JANUARY 2020

Next generation pH

The most versatile pH range that works the way you want to work

Customer Presentation

Agenda

Introducing ABB’s next generation range of pH and ORP sensors

Simplifying electrode selection

Smarter, faster and more accurate measurement

Key product features, benefits and areas of application

Summary

ABB’s next generation pH range

Intelligent pH and ORP sensors that work the way you want to work

Next generation pH range

Our next generation range of sensors bring together over 70 years of ABB pioneering pH sensor development and application expertize with the latest advanced digital technology and sensor diagnostics.

The result, a new range of electrodes that are simple to select, own and operate, each combining the perfect combination of performance and price for cost-effective process control.

Benefits include

- Simplified selection
- Superior performance and longevity
- Increased diagnostics

Simplified electrode selection

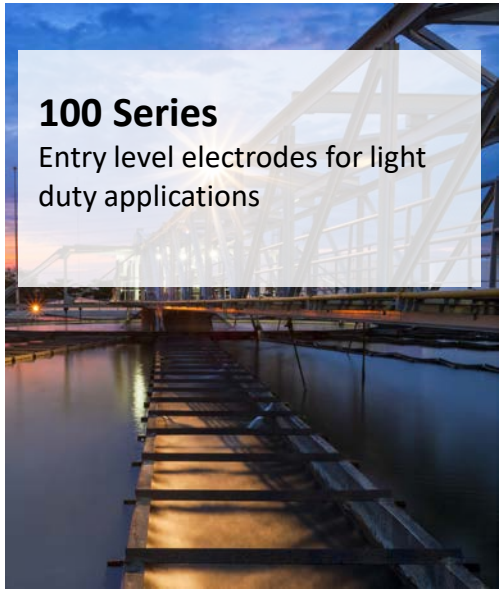
Maximizing electrode performance

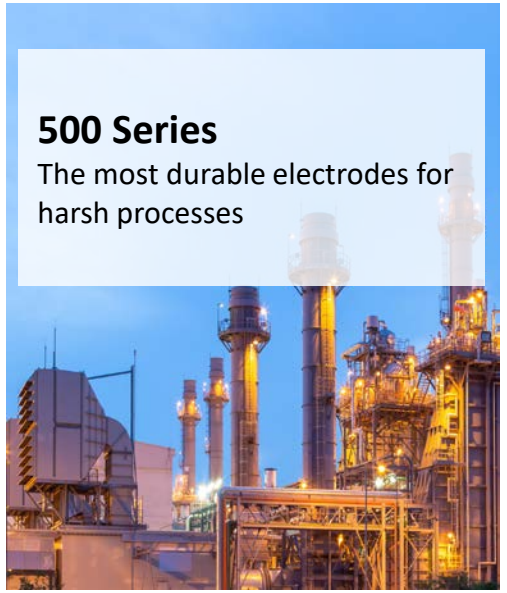
Three application based ranges

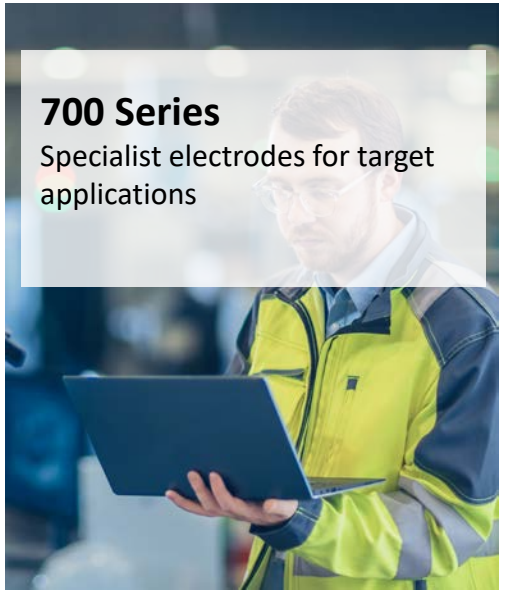
When it comes to electrode selection we believe in keeping things simple.

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.

This ensures you can easily select the best sensor to meet your needs, ensuring optimal plant efficiency, performance and lifetime; every time.







Next generation pH range

First releases of this exciting new range of pH and ORP electrodes

100 Series

500 Series

700 Series

100 E

Eco-efficient pH measurement

- Simple to integrate 12mm design
- Excellent mechanical protection
- Double-junction reference protection for prolonged life

100 GP

Complete confidence in general process applications

- Highly accurate with fast response times
- Durable robust design with high poisoning resistance
- Resistant to fouling

100 ULTRA

Simplified measurement in low conductivity applications

- No electrolyte replenishment needed
- Long operational life in low conductivity solutions
- Suitable for pressurized systems

500 PRO

High performance industrial sensor for harsh applications

- High chemical resistance
- Excellent poisoning resistance
- ATEX/IECEx certified for use in hazardous areas

700 ULTRA

The ultimate rechargeable sensor for demanding ultra-pure water pH accuracy

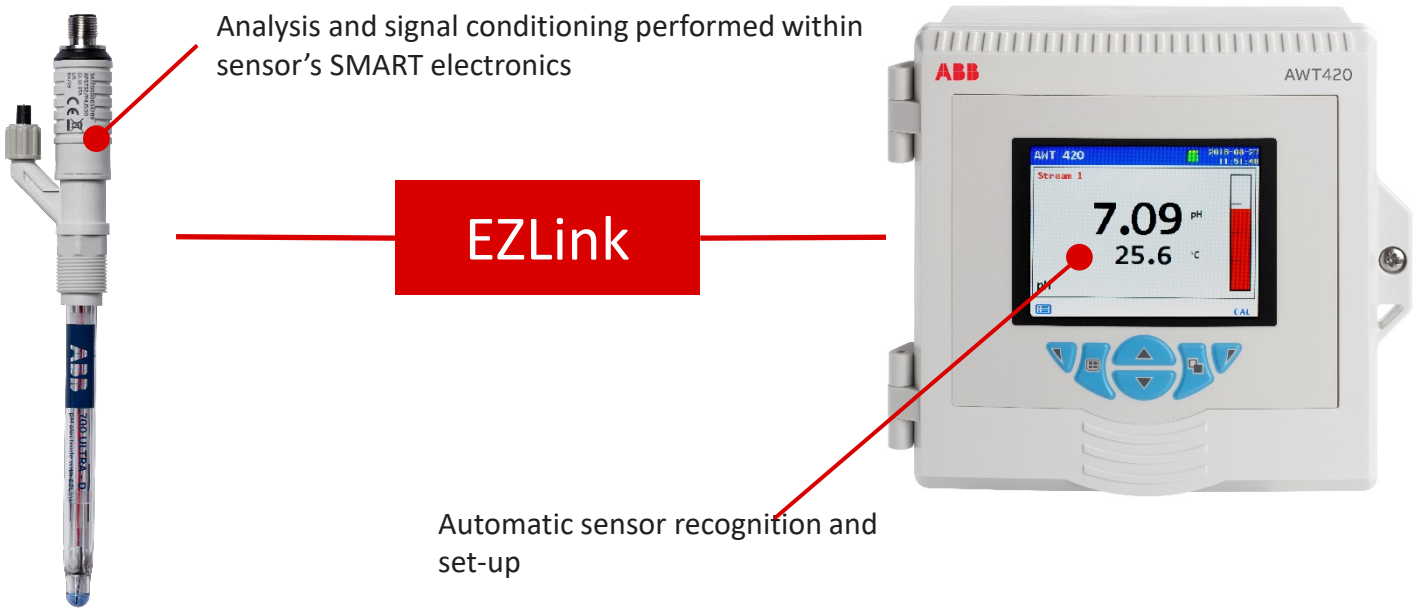
- Reservoir-fed design for extended operation
- Ultra-fast response times
- High measurement stability

Each electrode is clearly named with color-coding for ease of identification.

EZLink

Making measurement easy

A simpler way to measure: Smarter, faster and more accurate



EZLink plug-and-play technology

- Reduces time needed for installation
- Removes uncertainty during commissioning

Sensor health check diagnostics

- Maximize sensor lifetime – only replace sensors when necessary
- Improved measurement confidence with reduced process downtime

Enhanced measurement accuracy

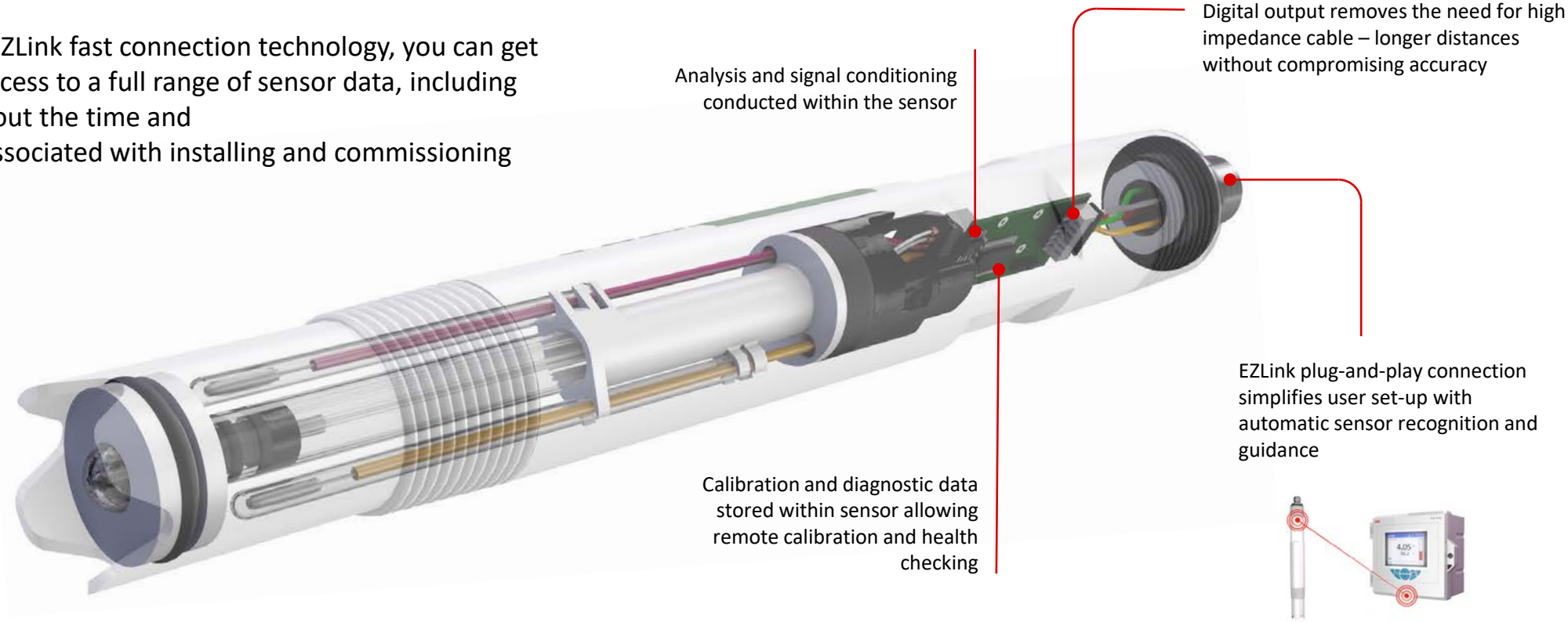
- Fast temperature response
- No degradation of signal integrity through sensor cables or electrical interference

Saving money, reducing maintenance time and improving plant performance

A smarter way to measure pH

EZLink digital connectivity

Thanks to ABB's EZLink fast connection technology, you can get quick and easy access to a full range of sensor data, including diagnostics, without the time and hassle typically associated with installing and commissioning sensing systems.



Enjoy smarter lifelong pH measurement

The pH sensor that tells you when it’s time to change!

The arduous and demanding nature of many pH measurement applications can take their toll on even the most rugged pH sensors.

Electrode lifetime is known to be difficult to predict - sensor failures can occur slowly, such as the gradual poisoning of the reference electrode or sudden as in the case of pH electrode breakage.

Our intelligent diagnostics increase operational confidence and maximize electrode service life. Enabling users to reduce operational expenditure without risking process control.

Reference Electrode Monitoring (REM)
ABB’s Reference Electrode Monitoring (REM) technology, uses a dual reference design to provide an early warning notification of electrode poisoning.

Perpetual impedance diagnostics
Our Perpetual impedance diagnostics (patent pending) analyzes the resistance and impedance between the reference and measuring electrode providing broken glass and out of sample indication without the need for a solution earth.

Enhanced accuracy in temperature varying processes

Up to 60% faster temperature response times

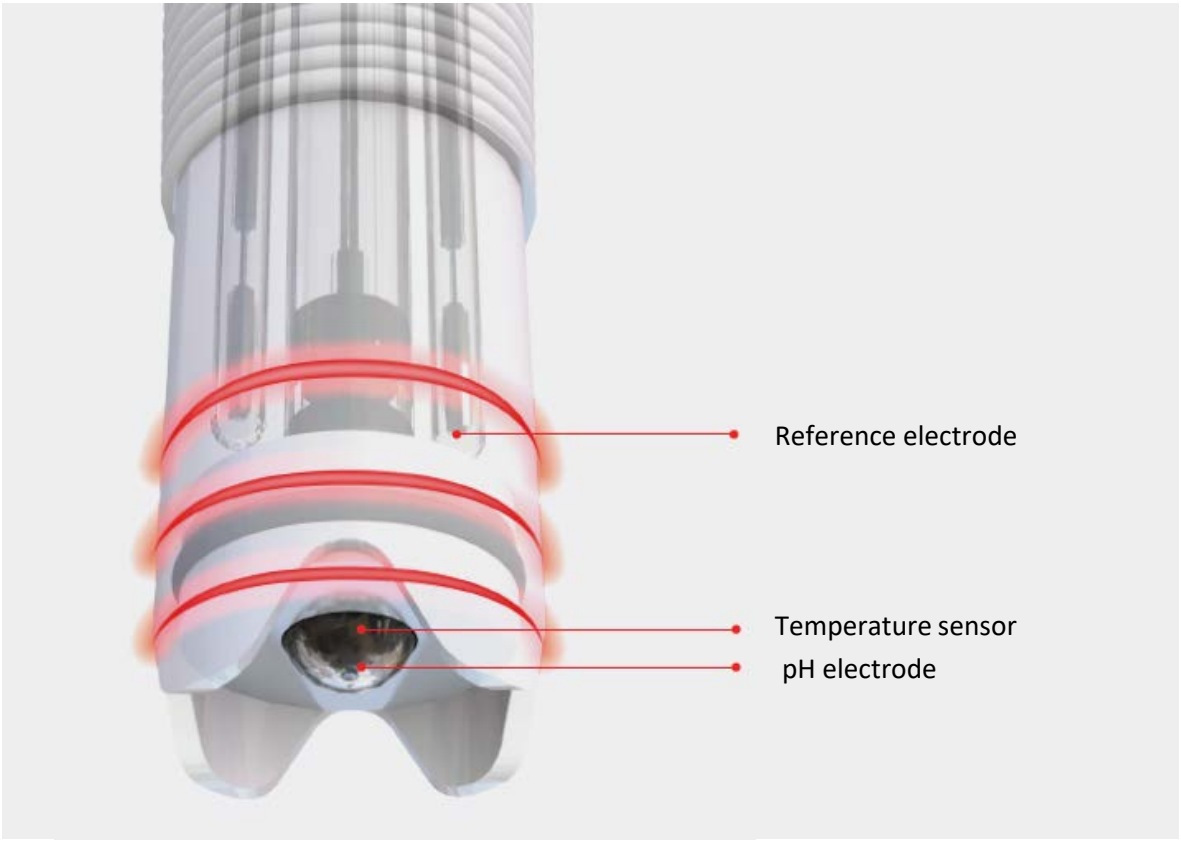
Thermal hotspot

Varying sample temperature is one of the most common causes of pH measurement error.

ABB's electrodes have been designed for optimal temperature compensation by locating the pH electrode, reference electrode and inbuilt temperature sensor together at the electrode tip.

This improves accuracy and enables enhanced process control in applications with changing sample temperatures.

This also reduces calibration costs by minimizing the volume of calibration solution required.



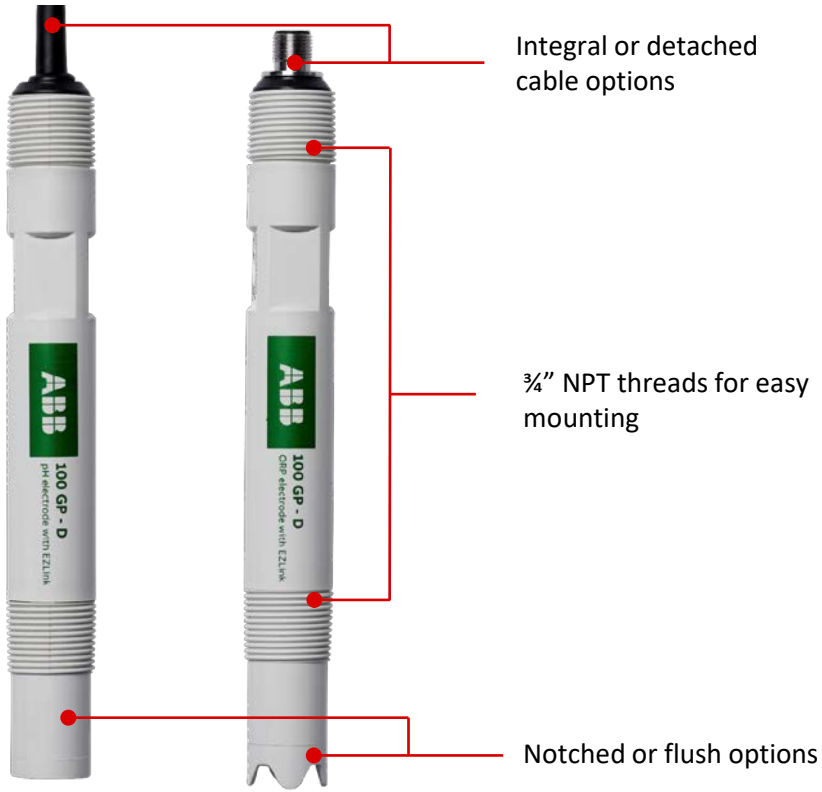
Simplified installation

Universal mounting features

Our robust ¾” NPT electrode bodies are made from PVDF for superior mechanical and chemical resistance and can be easily mounted in a number of configurations with our range of universal installation accessories.

A range of accessories for inline, bypass or immersion (dip) installation are available.

Including; flow cells, T-pieces, dip tubes, cleaning systems and quick-connect bayonet adaptors.



Measurement accuracy you can depend on

From the pioneers of industrial pH measurement

Precision manufacturing

To ensure your probe offers lifelong accurate and reliable measurement, we use the highest quality materials manufactured to the highest standards.

Under the care of our highly skilled engineers, every one of our electrodes goes through a vigorous QA procedure before it leaves our factory to make sure it meets our strict quality guidelines.

We also provide a calibration certificate, so you can be sure of accurate performance from the start.

pH Glassware

Designed for the application

Our unique application driven formulations have been designed to provide the highest reliability and most accurate measurement in the harshest of processes.

High Performance (S) Glass

Our high performance yellow glass sets the standard in industrial pH measurement providing 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.

Low Temperature (LT) Glass

Our renowned blue glass has been specially formulated to provide ultra fast response times when measuring pH in low conductivity solutions or at low temperatures below 15°C (59°F).

High Temperature (HT) Glass

Our durable high temperature glass provides extended operating lifetime when continuously measuring at temperatures greater than 50°C (122°F).

HF/Acid Resistant (HF) Glass

Resistant to attack and etching from hydrofluoric acid, our robust HF glass lasts up to three times longer than other commercially available HF glassware in applications containing up to 1% (10,000ppm) HF.

General Purpose (E) Glass

Our general purpose E glass provides excellent response across the entire pH range thanks to its low impedance and large surface area making it ideal for measurement in general aqueous media

Reduce In-line fouling

Our high performance (S) glass is available in a flat surface design that promotes self-cleaning and provides maximum resistance to fibrous build-up.

Extended storage

New storage solution design for long term 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 new range of pH sensors are stored in a specially formulated solution with added anti-microbial agent keeping the sensor active for up to 2 years when stored as recommended.

Explore the new range

Intelligent pH and ORP sensors that work the way you want to work

100 E

Eco-efficient pH measurement

The 100E series of maintenance-free electrodes combine economical efficiency with dependable operation in a virtually unbreakable 12mm design.

Accurate, reliable and simple to integrate the 100E offers the perfect combination of durability, performance and price.

Areas of application

Designed for low poisoning clean water applications where price is a paramount

- Drinking water, Irrigation, Hydroponics, Aquaculture

100 E

Key features and specification

Integral cable with either BNC or tagged connectors for universal connection

PG13.5 process connection for quick installation and removal

12mm Ultem body provides excellent mechanical protection and prevents accidental breakage

Double junction reference protection for prolonged life

Optional PT100 temperature element for temperature compensation

Specifications	
Measuring range	pH 0 to 14 pH Redox (ORP) -2000 to 2000 mV
Process temperature	0 to 60°C (32 to 140 °F)
Pressure range	0 - 6 bar (90 psi) @ 25 °C (77 °F)
pH glass	[GP General purpose glass bulb]
Redox (ORP)	Platinum
Reference system	Double junction Ag/AgCl KCl in gel matrix
Reference junction	Pellon, silicon bushing
Analog connection	[BNC] [Wire]
Digital connection	Not available
Cable lengths	1 m (3.3 ft.), 3 m (9.8 ft.), 5 m (16.4 ft.)

100 GP

Complete confidence in general process applications

The 100 GP brings together exceptional performance and durability into one efficient maintenance-free design.

Highly accurate with fast response times the versatile 100 GP provides complete confidence in a wide range of general process applications including drinking water, municipal wastewater and cooling waters.

Areas of application

Cost effective probe designed to give complete confidence in general process applications

- Drinking water, municipal wastewater, cooling water, food and bev

100 GP

Key features and specification

- Digital or analog options available with integral or detached cables
- Robust PVDF body provides high chemical and abrasion resistance
- Perpetual impedance diagnostics detect electrode faults in real-time
- Extended double junction reference protection with reference shielding for prolonged life
- Reference Electrode Monitoring (REM) system provides early warning notification of electrode poisoning
- Built-in temperature sensor located in the pH glass for precise measurement and compensation
- Large PTFE reference junction provides resistance to fouling
- Notched or flush design

Specifications	
Measuring range	pH 0 to 14 pH Redox (ORP) -2000 to 2000 mV
Process temperature	-5 to 60°C (23 to 140 °F)
Pressure range	0 - 6 bar (90 psi) @ 25 °C (77 °F)
pH glass	High performance (s) glass (bullet) High performance (s) glass (flat) Low temperature (LT) glass
Redox (ORP)	Platinum
Reference system	Extended double junction Ag/AgCl design plus ion trap in gel matrix
Reference junction	Porous PTFE and Viton O-rings
Analog connection	[BNC + Molex] [Tagged] [VarioPin]
Digital connection	EZLink
Cable lengths	1 m (3.3 ft.), 3 m (9.8 ft.), 5 m (16.4 ft.) 10m (33ft)

100 ULTRA

Simplified measurement in low conductivity applications

With no electrolyte to top-up, the 100 ULTRA reduces the maintenance requirements and costs typically associated with pure water applications.

The 100 ULTRA features a high volume internal chamber containing super-saturated electrolyte matrix with a large porous PTFE junction that provides added measurement stability with minimal drift for long-term measurement down to 2 µS/cm.

Areas of application

Cost effective sensor for low conductivity applications

- Boiler water, demin water, power plants, steam water analysis, reverse osmosis, condensate/feedwater

100 ULTRA

Key features and specification

Digital or analog options available with integral or detached cables

Robust PVDF body provides high chemical and abrasion resistance

Perpetual impedance diagnostics detect electrode faults in real-time

High volume internal chamber containing super-saturated electrolyte

Reference Electrode Monitoring (REM) system provides early warning notification of electrode poisoning

Built-in temperature sensor located in the pH glass for precise measurement and compensation

Large surface area PTFE junction provides great stability and responsiveness in low conductivity measurements with excellent fouling resistance

Specifications	
Measuring range	pH 0 to 14 pH Redox (ORP) -2000 to 2000 mV
Process temperature	-5 to 100°C (23 to 212 °F)
Pressure range	0 - 6 bar (90 psi) @ 25 °C (77 °F)
pH glass	High performance (s) glass (bullet) High performance (s) glass (flat) Low temperature (LT) glass
Redox (ORP)	Platinum
Reference system	Extended double junction Ag/AgCl design plus ion trap in saturated KCl matrix
Reference junction	Porous PTFE and Viton O-rings
Analog connection	[BNC + Molex] [Tagged] [VarioPin]
Digital connection	EZLink
Cable lengths	1 m (3.3 ft.), 3 m (9.8 ft.), 5 m (16.4 ft.) 10m (33ft)

500 PRO

High performance industrial sensor for harsh applications

The 500 PRO series provides the ultimate combination of performance, functionality, and durability delivering a competitive offering for harsher industrial applications.

Featuring a triple-junction design with ion traps, reference shielding and Viton® Extreme O-ring protection the 500 PRO provides enhanced poisoning resistance and chemical protection, extending operational lifetime without compromising performance.

ATEX/IECEx certified for use in hazardous area applications

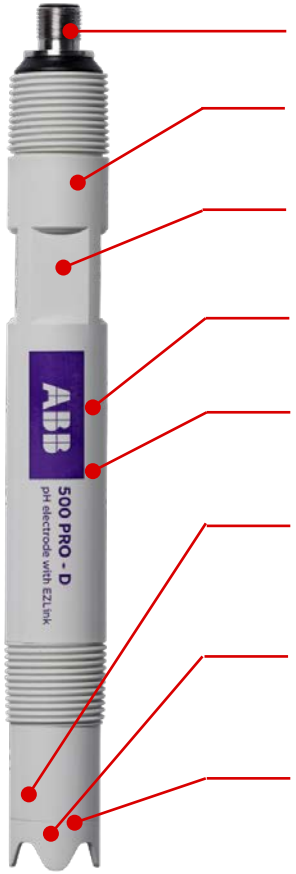
Areas of application

High performance industrial sensor for harsh applications

- Wastewater effluents, scrubbers, dye water, mineral processing, paper mill…

500 PRO

Key features and specification



Digital or analog options available with integral or detached cables

Robust PVDF body provides high chemical and abrasion resistance

Perpetual impedance diagnostics detect electrode faults in real-time

Triple junction design with ion-trap and reference shielding provides enhanced poisoning resistance

Inner tertiary cellular junction matrix slows the movement of poisoning ions

Reference Electrode Monitoring (REM) system provides early warning notification of electrode poisoning

Built-in temperature sensor located in the pH glass for precise measurement and compensation

Large sealed PTFE reference junction with Viton© Extreme O-ring protection provides chemical and fouling resistance

Specifications	
Measuring range	pH 0 to 14 pH Redox (ORP) -2000 to 2000 mV
Process temperature	-5 to 105°C (23 to 221 °F)
Pressure range	0 - 10 bar (145 psi) @ 25 °C (77 °F)
pH glass	High performance (s) glass (bullet) High performance (s) glass (flat) High temperature (HT) glass Low temperature (LT) glass Hydrofluoric acid-resistant (HF) glass
Redox (ORP)	Platinum
Reference system	Triple junction Ag/AgCl design with inner tertiary cellular junction plus ion-trap in gel matrix
Reference junction	Porous PTFE and Viton Extreme O-rings
Analog connection	[BNC + Molex] [Tagged] [VarioPin]
Digital connection	EZLink
Cable lengths	1 m (3.3 ft.), 3 m (9.8 ft.), 5 m (16.4 ft.)

700 ULTRA

The ultimate rechargeable sensor for demanding ultra-pure water pH accuracy

Featuring a rechargeable reservoir-fed design, the 700 ULTRA is capable of extended operation in ultrapure applications down to 0.2 µS/cm.

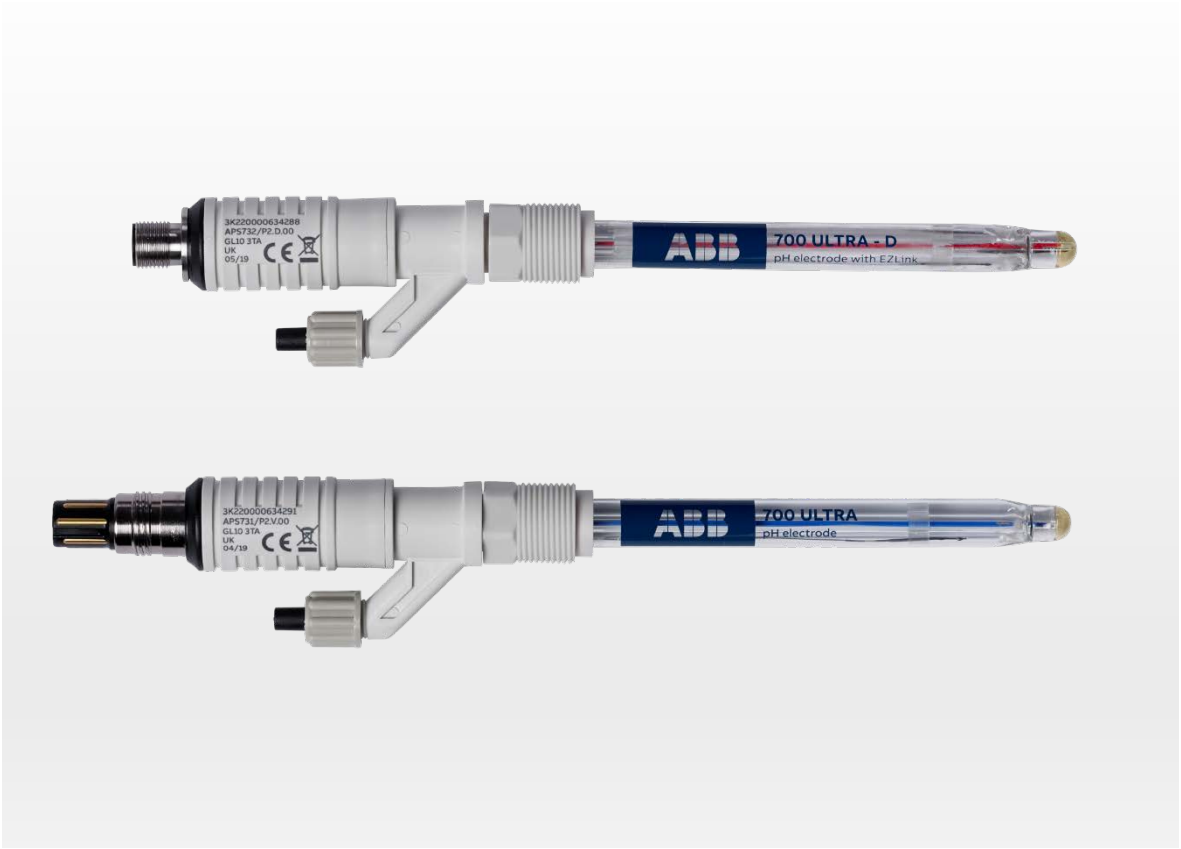
Enhanced with a triple ceramic junction design, the 700 ULTRA has improved speed of response while maintaining measurement stability in the most demanding high purity applications.

Available as a complete sample panel offering for quick and easy installation

Areas of application

Flow-through sensor for ultra-low conductivity applications

- Boiler water, demin water, power plants, steam water analysis, reverse osmosis, condensate/feedwater



700 ULTRA

Key features and specification

- Digital or analog options available with integral or detached cables
- Integral side-arm for easy reservoir attachment
- Perpetual impedance diagnostics detect electrode faults in real-time
- Double-junction design with reference shielding for prolonged use
- Reference Electrode Monitoring (REM) system provides advanced warning notification of electrolyte depletion
- Built-in temperature sensor located in the pH glass for precise measurement and compensation
- Triple ceramic junction ensures the highest measurement stability and fastest speed of response

Specifications	
Measuring range	pH 0 to 14 pH Redox (ORP) -2000 to 2000 mV
Process temperature	-5 to 100°C (23 to 221 °F)
Pressure range	Atmosphic
pH glass	High performance (s) glass (bullet) Low temperature (LT) glass
Redox (ORP)	Platinum
Reference system	Flowing KCl electrolyte with Ag/AgCl double junction
Reference junction	Ceramic
Analog connection	[Tagged] [VarioPin]
Digital connection	EZLink
Cable lengths	1 m (3.3 ft.), 3 m (9.8 ft.), 5 m (16.4 ft.) 10m (33ft)

700ULTRA panel

Fast and simple installation

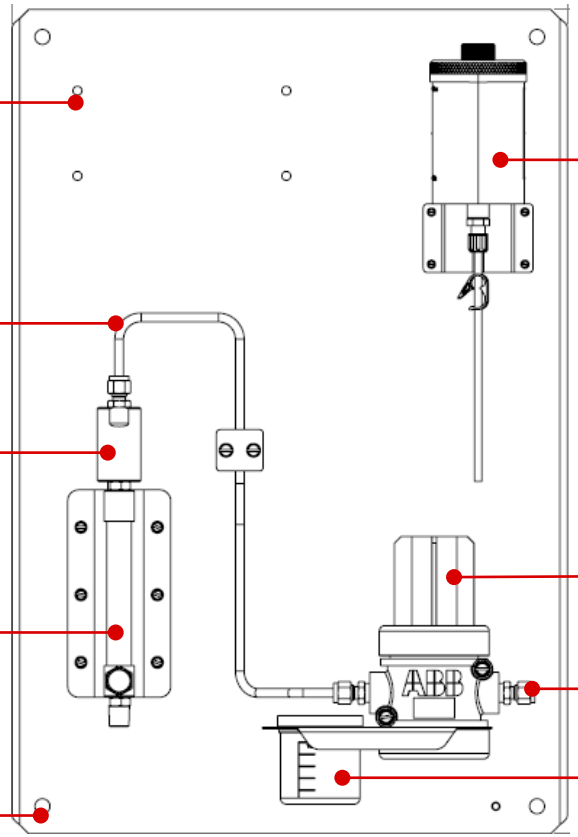
Mounting holes are predrilled to mount the AWT420 transmitter

316 Stainless Steel tubing and flow cell for ultrapure pH measurement

Flow interactor is integrated into the system which can be wired and programmed in the AWT420

To control the flow and reduce waste of solution a VA meter is installed on the panel

The panel comes with a mounting hole in each corner to allow simple integration



Large capacity mounted KCl reservoir, for extended operation between maintenance periods

ABB flow cell to mount the 700ULTRA, ensuring that the pH sensor remains wet when no running solution

¼ inch inlet and outlet connections, for fast and simple installation

The calibration kit offers a quick an easy way to carry out calibrations local to the install

Digital or Analog

Comparison guide

Comparison chart

This summary comparison chart enables you to quickly compare the key features and considerations between ABB analog and digital EZLink pH and ORP sensors.

Key benefits of EZLink digital pH/ORP sensors:

EZLink plug-and-play technology
- Reduces time needed for installation
- Removes uncertainty during commissioning

Sensor health check diagnostics
- Only replace sensors when necessary
- Improved measurement confidence with reduced process downtime

Enhanced measurement accuracy
- No degradation of signal integrity through sensor cables or electrical interference

	Analog	Digital
Factory calibration certificate	✓	✓
Extended storage	✓	✓
Fast temperature response	✓	✓
Detached or integral cabling	✓	✓
Transmitter compatibility	Any ABB or competitor analog pH transmitter	ABB EZLink digital transmitters only
Perpetual impedance diagnostics	Only if used with AWT420	✓
Interference free cabling	✖	✓
Plug-and-play installation	✖	✓
Remote calibration	✖	✓
Reference Electrode Monitoring (REM)	✖	✓

Summary

Next generation pH range

Intelligent pH and ORP sensors that work the way you want to work

Next generation pH range

Improved process control and measurement confidence with reduced operational expenditure and process downtime.

Our next generation range of pH and ORP sensors combine over 70 years of ABB pioneering pH sensor development and application expertise with the latest digital technology and sensor diagnostics for cost-effective process control.

- Application driven designs that are simple to select, own and operate
- Advanced sensor health diagnostics ensure measurement integrity and maximize sensor operational lifetime
- EZLink plug-and-play technology reduces installation and maintenance time
- Enhanced measurement accuracy with fast temperature compensation
- Propriety high performance glassware formulations


ABB