



Upgrade your fermentation with continuous off-gas analysis





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

- ✓ Available for CO₂, O₂, H₂, CH₄, combined units CO₂/O₂ and CH₄/CO₂
- ✓ 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



BCP-series - Easy in-situ gas analysis



BlueInOne - Compact CO₂/O₂ gas analyzer



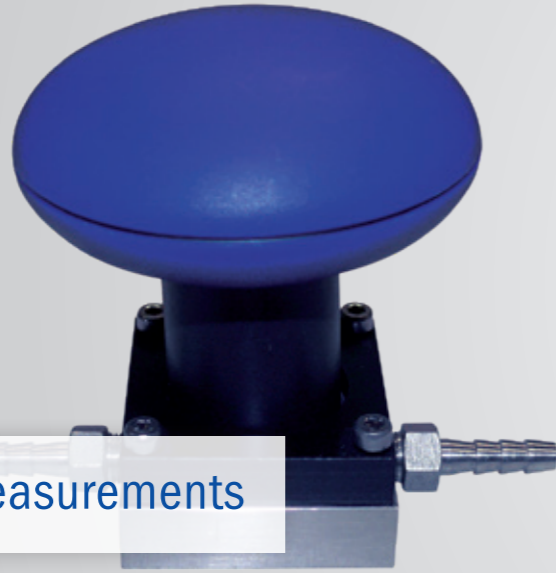
BlueVary - Variable and maintenance free



BlueVIS - Open bioprocess software



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 CO₂, O₂, H₂ and CH₄. 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: H₂, CO₂, O₂, CH₄.



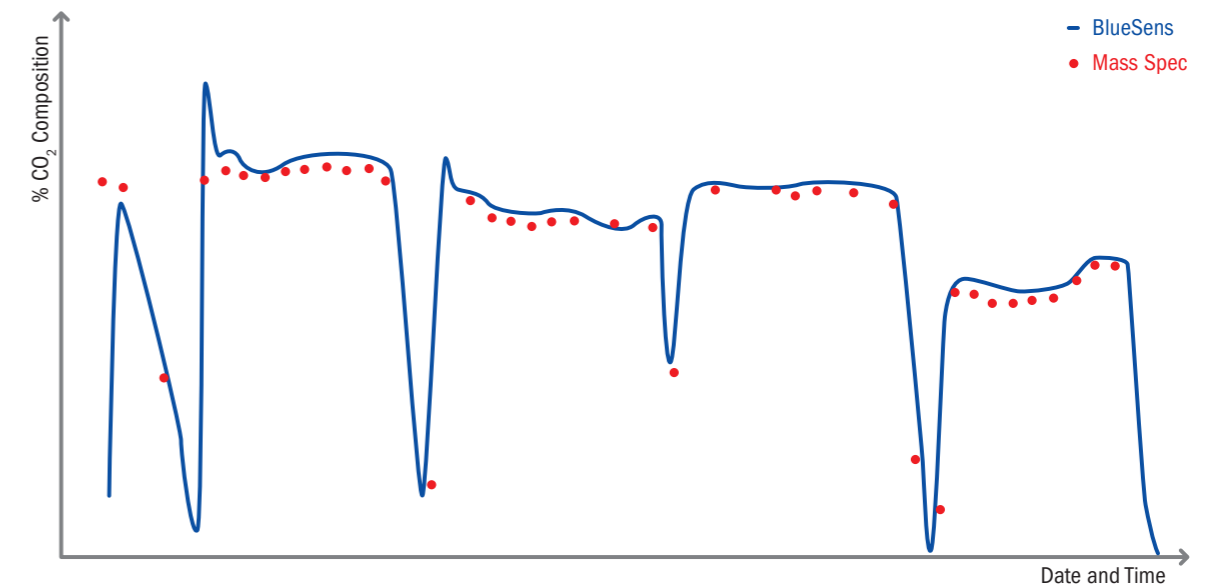
Housing



PA, IP40, 12 V



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 series – parallel real-time measurement of CO₂ and O₂ concentrations

Key facts BlueInOne



One device for parallel measurements

O₂ and CO₂, 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.



Two different models of BlueInOne are available:

- Continuous parallel measurement of O₂ and CO₂ – no need for sampling
- Multiple CO₂ and O₂ 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}



The maintenance free variable off-gas sensor adapting to your needs

CO₂ O₂ H₂ CH₄

Watch animation online:



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 CO₂, O₂, H₂ and CH₄ 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 (CO₂, O₂, H₂, CH₄). 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.



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



yieldmaster.bluesens.com



 BCPreFerm – gas analysis system for shake flasks



bcpreferm.bluesens.com



 BlueVCount – gas volume measurements



bluevcount.bluesens.com



 YeastForce – CO₂ determination for the baking industry



yeastforce.bluesens.com

BlueSens maintenance



 Instructions for maintenance and service



Please remember: keep your sensor in good shape. You can find all information about our service offers here: www.bluesens.com/service/maintenance

BlueSens experts



 Our experts are there for you



Book your free consultation appointment here: www.bluesens.com/service/online-consultation



Visit us at
BlueSens.com

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

