

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 $\text{NO}_3\text{-N}$, $\text{NO}_2\text{-N}$, organic ingredients (COD_{eq}, BOD_{eq}, DOC_{eq}, TOC_{eq}), 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.

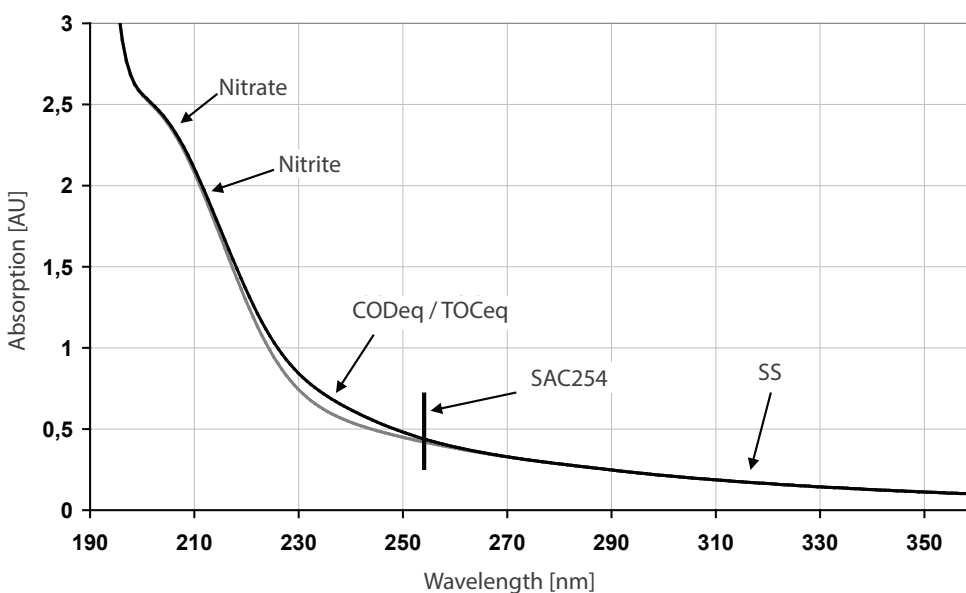
Benefits

- 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 of wastewater with/without COD_{eq}



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
Measuring range			See parameter list
Measurement accuracy			See parameter list
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)
Weight	stainless steel	~ 3 kg (with 10 mm path)	
	titanium	~ 2 kg (with 10 mm path)	
Interface	digital	Ethernet (TCP/IP)	
		RS-232 or RS-485 (Modbus RTU, ASCII, TriOS, (SCPI))	
Power consumption			≤ 8 W
Power supply			12-24 VDC (± 10 %)
Maintenance effort			Typically ≤ 0.5 h/month
Calibration/maintenance interval			24 months
System compatibility			Modbus RTU
Guarantee			1 year (EU: 2 years)
INSTALLATION			
Max. pressure	with SubConn	30 bar	
	with fixed cable	3 bar	
	in FlowCell	1 bar, 2-4 L/min	
Protection type			IP68
Sample temperature			+2...+40 °C
Ambient temperature			+2...+40 °C
Storage temperature			-20...+80 °C
Inflow velocity			0.1-10 m/s

Measuring range

Single parameter under optimum laboratory conditions

Path (mm)	Parameter	Measurement principle	Unit	Measuring range	Detection limit	Limit of determination	Precision	Accuracy*
1	Nitrat NO ₃ -N	Spectral	mg/L	0 - 100	0.3	0.5	0.05	± (5 % + 0.1)
	Nitrit 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	
	DOCe _q	Spectral	mg/L	0 - 1000	5	10	1	
	TOCe _q	Spectral	mg/L	0 - 1000	5	10	1	
	TSSe _q	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-SACe _q **	Single wavelength	mg/L	0 - 3200	22	73	7.3	
	BOD-SACe _q **	Single wavelength	mg/L	0 - 1050	7.2	24	2.4	
10	Nitrat NO ₃ -N	Spectral	mg/L	0 - 10	0.03	0.05	0.005	± (5 % + 0.01)
	Nitrit NO ₂ -N	Spectral	mg/L	0 - 15	0.05	0.12	0.012	± (5 % + 0.01)
	CODe _q	Spectral	mg/L	0 - 220***	3	10	1	
	BODe _q	Spectral	mg/L	0 - 220***	3	10	1	
	DOCe _q	Spectral	mg/L	0 - 100	0.5	1	0.1	
	TOCe _q	Spectral	mg/L	0 - 100	0.5	1	0.1	
	TSSe _q	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-SACe _q **	Single wavelength	mg/L	0 - 320	2.2	7.3	0.73	
	BOD-SACe _q **	Single wavelength	mg/L	0 - 105	0.72	2.4	0.24	

* Based on a standard calibration solution

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

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

1 mg/L NO₃-N correspond to 4.43 mg/L NO₃

1 mg/L NO₂-N correspond to 3.29 mg/L NO₂



OPUS G2 interface

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

MEASUREMENT HELP

TriOS Optical Sensors

CURRENT MEASUREMENT

N-NO3 [mg/l]	
TSSeq [mg/l]	
System1 [a.u.]	
CODeq [mg/l]	
BODeq [mg/l]	
HA [mg/l]	
FT Error [1]	
Integration Time [ms]	256
Cal Factor [1]	757
Flash Count [1]	1
Lamp Reference 1 [1]	757
Lamp Reference 2 [1]	356
Temperature Lamp [°C]	27.8437
Temperature Spectrometer [°C]	25.25

Spectrum

Comment

MEASUREMENT SETTINGS

Automatic On Off

Default Measurement Absorption

Run LSA Yes No

Interval [s] 30

Flash Count [1] 1

Flash Frequency 177

Averaging [1] 1

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CALIBRATION HELP

TriOS Optical Sensors

WATERBASE

Spectrum

PATH SETTINGS

Path Length [mm] 10

PERIPHERALS HELP

TriOS Optical Sensors

DIGITAL I/O

Transceiver RS-232

Protocol Modbus RTU

Baudrate 9600

Flow Control None

Parity None

Stop Bits One

PROTOCOL SETTINGS

Address 1

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

