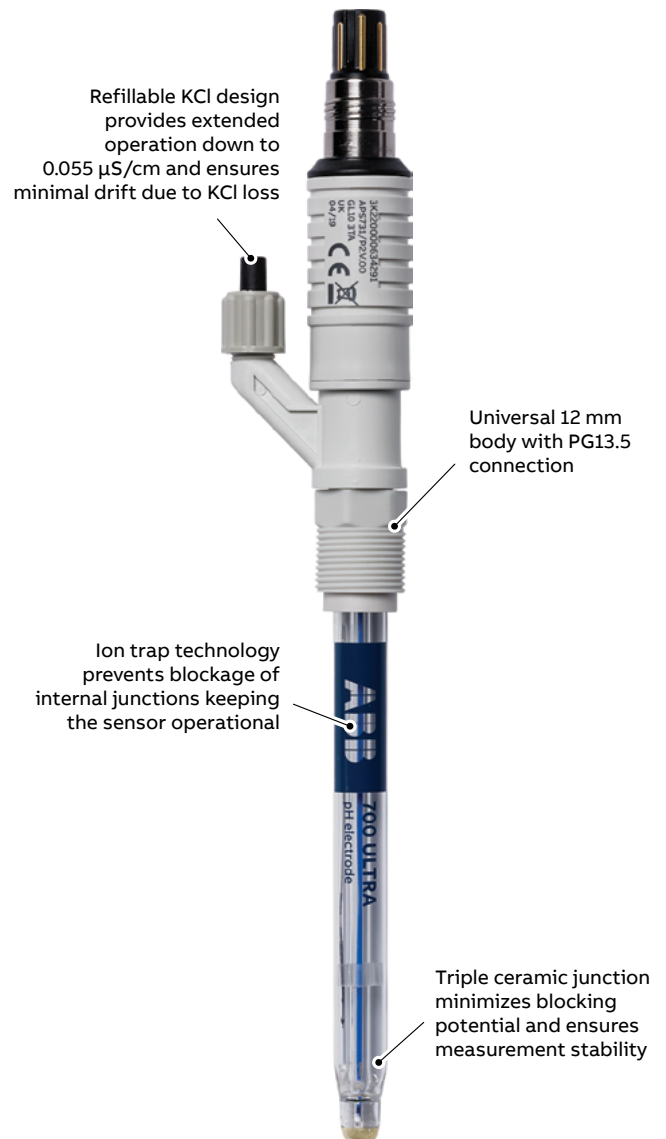


Figure 1 Sensor features

## 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 700 ULTRA 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.

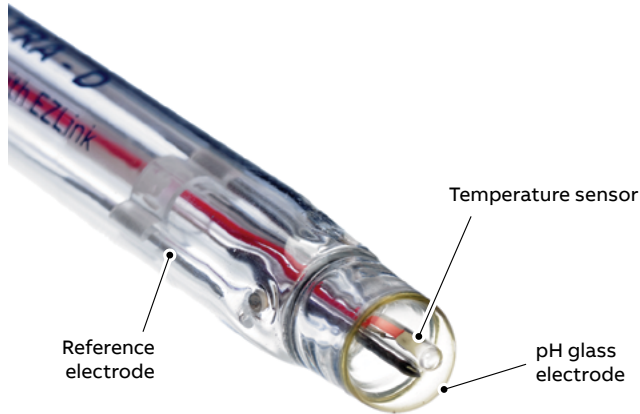


Figure 2 Temperature element location

## Robust glassware

Utilizing ABB's experience in glass manufacturing dating back to the 1950s, the proprietary glass formulations used with the 700 ULTRA 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 3 Low-temperature glass



Figure 4 High-performance glass

## 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 is stored in a specially formulated solution with added antimicrobial agent keeping the sensor active for up to two years when stored as recommended.



Figure 5 Sensor storage

## 700 ULTRA panel

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, flow chambers and pipework
- predrilled panel and transmitter mounting holes
- isolation and flow control valves with indicators
- pH sensor calibration pot and bracket for easy calibration



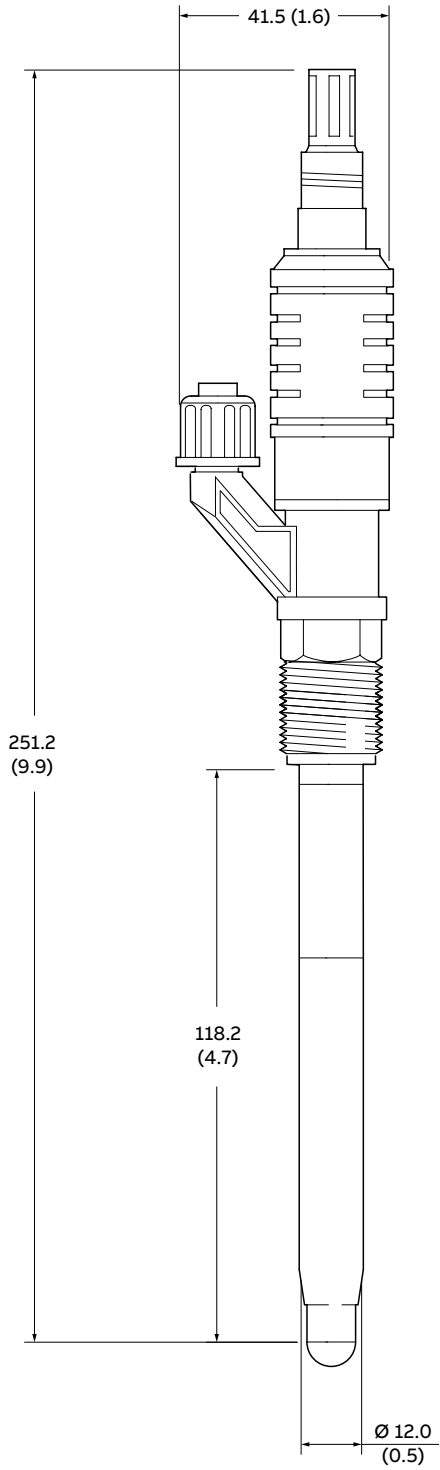
Figure 6 Optional sampling panel

The 700 ULTRA panel offers a ready-to-install kit that makes commissioning quick and easy. Additional mounting accessories designed to improve adaptability are available for the 700 ULTRA sensor and offer safe and convenient operation. The additional accessories include:

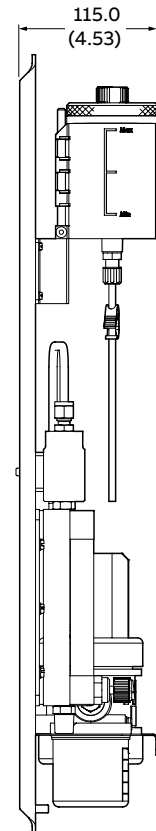
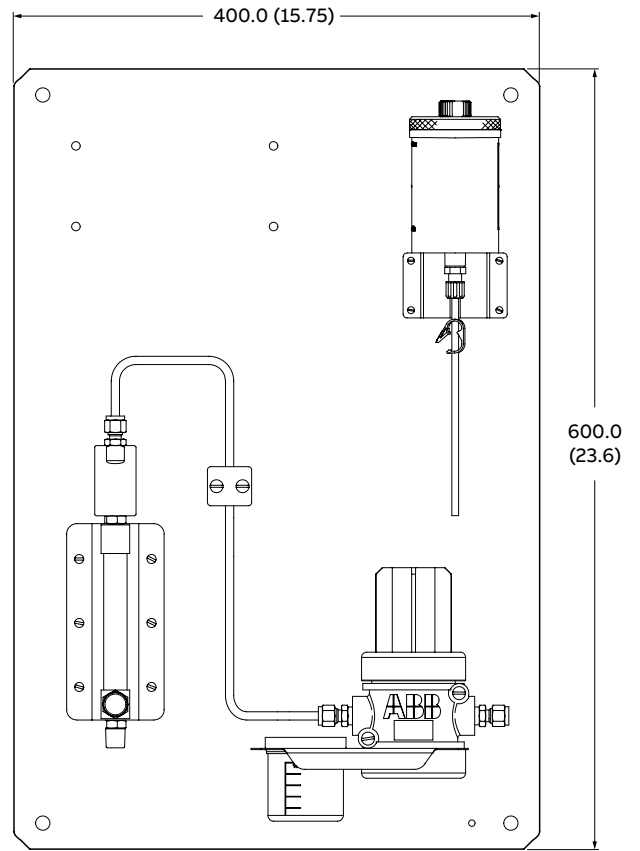
- flowcell
- quick-connect bayonet

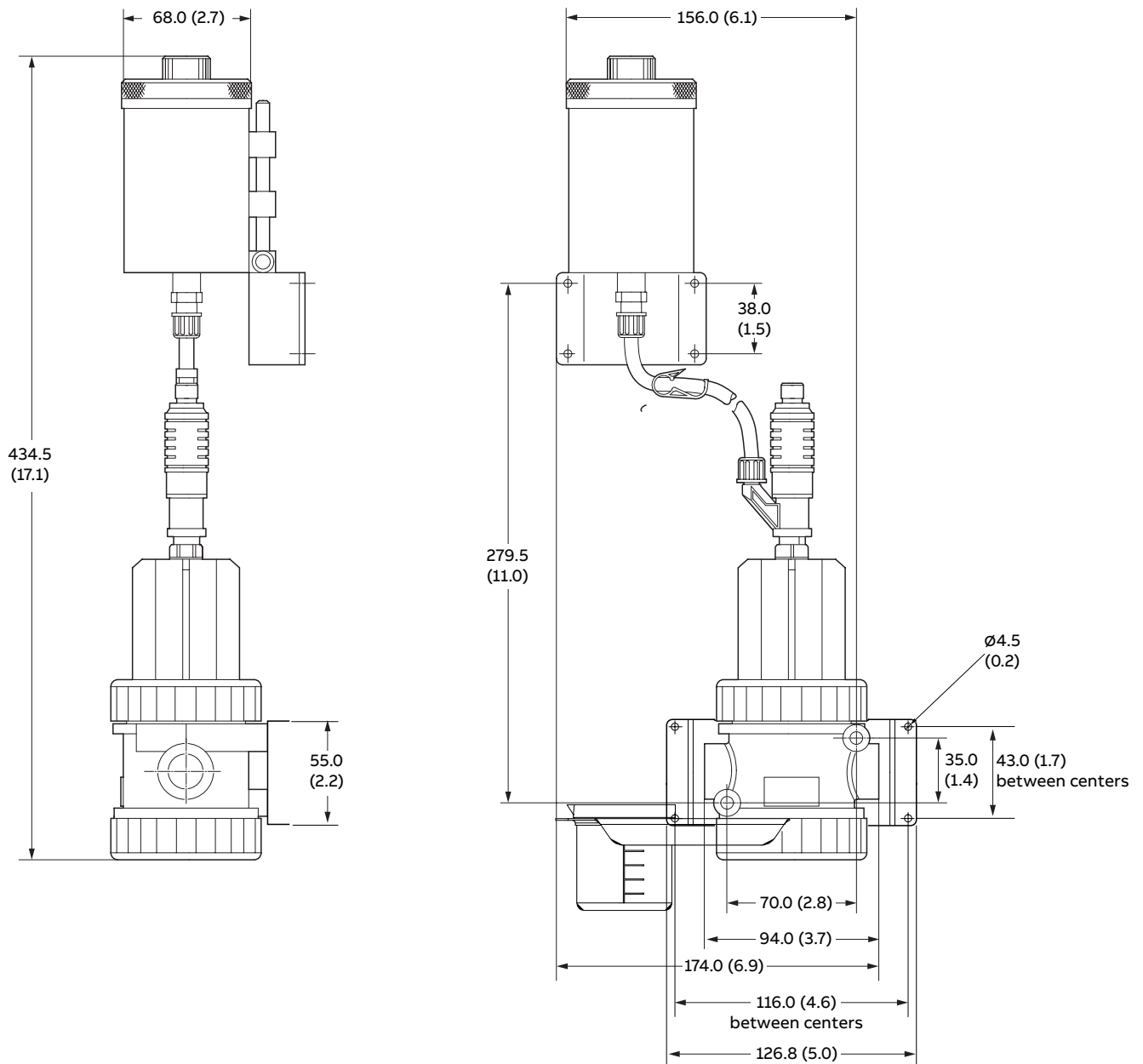
# Dimensions

Dimensions in mm (in)



## Sampling panel



**Reservoir/flowcell assembly**

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## Electrical connections

Wire color	Function
Blue	Glass electrode/ORP
Yellow	Guard
Black	Reference electrode
Red	2-wire compensation
White	2-wire compensation
Gray	3 <sup>rd</sup> wire

## 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

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

Pt100 (Class B, IEC 60751)

### Maximum pressure

Atmospheric

### Recommended minimum sample conductivity

0.055 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 12 mm flowing junction pH/ORP electrode	AP5731/	XX	X	Option
<b>Sensor type</b>				
pH – bullet glass for standard applications: high-performance (S) glass		P2		
pH – low-temperature (LT) glass		P4		
ORP (Redox) – platinum		R4		
<b>Connection type</b>				
VarioPin cable connector <sup>1</sup>			V	

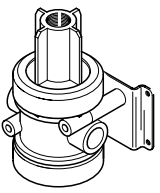
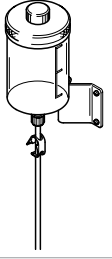
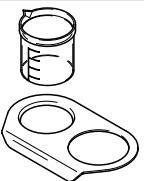
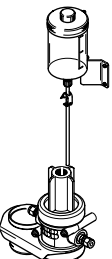
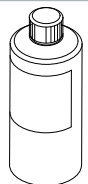
### Optional order codes

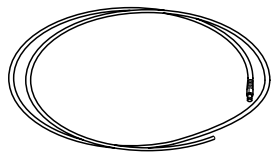
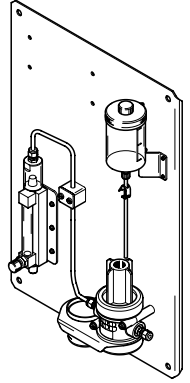
Add 1 or more of the following codes after the standard ordering information to select any additional options if required:

<b>Detachable VarioPin cable extension</b>				
1 m (3.3 ft)				01
3 m (9.9 ft)				03
5 m (16.4 ft)				05
10 m (32.8 ft)				10
<b>Flow cell systems</b>				
Panel-mounted system for ultrapure water applications. Includes: flow cell, reservoir, flowmeter, flow alarm and calibration cup holder mounted on a stainless steel panel (¼ in NPT process connections)				F05
Stainless steel flow cell kit for ultrapure 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
<b>Operating instruction</b>				
English				M5
German				M1
Italian				M2
Spanish				M3
French				M4
Chinese				M6
Polish				M9
Portuguese				MA
Turkish				MT

<sup>1</sup> All VarioPin cables are supplied with tagged leads.

## Accessories

Part number	Description	
3KXA163000L0013	½ in NPT stainless steel flow cell + PG13.5 adapter	
3KXA163000L0014	½ in NPT polycarbonate flow cell + PG13.5 adapter	
3KXA163700L0001	Reservoir complete with mounting bracket assembly	
3KXA163000L0120	Calibration kit (includes calibration beaker and holder)	
3KXA163700L0005	½ in NPT stainless steel flow cell + reservoir + calibration kit	
3KXA163700L0006	½ in NPT polycarbonate flow cell + reservoir + calibration kit	
3KXA163700L0007	3.5 M KCl solution, 500 mL	

Part number	Description	
3KXA163000L0051	VarioPin cable <sup>1</sup>	
3KXA163000L0052	1 m (3.3 ft)	
3KXA163000L0053	3 m (9.9 ft)	
3KXA163000L0054	5 m (16.4 ft)	
3KXA163000L0055	10 m (32.8 ft)	
3KXA163000L0056	15 m (49.2 ft)	
3KXA163000L0056	30 m (98.4 ft)	
3KXA163700L0002	700 ULTRA panel assembly	

For a complete list of spares and accessories, refer to Operating Instruction [OI/700](#).

<sup>1</sup> All VarioPin cables are supplied with tagged leads.

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## Trademarks

- EZLink is a trademark of ABB Limited.



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