ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/AUV501-EN REV. E

# UVITEC™ SENSOR

## UV254

ENGINEERED
TO OUTRUN



# MEASUREMENT MADE EASY

Water quality monitoring solutions

**Reliable UV254/UVT measurements utilizing UviTec's Ortho Beam & Split Sense Pro technologies**

- Minimal maintenance, maximum uptime.
- Lab-quality accuracy in real time.
- Dual-wavelength intelligence.
- Long-term stability without drift.

**Easy to maintain**

- Optional chemical cleaning to prevent mineral fouling.
- Straightforward annual service.
- Simple diagnostic messages.

**Key features**

- Easy to install, plug-and-play.
- Auto-zeroing after every measurement.
- Custom calibration features.
- Multiple flow cell path lengths for various applications.

## Introduction to UV254

UV254, or ultraviolet absorbance at 254 nanometers, measures the concentration of aromatic organic compounds in water, primarily humic and fulvic acids from natural organic matter.

UV-C light at 254 nm is the industry standard for germicidal disinfection because it effectively damages microbial DNA and RNA by forming thymine dimers that prevent replication. UV 254 nm is preferred over alternatives because it is non-thermal, non-toxic, leaves no chemical residue, and offers an optimal balance between effectiveness and cost-efficiency in the removal of bacteria, viruses, fungi, and spores.

When drinking water is disinfected with chlorine, it is important to monitor and understand the organic content of the source water. Dissolved organic carbon (DOC), for instance, can promote the formation of disinfection by-products (DBPs) such as trihalomethanes (THMs) and haloacetic acids (HAA5). UV254 can serve as a rapid surrogate measurement for DOC and can help predict the formation of potential DBPs.

For drinking water utilities, monitoring UV254 enables proactive optimization of coagulation and filtration processes to remove organic precursors before disinfection.

In wastewater reuse and industrial applications, UV254 provides real-time tracking of treatment efficiency and early detection of organic pollution events. Unlike laboratory TOC analysis that can take hours or manual grab sampling for turbidity, UV254 offers reagent-free optical measurement from a single sensor, making them essential tools for process control, compliance verification, and safeguarding water quality from source to tap.

## UviTec UV254 sensor

The UviTec UV254 Bypass sensor transforms organics monitoring into a real-time control point, delivering continuous precision data that improves process efficiency, compliance, and operating costs. By measuring UV254 absorbance at 254 nm, an industry-proven indicator of organic load, DBP formation potential, and UV demand, the system provides decision-ready insights without relying on grab samples or lab delays.

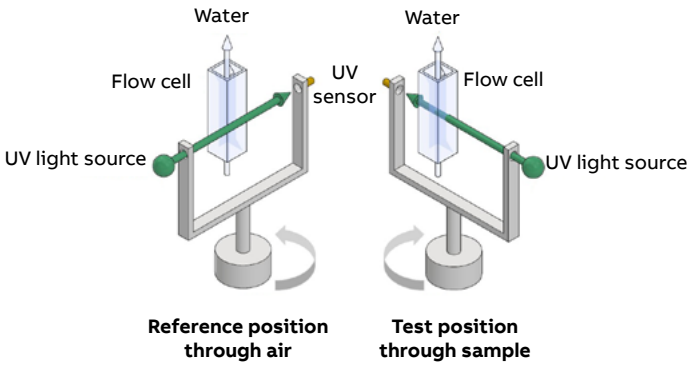
Our unique Ortho-Beam and Split-Sense Pro technologies automatically compensate for lamp drift, fouling, and optical interference, ensuring accurate, stable readings even in challenging wastewater environments. This translates into immediate operational gains: optimized UV disinfection energy, reduced coagulant consumption, early detection of source water changes, and tighter DBP precursor control; thus,delivering lower costs, higher efficiency, and stronger regulatory confidence.

## Controllers and accessories

Our innovative modular product platform ensures our clients gain the real-time water quality monitoring system that meets their specific demands and budget. With multiple controller and accessory options available such as automatic chemical cleaning systems that lower maintenance while improving system performance, ABB provides a total solution for all of your unique water quality needs.

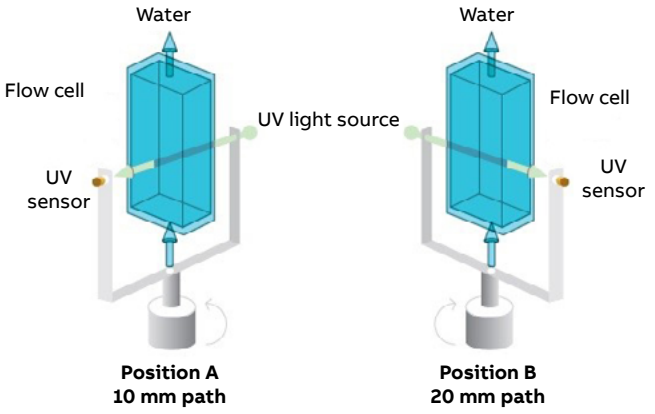
## Split Sense Pro and Ortho-Beam technologies

The UviTec UV254 bypass sensor features innovative Split-Sense Pro or Ortho-Beam technologies that deliver lab-quality accuracy with minimal maintenance requirements. Split-Sense Pro automatically compensates for lamp fluctuations and drift, dramatically reducing calibration frequency and ensuring highly accurate, reliable measurements test after test throughout the lamp's lifetime.




01 Split-Sense Pro technology

Ortho-Beam technology uses a unique dual path length approach, measuring absorbance through a 10 mm path and a 20 mm path. This enables it to intelligently distinguish between actual water quality changes and lamp performance issues while also compensating for fouling on the flow cell walls.
This combination eliminates sensor drift over time, provides long-term stability with factory calibration, and reduces total cost of ownership. Together, these technologies ensure the highest level of confidence in organics monitoring, delivering consistent, real-time results with minimal operator intervention and maximum up-time.




02 Ortho-Beam technology

## Areas of application

**Municipal & Industrial UVT**
- Disinfection optimization & performance enhancement
- Control UV dose & energy usage in treated effluent
  - Typical monitoring point pre-UV disinfection

**Municipal Drinking Water UV254**
- Coagulation optimization & cost saving
- DBP control (as bias to problematic organics)
- Organic removal to prevent DBPs, TOC reduction in treated water
  - Typical monitoring point pre-coagulation and/or Post coagulation

# Specifications

## Path length
**2000 Series**
1, 2, 4, 8 mm
**3000 Series**
10 × 20 mm
**4000 Series**
50, 100, 150, 250 mm

## Technology
**2000, & 4000 Series**
Split-Sense Pro
**3000 Series**
Ortho-Beam

## Parameter
Default: UV254
Inferred: BODeq, CODeq, TOCeq

## Range
Depends on model selected.
Refer to "Sensor models and range" on page 6.

## Units
Default: cm-1
Optional units: mg/L or ppm

## Accuracy
±0.5 % FS

## Sampling time
10 seconds

## Calibration
Zero to purified water. Factory-calibrated. Field adjustment of calibration is possible.

## Cleaning
Optional: In-situ chemical cleaning

## Self-diagnostics
Detection and diagnosis of internal system fault

## Alarms
Dry contact terminals allow for operator configurable alarms for: high and low set points, low lamp output, leak detected, system fault, etc.

## Humidity control
Humidity sensor with large plug-in regenerating desiccant system

## Wavelengths
253.7 nm and 550 nm

## Light source
Low-pressure mercury UV lamp and LED

## Process flow rate
300 to 1,000 mL/min

## Process pressure rating
1.34 bar (20 psi) max.

## Process fluid connections
6.35 mm (0.25 in) OD tube push-in fittings

## Wetted materials
Kynar, polyethylene, quartz, SS 316L, Viton

## Electrical
**Power consumption (max.)**
**2000, & 3000 Series**
200 mA @ 24 volts
**4000 Series**
500 mA @ 24 volts

## Ambient temperature
0 to 45 °C (32 to 113 °F)

## Process water temperature*
0 to 90 °C (32 to 194 °F) at 21 °C (69.8 °F) Ambient temperature

## Enclosure
NEMA 4X, wall-mountable

## Weight
**2000 & 3000 Series**
9.97 kg (22 lb)
**4000 Series**
10.88 kg (24 lb)

## Dimensions (H × W × D)
**2000, & 3000 Series**
432 × 362 × 190 mm
(17 × 14.25 × 7.5 in)
**4000 Series**
451 × 394 × 197 mm
(17.75 × 15.5 × 6.75 in)

## Approvals
CE Mark

* Water temperature range based on material compatibility only. Contact ABB to verify application.

## Sensor models and range*

Includes UviTec UV254 sensor, flow cell, calibration bottle and dehumidifier.
Controller and accessories sold separately.

**Maximum TSS for all 2000, 3000 & 4000 Series bypass sensors is up to 50 mg/L**

### SENSOR MODELS AND RANGE

| Series | Path length | UV254 ($cm^{-1}$) |
|---|---|---|
| 2000 | 1 mm | 0 to 20 |
| | 2 mm | 0 to 10 |
| | 4 mm | 0 to 5 |
| | 8 mm | 0 to 2.5 |
| 3000 | 10 × 20 mm | 0 to 1 |
| 4000 | 50 mm | 0 to 0.4 |
| | 100 mm | 0 to 0.2 |
| | 150 mm | 0 to 0.13 |
| | 250 mm | 0 to 0.8 |

### INFERRED ORGANICS VIA UV254

All ranges in mg/L

| Series | Path length | BODeq | CODeq | TOCeq |
|---|---|---|---|---|
| 2000 | 1 mm | 3 to 1,200 | 6 to 2,400 | 2 to 800 |
| | 2 mm | 1.5 to 600 | 3 to 1,200 | 1 to 400 |
| | 4 mm | 0.75 to 300 | 1.5 to 600 | 0.5 to 200 |
| | 8 mm | 0.375 to 150 | 0.75 to 300 | 0.25 to 100 |
| 3000 | 10 × 20 mm | 0.3 to 60 | 0.6 to 120 | 0.2 to 40 |
| 4000 | 50 mm | 0.06 to 24 | 0.12 to 48 | 0.04 to 16 |
| | 100 mm | 0.03 to 12 | 0.06 to 24 | 0.02 to 8 |
| | 150 mm | 0.02 to 8 | 0.04 to 16 | 0.015 to 5 |
| | 250 mm | 0.012 to 4.8 | 0.024 to 9.6 | 0.01 to 3 |

## Controllers

Controllers include proprietary inputs for UviTec sensors and accessories.

### UVITEC CONTROLLERS

| Part number | Name | Description |
|---|---|---|
| 3KXA300301 V | UviTec Controller | Wall-mounted controller with 4-line × 20-character backlit LCD display. Includes Modbus RTU (RS485), 1 channel of 4 to 20 mA out and digital I/O module |
| 3KXA300302 V | UviTec Controller Pro | Wall-mounted controller with 307 mm (12.1 in) color LCD touch panel PC interface (PC external on door model). Includes Modbus TCP |

## Accessories

### UVITEC ACCESSORIES

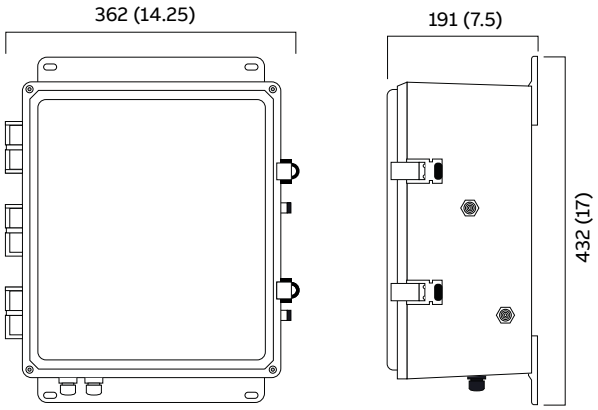
| Part number | Name | Description |
|---|---|---|
| 3KXA300000U0005 | UviTec Clean System I | Automatic chemical cleaning system for use with 2000 & 3000 Series |
| 3KXA300000U0006 | UviTec Clean System II | Automatic chemical cleaning system for use with 4000 Series |
| 3KXA300000U0007 | UviTec Pump Clean System I | Self-priming pump and automatic chemical cleaning for use with 2000 and 3000 Series |
| 3KXA300000U0008 | UviTec Pump Clean System II | Self-priming pump and automatic chemical cleaning for use with 4000 Series |
| 3KXA300000U0013 | UviTec Dual Feed II | Dual feed option includes Digital I/O module for use with controllers |

* Stated ranges are approximate, dependent on industry, site and application. Contact ABB to confirm model selection.

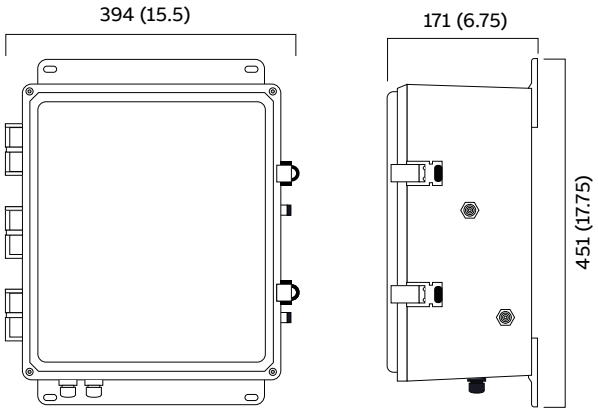
## Dimensions

The UviTec UV254 sensor is bypass cabinet instrument installed directly on a wall, railing or system backboard. Sample is supplied to the sensor from either a pressurized source or from an open-channel using an accessory pumping system.
Dimensions shown in mm (in).

**Dimensions for 2000 & 3000 Series**




**Dimensions for 4000 Series**



# Ordering information

| UviTec UV254 Sensor (ABB part number: 3KXA300501 V) | AUV501/ | XX | X | XXX | Options |
|---|---|---|---|---|---|
| **Parameter** | | | | | |
| UV254 | | ML | | | |
| **Series** | | | | | |
| 2000 Series for general water monitoring | | | 2 | | |
| 3000 Series for general water monitoring (Ortho-Beam) | | | 3 | | |
| 4000 Series for high-purity water monitoring | | | 4 | | |
| **Path length**** | | | | | |
| 1 mm | | | | 010 | |
| 2 mm | | | | 020 | |
| 4 mm | | | | 040 | |
| 8 mm | | | | 080 | |
| 10 × 20 mm | | | | 000 | |
| 50 mm | | | | 050 | |
| 100 mm | | | | 100 | |
| 150 mm | | | | 150 | |
| 250 mm | | | | 250 | |

**Optional ordering codes**

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

| | |
|---|---|
| **Sample handling** | |
| Clean System I for use with 2000 & 3000 Series (pressurized samples) – Modbus | SC3 |
| Clean System II for use with 4000 Series (pressurized samples) – Modbus | SC4 |
| Pump Clean System I for use with 2000 & 3000 Series (non-pressurized samples) – Modbus | SP3 |
| Pump Clean System II for use with 4000 Series (non-pressurized samples) – Modbus | SP4 |
| **Additional sample handling (multiple sel)** | |
| De-bubbler to remove bubbles from sample | SH1 |
| Dual Feed II system enables measurement of two water samples with one analyzer | SH3 |
| **Documentation language** | |
| English | M5 |
| German | M1 |
| Italian | M2 |
| Spanish | M3 |
| French | M4 |
| **Liquid AI – Calibration service** | |
| Calibration health – One time (basic) | LC1 |
| **Liquid AI – Annual subscriptions** | |
| Remote monitoring dashboard - Annual | LD4 |

** Refer to path lengths available for each series in "Specifications" on page 5.

# Trademarks

- Kynar is a registered trademark of Arkema Inc.
- Liquid AI is a registered trademark of ABB Limited.
- Modbus is a registered trademark of Schneider Electric USA, Inc.
- UviTec is a trademark of ABB Limited.
- Viton is a trademark of The Chemours Company FC, LLC.

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