ABB MEASUREMENT & ANALYTICS | DATA SHEET | DS/AUV504-EN REV. C

UVITEC™ SENSOR

BOD/COD



MEASUREMENT MADE EASY

Water quality monitoring solutions

Reliable measurement

- Multi-wavelength LED technology providing superior measurement performance.
- Factory calibrated for immediate deployment with 10-second sampling time.
- Multi-dimensional organic detection responds to immediate composition changes, independent of concentration for enhanced process insight and control.

Easy to operate

- BOD/COD results in 10 seconds compared to 5 days for traditional lab testing with no waiting and no reagents.
- Simple installation and setup: Bypass-style sensor with push-in tube fittings and wall-mountable enclosure.
- Liquid AI® data platform compatible. Remote monitoring and calibration health, providing high degrees of accuracy for critical applications.

Easy to maintain

- Long-life UV LED light source eliminates frequent lamp replacements and reduces consumable costs.
- Optional chemical cleaning to maintain optical window clarity in high-solids applications.
- Continuous diagnostics provide early warning of maintenance needs before failures occur, minimizing unplanned downtime.

BOD and COD: Essential water quality parameters

Biochemical Oxygen Demand (BOD) measures the amount of dissolved oxygen consumed by microorganisms while breaking down biodegradable organic matter in water. BOD indicates what the biodegradable organic pollution is (sewerage, food waste, plant matter, etc.), how well the biological treatment process is working, and the oxygen depletion potential when discharged into the environment.

COD measures the total oxygen needed to chemically oxidize all organic compounds, both biodegradable (sewage, food waste) and non-biodegradable (industrial chemicals, plastics, pesticides). COD is always higher than BOD because it captures all pollutants, while BOD measures only biodegradable organics.

Both parameters are critical for regulatory compliance (effluent discharge limits), environmental protection (preventing oxygen depletion in rivers and lakes that kills aquatic life), process control (optimizing aeration and chemical dosing), and operational cost management. High BOD/COD levels indicate organic pollution from sewage, industrial waste, or agricultural runoff, making continuous monitoring essential for municipal wastewater treatment plants, industrial facilities, and water reuse applications.

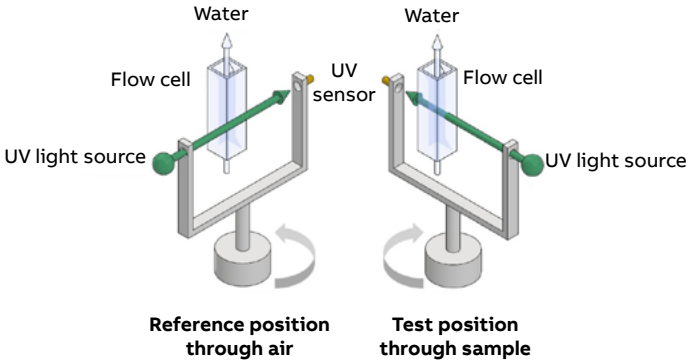
Traditional laboratory methods are slow, expensive, and prevent real-time control. Standard BOD_5 testing requires a five-day incubation period with ±15 to 20 % measurement error due to biological variability, sample handling, and analyst technique. COD testing uses hazardous chemical digestion (strong acids and dichromate) that takes two to three hours with ±5 to 10 % error, generates toxic waste requiring disposal, and poses safety risks to operators. Both methods are labor-intensive, require frequent sampling, and deliver results too late for proactive process adjustments.

UviTec BOD/COD Sensor

ABB's UviTec BOD/COD system revolutionizes organic monitoring by delivering lab-quality results in 10 seconds instead of 5 days. Using our unique Split Sense Pro technology, the system provides continuous, reagent-free measurements with confidence and no hazardous chemicals or waste. Real-time data enables immediate process control, reducing chemical usage, and preventing permit violations through 24/7 compliance monitoring. ABB’s bypass BOD/COD sensor provides affordable real-time measurement of organic matter in water or wastewater. Designed to meet the needs of many monitoring applications, the UviTec BOD/COD sensor offers multiple flow cell designs and sensor path length selections to meet the desired measurement range.

Split Sense Pro

Split-Sense automatically compensates for lamp fluctuations and drift, dramatically reducing calibration frequency and ensuring highly accurate measurements, test after test, throughout the lamp's lifetime.



01 Split-Sense Pro technology

Liquid AI Calibration Health

Liquid AI Calibration Health is an active monitoring service designed to ensure water quality systems produce reliable and accurate data. Unlike traditional global calibrations that lose effectiveness as water conditions change, through Calibration Health new contaminants and composition shifts that could impact calibration performance are incorporated into the calibration to continuously improve performance, maintaining confidence in results, even in complex environments.. Available as a one-time or ongoing service, it transforms UviTec monitoring systems into intelligent solutions that become smarter the longer they operate, delivering the highest level of confidence and trust in water quality measurements.

Measurement principle

ABB's UviTec BOD/COD Bypass Sensor utilizes advanced UV-VIS absorption spectroscopy to deliver real-time organic matter measurements in various water and wastewater applications. The sensor employs Split-Sense Pro technology and emits light across multiple UV/VIS wavelengths, which pass through the water sample along a defined optical path length. Organic compounds, absorb UV light while the transmitted light intensity is measured by photo-detectors.

The system applies the Lambert-Beer Law: $A = \varepsilon \times c \times l$, where:

A = absorbance (Abs/cm)
c = concentration of organic compounds
ε = the molar absorptivity of the compounds
l = the measuring path length, in mm

Multi-wavelength LED technology measures both the concentration and composition of organic matter, enabling detection of changes in wastewater characteristics that single-wavelength sensors cannot identify. This reagent-free optical approach delivers lab-quality BOD/COD results in just 10 seconds.

Areas of application

Municipal wastewater

Early warning systems | BOD/COD
Location: Primary effluent (post grit removal, primary effluent weir)
- Optimize coagulation dosing
- Detect slug events & industrial discharge

Effluent monitoring | BOD/COD
Location: Effluent weir, prior to discharge
- Ensure regulatory compliance
- Verify BOD/COD removal & process efficiency

Industrial wastewater

Dairy wastewater – Influent | BOD/COD
Location: Lift station, pre/post EQ tanks, pre-DAF
- Detect & prevent product loss
- CIP control & pre-DAF polymer dosing
- Surcharge management

Dairy wastewater – Effluent | BOD/COD
Location: Post-DAF, flume
- Feedback treatment optimization
- Surcharge management

Pulp & Paper wastewater

Pulp & Paper – Influent | BOD/COD
Location: Primary effluent weir
- Detect slug events (soap, liquor)
- Nutrient dosing & aeration control

Pulp & Paper – Effluent | COD
Location: Final effluent, post-secondary clarifier
- Non-reportable regulation compliance (BOD equivalent)

Specifications

Path length
1000 Series
0.5, 1, 2, 4, 10 mm
2000 Series
1, 2, 4, 8 mm

Parameters*
BODeq, CODeq

Range
Dependent on model selected.
Refer to tables in "Sensor models and range" on page 6.

Units
mg/L

Sampling time
10 seconds

Calibration
Factory calibrated. Field adjustment of calibration is possible.

Cleaning
In-situ chemical cleaning.
Optional: Automatic 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
Multiple wavelengths

Light source
UV LED

Process flow rate
1000 Series
500 to 1,000 mL/min
2000 Series
300 to 1,000 mL/min

Process pressure rating
1000 Series
5.86 bar (85 psi) max.
2000 Series
1.38 bar (20 psi) max.

Process fluid connections
1000 Series
9.5 mm (0.375 in) OD tube push-in fittings
2000 Series
6.35 mm (0.25 in) OD tube push-in fittings

Wetted materials
1000 Series
Kynar®, FEP, quartz, SS316L, Viton™
2000 Series
Kynar, polyethylene, quartz, SS316L, Viton

Electrical
Power consumption (max.)
1000 Series
600 mA @ 24 volts
2000 Series
200 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
9.97 kg (22 lb)

Dimensions (H × W × D)
432 × 362 × 190 mm (17 × 14.25 × 7.5 in)

Approvals
CE Mark

* Results can not typically be used for compliance, only as an indicator value of organic loading for process control support. BODeq is an equivalent measurement for BOD_5. CODeq is an equivalent measurement for COD.

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

Sensor models and range

Includes BOD/COD sensor, flow cell, calibration bottle and dehumidifier. Controller and accessories sold separately.

Measurement ranges are estimations based on previous field data, and may vary based on plant-specific details. Full measurement range may be greater than the ranges stated in the table below, although accuracy may be significantly reduced outside these stated ranges.

Maximum TSS for all 2000 Series bypass sensors is 50 mg/L.

Maximum TSS for all 1000 Series is up to 2,000 mg/L when used in conjunction with the Pump Clean Pro.

Contact ABB for your application-specific demands.

MUNICIPAL & INDUSTRIAL WASTEWATER

Series	Path length	BOD (mg/L)	COD (mg/L)
1000	0.5 mm	0 to 6,000	0 to 14,000
	1 mm	0 to 3,000	0 to 7,000
	2 mm	0 to 1,500	0 to 3,500
	4 mm	0 to 750	0 to 1,750
	10 mm	0 to 300	0 to 700
2000	1 mm	0 to 3,000	0 to 7,000
	2 mm	0 to 1,500	0 to 3,500
	4 mm	0 to 750	0 to 1,750
	8 mm	0 to 375	0 to 875

DAIRY WASTEWATER

Series	Path length	BOD (mg/L)	COD (mg/L)
1000	0.5 mm	0 to 20,000	0 to 50,000
	1 mm	0 to 10,000	0 to 25,000
	2 mm	0 to 5,000	0 to 12,500
	4 mm	0 to 2550	0 to 6,250
	10 mm	0 to 1,000	0 to 2,500
2000	1 mm	0 to 10,000	0 to 25,000
	2 mm	0 to 5000	0 to 12,500
	4 mm	0 to 2,550	0 to 6,350
	8 mm	0 to 1,275	0 to 3,175

PULP & PAPER WASTEWATER

Series	Path length	BOD (mg/L)	COD (mg/L)
1000	0.5 mm	0 to 1,400	0 to 4,000
	1 mm	0 to 700	0 to 2,000
	2 mm	0 to 350	0 to 1,000
	4 mm	0 to 175	0 to 500
	10 mm	0 to 70	0 to 200
2000	1 mm	0 to 700	0 to 2,000
	2 mm	0 to 350	0 to 1,000
	4 mm	0 to 175	0 to 500
	8 mm	0 to 90	0 to 250

* Stated ranges are approximate, dependent on site and application. Contact ABB to confirm model selection.
* TSS measurement output possible. Contact ABB to confirm.

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

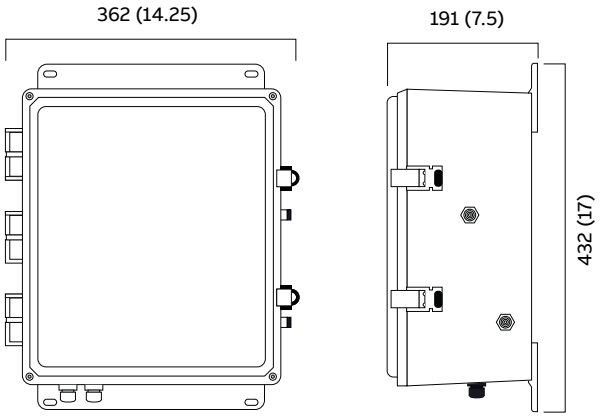
UVITEC ACCESSORIES

Part number	Name	Description
3KXA300000U0005	UviTec Clean System I	Automatic chemical cleaning system for use with 2000 Series
3KXA300000U0007	UviTec Pump Clean System I	Self-priming pump and automatic chemical cleaning for use with 2000 and 3000 Series
3KXA300000U0009	UviTec Pump Clean Pro System (pressurized)	For high solids sample water, automatic chemical cleaning and pumping system for up to 7.62 m (25 ft) vertical lift or 30.48 m (100 ft) horizontal in pressurized installation (no air compressor)
3KXA300000U0010	UviTec Pump Clean Pro System (non-pressurized)	For high solids sample water, automatic chemical cleaning and pumping system for up to 7.62 m (25 ft) vertical lift or 30.48 m (100 ft) horizontal in non-pressurized/ open channel installation (no air compressor)
3KXA300000U0013	UviTec Dual Feed II	Dual feed option includes Digital I/O module for use with controllers

Dimensions

The UviTec BOD/COD sensor is a 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 1000 & 2000 Series



Ordering information

UviTec BOD/COD Sensor (ABB part number: 3KXA300504 V)	AUV504/	XX	X	XXX	Options
Parameter					
BOD/COD		BL			
Series					
1000 Series for closed loop, high pressure/high solids wastewater monitoring			1		
2000 Series for general water monitoring			2		
Path length*					
0.5 mm				005	
1 mm				010	
2 mm				020	
4 mm				040	
8 mm				080	
10 mm				100	

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 Series (pressurized samples) – Modbus	SC3
Pump Clean System I for use with 2000 Series (non-pressurized samples) – Modbus	SP3
Pump Clean Pro System for use with 1000 Series (pressurized)	SP5
Pump Clean Pro System for use with 1000 Series (non-pressurized)	SP6
Pump Clean Pro Upgrades (multiple sel)	
Rinse valve	PUR
Second cleaning valve	PUS
Compressed Air system	PUC
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 (standard)	LC2
Calibration health – One time (advanced)	LC3
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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ABB Measurement & Analytics

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