OPUS

12SXXXXX0

OPUS is the new generation of spectral sensors for online measurement of nitrogen and carbon compounds. Through the analysis of a full spectrum, OPUS is able to deliver reliable readings for NO_3-N, NO_2-N, organic ingredients (CODeq, BODeq, DOCeq, TOCeq), and a number of other parameters.

OPUS features the new TriOS G2 interface, allowing fast and easy configuration of sensors by using a web browser. Integration into existing process control systems and external data loggers has never been easier.

With the optional battery pack, mobile applications are also feasible. WiFi connectivity allows laptops, tablets or smartphones to be easily used for control without any special application software or app installation.

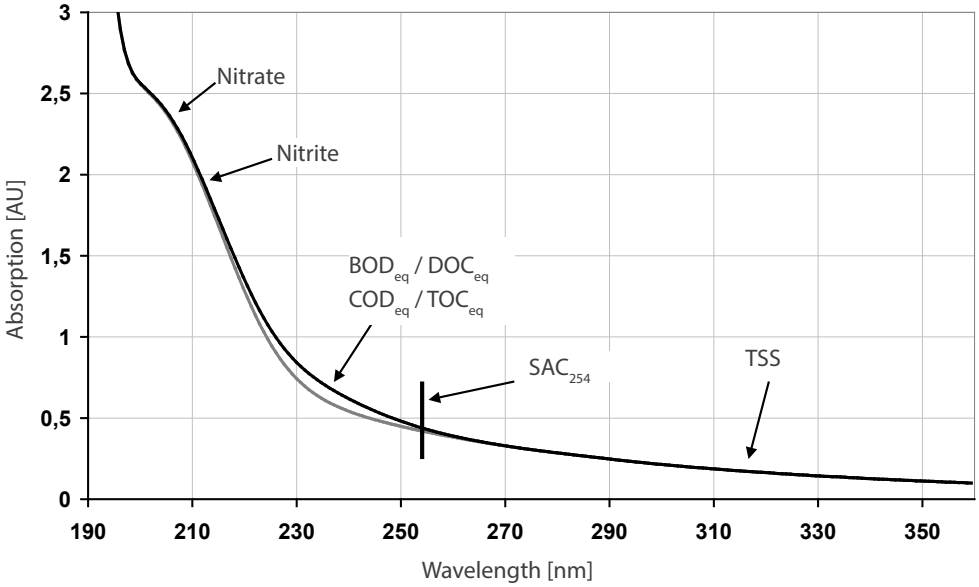
Benefits

- Without sampling and preparation of test samples
- Real-time sensor
- Without reagents
- Optical window with nano coating
- Pre-installed application calibration

Applications

- Sewage treatment plants
- Environmental monitoring
- Drinking water monitoring
- Industrial applications

Absorption spectrum with/without CODeq



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Technical Specifications

Measurement technology	light source	Xenon flash lamp	
	detector	High-end miniature spectrometer	
		256 Channels	
		200 to 360 nm	
		0.8 nm/pixel	
Measurement principle		Attenuation, spectral analysis	
Optical path		0.3 mm, 1 mm, 2 mm, 5 mm, 10 mm, 50 mm	
Parameter		See parameter list p. 3	
Measuring range		See parameter list p. 3	
Measurement accuracy		See parameter list p. 3	
Turbidity compensation		Yes	
Data logger		~ 2 GB	
T100 response time		2 min	
Measurement interval		≥ 1 min	
Housing material		Stainless steel (1.4571/1.4404) or titanium (3.7035)	
Dimensions (L x Ø)		470 mm x 48 mm (with 10 mm path)	~ 18.5“ x 1.9“ (with 10 mm path)
Weight	stainless steel	~ 3 kg (with 10 mm path)	~ 6.6 lbs (with 10 mm path)
	titanium	~ 2 kg (with 10 mm path)	~ 4.4 lbs (with 10 mm path)
Interface	digital	Ethernet (TCP/IP)	
		RS-232 or RS-485 (Modbus RTU)	
Power consumption		≤ 8 W	
Power supply		12...24 VDC (± 10 %)	
Maintenance effort		≤ 0.5 h/month (typical)	
Calibration/maintenance interval		24 months	
System compatibility		Modbus RTU	
Warranty		1 year (EU: 2 years)	US: 2 years

INSTALLATION

Max. pressure	with SubConn	30 bar	~ 435 psig
	with fixed cable	3 bar	~ 43.5 psig
	in FlowCell	1 bar, 2 ...4 L/min	~ 14.5 psig at 0.5 to 1.0 gpm
Protection type		IP68	NEMA 6P
Sample temperature		+2...+40 °C	~ +36 °F to +104 °F
Ambient temperature		+2...+40 °C	~ +36 °F to +104 °F
Storage temperature		-20...+80 °C	~ -4 °F to +176 °F
Inflow velocity		0.1...10 m/s	~ 0.33 fps to 33 fps

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Measuring Range

Single parameter under optimum laboratory conditions

Path (mm)	Parameter	Measurement principle	Unit	Measuring range	Detection limit	Limit of determination	Precision	Accuracy*
1	Nitrate NO_3-N	Spectral	mg/L	0...100	0.3	0.5	0.05	± (5 % + 0.1)
	Nitrite NO_2-N	Spectral	mg/L	0...150	0.5	1.2	0.12	± (5 % + 0.1)
	CODeq	Spectral	mg/L	0...2200***	30	100	10	
	BODeq	Spectral	mg/L	0...2200***	30	100	10	
	DOCeq	Spectral	mg/L	0...1000	5	10	1	
	TOCeq	Spectral	mg/L	0...1000	5	10	1	
	TSSeq	Spectral	mg/L	0...1500	60	200	20	
	KHP	Spectral	mg/L	0...4000	5	10	1	± (5 % + 2)
	SAC_{254}	Single wavelength	1/m	0...2200	15	50	5	
	COD-SACeq**	Single wavelength	mg/L	0...3200	22	73	7.3	
	BOD-SACeq**	Single wavelength	mg/L	0...1050	7.2	24	2.4	
10	Nitrate NO_3-N	Spectral	mg/L	0...10	0.03	0.05	0.005	± (5 % + 0.01)
	Nitrite NO_2-N	Spectral	mg/L	0...15	0.05	0.12	0.012	± (5 % + 0.01)
	CODeq	Spectral	mg/L	0...220***	3	10	1	
	BODeq	Spectral	mg/L	0...220***	3	10	1	
	DOCeq	Spectral	mg/L	0...100	0.5	1	0.1	
	TOCeq	Spectral	mg/L	0...100	0.5	1	0.1	
	TSSeq	Spectral	mg/L	0...150	6	20	2	
	KHP	Spectral	mg/L	0...400	0.5	1	0.1	± (5 % + 0.2)
	SAC_{254}	Single wavelength	1/m	0...220	1.5	5	0.5	
	COD-SACeq**	Single wavelength	mg/L	0...320	2.2	7.3	0.73	
	BOD-SACeq**	Single wavelength	mg/L	0...105	0.72	2.4	0.24	

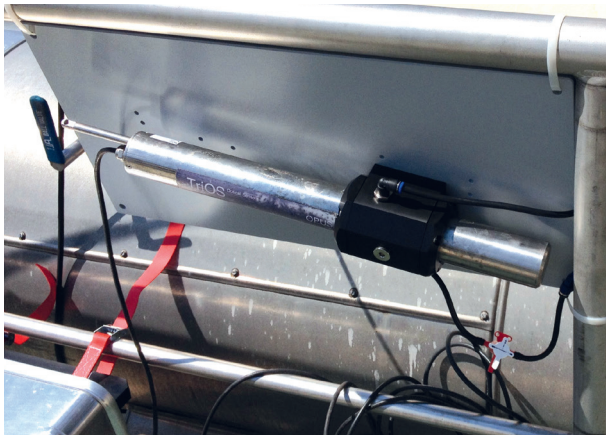
* Based on a standard calibration solution

** Based on KHP (100 mg/L COD standard solution correspond to 85 mg/L KHP)

*** Depending on composition of COD and BOD (checksum parameter)

1 mg/L NO_3-N correspond to 4.43 mg/L NO_3

1 mg/L NO_2-N correspond to 3.28 mg/L NO_2



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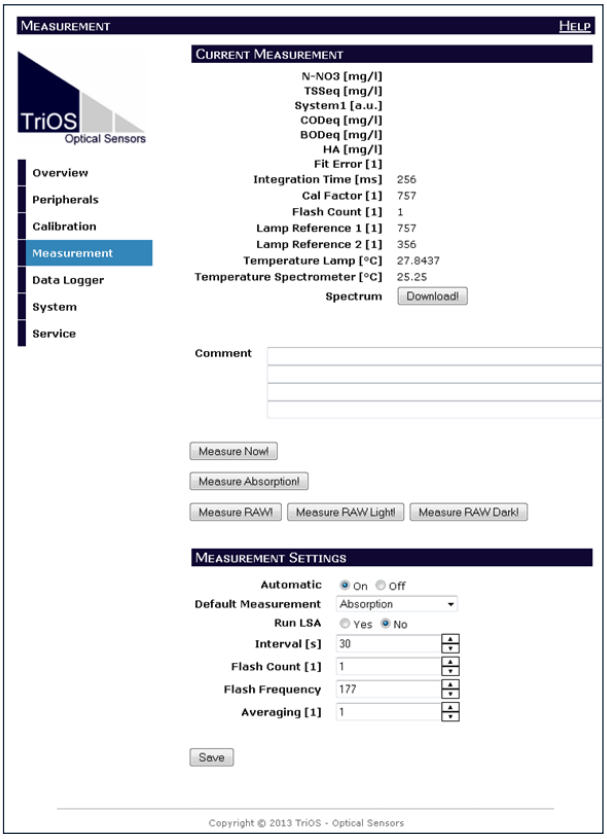
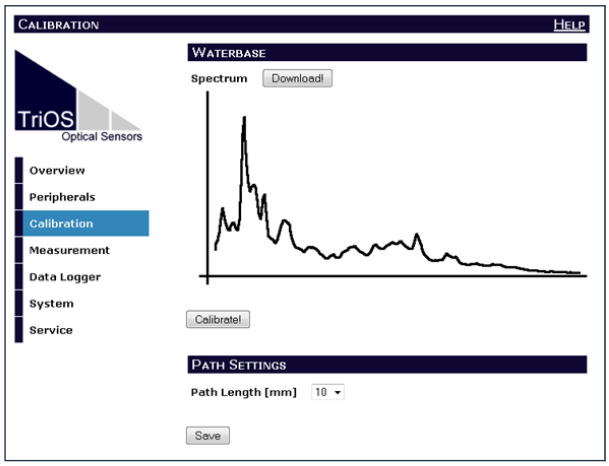
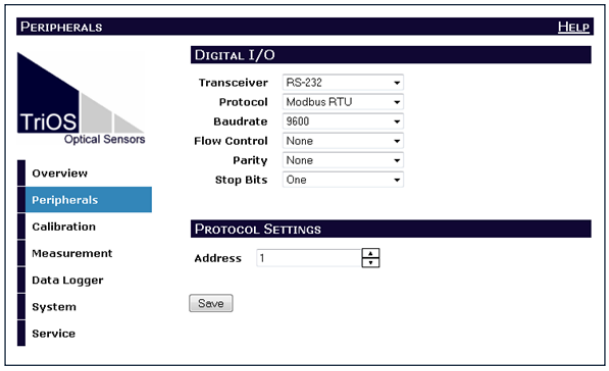
OPUS G2 Interface

The easiest and fastest way of sensor integration and configuration in any process control system or data logger via web browser:







Let OPUS automatically monitor your processes and react to unexpected events or incidents with the optional "policing" feature of OPUS.

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