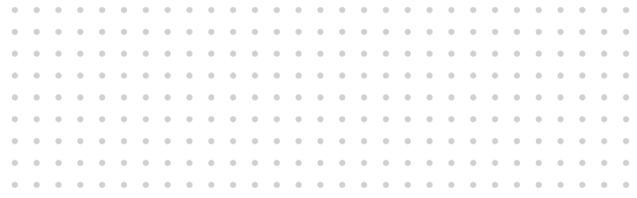




## VisiSens™ – 2D Mapping of Oxygen, pH & CO<sub>2</sub>



- 2D read-out of luminescent sensor foils
- Contactless direct sensing or through transparent walls
- Visualize spatial and temporal analyte gradients
- Numerous measurement points in one image



O<sub>2</sub>

pH

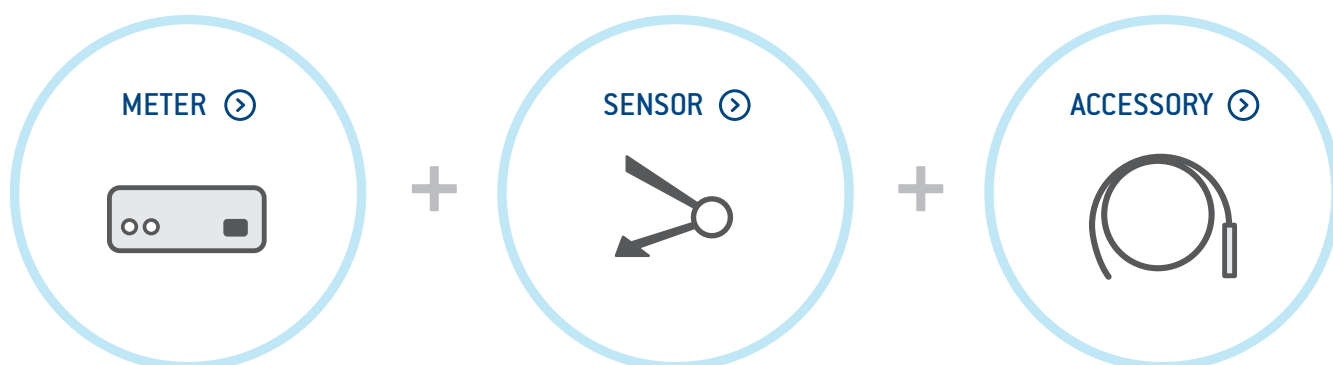
CO<sub>2</sub>



# Content

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- 06 Modular VisiSens TD
- 10 Accessories VisiSens TD
- 14 VisiSens A1
- 18 Product Matrix
- 19 Product Range

## Functional Principle



# We bring to light what's inside...



## Products Made in Germany

PreSens offers a broad range of sensor systems for end users in Bioprocess Control, Biological & Environmental Research, the Food & Beverage industry as well as other industrial applications.

### We offer systems for

- Oxygen measurement in gases and liquids
- Non-invasive online pH, CO<sub>2</sub> and oxygen measurement
- Oxygen and pH sensors for single-use bioreactors
- Microsensors pH, oxygen and CO<sub>2</sub>
- Process control in shake flasks incl. biomass monitoring
- Low-maintenance DO measurement for fermentation and bioreactor systems
- Online oxygen and pH measurement in disposables like multiwell plates and plastic bags
- Imaging solutions for 2D-mapping of oxygen-, pH-, and CO<sub>2</sub>-distribution

Our product range is constantly expanding.

## Company Profile

Based on research activities in the 1980's at the University of Regensburg, Germany, PreSens Precision Sensing GmbH was founded in 1997.

The company combines long-time experiences of different researchers in the fields of electronic engineering and sensor development. Right from the beginning, microsensor systems were sold to customers in life sciences. Already in its first decade of operation PreSens became one of the leading companies in the field of chemical optical sensor technology. Together with its partners it offers full service in Europe, America and Asia.

## Service

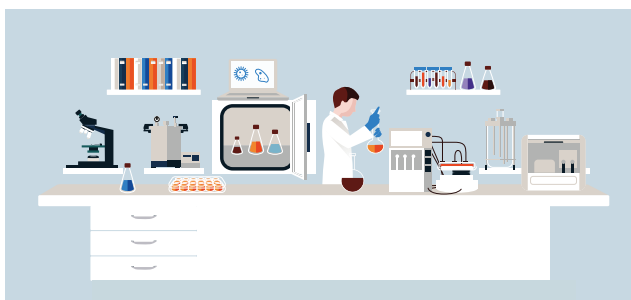
Furthermore, we are developers and manufacturers of optoelectronic OEM sensor components for companies in the field of medical equipment and process control.



Quality Management  
ISO 9001  
ISO 13485  
Voluntary participation in regular monitoring

**Is your application missing? Contact us and we find your customized solution!**

## ...and work for the following industries.



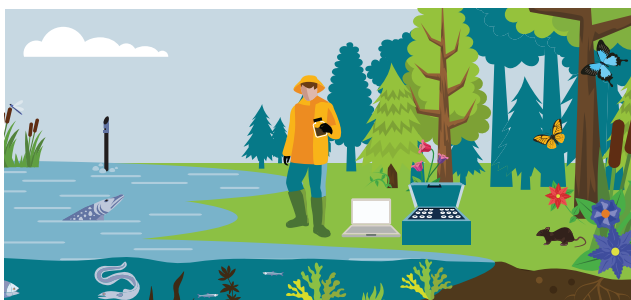
### Biotech & Pharma

Our Biotech & Pharma business field helps pharmaceutical companies such as Roche and DSM to improve their bioprocess development with PreSens sensors. With two decades of customer feedback our product development provides efficient solutions for your needs.



### Food & Beverage

A cooperation with the market leader for beverage filling systems, Kronen AG, Neutraubling, triggered our Food & Beverage business field in the late 1990's. PreSens supplies sensors for checking the oxygen-tightness of packaging and special systems for determining the penetrability of oxygen in PET bottles at companies such as Nestlé, Heineken or Danisco.



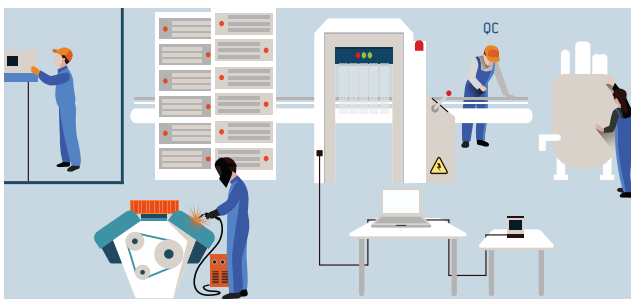
### Biology & Environmental

Our worldwide customer base in biological & environmental research has now grown to hundreds of users coming from the University of Alaska in Anchorage to the University of Wellington in New Zealand. For more than two decades we have delivered special sensor systems for various applications such as respirometry, or environmental monitoring.



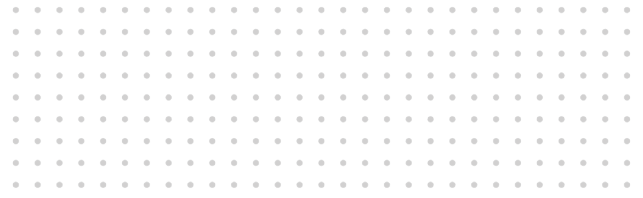
### Medical Research & Life Sciences

Our most recent business field arose from a cooperation with renowned medical technology manufacturers from the medical devices sector. PreSens supplies OEM parts, which are integrated into more complex medical systems. Microsensors, sensor spots, and imaging systems are applied in tissue engineering, microfluidics, and many other medical research fields.



### Industry & Technical Applications

Robust probes with excellent long-term stability or sensors for contactless measurement find use in technical or industrial applications. Specially designed flow-through connectors for integration in pipes are already applied to monitor the oxygen content in liquids or gases. OEM sensor components can be designed to be integrated in customer systems.



# IMAGING

## VisiSens TD – 2D Mapping Solution for O<sub>2</sub>, pH or CO<sub>2</sub>

2D Contactless Read-out System for High Resolution, Large Area, Multi-parameter or Multi-spot Sensing of O<sub>2</sub>, pH and CO<sub>2</sub>

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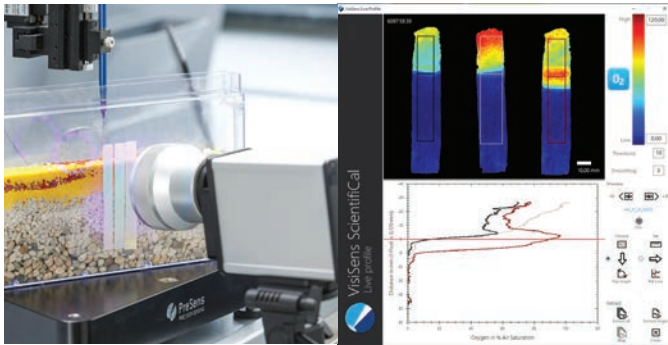
VisiSens™ TD enables simultaneous 2D read-out of optical O<sub>2</sub>, pH and CO<sub>2</sub> sensor foils within one set-up. For measurement, the sample surface is covered with the sensor foil, which translates the analyte content into a light signal. The sensor response is recorded pixel by pixel with a digital camera. With VisiSens™ TD spatial and temporal analyte changes can be monitored. VisiSens™ TD gives an overview over your sample area and allows you to freely choose the region of interest for investigation of spatial and temporal gradients.

- Three analytes – one system
- Read-out of oxygen, pH and CO<sub>2</sub> sensor foils
- Multiple sensor types combinable in one field of view
- Variable sensor and measurement geometry
- No analyte consumption or electric potential
- Read-out through transparent vessel walls
- Customized 2D sensor systems
- 12-bit detector
- Adaptable field of view, microscopic, 6 x 4 cm<sup>2</sup> or up to 30 x 25 cm<sup>2</sup>
- Single- and multi-analyte operation modes
- Time-lapse slide shows of recordings

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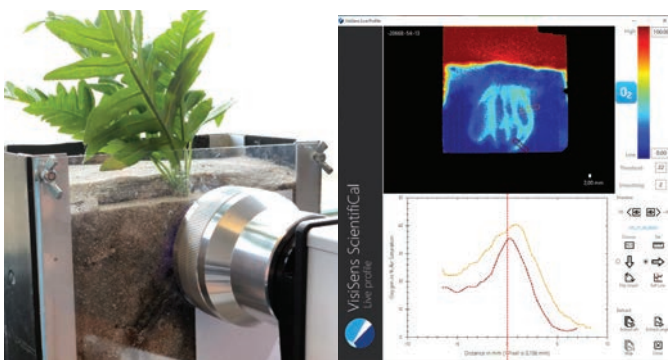
**Is your application missing?** Contact us and we find your customized solution!

## Examples for Applications



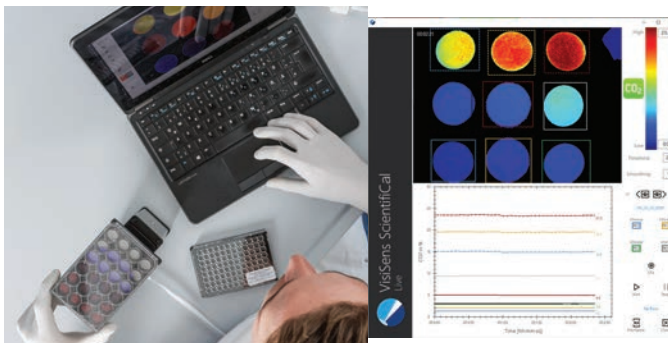
### O<sub>2</sub>, pH and CO<sub>2</sub> Mapping in Sediments

O<sub>2</sub>, pH, and CO<sub>2</sub> are key factors for microbial activity and various geochemical processes in sediments. They highly vary locally, e.g. at interfaces or different depths. Spatial and temporal analyte dynamics over long time periods can be visualized. Various regions can be compared within one measurement. VisiSens™ enables non-invasive 2D-mapping over cross-sections or on sample surfaces.



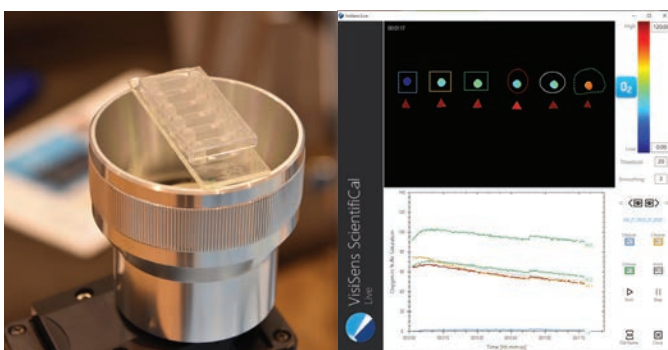
### Spatial and Temporal Analyte Changes in Plants and Soil

O<sub>2</sub>, pH and CO<sub>2</sub> play a crucial role in plant and soil processes, e. g. in photosynthesis, respiration, in rhizospheres or in microbiological processes. Metabolic processes can be monitored. This planar optical sensor technique allows non-invasive read-out through glass walls of rhizotrons. Studying metabolic activity of roots and determining the cultivation optimum is important for sustainable agriculture, e. g. for adjustment of water and fertilizer supply.



### O<sub>2</sub> or pH in Cell Culture and Engineered Tissue

Cellular metabolism critically depends on local O<sub>2</sub> supply and pH values. Especially in 2D and 3D cell culture or engineered tissue, cells located in diffusion limited regions (e. g. in scaffolds or spheroids) can be subject to low oxygen levels and pH changes. Non-invasive, continuous 2D-mapping can be performed directly in the incubator under growth conditions. Furthermore, 2D analyte distributions in living samples can be visualized.

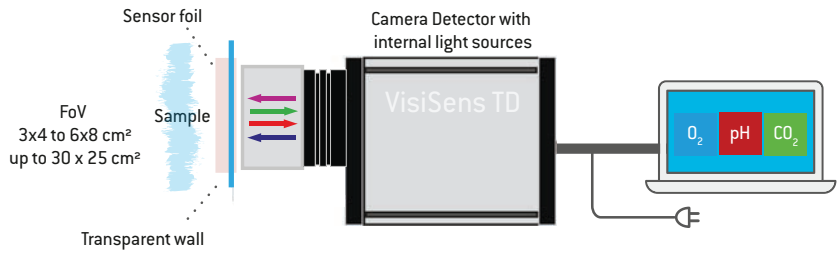


### Non-invasive 2D Analyte Mapping in Microfluidics

VisiSens™ enables 2D visualization of important culture parameters inside microfluidic chips. You can continuously monitor in 2D, with high resolution at specific positions or over the whole chip surface in a non-contact read-out mode. Detect metabolic hotspots, record time-series, and monitor hypoxia, cellular growth, or O<sub>2</sub> supply inside the chip. You can gain new insights on metabolic activity and natural or artificially produced gradients.

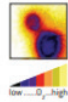
## SPECS

O <sub>2</sub>	0 - 100% a.s. <small>[0 - 20.9% O<sub>2</sub>]</small>	
pH	2.5 - 4.5	5.5 - 7.5
pCO <sub>2</sub>	0 - 1%	1 - 25 %

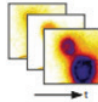


## Exemplary Results

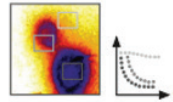
2D Read-Out



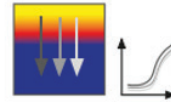
Time Series



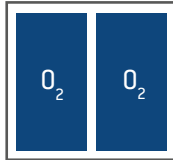
Multiple ROI



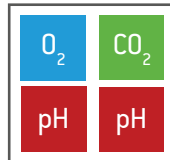
Gradients



Multi-sensor Set-up



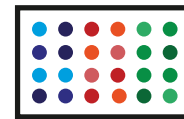
Multi-analyte Set-up



Operational modes



Modular accessories

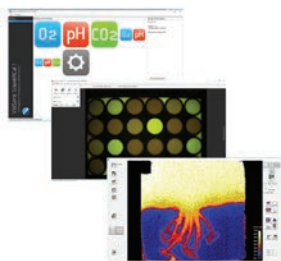


## VisiSens™ TD Basic System

The basic imaging device consists of a 12-bit detector with integrated light sources and mode operation units. It is prepared for reading out O<sub>2</sub>, pH and CO<sub>2</sub> sensor foils, even simultaneously in one experiment. The modular concept allows to choose the modalities that are required for the specific application.

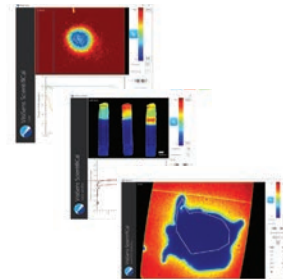
## Sensor Foils

The sensor foil can be attached directly on the sample or behind a transparent vessel wall. A sensor film translates the analyte content into a light signal. Foils are available for O<sub>2</sub>, pH or CO<sub>2</sub>. They can be cut in any desired size or shape.



## VisiSens™ Scientific Software

VisiSens TD includes a modular control and evaluation software. One can choose between different operation modes from single- to multi-analyte modes. Images can be recorded as snapshots or automatic time series. Furthermore, the software offers different evaluation functions for image analyses.



## VisiSens™ Software Plugins

These software extensions for the VisiSens Scientific software and the VisiSens TD imaging system will assist you in processing your O<sub>2</sub>, pH and / or CO<sub>2</sub> images and evaluating the data. The plugins are small programs that enable easy access to data from previously recorded or live measurement images.

**Is your application missing? Contact us and we find your customized solution!**



	Oxygen (blue)		pH (red)		CO <sub>2</sub> (green)	
	SF-RPSu4	SF-LV1R	SF-HP5R	SF-CD2R*	SF-CD1R	
<b>Specifications</b>						
Measurement range	0 - 100 % air saturation (0 - 20.9 % O <sub>2</sub> )	pH 2.5 - 4.5	pH 5.5 - 7.5	0 - 1 % pCO <sub>2</sub> at atmospheric pressure (1013.15 hPa)	0 - 25 % pCO <sub>2</sub> at atmospheric pressure (1013.15 hPa)	
Response time (t <sub>90</sub> )**	Gas phase: < 8 sec. Dissolved: < 30 sec.	< 30 sec.	< 30 sec.	< 3 min.	< 3 min.	
Limit of detection***	0.03 % air saturation					
Precision (temporal)****	± 0.02 % air saturation at 0 % air saturation ± 0.1 % air saturation at 100 % air saturation	± 0.01 pH at pH 4	± 0.01 pH at pH 7	± 0.02 % CO <sub>2</sub> at 0.15 % CO <sub>2</sub> ± 0.01 % CO <sub>2</sub> at 0.8 % CO <sub>2</sub>	± 0.02 % CO <sub>2</sub> at 2.0 % CO <sub>2</sub> ± 0.1 % CO <sub>2</sub> at 25.0 % CO <sub>2</sub>	
Precision (spatial)*****	± 1.5 % air saturation at 0 % air saturation ± 3 % air saturation at 100 % air saturation	± 0.1 pH at pH 4	± 0.1 pH at pH 7	± 0.08 % CO <sub>2</sub> at 0.15 % CO <sub>2</sub> ± 0.08 % CO <sub>2</sub> at 0.8 % CO <sub>2</sub>	± 0.2 % CO <sub>2</sub> at 2.0 % CO <sub>2</sub> ± 1.2 % CO <sub>2</sub> at 25.0 % CO <sub>2</sub>	
<b>Properties</b>						
Compatibility	Aqueous solutions, pH 2 - 10 ethanol (max. 70 % v/v), methanol (max. 10 % v/v),	Aqueous solutions, pH 2 - 9, ethanol (max. 10 % v/v)		Aqueous solutions, pH 2 - 9, ethanol (max. 10 % v/v)		
General sensor temperature working range	from + 5 °C to + 45 °C					
<b>Device</b>						
Camera chip	Type 1/3 Global shutter					
Image Resolution	1.25 megapixel (1292 x 964 pixels)					
Field of View	Standard VisiSens TD Basic System configuration: adaptable about 3 x 4 cm <sup>2</sup> to 8 x 6 cm <sup>2</sup>					
Number of LEDs	7 + 8 (internal ring light)					
Dimensions [L x W x H]	Body: 160 x 108 x 58 mm <sup>3</sup> Basic System light source tube: 90 - 140 mm length 80 mm diameter					
Weight	1150 g					
Material	Aluminum housing					
Digital Interface	Ethernet cable (PoE)					
<b>System Components</b>						
	<b>Modular VisiSens TD</b>					
<b>Hardware</b>	<b>O<sub>2</sub></b>		<b>pH</b>			<b>CO<sub>2</sub></b>
VisiSens TD Basic System* **	x		x			x
VisiSens™ TD Big Area Imaging Kit* **	x		x			x
VisiSens™ TD MIC Kit*	x					
Imaging Sensor Plate Adapter Tubus* **	x		x			x
<b>Software</b>						
VisiSens ScientificAl* **	x		x			x
VisiSens Plugins* **	x		x			x
Imaging Modality O <sub>2</sub> *	x					
Imaging Modality pH*			x			
Imaging Modality CO <sub>2</sub> *						x
Mixed analyte modes**	x		x			x
<b>Sensor</b>						
SF-RPSu4	x					
SF-HP5R			x			
SF-LV1R			x			
SF-CD1R						x
SF-CD2R*						x

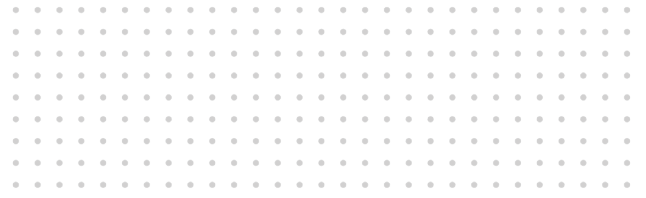
\* Prototype component. Please contact our service team!

\*\* depends on the chosen imaging modalities

\*\*\* Typical data of LOD of a defined ROI (> 6,000 pixels) over time in dark lab conditions at 20 °C, FoV 8 cm x 6 cm

\*\*\*\* Typical data of accuracy in a defined ROI (> 6,000 pixels) over time in dark lab conditions at 20 °C, FoV 8 cm x 6 cm; strongly depends on used sensor foil batch

\*\*\*\*\* Typical data of spatial standard deviation in defined ROI (> 6,000 pixels) in dark lab conditions at 20 °C, FoV 8 cm x 6 cm



# IMAGING

## Accessories VisiSens TD

### Adapt Your Imaging System to Your Application

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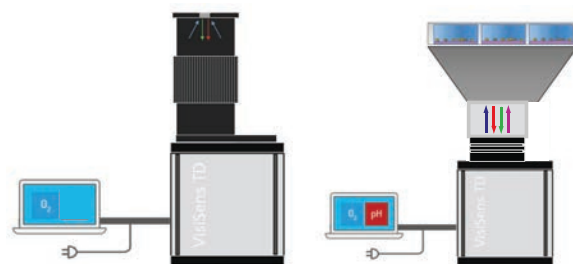
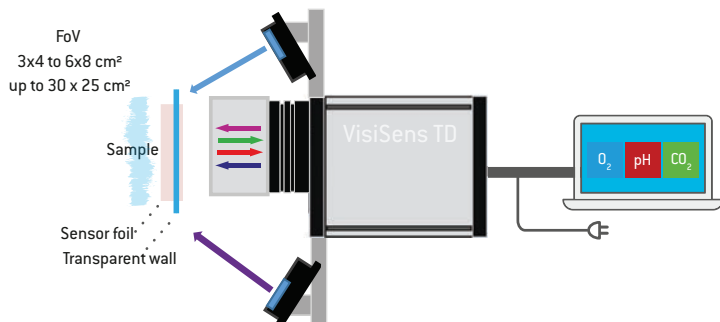
We offer several modular accessories for the VisiSens TD imaging system. This way VisiSens TD can be adapted for large area or microscopic 2D analyte mapping. Even a special adapter that facilitates imaging in multiwell plates for screening applications is available. These adapters make the VisiSens TD applicable in almost any field of research.

- 2D analyte mapping over large areas
- Microscopic O<sub>2</sub> imaging
- Parallel imaging in multiple samples
- Adapt VisiSens to your application

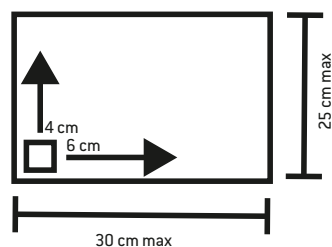
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**Is your application missing?** Contact us and we find your customized solution!

## Modular Set-Up



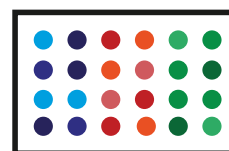
### Large Field of View



### Microscopic Imaging



### Sensor Array



## VisiSens™ TD Big Area Imaging Kit

These external excitation light source arrays are an accessory for large area sensor read-out with the VisiSens TD Basic System. The VisiSens TD Big Area Imaging Kit contains a total of 4 arrays in 2 pairs enabling field of view up to 30 x 25 cm<sup>2</sup>.



## Imaging Sensor Plate Adapter Tubus

This adapter is specifically designed for the read-out of imaging sensor plates with the VisiSens TD Basic System. The adapter can easily be attached to the read-out unit.



## VisiSens TD MIC Kit

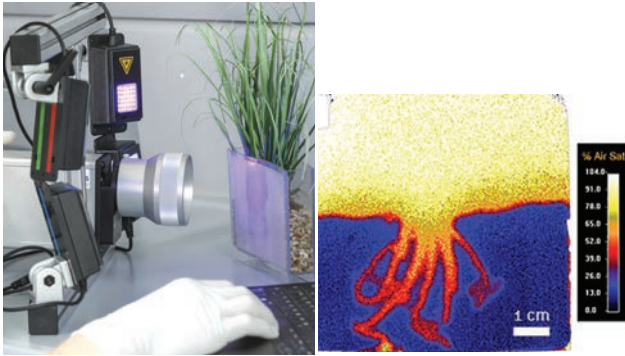
We offer optics and an excitation light source to adapt the VisiSens TD Basic System for microscopic oxygen imaging. This allows you to analyze oxygen distributions, gradients and hot spot formation in your sample at very fine scale resolution.



## Customized VisiSens™ TD

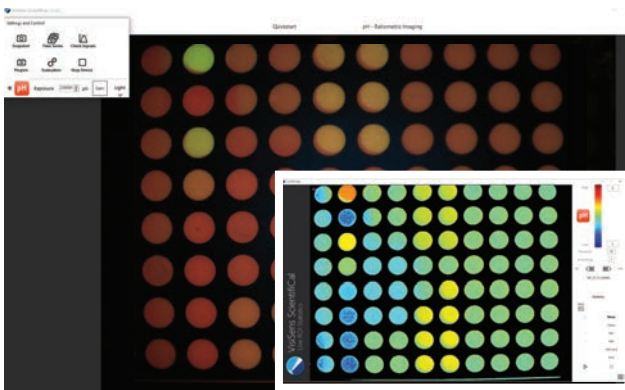
VisiSens™ TD offers a broad range of possible modifications with different lenses, light sources, and operation modes. Various accessories allow to further customize the system according to the specific experimental needs.

## Examples for Applications



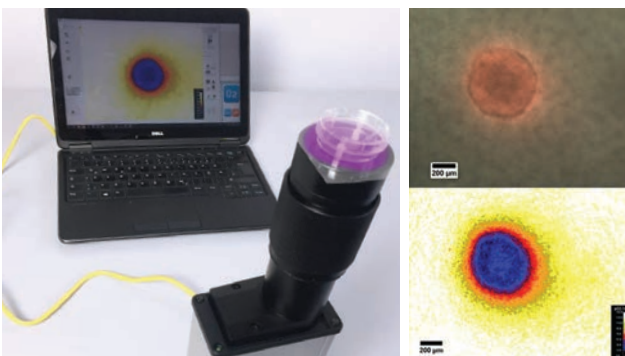
### Visualizing Analytes over Large Sample Surfaces

The VisiSens™ TD images large areas and gathers information on spatial and temporal analyte changes, e. g. in large scale pH and CO<sub>2</sub> imaging of root-soil interactions within rhizotrons or while analyzing biogeochemical processes in sediments. It is also well suited for applications in sensitive processes, e. g. metabolic activity of living samples or tissue engineering, where O<sub>2</sub> gradients over a cross section of a 3D graft can be monitored.



### Multi-sample and Multi-sensor Read-out

Large fields of view enable analyte value recording in multiple samples simultaneously with free choice of measurement geometry. Even different sensor ranges can be combined. The fluorescent sensor foils can be mounted at the bottom of transparent vessels, plates or vials containing different samples and placed next to each other, e. g. in a small rack. One image taken from the bottom contains the information on analyte concentrations in a group of samples.



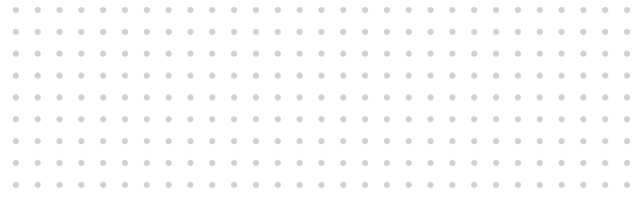
### Microscopic Analyte Imaging – TD MIC Configuration

VisiSens™ TD can be equipped with microscope optics for measuring analyte gradients with very high spatial resolution. The VisiSens™ TD MIC can be used e. g. to monitor spatial and temporal changes of O<sub>2</sub> of cross-sections of multicellular tumor spheroids. The system is compact and fits into an incubator to monitor analyte changes under cell culture conditions over days.

## Specifications

	VisiSens TD Big Area Imaging Kit	VisiSens TD MIC Kit
<b>Specifications</b>		
Optics		Integrated 2 x microscope lens
Field of View	From 8 x 6 cm <sup>2</sup> up to a maximum of 30 x 25 cm <sup>2</sup>	Approx. 2.5 x 1.8 mm <sup>2</sup>
Focus		Distance controlled, adjustable distance wheel
Number of LEDs	One array: 36, one kit: 144	14
Analyte	One set: 2 arrays for O <sub>2</sub> and 2 arrays for pH / CO <sub>2</sub>	O <sub>2</sub> imaging
Weight	700 g	500 g

	Imaging Sensor Plate Adapter Tubus
<b>Specifications</b>	
Dimensions	14 cm x 10 cm x 12 cm
Material	PLA
Weight	130 g



# IMAGING

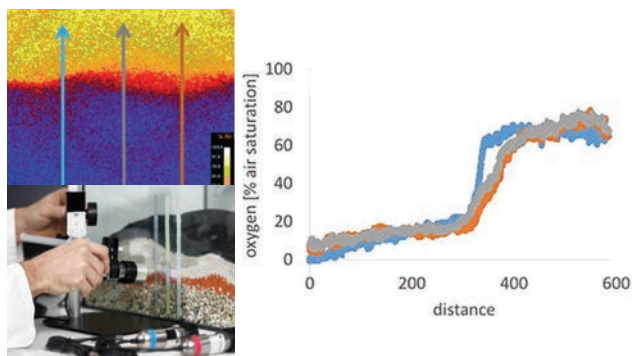
## VisiSens A1 Oxygen Imaging

### Entry level device for 2D Oxygen Imaging

The Detector Unit DU01 is the compact and economic solution for 2D visualization of oxygen distributions in e. g. living, heterogeneous samples. The handheld, USB powered digital camera records pixel by pixel sensor responses, capturing information of a whole array of sensor points. With this small and portable device spatial and temporal changes of oxygen can be monitored. The software allows controlling the image recording process, and assists image processing and evaluation. Acquired images can be single images or automatically recorded time series.

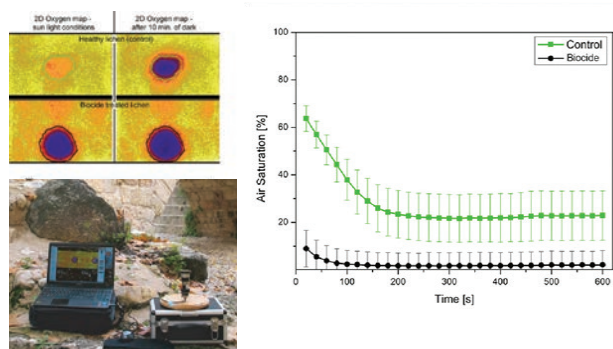
- Read-out of O<sub>2</sub> sensor foils
- More than 100,000 measurement points within one recorded image
- USB-powered portable microscope detector unit
- Small to medium size field of view (4.6 mm<sup>2</sup> to 13.5 cm<sup>2</sup>)
- Image processing and evaluation software included
- Visualize spatial and temporal gradients
- Time-lapse analyte movies

## Examples for Applications



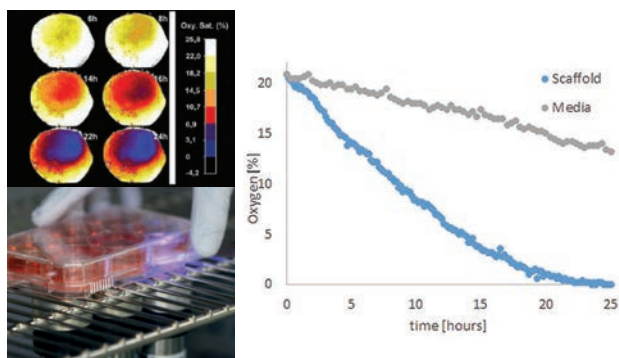
### O<sub>2</sub> Mapping in Sediments

O<sub>2</sub> is a key factor for microbial activity and various geochemical processes in sediments. It highly varies locally, e.g. at interfaces or different depths. Spatial and temporal analyte dynamics over long time periods can be visualized. Various regions can be compared within one measurement. VisiSens™ enables non-invasive 2D-mapping over cross-sections or on sample surfaces. The portable device can be used in lab and field.



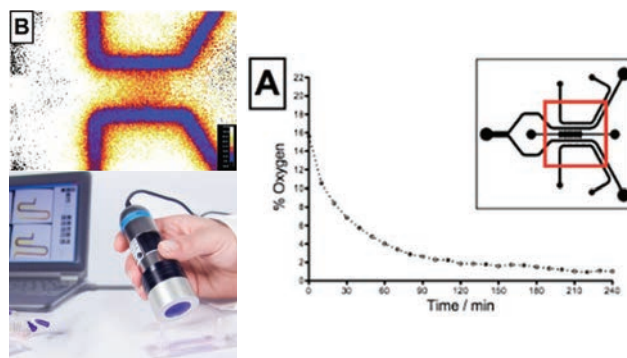
### Assessing Biocide Actions on Lichen with VisiSens

The action of a biocide on lichens colonizing dolostone rock was determined using the VisiSens oxygen system. After four days of biocide treatment, signs of damage to the photobiont cells of the lichen thallus were observed. Such damage will prevent the normal functioning of the symbionts and should eradicate the lichen from the rock. The rapid "in situ" and "in vivo" determination of the efficacy of a biocide offered by the VisiSens system is of great advantage in this field of research.



### O<sub>2</sub> in Cell Culture and Engineered Tissue

Cellular metabolism critically depends on local O<sub>2</sub> supply. Especially in 2D and 3D cell culture or engineered tissue, cells located in diffusion limited regions (e.g. in scaffolds or spheroids) can be subject to low oxygen levels. Non-invasive, continuous 2D-mapping can be performed directly in the incubator under growth conditions. Furthermore, 2D analyte distributions in living samples can be visualized.

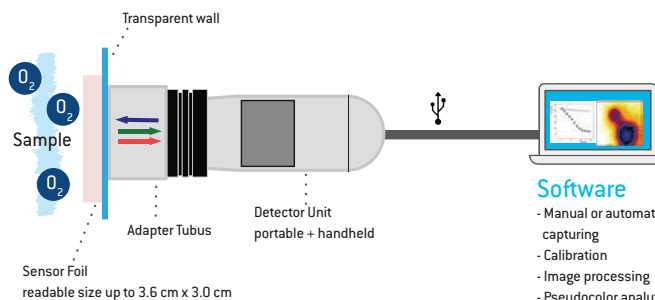


### Non-invasive 2D Analyte Mapping in Microfluidics

VisiSens™ enables 2D visualization of important culture parameters inside microfluidic chips. You can continuously monitor in 2D, with high resolution at specific positions or over the whole chip surface in a non-contact read-out mode. Detect metabolic hotspots, record time-series, and monitor hypoxia, cellular growth, or O<sub>2</sub> supply inside the chip. You can gain new insights on metabolic activity and natural or artificially produced gradients.

## SPECS

A1 O<sub>2</sub> 0 - 100% a.s.  
(0 - 20.9 % O<sub>2</sub>)



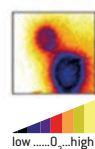
## SET-UP

### Software

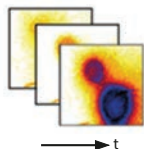
- Manual or automated picture capturing
- Calibration
- Image processing
- Pseudocolor analyte maps
- Time-lapse
- Free choice of ROI

## EXEMPLARY RESULTS

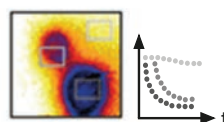
### 2D Read-Out



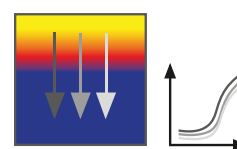
### Time Series



### Multiple ROI

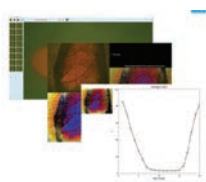


### Gradients



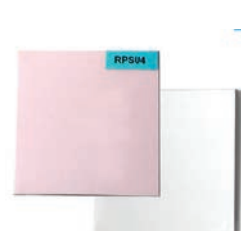
## Detector Unit DU01

Detector Unit DU01 for 2D visualization of oxygen distributions. The handheld digital camera records pixel by pixel sensor responses, capturing information of a whole array of sensor points. With VisiSens™ spatial and temporal changes of oxygen can be monitored.



## VisiSens AnalytiCal 1 Software

This software allows controlling the image recording process and assists image processing and evaluation. An easy-to-use acquisition module manages image recording and storage. Measurements which belong together can be organized as user defined sessions.



## Oxygen Sensor Foil SF-RPSu4

The SF-RPSu4 for measuring oxygen allows non-invasive mapping of metabolic activities as well as changes over time periods from seconds to months. The fluorescent sensor foil is attached on a living or dead sample surface or a transparent glass or disposable vessel.



## Adapter Tubes

Tubes in different sizes can be attached to the VisiSens™ detector units to enable standardized measurement conditions, avoid ambient light coming from the sides and work at fixed fields of view. The adapter tube 2 for example gives a typical field of view of 1.7 x 1.3 mm<sup>2</sup>, while the adapter tube 4 allows to enlarge the field of view to 3.6 x 3.0 cm<sup>2</sup>.

**Is your application missing? Contact us and we find your customized solution!**



## Specifications

Oxygen (blue) SF-RPSu4	
<b>Specifications*</b>	
Measurement range	0 - 100 % air saturation (0 - 20.9 % O <sub>2</sub> )
Response time (t <sub>90</sub> )**	Gas phase: < 8 sec. Dissolved: < 30 sec.
Size of sensor foil***	40 x 40 mm <sup>2</sup> to 100 x 150 mm <sup>2</sup>
Number of sensing points within one image**	300,000
Measurement temperature range	From + 5 °C to + 45 °C
<b>Properties</b>	
Compatibility	Aqueous solutions, ethanol (max. 70 % v/v), methanol (max. 10 % v/v), pH 2 - 10
<b>Device</b>	
Camera chip	Enhanced Color CMOS
Image resolution	1.3 megapixel (1280 x 1024 pixels)
Magnification	10-fold up to 220-fold, depending on adapter tubus used
Field of view	~ 1.6 x 1.3 mm <sup>2</sup> to ~ 3.6 x 3.0 cm <sup>2</sup> ; typically ~ 1.2 x 1.0 cm <sup>2</sup>
Output	15 fps live video preview (no storage) and 0.5 fps full-resolution picture storage (.png)
Number of LEDs	8
Dimensions	Length 10 cm, diameter 3.8 cm
Weight	0.17 kg (without adapter tubus)
Material	ABS housing
Digital interface	USB 2.0, high speed USB transmission

\*VisiSens™ is no approved medical device

\*\*typical data which may strongly differ with adapting the imaging set-up to specific needs

\*\*\* standard product size; sensor foils can be cut with e.g. scissors into desired size or shape

# Product Matrix

		Meters			
		VisiSens™ A1	VisiSens™ TD		
		O <sub>2</sub>	O <sub>2</sub>	pH	CO <sub>2</sub>
Hardware and Accessories	<b>Sensors</b>				
	SF-RPSu4	x	x		
	SF-HP5R			x	
	SF-LV1R			x	
	SF-CD1R				x
	SF-CD2R				x
	ISP24 or ISP96		x		
	<b>Hardware</b>				
	Detector Unit DU01	x			
	VisiSens™ TD Basic System*		x	x	x
	VisiSens™ TD Big Area Imaging Kit*		x	x	x
	VisiSens™ TD Mounting Rack		x	x	x
	VisiSens™ TD MIC Kit		x		
Imaging Sensor Plate Adapter Tubus		x			
CaliPlate			x		
Software	<b>Software</b>				
	VisiSens AnalytiCal 1	x			
	VisiSens ScientificCal *		x	x	x
	Oxygen imaging modality		x		
	pH imaging modality			x	
	Carbon Dioxide imaging modality				x
	Mixed analyte modes		x	x	x
	VisiSens Plugins*		x	x	x

\*depending on chosen imaging modalities

Is your application missing? Contact us and we find your customized solution!

# Product Range



O<sub>2</sub>    pH    CO<sub>2</sub>

## VisiSens™ TD



### VisiSens™ TD Basic System

Modular imaging detector unit that can be equipped with various imaging modalities for read-out of O<sub>2</sub>, pH or CO<sub>2</sub> sensor foils



### VisiSens™ ScientificCal Software

VisiSens™ TD Software for measurement control and evaluation of recorded data; the modular software offers various operation modes from single- to multi-analyte modes.



### Oxygen Sensor Foil SF-RPSu4

Fluorescent sensor foil for oxygen imaging from 0 – 100 % air saturation



### pH Sensor Foil SF-HP5R

Fluorescent sensor foil for measurements in a range of 5.5 – 7.5 pH



### CaliPlate for SF-HP5R

Calibration helper; 10-well plate equipped with pH sensor foil SF-HP5R



### pH Sensor Foil SF-LV1R

Fluorescent sensor foil for measurements in low pH range from 2.5 – 4.5 pH



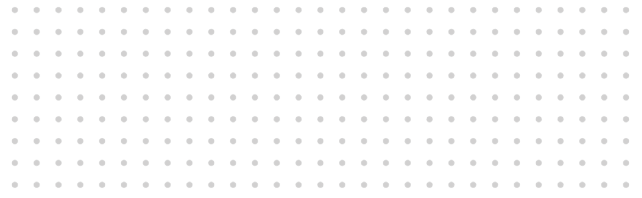
### CaliPlate for SF-LV1R

Calibration helper; 10-well plate equipped with pH sensor foil SF-LV1R



### CO<sub>2</sub> Sensor Foil SF-CD1R

Fluorescent sensor foil SF-CD1R for the range of 1 – 25 % CO<sub>2</sub>; suitable for measurements in liquids or samples with a constant relative humidity of 100%



### CO<sub>2</sub> Sensor Foil SF-CD2R

Low CO<sub>2</sub> range (0 – 1 %) sensor foil; suitable for measurements in liquids or samples with a constant relative humidity of 100 %



### Self-adhesive Sensor Foils

O<sub>2</sub> and pH sensor foils are also available with self-adhesive backside for easy sensor implementation

## VisiSens™ TD Accessories



### VisiSens TD Mounting Rack

Rack for mounting light sources in various modifications



### Big Area Light Sources

Mixed excitation light sources for read out of 8 x 6 cm<sup>2</sup> to a max of 30 x 25 cm<sup>2</sup> field of view



### VisiSens™ TD MIC Modification

Optics and excitation light source for microscopic O<sub>2</sub> imaging.



### Imaging Sensor Plate Adapter Tubus

#### Adapter Tubus

Adapter for the read-out of imaging sensor plates with the VisiSens TD Basic System.



### 24-Well O<sub>2</sub> Plates

24-well plates with integrated sensor foils for O<sub>2</sub>; read-out of all wells in one image possible; beta-irradiation service offered.



### 96-Well O<sub>2</sub> Plates

96-well microtiterplates with integrated sensor foils for O<sub>2</sub>; read-out of all wells in one image possible; beta-irradiation service offered.

Is your application missing? Contact us and we find your customized solution!

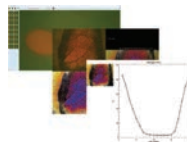
# VisiSens™ A1 Oxygen Imaging

O<sub>2</sub>



## Detector Unit DU01

USB powered and portable 2D detection device for oxygen imaging



## Software VisiSens™ AnalytiCal 1

Software for measurement control and evaluation of oxygen images



## Oxygen Sensor Foil SF-RPSu4

Fluorescent sensor foil for oxygen imaging from 0 – 100 % air saturation

# VisiSens™ A1 Accessories



## Adapter Tube 1

Standard adapter tube that comes with the VisiSens™ A1 detector unit; typical field of view of ~ 12 x 10 mm<sup>2</sup>



## Adapter Tube 2

Adapter tube for VisiSens™ A1 detector unit with typical field of view of ~ 1.7 x 1.3 mm<sup>2</sup>



## Adapter Tube 4

Adapter tube for VisiSens™ A1 detector unit with typical field of view of ~ 36 x 30 mm<sup>2</sup>

# Discover the complete PreSens portfolio



## Products

Optical Oxygen  
Sensors & Meters

Optical pH  
Sensors & Meters

Optical CO<sub>2</sub>  
Sensors & Meters

Optical Sensor  
Systems

VisiSens™  
Imaging Systems

OEM Solutions &  
Engineering



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what's inside.

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**PRECISION SENSING**  
and offers:

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- sensors thinner than a hair, non-invasive and online
- optimum advice and support
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Fax +49 941 942 72 111  
info@PreSens.de

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