MEASUREMENT & ANALYTICS | DATA SHEET | DS/ADS56X-EN REV. A

AEROSTAR™ ULTRA SERIES

Optical low-level dissolved oxygen sensors

ENGINEERED
TO OUTRUN



MEASUREMENT MADE EASY

Optical brilliance for ultrapure performance

Ultralow detection of dissolved oxygen for critical process control

- Stable optical technology with fast response.
- Unaffected by flow, pressure or CO_2.
- Accurate trace measurement down to 0.8 ppb.
- Suitable for power, semicon, and brewing industries.

Flexible installation options

- Compact 12 mm form-factor for easy integration.
- Suitable for processes up to 85 °C (185 °F) and 12 bar.
- Sterilizable and autoclavable up to 140 °C (284 °F).
- High-quality surface finish (N5) for hygienic applications.

Easy to use

- EZLink™ VP8 connectivity with automatic recognition and set-up.
- Advanced predictive maintenance diagnostics.
- Long-life sensor cap reduces maintenance and process down-time.

AeroStar Ultra and Ultra Trace sensors

ABB's AeroStar Ultra series of sensors deliver ultralow (to sub-ppb) level dissolved oxygen measurement with unmatched precision and reliability, making it the ideal solution for ultrapure water measurements in power, semiconductor, and beverage industries.

Engineered for environments where downtime is costly, the AeroStar Ultra sensors ensure stable, accurate, and low-maintenance performance through its advanced luminescence quenching optical design. Its fast response time, robust construction, and long-lasting sensor cap (up to 2 years) significantly reduce calibration frequency and total cost of ownership.

The AeroStar Ultra provides measurement from 4 ppb to 25 ppm, while the AeroStar Ultra Trace delivers reliable dissolved oxygen monitoring down to 0.8ppb.

The AeroStar Ultra sensors and caps are robust, being made with a high-quality surface finish, and tough electronic components to withstand Sterilization in Place/Cleaning in Place (SIP/CIP), alongside an algorithm to compensate for the high-temperature cycling during SIP and aging effects of photobleaching.

Analysis and signal conditioning is conducted within the sensor housing and transmitted digitally to the transmitter.

Featuring ABB's EZLink™ technology, users of this system just connect and measure, given the automatic sensor recognition/set-up and predictive diagnostics with a real-time health check feature.

Applications
Typical applications for the AeroStar Ultra and AeroStar Ultra Trace optical DO sensors include:

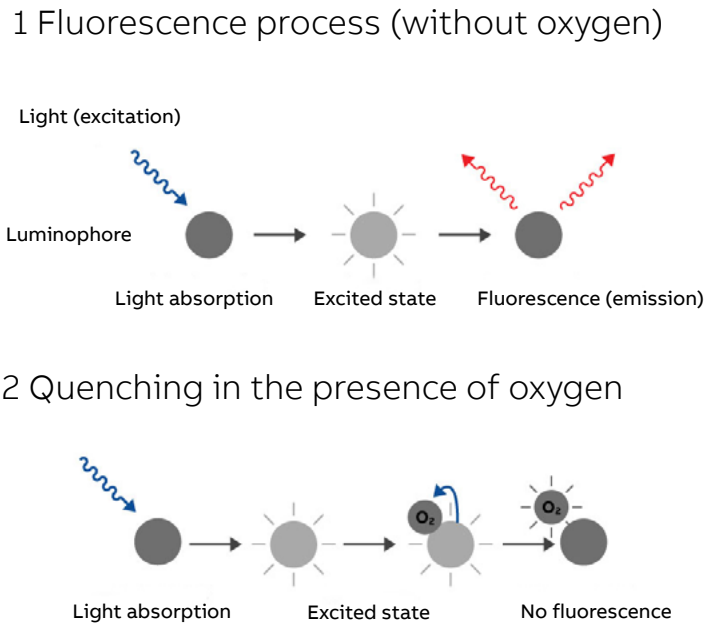
- Power
- Semiconductor
- Food and Beverage

Accurate and reliable measurement

The AeroStar Ultra and AeroStar Ultra Trace optical DO sensors use the latest advancements in optical measurement technology to provide an extremely stable and accurate measurement system that maintains calibration and operates without drift. This enables the system to operate continuously for up to 24 months. The real-time health check feature enables us to monitor the measurement quality, while the advanced diagnostics help to plan maintenance, resulting in less downtime and low cost-of-ownership.

Measuring principle
The optical measurement principle is based on the so-called luminescence quenching. The luminescence of certain organic pigments (luminophore) is quenched in the presence of oxygen.

The luminophore absorbs the excitation light and release a part of the absorbed energy by emission of fluorescence. In the presence of oxygen, energy transfer takes place from the excited luminophore to oxygen. The luminophore does not emit fluorescence and the measurable fluorescence signal decreases.



O1 Fluorescence quenching by oxygen

Easy-to-use and maintain

ABB's AeroStar Ultra sensors feature ABB's EZLink technology, whereby the users only need to connect and measure, when coupled with ABB's latest digital transmitter AWT424. This yields the easiest to use and maintain monitoring system on the market today.

Design
The compact 12 mm design with PG13.5 process connection enables easy integration.
Suitable up to 85 °C (185 °F) and 12 bar (175 psi).
High-quality surface finish of the stainless steel prevents contamination and makes sensors easy to clean and disinfect, compatible with SIP/CIP.



02 AeroStar Ultra sensor

Advanced diagnostics
Health check and predictive diagnostics provide real-time monitoring of quality indicators that enable understanding of the sensor performance, and maximize uptime.

Calibration
The sensor can be calibrated in-process, zero calibration with sodium sulfite and with gas via our AeroStar Ultra calibration Station.
The long-lasting sensor cap (up to 2 years) significantly reduces calibration frequency.

Versatile transmitters

The AWT424 universal four-wire, multi-input transmitter offers true flexibility for measuring a wide variety of parameters in a single device.



03 AWT424 universal 4-wire, multi-input transmitter

The transmitter that gives you more choice
Offering swappable communications and sensor modules, options for panel, pipe, and wall mountings and general-purpose and safety enclosures, the AWT424 is the versatile single-box solution for measuring a range of parameters including pH/ORP, conductivity, dissolved oxygen, and the 4690 turbidity sensor.

The unique modular design of the AWT424 enables the same unit to be used with any of the available or future sensor and communication modules, minimizing stock holding and maximizing operational uptime.

Each module is factory calibrated and can be quickly and securely installed by hand in seconds, providing the ultimate in transmitter adaptability, with no wiring, no complicated sensor set-up or configuration. Simply connect the sensor using the EZLink™ connection and the transmitter configures the sensor setup automatically.

Your data, when you need it

Securely connect to iOS™ or Android™ devices via Bluetooth® using the EZLink Connect app to access essential sensor information wherever and whenever you need it to ensure your process is continually operating at maximum efficiency.

From checking your audit logs to downloading the latest software through your smartphone, we are confident that EZLink Connect will make your life that little bit easier by providing you with a wealth of information and services to support you wherever and whenever you need it.



Secure access to your data
Easy and secure access to measurement, diagnostic and audit data.

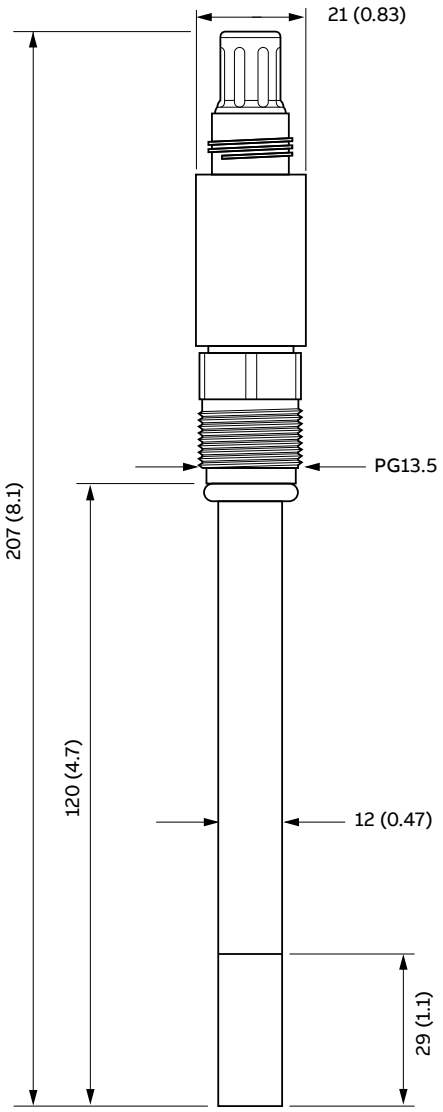
Keep your analysis up-to-date
Access software updates and sensor information through your smartphone.

As standard, the AWT424 fully supports ABB's Dynamic QR code system. Able to instantly summarize both product identification and system diagnostics data, Dynamic QR Code is an invaluable time-saving tool. On-screen QR codes are scanned using ABB's My Measurement Assistant website and a detailed report is instantly generated.

The Dynamic QR code enables easier troubleshooting, create instrument audit trails, and recordings of the installed base. For more information, refer to the AWT424 data sheet: DS/AWT424.

Dimensions

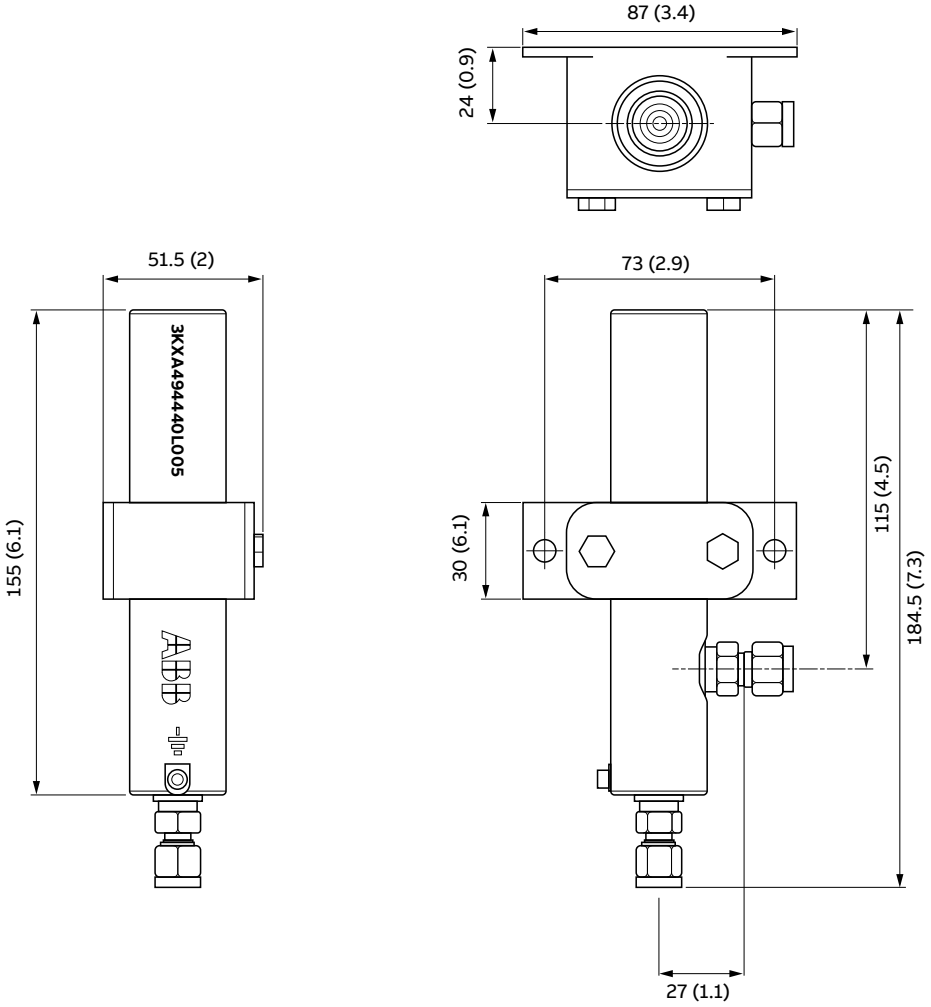
All dimensions in mm (in).



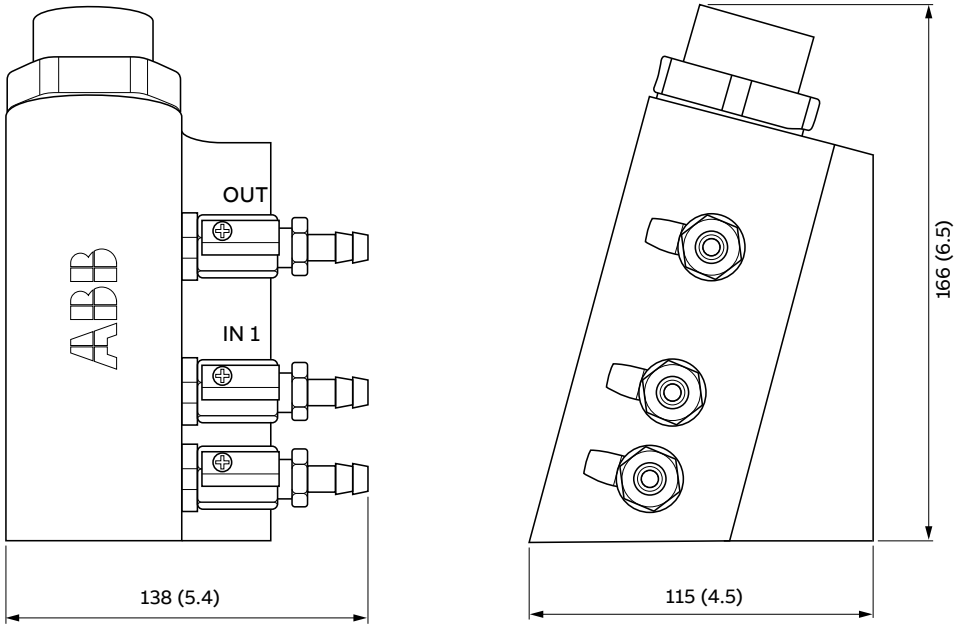
04 AeroStar sensor dimensions

...Dimensions

All dimensions in mm (in).



05 Flow cell dimensions



06 Calibration station dimensions

Specifications – AeroStar sensor

Measurement principle

Oxygen-dependent luminescence quenching with temperature, pressure, and salinity compensation.

Configurable values

Dissolved oxygen

ppb, ug/L, ppm, mg/L, %-vol, %-sat, mbar

Temperature

°C, °F

Measurement performance – AeroStar Ultra

Measuring range*

4 ppb to 25 ppm (in liquid),
100 ppm to 600,000 ppm (in gas)

Accuracy at 25 °C

4 to 400 ppb ± 20 ppb or 5 %, whichever is greater
400 to 8,400 ppb ± 80 ppb or 1 %, whichever is greater
8,400 to 20,000 ppb ± 200 ppb or 1 %, whichever is greater

Response time

t98 %, 30 s at 25 °C

Measurement performance – AeroStar Ultra Trace

Measuring range*

0.8 ppb to 2,000 ppb (in liquid),
20 ppm to 49,000 ppm (in gas)

Accuracy at 25 °C

0.5 ppb, or 2 %, whichever is greater

Response time

t90 % < 20 s in gas, < 90 s in water

Maintenance

Sensor cap replacement interval

24 months (typical)

Shelf-life of sensors and caps

36 months when stored in original packaging at 4 to 40 °C (32 to 104 °F) and humidity < 85 % RH non-condensing environment

Operating range

Operating temperature range**

0 to 85 °C (32 to 185 °F)

Environmental temperature

-20 to 140 °C (-4 to 284 °F)
Sterilizable and autoclavable

Pressure range

-1 to 12 bar (-14.5 to 174 psi)

Wetted materials

- 316L stainless steel
- O-ring: EPDM (Ethylene propylene elastomer) – FDA positive listed
- Silicone PDF 21 CFR 177.260
- VMQ (silicone elastomer)

Wetted parts resistant to:

Standard cleaning and disinfectant solutions (NaOH, ethanol and isopropyl alcohol, active chlorine, chlorine dioxide)

Wetted parts not resistant to:

Ozone, organic solvents

Mechanical data

Electrical connector

EZLink VP8

Process connection

PG13.5

Surface quality

Ra < 0.4 µm (N5)

Ingress protection

IP68 at 1.2 m for 45 mins

Power

Operating voltage

10 to 27 V DC, max. 1.5 W

Approvals

CE

- RoHS2 and RoHS3 – 2011/65/EU + 2015/863/EU including latest version IEC 61010)
- EMC Directive 2014/30/EU

Sensor dimensions

Overall length

207 mm (8.1 in)

Overall diameter

21 mm (0.83 in)

Insertion length

120 mm (4.72 in)

Insertion diameter

12 mm (0.472 in)

* At 25 C and 1,013 mb total gas pressure.

** The sensor provides no DO reading above 85 °C (185 °F).

Specifications – Flow cell

Suitable sensors

Insertion length
120 mm
Insertion width
12 mm
Connection
PG13.5

Dimensions (W × D × H)

51.5 × 87 × 184.5 mm
(2 × 3.4 × 7.3 in)

Operating range

Pressure range
0 to 12 bar (0 to 174 psi)
Temperature range
0 to 85 °C (32 to 185 °F)

Mechanical data

Body
316 stainless steel
Fittings
316 stainless steel
Seals
FKM/stainless steel

Process connection

Main connections pipe/tube
¼ in pipe
Alternative connections
G⅛ in, parallel thread

Specifications – Calibration station

Suitable sensors

Insertion length
120 mm
Insertion width
12 mm
Connection
PG13.5

Dimensions (W × D × H)

137 × 115 × 186 mm
(5.4 × 4.5 × 7.3 in)

Operating range

Max. pressure
0.5 bar (7.3 psi)

Mechanical data

Internal volume, approx.
40 mL
Body material
Black POM
Connector material
Stainless steel 1.4435

Process connection

Barb fitting suitable for approx. 8 mm ID flexible tubing

Ordering information

		Options
AeroStar Ultra sensor	**ADS560.A1**	
AeroStar Ultra Trace sensor	**ADS565.A1**	

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

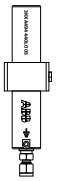
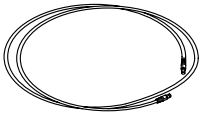
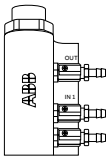
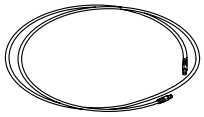
Sensor cable	
EZLink VP8 sensor cable, 3 m (9.8 ft)	V03
EZLink digital sensor extension cable	
1 m (3.3 ft)	E01
5 m (16.4 ft)	E05
10 m (32.8 ft)	E10
15 m (49.2 ft)	E15
25 m (82 ft)	E25
50 m (164 ft)	E50
Flow cell	
12 mm sensor stainless steel flow cell (includes mounting kit)	F1

What's included

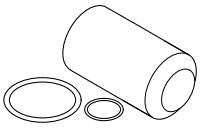
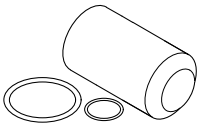
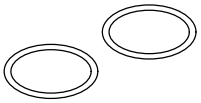
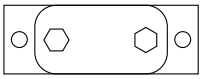
- AeroStar sensor (includes cap)
- Verification certificate
- Commissioning instruction
- Sensor cabling – optional
- Flow cell (includes mounting kit) – optional

Spares and accessories

ACCESSORIES

Part number	Description	
3KXA494440L0005	12 mm sensor stainless steel flow cell (incl. mounting kit)	
3KXA494440L0006	EZLink VP8 sensor cable (3 m)	
3KXA494440L0007	AeroStar Ultra calibration station	
AWT4009010 AWT4009030 AWT4009050 AWT4009100 AWT4009150 AWT4009250 AWT4009500	1 m (3.3 ft) EZLink cable 3 m (9.8 ft) EZLink cable 5 m (16.4 ft) EZLink cable 10 m (32.8 ft) EZLink cable 15 m (49.2 ft) EZLink cable 25 m (82.0 ft) EZLink cable 50 m (164.0 ft) EZLink cable	

SPARES

Part number	Description	
3KXA494440L0003	AeroStar Ultra cap (incl. process connection and sensor cap O-rings)	
3KXA494440L0004	AeroStar Ultra Trace cap (incl. process connection and sensor cap O-rings)	
3KXA494440L0008	O-ring for process connection (pack of 2)*	
3KXA494440L0009	Mounting kit for flow cell	

* **Note:** 1 O-ring included with AeroStar caps 3KXA494440L0003 and 3KXA494440L0004.

Trademarks

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- Bluetooth is a registered trademark of Bluetooth SIG, Inc.
- EZLink is a trademark of ABB Limited.
- iOS is a trademark or registered trademark of Cisco in the US and other countries and is used under license.
- Modbus is a registered trademark of Schneider Electric USA, Inc.

Notes

Notes

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Additional information
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