



NICO plus

16AXX10X0



NICO plus

UV photometer for nitrate and SAC₂₅₄ determination

The versatile **NICO plus** sensor enables the precise measurement of numerous water quality parameters in real time. In addition to measuring nitrate and nitrogen compounds, it offers analysis of the following parameters: UVT₂₅₄, UVT_{254n}, SAC₂₅₄, COD_{eq}, BOD_{eq}, TOC_{eq}, DOC_{eq}, turbidity and TSS_{eq}. An internal temperature correction additionally increases the stability of the measured values.

Thanks to the TriOS G2 interface, the sensor can be conveniently configured via a web browser. Integration into existing process control systems or external data loggers is straightforward. NICO can be conveniently controlled via WLAN using a laptop, tablet or smartphone - without any additional software or app installation.

Due to the uniform device platform, all TriOS photometers offer a high level of compatibility for spare parts and accessories as well as efficient integration into existing systems.

Advantages

- Without sampling and sample preparation
- Delay-free
- Optical windows with nano coating
- Without reagents
- Proven UV absorption method

Applications

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

Technical specifications

Measurement technology	Light source	Xenon flash lamp
	Detector	4 photodiodes + filter
Measurement principle		Absorption (Attenuation)
Optical path		0.3 mm, 1 mm, 2 mm, 5 mm, 10 mm, 20 mm, 50 mm
Parameters		NO ₃ / NO ₃ -N, NO _x / NO _x -N(calibrated with NO ₃ standard solution) SAC ₂₅₄ , COD _{eq} , BOD _{eq} , TOC _{eq} , DOC _{eq} , Turb, TSS _{eq} , UVT ₂₅₄ , UVT _{254n}
Standard applied		DIN 38404-3, based on DIN 7027

Response time	40 s
Temperature compensation	No
Turbidity compensation	Yes
Data logger	~ 2 GB
Response time T100	40 s
Measurement interval	≥ 20 s

Interface	digital	Ethernet (TCP/IP)
		RS-485 (Modbus RTU)
Power supply		12 - 24 VDC (± 10 %)
Power consumption		≤ 7 W

Connection		Fixed cable with 8pin M12 connection	
Housing material		Stainless steel (1.4571/1.4404) or titanium (3.7035)	
Dimensions (L x Ø)		~ 470 mm x 48 mm*	~ 18.5" x 1.9" *
Weight	VA	~ 3 kg	~ 6.6 lbs
	Ti	~ 2 kg	~ 4.4 lbs

* With 10 mm path

Sample temperature	0...+55 °C* +2...+40 °C for specified measurement accuracy	~ +32 to +131 °F* ~ +36 to +104 °F
Ambient temperature	0...+55 °C* +2...+40 °C for specified measurement accuracy	~ +32 to +131 °F* ~ +36 to +104 °F
Relative humidity	0 ... 95 % non-condensing	
Storage temperature	-20...+80 °C	~ -4 to +176°F

* No ice crystals in the sample water

Max. Pressure	with SubConn	30 bar	~ 435 psi
	with fixed cable	3 bar	~ 43.5 psi
	in FlowCell	1 bar, 2...4 L/min	~ 14.5 psi at 0.5 to 1.0 gpm

Inflow velocity		0.1...10 m/s	~ 0.33 t 33 fps
Degree of protection	Sensor side	IP68	
	Controller side	IP65/ IP67	
Operating altitude		max. altitude 2000 m (6562 ft)	
Maintenance effort		≤ 0.5 h/month typical	
Calibration/ maintenance interval		24 months	
System compatibility		TriBox3, TriBox mini, Modbus RTU	
Warranty		1 year (EU & US: 2 years)	

Measurement ranges depending on the path length*

Parameters	Unit	Path length						
		0.3 mm	1 mm	2 mm	5 mm	10 mm	20 mm	50 mm
NO₃-N	mg/L	0...165	0...50	0...25	0...10	0...5	0...2.5	0...1
NO₃	mg/L	0...730	0...222	0...111	0...44	0...22	0...11	0...4.43
SAC₂₅₄	1/m	0...2000	0...600	0...300	0...120	0...60	0...30	0...12
CODeq**	mg/L	0...2920	0...876	0...438	0...175	0...88	0...44	0...18
BODeq**	mg/L	0...960	0...288	0...144	0...58	0...29	0...14	0...6
TOCeq**	mg/L	0...1168	0...350	0...175	0...70	0...35	0...18	0...7
DOCeq**	mg/L	0...1168	0...350	0...175	0...70	0...35	0...18	0...7
Turb	FAU***	0...4000	0...4000	0...1477	0...444	0...197	0...93	0...36
TSSeq****	mg/L	0...6000	0...1800	0...900	0...360	0...180	0...90	0...36
UVT₂₅₄	%	0...96.6	0...96.6	0...96.6	0...96.6	0...96.6	0...96.6	0...96.,6
UVT_{254n}	%	31.,6	70.8	84.1	93.3	96.6	98.3	99.3

Note: 1 mg/L NO₃-N corresponds to 4.43 mg/L NO₃.

* under laboratory conditions

** based on KHP (Note: 100 mg COD standard solution corresponds to 85 mg/l KHP)

*** Formazin attenuation unit

**** based on SiO₂

Measurement accuracy and repeatability

Path length	Parameters	Accuracy**	Precision* [mg/L]
0.3 mm	Nitrate NO ₃ -N	± (5 % + 3.3)	0.50
	Nitrate NO ₃	± (5 % + 14.5)	2.22
1 mm	Nitrate NO ₃ -N	± (5 % + 1)	0.15
	Nitrate NO ₃	± (5 % + 4.4)	0.66
2 mm	Nitrate NO ₃ -N	± (5 % + 0.5)	0.075
	Nitrate NO ₃	± (5 % + 2.2)	0.33
5 mm	Nitrate NO ₃ -N	± (5 % + 0.2)	0.03
	Nitrate NO ₃	± (5 % + 0.88)	0.133
10 mm	Nitrate NO ₃ -N	± (5 % + 0.1)	0.015
	Nitrate NO ₃	± (5 % + 0.44)	0.067
20 mm	Nitrate NO ₃ -N	± (5 % + 0.05)	0.008
	Nitrate NO ₃	± (5 % + 0.22)	0.033
50 mm	Nitrate NO ₃ -N	± (5 % + 0.02)	0.003
	Nitrate NO ₃	± (5 % + 0.09)	0.014

* under laboratory conditions

** referred to a nitrate standard solution

Detection limit

Parameter	Unit	Path length						
		0.3 mm	1 mm	2 mm	5 mm	10 mm	20 mm	50 mm
NO ₃ -N	mg/L	1.65	0.5	0.25	0.1	0.5	0.025	0.01
NO ₃	mg/L	7.26	2.2	1.1	0.44	0.22	0.11	0.044
SAC254	1/m	50	15	7.5	3	1.5	0.75	0.3
COD _{eq}	mg/L	73	22	11	4.4	2.2	1.1	0.44
BOD _{eq}	mg/L	24	7.2	3.6	1.44	0.72	0.36	0.14
TOC _{eq}	mg/L	29.2	8.76	4.38	1.75	0.88	0.44	0.18

Parameter	Unit	Path length						
		0.3 mm	1 mm	2 mm	5 mm	10 mm	20 mm	50 mm
DO _{Ceq}	mg/L	29.2	8.76	4.38	1.75	0.88	0.44	0.18
Turb	FAU	197.37	54	26.48	10.46	5.21	2.60	1.04
TS _{Seq}	mg/L	180	54	27	10.8	5.4	2.7	1.08
UVT ₂₅₄	%	25.1	25.1	25.1	25.1	25.1	25.1	25.1
UVT _{254n}	%	0	0.0001	0.1	6.3	25.1	50.1	75.9

Limit of quantification

Parameter	Unit	Path length						
		0.3 mm	1 mm	2 mm	5 mm	10 mm	20 mm	50 mm
NO ₃ -N	mg/L	5	1.5	0.75	0.3	0.15	0.075	0.03
NO ₃	mg/L	22.2	6.65	3.32	1.33	0.67	0.33	0.133
SAC254	1/m	166.67	50	25	10	5	2.5	1
COD _{eq} **	mg/L	243.33	73	36.5	14.6	7.3	3.65	1.46
BOD _{eq} **	mg/L	80	7.2	3.6	1.44	0.72	0.36	0.14
TOC _{eq} **	mg/L	97.33	29.2	14.6	5.84	2.92	1.46	0.584
DOC _{eq} **	mg/L	97.33	29.2	14.6	5.84	2.92	1.46	0.584
Turb	FAU***	848.46	197.37	92.56	35.55	17.535	8.7	3.47
TS _{Seq} ****	mg/L	600	180	90	36	18	9	3.6
UVT ₂₅₄	%							
UVT _{254n}	%							

* under laboratory conditions

** based on KHP (Note: 100 mg COD standard solution corresponds to 85 mg/l KHP)

*** Formazin attenuation unit

**** based on SiO₂