



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

Measure-ment tech-nology	Light source	Xenon flash lamp
	Detector	4 photodiodes + filter
Measuring 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
Measuring 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 8-pin 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

Ambient temperature		+2...+40 °C	~ +36 to +104°F
Sample temperature	in situ	+2...+40 °C	~ +36 to +104°F
	in FlowCell	+2...+40 °C	~ +36 to +104°F
Relative humidity		0 ... 95 % non-condensing	
Storage temperature		-20...+80 °C	~ -4 to +176°F

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	NEMA 6P
	Controller side	IP65/ IP67	NEMA 6P
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)	

Measuring 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

***** unit of the absorption measure

Measurement accuracy & repeatability

Path length	Parameters	Accuracy * **	Precision* [mg/L] [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
CODeq	mg/L	73	22	11	4,4	2,2	1,1	0,44
BODeq	mg/L	24	7,2	3,6	1,44	0,72	0,36	0,14
TOCeq	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
CO _{Deq} **	mg/L	243,33	73	36,5	14,6	7,3	3,65	1,46
BO _{Deq} **	mg/L	80	7,2	3,6	1,44	0,72	0,36	0,14
TO _{Ceq} **	mg/L	97,33	29,2	14,6	5,84	2,92	1,46	0,584
DO _{Ceq} **	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

***** unit of absorption measure