



BA-SMART UV-VIS PROBE

Multi-parameter depends
on application

Your Trusted Global
Industrial Partner
Since 1990 ISO
9001:2015 Certified

Why BOD and COD an important parameter for measurement?

Biological Oxygen Demand (BOD) and Chemical Oxygen Demand (COD) are two of the most important parameters to characterize (measure the degree of pollution) of wastewater.

BOD, the biological demand for oxygen a source of water has, **is the amount of oxygen used by microorganisms to break down organic substances**. These are usually bacteria (aerobic or anaerobic), yeasts and plankton contained in the water. It is a measure of the degree of contamination and is expressed in mgO₂/L. It is measured via a delicate and time-consuming biological process, which depends on temperature. The standard measurement is performed at 20°C for 5 days and is called BOD₅. The period of 5 days was chosen, as this is the average time it takes a British river to reach the sea.

In general terms, **the greater the pollution, the higher the BOD**. It provides a rough measure and some reference values for certain water types as follows:

Pure: 2 - 20 mg/L	Slightly polluted: 20 - 100 mg/L	Moderately polluted: 100 - 500 mg/L
Highly polluted: 500 - 3,000 mg/L	Extremely polluted: 3,000 - 15,000 mg/L	

COD, the chemical demand for oxygen a source of water has, **is the amount of oxygen required to break down organic substances chemically** and convert them to CO₂ and H₂O. It is also expressed in mgO₂/L, and the higher the COD, the more polluted the water is. However, this test only takes about 3 hours, so much less time is needed for a result than for a BOD test. The COD in industrial water may be 50 - 2,000 mgO₂/L, although it may reach 5,000, depending on the type of industry.

The main difference between BOD and COD

COD measures all organic material, while BOD only measures organic material which is or can be biologically degraded. Therefore, for a given water sample, the COD is always greater than the BOD, and the second result (COD), as the complete chemical oxidation of the sample, can be considered to include the first.

BOD and COD are related and maintain their relationship for each type of water. The relationship is not the same for different types of water; however, industrial water of the same type has a similar BOD/COD relationship.

By providing more information and being quicker to obtain, the COD is becoming the reference standard in the field.

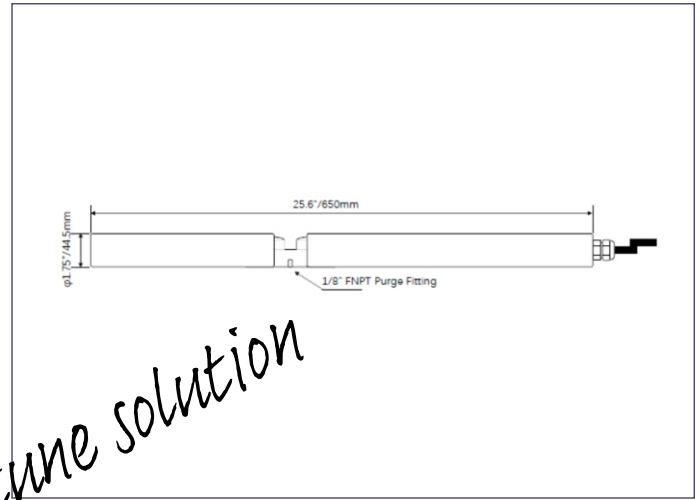
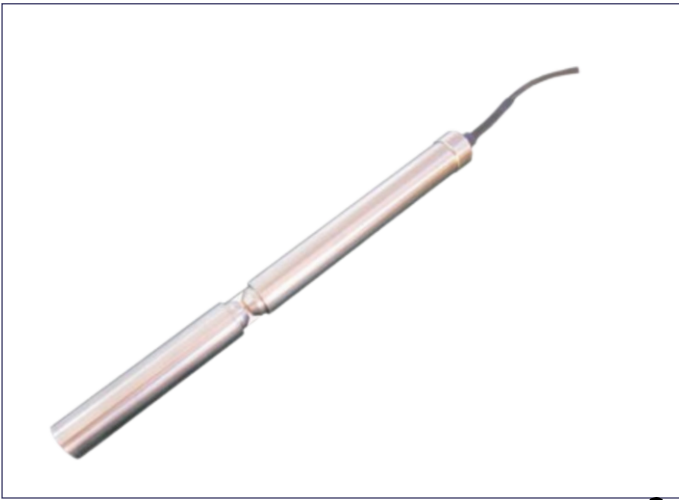
Brasten BA SMART UV VIS Multiparameter Probe

Introduction

BA-Smart UV-VIS is the new generation of immersion spectra analyzing sensor. It uses standardized spectra algorithms by taking the complete 200 to 720 nm absorption spectrum of water into account to determine the nitrogen and carbon compounds. BA-Smart UV-VIS's spectrum compensation for light absorbing particles and turbidity provides a unique and high sensitivity approach that allows the monitoring of dissolved organic substances without sample pre-treatment. BA-Smart UV-VIS gives reliable readings for NO₃-N, NO₂-N, organic ingredients (CODeq, BODeq, DODeq, TODeq), and a number of other parameters.

The sensor can be submerged into water by mounting hardware or using flow cell for bypass installation.

Measurement path length is from 0.5 to 35 mm. There is a built-in purging nozzle for cleaning the test window by compressed air or pressurized water stream. There is also an optional clamp on wiper for automatic test window cleaning.



Viransh the fine-tune solution

The validated spectral calibration in BA-Smart UV-VIS uses multiple wavelengths to monitor and compensate each sum parameter, which enables much more accurate and robust measurement than the single wavelength method. Using field special calibration that employs

specific features of the absorption spectrum, it is even possible to distinguish various fractions of organic carbon groups. For a specific application, the relevant calculation and calibration of desired parameters require their corresponding spectra and reference values obtained from the analytical chemistry lab. The spectral data plus one or more corresponding measured values are called reference value pair. The sensor uses the reference value pair and the proprietary spectral algorithm to perform calibration. the more reference value pairs are provided; the more accurate calibration is given.

BA-Smart UV-VIS Sensor also enables applications in aggressive media (e.g. high chloride concentrations) thanks to the optional titanium housing.

Equipped with the BRATES View configuration, internal data logger, flexible protocols and data outputs, BA-Smart UV-VIS Sensor includes features that are much more advanced than those of comparable devices currently available on the market.

The unified platform of all BRASTEN photometers also facilitates a standardized spare parts and consumables system, which allows the use of a wide range of accessories for our devices. Furthermore, the cutting-edge BRASTEN View enables quick integration into third-party systems.

BA-Smart UV-VIS can also be used for reliable low-cost color measurements. It uses Xenon Flash Light for long-term stable measurements of SAC or colors on UV to Vis Spectrum, BA-Smart UV-VIS choose the different wavelengths for Color measurements, and the absorption at 550nm is used for turbidity/background correction. The cutting-edge device platform, used in all other BRASTEN photometers, enables optical path lengths of 10, 20, 50, and 100 mm, so that almost any application can be easily implemented.

BA-SMARTUV-VIS

Continuous Spectrum Sensor

The sensor is designed and manufactured with 200 ~ 700nm continuous spectrum doas technology. it can work with the transmitter which is of full touch screen control.

The transmitter can record historical data, display historical trend, analyze spectra, calculate the custom formula, and perform lan and wireless gprs data transmission.

The ba-smart uv-vis is available in various measuring ranges (1mm, 2mm, 5mm, 20mm, 35mm,50mm and 100mm) to meet different measuring requirement.

The ba-smart uv-vis' slight window is treated with a special anti-hanging coating when combined with the automatic purging device, the ba-smart uv-vis is basically maintenance-free.



The Advantage

- Online multi-parameter immersion spectra analysing sensor
- Xenon flash light 50 years theoretical life
- Different optical path lengths for various ranges and application
- 316L Stainless steel housing compatible with water with high salinity
- Factory pre-calibration for easy set up and field calibration for more accuracy
Turbidity compensation
- Fully integrated with Automatic Air pressure cleaning (optional mechanical wiper)



Application Areas

- Drinking water analyzer
- Waste water treatment plant
- Process water analysis
- Environmental monitoring
- Ocean&marlinwater
- Aquaculture
- Municipal treatment plant
- Sewage treatment plant



Measuring Scale & Optical Path Length

Application	WWWTP Influent/Sewer		WWWTP Effluent	River water	Drinking water
	2mm.	5mm.	5mm.	5mm.	5mm.
NO3-N mg/L	0.5-10	-	0.2-25	0.3-70	0.1-10
COD mg/L	23-3750	10-1500	2-500	-	-
BOD mg/L	20-1250	10-500	2-300	-	-
TOC mg/L	-	-	-	1-150	0.1-20
DOC mg/L	-	-	-	1.5-75	0.1-10
SAC254 Abs/m	5-750	2-300	2-300	2-300	0.1-40
TSS mg/L	25-2500	10-1000	2-500	-	-
Turbidity mg/L	-	-	-	5-1400	0.5-150
O3 mg/L	-	-	0.1-10	-	0.1-10

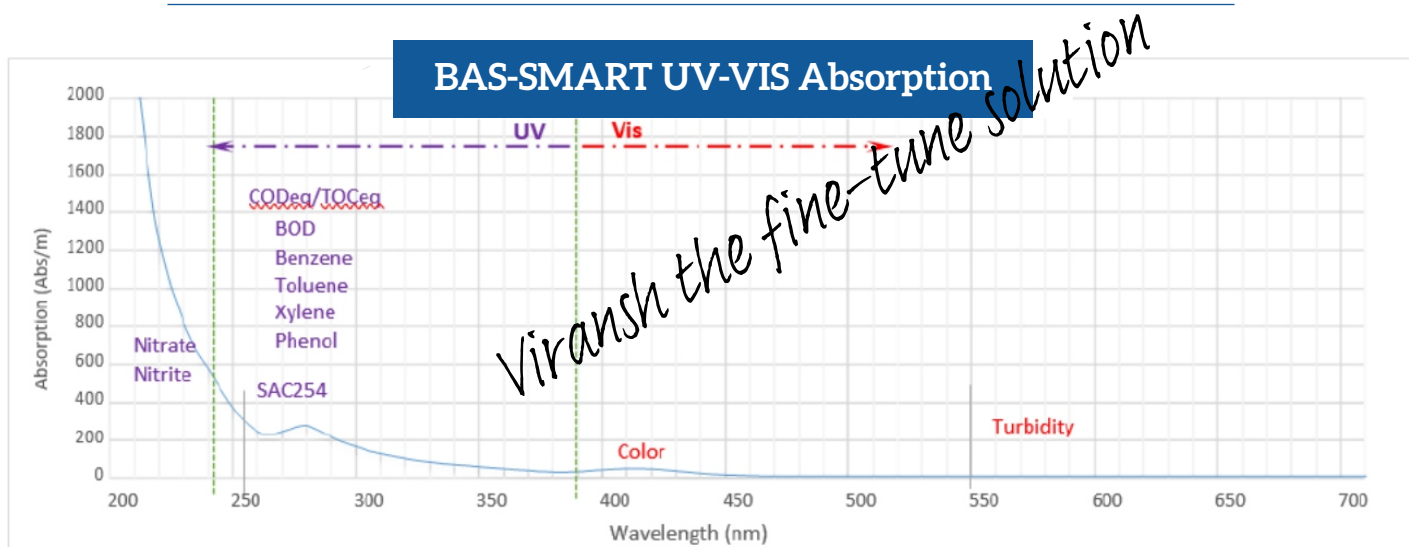
The measuring range of color

parameter variations	According to the standard	Unit	Range: (Optical path: 5mm)	Range: (Optical path: 10mm)	Range: (Optical path: 20mm)	Range: (Optical path: 35mm)	Range: (Optical path: 50mm)	Range: (Optical path: 100mm)
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Pt-Co color number (Hazen) (390 nm or 455 nm). Other Standard Please Contact The Factory

Hazen 390 nm	DIN EN ISO 6271-2 2005-03	mg/L pt	0-500			0-300		0-100
Hazen 455 nm	DIN EN ISO 6271-2 2005-03	mg/L pt	0-500			0-300		0-100

The above data are based on the commonly used water quality calibration methods. for other special water, the data must be calibrated at the field.



4 Specification

measuring principle	Absorb spectral analysis UV-Vis(200-700nm) or Attenuation
light source	Xenon flash light
detector	Miniature 256 CCD array spectrometer
optical path	1/2/5/20/35/50/100mm
resolution	+0.5% F.S.
accuracy	+2%
respond time	T90 < 1min
working temperature	32 to 122 °F (0to 50 °C)
storage temperature	14 to 140 °F (-10 to 60°C)
operating pressure	<5 bar
housing material	316L Stainless steel, optional titanium
protection type	>IP68 immersible
requirement of flow	<3m/s, high velocity may cause bubbles in the measurement.
Auto cleaning	Air or water purging controlled by BA-MULTIPARAMETER uses either compressed air of 3-7 bar or pressurized water. optional clamp-on wipe
power	24 VDC (18-36VDC) by BA-Multiparameter, Consumption normally 5W, Max 25W
interface	RS-485 Modbus RTU
dimension & weight	1.75" O.D, length (44.5 mm x 1.560 mm) & 6.6 lbs. (3kg) with SS housing

Installation

The protection grade of the BA-Smart UV-VIS sensor is IP68, which means it can be directly immersed in water for measurement. The proper installation is very important since it is the prerequisite for correct measurement. Follow the instructions below to install the sensor to ensure that the sensor can work properly.

When installing the spectral sensor, make sure that the optical window is not clogged and there are no particles piling upon it.

1. For horizontal installation (that is, the measurement window is in the vertical position), the plane of the measurement area should be in the vertical direction. This ensures that no sedimentation occurs on the optical window and also there is no air bubbles adhesion to the optical window. Properly use the sensor bracket or the bypass device can ensure the correct installation position.

2. In general, the vertical installation is not recommended (ie the measurement window is horizontal). If it has to be mounted vertically, make sure that the measuring medium is flowing or an automatic cleaning device is used to ensure that no particles are deposited on the lower part of the optical window and there is no air bubbles adhesion to the upper part of the optical window.

3. If the sensor will be installed into in the activated sludge aeration tank, the installation should be kept horizontal.

4. Flow rate: The flow rate of the measuring medium should be $< 3\text{m/s}$ to avoid cavitation. Otherwise, it will impact the measurement.

For the vertical installation, the medium flow rate should be $> 1\text{m/s}$.

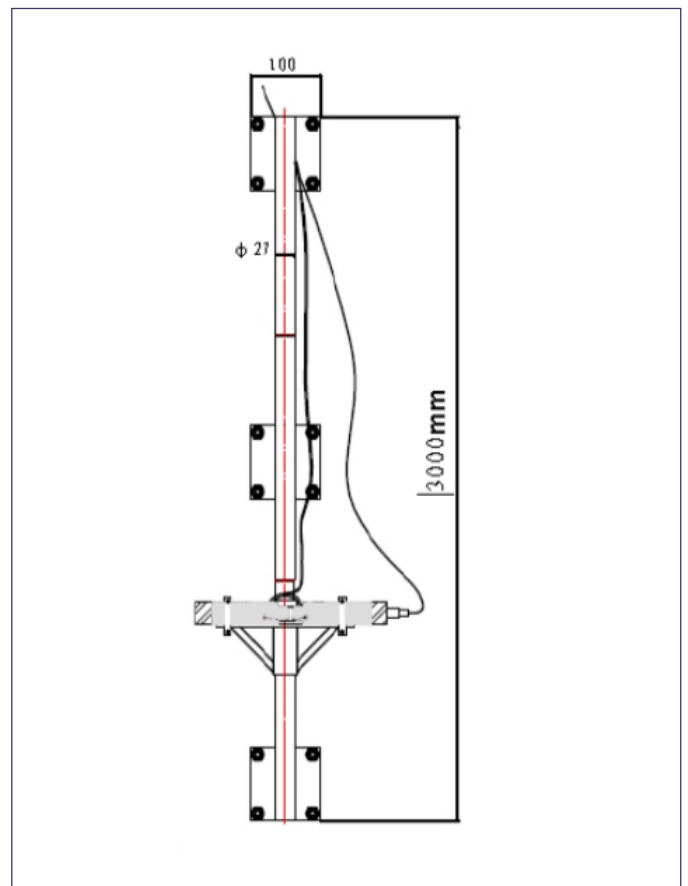
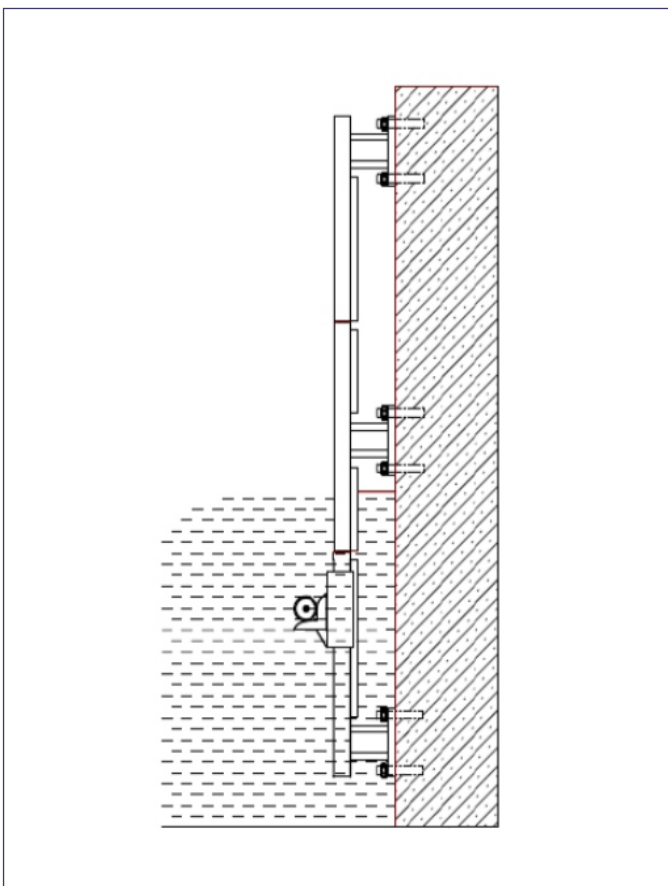
5. The suspended solids (sand) concentration should be $< 1\text{g/L}$. It is recommended to install the sensor horizontally. It must be at least 10cm higher away from the bottom.

6. The probe housing is prohibited to directly contact with other materials to avoid possible corrosion.

7. The probe cable must be effectively protected to prevent it from being cut or damaged by other substances in water.

8. In the event of shallow water or low flow rates, the compressed air cleaning system may cause deposits around the measurement site (eg at the bottom of the wastewater). In this case, the state of the medium to be measured does not represent the normal water quality parameters just after cleaning. To avoid this, the sensor should be installed in such a manner that the opening of the cleaning nozzle should be

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7 Guidance for selection

BA-Smart UV to Vis Spectra Sensor (200 to 700nm)
BA-Smart UV Spectra Sensor (190 to 390nm)

Housing Material:

- Standard Stainless Steel 3161
- T Titanium

Optical Path

- | | | |
|-----------|-----------|------------|
| -001 1mm | -002 2mm | -005 5mm |
| -020 20mm | -035 35mm | -100 100mm |

The recommended application

- I Inlet of WWWT (COD,NO3-N, BOD, SS,H2s,SAC254)
- Aeration tank of WWWT (NO3-N,SS)
- Outlet of WWTP (COD,NO-N, BOD, SS,H2s,SAC254)
- Ground Water (NO-N, DOC, TOC, SAC254, Turbidity)
- Drinking Water (NO-N, DOC,TOC, O3, SAC254, Turbidity)
- Surface Water (NO3-N, DOC, O3, SAC254 Turbidity))
- Industrial Process (NO-N, TOC, O3, SAC254, Turbidity, Color)
- Other Parameters Please Contact Factory

Cable Length

- | | | |
|----------|----------|----------|
| -C20 20` | -C30 30` | -C50 50` |
|----------|----------|----------|

BAC - 005 I -C30

Standard Warranty

Standard warranty is 12 months from the date of commissioning & limited to maximum of 15 months from the date of shipment of the analyzer system

Sales & Service Support

- Factory Acceptance Test (fat)
- Site Acceptance Test (sat)
- Site Commissioning
- After Sales Service Backup
- Guaranteed Spares Parts Availability For
- Maximum 10 Years Of Instrument Life.