BlueSens

understanding bioprocesses

Professional tools for gas analysis

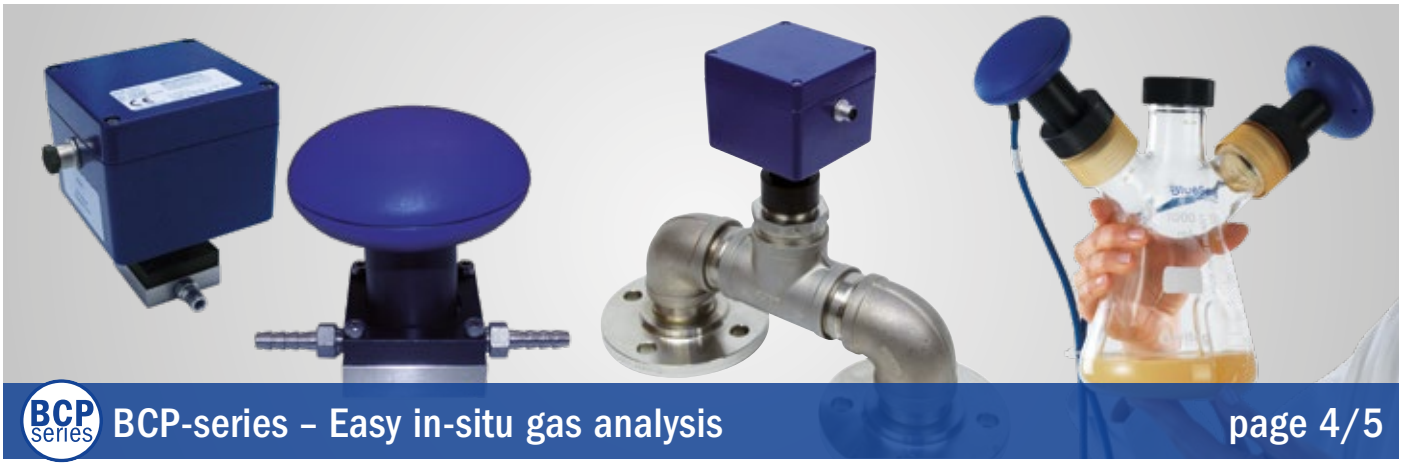
Upgrade your fermentation with continuous off-gas analysis

General facts about BlueSens

Are you looking for professional tools to optimize your process and decrease work?

- ✓ Available for CO_2, O_2, H_2, CH_4, combined units CO_2/O_2 and CH_4/CO_2
- ✓ Continuous measurement – no sampling required
- ✓ No pre-treatment of the exhaust stream required sensor can operate in fully saturated gas streams
- ✓ No maximum or minimum flow rates
- ✓ Plug & Play' ease of operation
  - connect to power, gas stream and data collector
  - data available in minutes
- ✓ In use with every fermenter brand and vessel volume (Shake flasks – 300,000 L)
- ✓ In use with cell culture and microbial single-use fermentation systems
- ✓ Digital and Analogue data communication
  - RS232, RS485, Ethernet, 4-20mA

Professional tools for gas analysis



BCP-series: Easy in-situ gas analysis

Continuous in-situ measurements

Defined online real-time gas analysis often is the key to success in **modern bioprocessing.** The BCP gas analyzers are available for CO_2, O_2, H_2 and CH_4. They can be applied **in every scale** starting from shake flasks or anaerobic digesters in the lab up to industrial scales.

The BCP analyzers allow you to scale up your process using the same technology at every scale step **minimizing variations** and unpredictabilities due to changes in measuring technology at the different scales. They are **easy to connect** directly to the exhaust flow of all types of fermenters and bioreactors (stainless steel, single-use or glass). In combination with a bioprocess software (such as BlueVis) the BCP sensors can be used to calculate essential **respiration parameters** for example CER (carbon dioxide emission rate), RQ (respiratory quotient), and OUR (oxygen uptake rate) or other.

All BCP-analyzers are available with aluminium (pilot to industrial scale use) or PA (lab scale) casings.

Key facts BCP-series

Fits on every scale
Gain important parameters and measure accurately – no matter if benchtop or production scale.

Wide choice
Each sensor is for a single gas: H_2, CO_2, O_2, CH_4.

Different housing
All BCP sensors are available with PA or Aluminium housing (IP65).

CO_2 ◆ O_2 ◆ H_2 ◆ CH_4

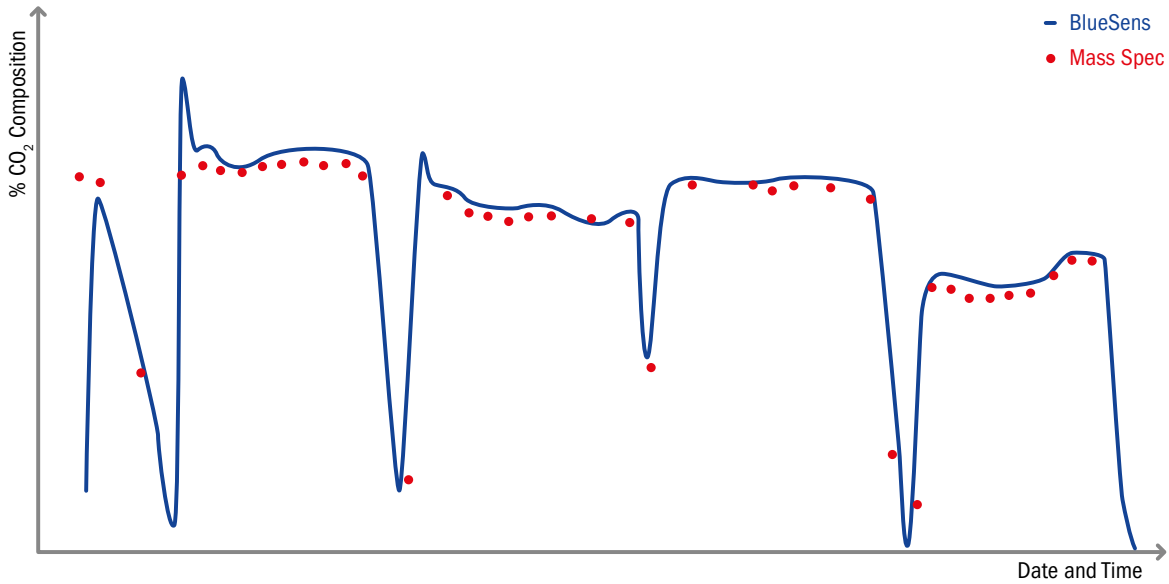
Housing

Aluminum, IP65, 12 – 24V

PA, IP40, 12 V

BCP-series: Easy in-situ gas analysis

Benefit from continuous off-gas measurement with BlueSens



	CO_2	H_2	O_2
Application	Microbial Cell culture Algae Biogas Fuel cell	Fuel cell Biogas Algae	Microbial Cell culture Algae Biogas Fuel cell
Concentration range	0 – 10 Vol.% 0 – 25 Vol.% 0 – 50 Vol.% 0 – 50 Vol.% (biogas)	0 – 10 Vol.% 0 – 50 Vol.% 0 – 100 Vol.% (others on request)	0,1 – 25 Vol.% 0,1 – 50 Vol.% 0 – 100 Vol.% Aerobic Anaerobic (or anaerobic phases)

BlueInOne: Combined CO_2/O_2 sensor

BlueInOne series – parallel real-time measurement of CO_2 and O_2 concentrations

Key facts BlueInOne

One device for parallel measurements
O_2 and CO_2, humidity and pressure. No minimal gas flow needed. Autocompensated for fluctuations in humidity and pressure.

All devices reasonably priced
The reasonably priced BlueInOne helps you to understand your process.

Perfect gas analyzer for microbial and cell culture processes
Continuous real-time measurements without gaps or interruptions.

Application areas

- Fermenter/Bioreactor monitoring
- Cell Culture and microbial processes
- Microbial fermentation with anaerobic phase or containing volatile hydrocarbons
- Can be used with laboratory to industrial scale culture systems

The BlueInOne is designed to measure concentrations of **carbon dioxide and oxygen** in biotechnological processes. It can be connected directly to the exhaust gas flow of fermenters and bioreactors from benchtop to industrial scale without a requirement for pretreatment of the gas stream. The BlueInOne measures the gas concentrations continuously **in real-time.**

Installed **downstream of the sterile barrier** of the culture vessel, the analyzer can be calibrated at any time with no risk of contaminating the culture.

Fluctuations of pressure and humidity are **automatically compensated** for by the analyzer.

BlueInOne: Combined CO_2/O_2 sensor

Two different models of BlueInOne are available:

- Continuous parallel measurement of O_2 and CO_2 – no need for sampling
- Multiple CO_2 and O_2 calibration ranges are available
- BlueInOne cell will operate from 0 to 100 % oxygen
- BlueInOne ferm will operate from 0.1-25 % or 1-50% oxygen
- Compact stainless steel housing – robust and easy to clean
- PAT and QbD conforming in-situ-measurement – for highest standard of quality
- Auto compensation for humidity and pressure – no need for extra gas coolers, pumps or valves
- Real-time process optimization – see what happens when it happens – fast response option

Which BlueInOne is the right one for you?

Your demands	BlueInOne Ferm	BlueInOne Cell
Anaerobic	–	✔
Aerobic	✔	✔
Cell culture	–	✔
Inflammable Gases	–	✔
High concentration of O_2	–	✔
Dry gas	✔	–
Higher pressure conditions up to 1.3 bar	✔	–

CER, OUR, RQ

Biomass

Growth rate

μ_{max}, X_s, Y_{xs}

BlueVary: Maintenance free off-gas sensor

BlueVary – maintenance free gas analyzer adapting to your needs

BlueVary consists of a basis station with three plug-in positions for gas sensor cartridges. Two different gases can be measured at once. The third plug-in position holds a pressure or pressure/humidity sensor cartridge. Gas sensor cartridges are selectable according to your application and can be changed easily as required.

Technical Short Facts

- Cartridge plug-in positions
  - 1 for pressure/humidity
  - 2 for two various gas cartridges
- Variable connections and data output options
- Light but robust PA housing
- Cartridges for CO_2, O_2, H_2 and CH_4 available now

BlueVary increases your efficiency

- **One device to cover different measurement tasks**
  Choose a suitable gas sensor cartridge for your application.
- **Maintenance free**
  No need for offsite annual maintenance – minimizes your downtime.
- **Auto compensated pressure and/or humidity**
  No gas cooler, pumps, valves or other gas pretreatment needed.
- **Connectable to any hose/tube or pipe**
  Use it on your fermenter of choice.
- **Integrated status display**
  See all sensor information and measurement data at a glance.

Key facts BlueVary

Maintenance free
No need for annual maintenance. Performing our established one-point calibration regularly is all you have to do.

No specific training – easy to install and handle
Install and calibrate it yourself. PC housing and various connections guarantee easy handling.

Maximum flexibility
Combine two gases for parallel measuring (CO_2, O_2, H_2, CH_4). Use it also for biogas applications.

Simplify process optimization

- Continuous online fermentation monitoring for cell culture, microbial, algae, fungi or biogas processes.
- Identify metabolic phenomena and obtain vital process parameters.
- Applicable from lab to industrial scale.

BlueVIS: Open bioprocess software

Connect what you want!

Key facts BlueVIS software

Parallel tracking of important process parameters
Monitoring, acquisition and integration of data from all components and for process control in real-time.

Digital and analog data input implemented
Analog devices can be connected via analog/digital converter.

Open to other systems and brands
Integrated OPC server/client for data exchange to other systems and programs.

BlueVIS
Calculates OUR, CER, RQ, growth rate and biomass, offers math sensors and connects to MATLAB.

Features of BlueVIS

- Can be used with all brands of fermenter
- Open software
- Comes with OPC server/client
- Important process parameters
- Set up your own PID controller
- Integrated simple to use calculation module for data analysis and integration of data points

Additional BlueSens products

Yieldmaster – automated BMP determination

BlueVCount – gas volume measurements

BCPreFerm – gas analysis system for shake flasks

YeastForce – CO_2 determination for the baking industry

Instructions for maintenance and service

Each measuring device needs calibration and maintenance.

We recommend an annual maintenance plan for the sensors to ensure both, proper function and best accuracy. Here, we offer the service package Blue4Care. It offers a warranty extension for one year. As part of this package, we change all spare parts and components that are needed to maintain a mint condition. Lastly, a factory calibration and quality control of the sensors is done. Of course, you can order a repair service on demand. The cost of such a service depends on the work required and can be requested by estimate.

If you'd like to send us your sensor for service or annual maintenance please download the pdf on our website (www.bluesens.com/service/maintenance).

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BlueSens gas analyzers and more

Market leader BlueSens offers a wide variety of gas analyzers and additional equipment for bioprocess industry. For many years process engineers have been counting on the incomparably quality, longevity and simple handling of the analyzers. Beside single gas analyzers available for five different gas types BlueSens also offers parallel gas analyzers which enable the measurement of two gases at the same time. Gas counter as well as the open bioprocess software BlueVIS round off the product portfolio.

Products

Gas Sensors and Analysis Systems

- BlueVary
- BlueInOne
- Yieldmaster
- BlueVCount
- BCpreFerm
- BCP sensors
- YeastForce

Software

- BlueVIS
- YeastForce Monitor

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