



Digital, optical in-situ photometer for measuring nitrate, applying an integrated turbidity compensation.

OTT ecoN

Low maintenance UV nitrate sensor

Advancing UV nitrate sensors, the OTT ecoN combines field reliability with a user friendly, low operational cost, future ready platform. It uses optical UV absorption technology for the determination of nitrate concentrations in fresh surface and groundwater, including compensations for turbidity and organic interferences. Nitrate measurements and sensor status information are available in real-time for integration into data acquisition systems. The optional anti-fouling wiper reduces maintenance requirements and extends deployment times for continuous monitoring locations.

Qualitative
Hydrology

Reliable and high quality nitrate measurement at low operational cost

Applications

Fresh surface and groundwater:

- Lakes and reservoirs
- Streams and rivers
- Groundwater aquifers

Ideal for:

- Nitrate loading and reduction studies
- Academic research
- Regulatory monitoring
- Wetland management



Ideal for urban and remote locations

Features / Benefits

Smart optical technology

- Individual absorption channels deliver reliable data
- Separate reference signal provides greater accuracy
- Smart channel processing reduces drift and eliminates bias
- Turbidity and dissolved organic matter compensations for data quality

Access with web browser

- No need to install software to access and manage instrument
- Minimizes IT security concerns
- Greater flexibility as different Operating Systems can be used

Anti-fouling wiper

- Wiper removes bio-fouling even in harsh conditions
- Minimizes the likelihood of noisy data caused by debris
- Simple to exchange wiper blades
- Reduces the amount of maintenance and increases deployment time
- Nano coating on lens reduces biofouling and prolongs life

Calibration verification

- Does not require annual factory calibrations, thus reducing maintenance costs
- Uses standard solutions to verify performance and provide traceability
- Verification of Zero baseline using ultrapure water
- Supports additional dissolved oxygen matter (DOM) compensation adjustment based on laboratory results

Flexible sensor options

- Ability to use sensor for different site conditions
- Less restrictions in instrument selection and usage
- On-board logger supporting portable applications with external power supply



Web browser software



Wiper reduces bio-fouling

Flexibility to equip evolving monitoring needs

Measurement Principle

The ecoN measurement principle uses the proven method of absorbance by nitrate at a specific wavelength which is measured by a photometer and then converted for the determination of the nitrate concentration. The sensor consists of key optical elements including a Xenon flash lamp, a lens system, filters and photodiodes. The nitrate concentration is proportional to the remaining light intensity that has passed through the medium.

The ecoN sensor uses the absorption at 212 nm for the detection of NO₃-N. Advanced signal processing coupled with the absorption at 254 nm and 360 nm is used for the correction of organic compounds and turbidity.

Site Selection Considerations

OTT ecoN has a choice of 5 different path lengths that suit the wide variety of freshwater nitrate concentrations and turbidity conditions. General guidance includes:

Shorter Path Lengths

- Greater nitrate detection range
- Less sensitivity at low-level concentrations
- Better at minimizing the impacts of turbidity

Longer Path Lengths

- Reduced nitrate detection range
- Greater sensitivity at low-level concentrations
- Increased impacts from interferences such as turbidity

System Approach

Online nitrate monitoring systems consist mainly of three components: the nitrate sensor, a multi-parameter sonde and a data logger as the system's centerpiece. The OTT ecoN is designed to interact with a variety of data loggers such as OTT netDL, Sutron SatLink3 and XLink. A system approach provides a multitude of advantages including: access to the quality control data, USB interface for local communication, Wi-Fi operation with wireless devices, full IP compatibility, data transmission via satellite, and remote maintenance opportunities.

Adaptable Path Lengths

A key part of the measurement system is the path length between the lens system, as the range of detectable nitrate concentrations is influenced by this distance. Choosing the correct path length based on the expected concentrations is important and additional influences such as turbidity ranges should also be considered. An advantage of the modular approach of the OTT ecoN lies in the ability to have the lens system and calibration adapted by factory trained personnel.



Solar power surface water monitoring station



Integrate into a remote data acquisition system



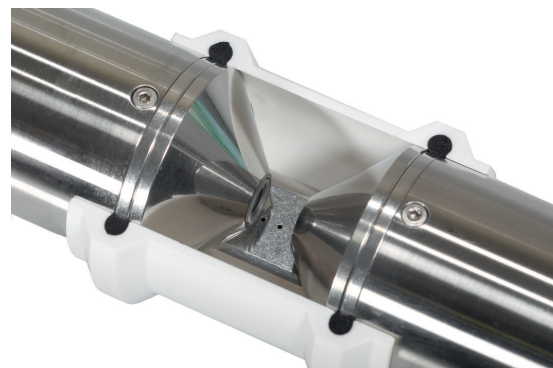
Path length between lens system

Simple measurement verification for QA/QC



Practical design for reliability

The OTT ecoN has a precise high quality stainless steel construction and lens system, providing a robust, corrosion resistant instrument which makes it easier to maintain and clean for calibration checks. The optional horizontal mounting brackets and compact design allows for a simple installation in discrete locations or river bank rail mount system. For vertical mounting, the OTT ecoN comes equipped with a suspension device, versus using the communication cable for instrument deployment and retrieval.



Software interface

Quick and secure access to the instrument is achieved by using the G2 interface box that enables direct connection to the OTT ecoN using a web browser. Easily access live nitrate measurements, internal data logging files, optical performance indicators and system settings. The internal data files can be exported to CSV formats for further analysis.

Standard calibration solution verification with VALtub half-cup



Local access to settings with the G2 interface

Technical data

Measurement technology

Light source
Xenon flash lamp

Detector
4 photo diodes + filter

Measurement principle
Attenuation

Optical path
0.3 mm, 1mm, 2 mm, 5 mm, 10 mm

Parameter
NO₃-N, NO₃, NO_x-N, NO_x (calibrated with NO₃ standard solution)

Measuring range
0.3 mm path
1.65...200 mg/L NO₃-N
1 mm path
0.5...60 mg/L NO₃-N
2 mm path
0.25...30 mg/L NO₃-N
5 mm path
0.1...12 mg/L NO₃-N
10 mm path
0.05...6 mg/L NO₃-N

Measurement accuracy

0.3 mm = ± (5 % + 1.0 mg/L NO₃-N)
1 mm = ± (5 % + 1.0 mg/L NO₃-N)
2 mm = ± (5 % + 0.5 mg/L NO₃-N)
5 mm = ± (5 % + 0.2 mg/L NO₃-N)
10 mm = ± (5 % + 0.1 mg/L NO₃-N)

Turbidity compensation
Yes

Data logger
2 GB

T100 response time
20 s

Measurement interval
≥ 10 s

Housing material
Stainless steel
(1.4571/1.4404)

Dimensions (L x Ø)
470 mm x 48 mm (10 mm path)
18.5 inch x 1.9 inch (with 10 mm path)

Weight

3 kg (6.6 lbs)

Interface digital

Ethernet (TCP/IP)
RS-485 (Modbus RTU)
SDI-12 ** coming soon

Power consumption
≤ 7 W

Power supply
12...24 VDC (± 10 %)

System compatibility
Modbus RTU

Warranty
2 years

Max. pressure
3 bar (43.5 psig)

Protection type
IP68 NEMA 6P

Sample temperature
+2...+40 °C



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