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

100 ULTRA

Analog pH/ORP sensor



Measurement made easy

The ¾ in analog 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

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 analog pH/ORP sensor

Part of the next generation of ABB's pH/ORP sensors, the analog 100 ULTRA 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 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 analog 100 ULTRA 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 provides 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 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.

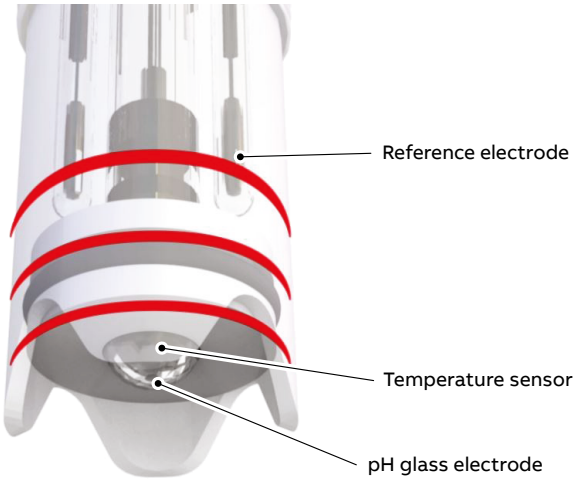


Figure 2 Temperature element location

Robust glassware

Utilizing ABB's experience in glass manufacturing dating back to the 1950s, the proprietary glass formulations used with the 100 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 High performance (S) glass – flat with flush body



Figure 5 Low temperature (LT) glass with notched body



Figure 4 ORP electrode with notched body

Product adaptability

The 100 ULTRA 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 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 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.

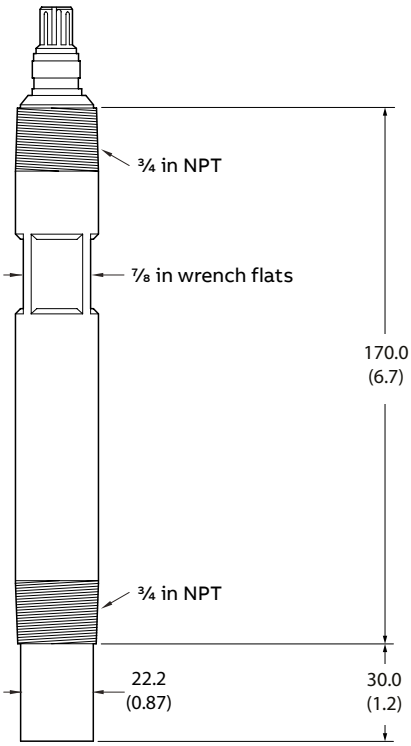
The 100 ULTRA is stored in a specially formulated solution with added antimicrobial agent, keeping the sensor active for up to two years when stored as recommended.



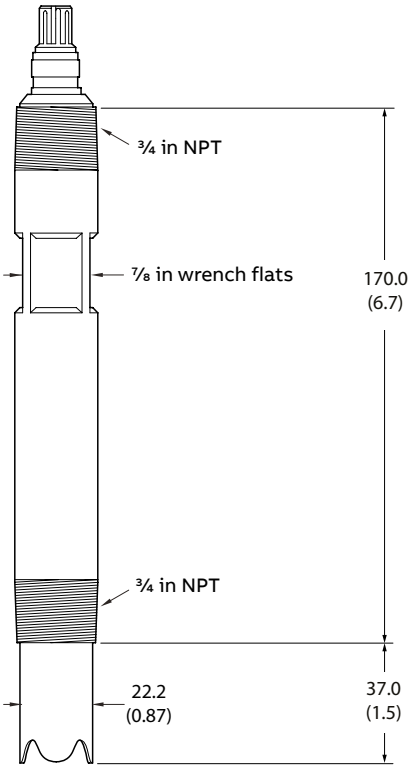
Dimensions

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

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

Pt100 (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

VarioPin connector IP rating
IP67/NEMA 6P
VarioPin cable options
1, 3, 5, 10, 15, 30 m (3.3, 9.8, 16.4, 32.8, 49.2, 98.4 ft)
BNC or tagged leads options
1, 3, 5, 10 m (3.3, 9.8, 16.4, 32.8 ft)
Maximum length
Up to 30 m (98.4 ft) VarioPin
Up to 10 m (32.8 ft) BNC or tagged leads

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

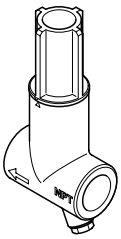
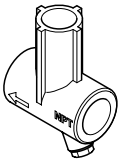
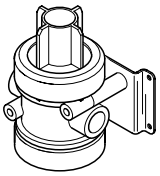
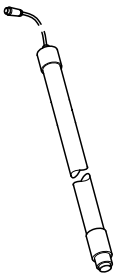
CRN approval
Maximum allowable working pressure (MAWP): 5.58 bar (81 psi)
Design temperature: -5 °C to 105 °C (23 °F to 221 °F)
CRN number: 0F22557

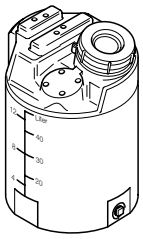
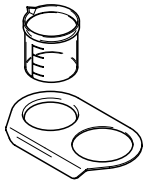
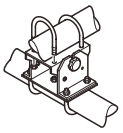
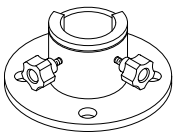
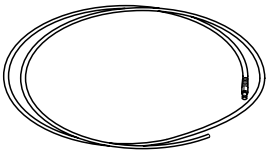
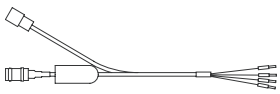
Ordering information

100 ULTRA ¾ in pH/ORP electrode	**APS131/**	**XX**	**XX**	**X**	**XX**		**XX**
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							
Tagged leads				A			
BNC on pH/ORP + temperature compensator connector				N			
VarioPin cable connector[1]				V			
Integral cable length							
None[2]					00		
1 m (3.3 ft)					01		
3 m (9.9 ft)					03		
5 m (16.4 ft)					05		
10 m (32.8 ft)					10		
Optional order code							
Operating instructions							
English							M5

1 All VarioPin cables are supplied with tagged leads.
2 Available only for VarioPin cable connector.

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	
	VarioPin cable[1]	
3KXA163000L0051	1 m (3.3 ft)	
3KXA163000L0052	3 m (9.9 ft)	
3KXA163000L0053	5 m (16.4 ft)	
3KXA163000L0054	10 m (32.8 ft)	
3KXA163000L0055	15 m (49.2 ft)	
3KXA163000L0056	30 m (98.4 ft)	
3KXA877420L0067	BNC/Molex® to tagged leads adapter	

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

1 All VarioPin cables are supplied with tagged leads.

Acknowledgements

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

ABB Measurement & Analytics

For your local ABB contact, visit:
www.abb.com/contacts

For more product information, visit:
www.abb.com/measurement

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