



PRODUCT PORTFOLIO





TriOS

TriOS Mess- und Datentechnik GmbH is an independent, owner-managed company that was founded in Oldenburg in 1998 and is now headquartered in Rastede. Since then, TriOS has become an established manufacturer of high quality optical measurement technology and one of the leading companies in the field of optical immersion sensors for water treatment. Although the company's roots lie in radiometry, we have managed to expand our portfolio to include photometry, fluorometry, nephelometry and eChemistry. TriOS offers its customers not only individual measurement sensors, but also complete system solutions for applications in different segments.

At its location in Rastede, Germany, TriOS combines all production processes. Starting with research and development, the production of parts in the mechanical and electronic workshops, up to the final product design, every step is owned by TriOS. We live an active exchange of information, skills and ideas between all departments, creating a diverse pool of expertise and creativity. We also place great emphasis on the use of high quality materials and precise construction in all production processes.

Discover the variety of the TriOS product range and convince yourself of the high quality of our sensors.

Parameter

TriOS		Optical Sensors																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
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Sustainability



We are proud that not only do our products contribute to environmental research and conservation, but that our company is committed to sustainability and offsetting our own emissions. As a company in the environmental and water industry, we are aware of the impact that humans have on nature and we are committed to sustainable operations. Therefore, as an industrial company, we place great importance on being sustainable and in harmony with nature. For this reason, we cover a large part of our energy needs through solar power and have created a biotope on our company premises, right in the middle of an industrial area.



Photometer



TriOS photometers meet the highest quality standards and are manufactured from high grade stainless steel or titanium. The modular design allows us to produce different path lengths depending on the application. The optical path length can be adapted to the application at any time by using different lens sockets.

The TriOS G2 interface allows quick and easy integration of the sensor into existing process control systems or external data loggers. The sensors can be easily configured using any standard web browser on a PC, tablet or smartphone.

OPUS & OPUS aero

High-end UV spectral sensor for online measurement

OPUS is a high-end spectral sensor for online measurement of nitrogen and carbon compounds. By analyzing a full spectrum, OPUS is able to provide reliable measurements of $\text{NO}_3\text{-N}$, $\text{NO}_2\text{-N}$, organic constituents (COD_{eq} , BOD_{eq} , DOC_{eq} , TOC_{eq}) and a range of other parameters.

Applications:

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



Parameter OPUS:

$\text{NO}_3 / \text{NO}_3\text{-N}$ $\text{NO}_2 / \text{NO}_2\text{-N}$ COD_{eq}
 BOD_{eq} DOC_{eq} TOC_{eq} TSS_{eq} KHP
 SAC_{254} $\text{COD}_{\text{eq}} - \text{SAC}_{\text{eq}}$ $\text{BOD}_{\text{eq}} - \text{SAC}_{\text{eq}}$



Parameter OPUS aero:

$\text{NO}_3 / \text{NO}_3\text{-N}$ $\text{NO}_2 / \text{NO}_2\text{-N}$



NICO & NICO plus

Digital, optical in-situ photometer for nitrate

Based on the device platform concept of TriOS sensors such as OPUS, LISA and VIPER, TriOS introduces NICO: a low-cost UV photometer for the determination of nitrate. The four detection channels allow accurate optical determination of nitrate by absorption, taking into account turbidity and organic substances that are a problem for many products currently on the market. An internal temperature correction increases the stability of the measurements.

Applications:

- ◆ Environmental monitoring
- ◆ Drinking water monitoring
- ◆ Sewage treatment plants



Parameter NICO:

$\text{NO}_3 / \text{NO}_3\text{-N}$ $\text{NO}_x / \text{NO}_x\text{-N}$



Parameter NICO plus:

$\text{NO}_3 / \text{NO}_3\text{-N}$ $\text{NO}_x / \text{NO}_x\text{-N}$

COD_{eq} BOD_{eq} DOC_{eq}

TOC_{eq} TSS_{eq} SAC_{254}

Turbidity UVT_{254}



LISA UV

The state-of-the-art SAC_{254} sensor from TriOS

Long-lasting and energy-efficient UV-LED technology and a robust design are the outstanding features of LISA UV. Like all TriOS sensors LISA uses the unique nanocoated windows combined with compressed air flushing to achieve long operating times with cleaning.

Applications:

- ◆ Environmental monitoring
- ◆ Drinking water monitoring
- ◆ Sewage treatment plants
- ◆ Monitoring of UV disinfection systems



Parameter:

SAC_{254} COD_{eq} BOD_{eq} TOC_{eq}

UVT_{254} Turbidity



VIPER

VIS photometer for color measurements
between 360 and 720 nm

VIPER measures hyperspectral attenuation and transmission coefficients in the wavelength range of 360 nm and 720 nm, enabling detailed determination of multiple parameters at the same time. The light source is provided by 5 selected, energy-saving LEDs that warranty a long service life and stable measurement data. VIPER can be used in different media as it is available in multiple path lengths of 10, 50, 100, 150 und 250 mm and in stainless steel or titanium housing.

Like all TriOS sensors, VIPER is equipped with nano coated optical windows that protects from fouling and if necessary, additional parameters can be installed by means of software at a later time.



Parameter:

SAC₄₃₆ **SAC₅₂₅** **SAC₆₂₀** **True color**
Pt-Co-color₃₉₀ **Pt-Co-color₄₅₅**
Cr-Co-color₃₈₀ **Cr-Co-color₄₁₃**



Applications:

- ◆ **Environmental monitoring**
- ◆ **Color measurement**
- ◆ **Quality assurance**
- ◆ **Petrochemistry**
- ◆ **Drinking water monitoring**
- ◆ **Industrial applications**
- ◆ **Food industry**

LISA color

Advanced VIS absorbance photometer for measuring color

Colorimetry – LISA enables reliable low-cost color measurements. LISA color uses two different LEDs for long-term stable measurements of SAC or colors at different wavelengths. The second channel is used for turbidity/background correction. The cutting-edge device platform, used in all other TriOS photometers, enables optical path lengths of 50, 100, 150 and 250 mm, so that almost any application can be easily implemented. LISA color also enables applications in aggressive media (e.g. high chloride concentrations) thanks to the optional titanium housing.



Parameter:

SAC₄₃₆ **SAC₅₂₅** **SAC₆₂₀**
True color₄₁₀ **Pt-Co-color₃₉₀**
Pt-Co-color₄₅₅ **Cr-Co-color₃₈₀**
Cr-Co-color₄₁₃



Applications:

- ◆ **Environmental monitoring**
- ◆ **Drinking water monitoring**
- ◆ **Industrial applications**

Fluorometer



TriOS fluorometers are high-quality, submersible measuring instruments based on the principle of fluorescence measurement. They precisely detect and analyze the fluorescence emissions of substances in water or other media. Our sensors are able to measure a wide range of fluorescence signals, from organic substances to traces of pollutants. These instruments offer high sensitivity and accuracy in the detection and quantification of substances, making them an indispensable tool for environmental monitoring, water quality measurement and research.

enviroFlu

Fluorometer for measurements of PAH

enviroFlu HC is a submersible sensor for oil in water measurement. The measuring principle of UV fluorescence is much more sensitive than the conventional infrared scattering or absorption method. This makes it possible to detect even the smallest traces of PAH's, for example in drinking water and cooling water condensates.

Applications include the petrochemical industry, leak detection in cooling and waste water streams, and environmental monitoring. The instruments are designed for stationary use in manholes, streams or pipelines as well as for mobile use with an optional handheld instrument. An innovative coating reduces fouling of the optical window and minimizes maintenance.



Parameter:

PAH Oil in water BTX



Applications:

- ♦ **Drinking water** ♦ **Waste water**
- ♦ **Cooling water** ♦ **Rafineries**
- ♦ **Desalination plants** ♦ **Pipeline monitoring**

microFlu V2

Submersible miniature fluorometer

microFlu V2 fluorometers are submersible miniature fluorometers for highly precise and selective measurement of tryptophan, CDOM, blue-green algae or chlorophyll. The combination of low power consumption and innovative coating of the measurement windows as an energy and environmentally neutral antifouling solution ensures long-term stability of the measurements. The instruments can be used in a wide range of applications for monitoring sea water, river water, drinking water and waste water.

Applications:

- ◆ Surface water
- ◆ Bathing lakes
- ◆ Drinking water treatment
- ◆ Raw water treatment
- ◆ Environmental monitoring



Parameter:

CDOM Chlorophyll a
Phycocyanin Rhodamine
Fluorescein Tryptophan
BTX



microFlu HC

Submersible miniature fluorometer for oil in water

microFlu HC is an immersion sensor for the measurement of oil in water. The measuring principle of UV fluorescence is much more sensitive and specific than the conventional infrared scattering or absorption methods. This makes it possible to detect even the smallest traces of PAHs, e.g. in drinking water, but also in cooling water condensates. Applications range from petrochemicals to leak detection in cooling and waste water streams to environmental monitoring.

Applications:

- ◆ Surface water ◆ Drinking water ◆ Waste water
- ◆ Cooling water ◆ Desalination plants ◆ Refineries



Parameter:

PAH Oil in water



nanoFlu

Online fluorometer for the determination of colorings and pigments

nanoFlu fluorometers are low-cost, submersible, miniaturized fluorometers for the highly accurate and selective measurement of CDOM (colored dissolved organic matter), chlorophyll a or phycocyanin in cyanobacteria. Long-term stability of the measurements is ensured by a combination of low power consumption and an innovative coating of the optical window as an energy efficient and environmentally friendly anti-fouling solution. The instruments can be used in a variety of applications for monitoring marine and river waters, as well as drinking water and waste water treatment systems. Internal reference signals of the high performance LEDs used for fluorescence excitation compensate aging effects and temperature influences.



Parameter:

**CDOM Chlorophyll a
Phycocyanin Rhodamine
Fluorescein**



Applications:

- 💧 **Surface water**
- 💧 **Bathing lakes**
- 💧 **Raw water treatment**
- 💧 **Drinking water production and treatment**
- 💧 **Environmental monitoring**

eCHEM



The TriOS eCHEM series offers a wide range of electrochemical sensors for water analysis. In addition to pH and turbidity, TriOS also offers sensors for conductivity and dissolved oxygen. All eCHEM sensors are available with a cable length of 2 m or 10 m.

TpH

Digital pH sensor

Rugged digital pH sensor for use with TriBox controllers. Digital communication ensures secure and trouble-free signal transmission from the sensor to the controller. The high quality gel pH electrode has a porous HDPE diaphragm and is insensitive to fouling, making the sensor ideal for waste water applications.

Applications:

- ◆ Water and waste water treatment
- ◆ Coagulation and flocculation
- ◆ Process monitoring and control
- ◆ Acid/base neutralisation systems



Parameter:

pH-Value Temperature



TpH-D

Digital, differential pH sensor

Rugged, digital differential pH sensor for use with TriBox controllers. The reference system of the pH electrode is separated from the measuring medium due to the closed design. This eliminates electrode poisoning. A dirt-resistant salt bridge reduces cleaning and prevents electrolyte dilution.

Applications:

- ◆ Inlet measurement for waste water treatment plants
- ◆ Process monitoring and control



Parameter:

pH-Value Temperature



TORP

Redox potential sensor

The TORP sensor for measuring the redox potential from the eCHEM sensor product range is an electrochemical sensor for measuring in aqueous solutions. This digital sensor is an immersion sensor that is used under water or in conjunction with flow-through cells. It measures the redox potential at a gold electrode against an Ag|AgCl|Cl reference electrode

Applications:

- ◆ Water and waste water treatment
- ◆ Coagulation and flocculation
- ◆ Process monitoring and control
- ◆ Acid/base neutralisation systems



Parameter:

Redox



TTurb

Turbidity sensor

The TTurb is a digital sensor for optical turbidity measurement using the 90° IR scattered light method. Depending on the sensor, it can be used in pure water up to 100 FNU and in raw, waste and process water up to 1000 FNU.

Applications:

- ◆ Drinking water
- ◆ Potable water
- ◆ Circulating water
- ◆ Open waters



Parameter:

Turbidity TSS_{eq}



Oxygen

Sensor for dissolved Oxygen

This sensor is a calibration-free dissolved oxygen sensor using the luminance method. Digital value transmission to controller. No interference from H_2S , reducing or oxidizing substances. Evaluation via display unit.

Applications:

- ◆ Surface water
- ◆ Aquaculture
- ◆ Sea water
- ◆ Drinking water
- ◆ Waste water plants



Parameter:

Dissolved Oxygen **Temperature**



Conductivity

Digital sensor for conductivity

Digital sensor to measure conductivity especially in pure media, for operation on TriBox controllers. The digital technology ensures secure and interference-free signal transmission from the sensor to the controller.

Applications:

- ◆ Waste water treatment plants
- ◆ Circuits for industry and water



Parameter:

Conductivity **Temperature**



TW Master Series



The TW Master Series is a product line specially developed for the accurate analysis of drinking water. Starting with TW Turb as the first module, TriOS gradually introduces further parameters such as nitrate, pH, conductivity, dissolved oxygen, chlorine and also parameters such as tryptophan, chlorophyll, cyanobacteria, CDOM and PAH. The modular design allows a customised combination of parameters to meet the exact requirements of your application. All devices can be connected in series in groups of three, each with a bypass installation.

TW Turb

Turbidity analyzer

Analyzer for precise drinking water analysis for the parameter turbidity. The TW Master Series is a product line specifically designed for the exact analysis of drinking water. The measurement ranges are designed to meet the particular needs of drinking water monitoring.

Applications:

- ◆ **Drinking water analysis**
- ◆ **Quality control in waste water treatment plants**



Parameter:

Turbidity



TW pH / EC

Analyzer for determination of pH value and conductivity

TW pH / EC is a sensor from the modular TW Master series from TriOS. It has been specially developed for the precise analysis of pH values and electrical conductivity in drinking water and fulfils the highest standards of accuracy and reliability.

Applications:

- ◆ Drinking water analysis
- ◆ Quality control in waste water treatment plants



Parameter:

pH value Conductivity



TW PS300

Power supply unit for connecting sensors of the TW Master Series

The TW PS300 is a power supply unit for connecting TW Master Series sensors. It can be connected to an interface module with functions such as relay output and analog 4 .. 20 mA signal outputs.

Applications:

- ◆ Drinking water analysis
- ◆ Quality control in waste water treatment plants



Suitable for:

TW Master Series



Controller



For immediate monitoring and control of measurement data, TriOS offers controllers that are compatible with all TriOS sensors. These measurement and control systems have various interfaces, low power consumption and a robust aluminum housing, making them suitable for all applications in environmental monitoring, drinking water, waste water treatment plants and many other areas.

TriBox3

4-Channel Display and Control Unit

TriBox3 provides 4 sensor channels with selectable RS-232 or RS-485 function. In addition to Modbus-RTU, several other protocols are available. A built-in valve allows compressed air cleaning of the sensors. In addition, the TriBox3 offers various interfaces such as an IEEE 802.3 Ethernet interface, a USB port and 6 analog outputs (4 ..20 mA). A built-in relay can be used to trigger alarms or control external devices.



Compatible with:

**Photometer Fluorometer
Radiometer Turbidity eChem**



TriBox mini

Digital 2-Channel Controller

Digital 2-channel controller with 2 digital sensor inputs and 2 x 4 .. 20 mA outputs. The 2-channel digital controller is compatible with all TriOS digital sensors. All measurement and diagnostic data can be read out via a built-in web browser.



Compatible with:

Photometer **Fluorometer**
Turbidity **eChem**



Radiometers



RAMSES spectrally resolving radiometers for measuring radiance, irradiance or scalar irradiance in the UV, VIS or UV/VIS range are characterised by low weight and size as well as very low power consumption.

RAMSES G2

Hyperspectral Radiance and Irradiance Sensors
for the UV, VIS or UV/VIS range.

RAMSES G2 radiometers are also spectral imaging radiometers to measure radiance, irradiance or scalar irradiance in the UV, VIS and UV/VIS ranges.

In addition to the previously mentioned advantages of the RAMSES series, the RAMSES G2 radiometry series now features the innovative G2 interface, allowing for easy configuration via a web browser. The internal data logger with 2 GB storage and the comparably low power consumption provides the opportunity for a self-sufficient measurement operation without a separate controller.

The addition of the Modbus RTU protocol to the interface simplifies the integration into existing PLCs and external data loggers. In addition to radiance and irradiance, parameters such as inclination, pressure and temperature can also be retrieved.



Parameter:

Radiance Irradiance



Applications:

- ♦ **Water quality** ♦ **Photosynthesis**
- ♦ **Satellite validation** ♦ **Biology**
- ♦ **Field measurements** ♦ **Color measurements**
- ♦ **Climate research**

Systems



In modern water analytics, systems that integrate a variety of sensors play a crucial role in the precise monitoring and analysis of water quality. These systems enable the efficient connection of various measurement devices such as pH sensors, conductivity meters, dissolved oxygen sensors, and turbidity sensors allowing for the continuous collection and real-time analysis of data. By networking these sensors, complex parameters can be monitored, which is essential for applications in environmental monitoring, industrial processes, and drinking water treatment.

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