

CO₂ Sensor

BCP-CO₂

CO₂ in-situ measurement



Advantages & Applications

Easy, efficient und precise optimization of processes

BCP-CO₂ is a reliable sensor for the laboratory and the industrial use. You can choose between a robust version with an aluminum housing (IP 65) or a compact version with a PA-plastics housing. Whatever you decide for – BCP-CO₂ optimizes bioprocessing easily, efficiently and precisely.

The field of application is large – whether in the bioreactor or in the fermenter, in the laboratory or on the industrial large scale. The sensor is favourably priced, longterm stable and already often used in parallel bioreactors. For the parallel control of O₂ and CO₂ in growth analysis for scale-up applications, we additionally offer BCpreFerm as a ready-to-use analysis system.

BCP-CO₂ works independently of the gas flow quantity with the established dual wavelength infrared measurement technology. The maintenance is more than easy and the operation costs are very low. Due to its low weight of 150g, the compact sensor in a PA housing can be screwed sterile directly at the shake flask. BlueSens sensors are always measuring on the spot, where the process takes place. Thanks to its universal connections, BCP-CO₂ can be easily integrated in existing gas lines.

Wherever your bioprocess takes place – in a glass flask, the fermenter or of course also for the use of disposals – the BCP-CO₂ series is always the right choice. Sampling, gas cooling or additional complicated gas lines are not longer needed. Thanks to the standard interfaces the data can be readout in real time by any electronic process control system.

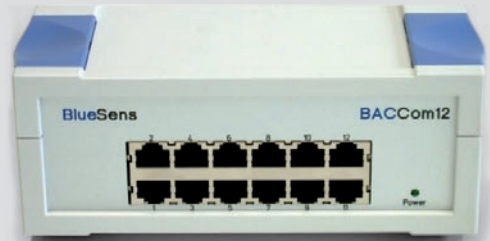


BCpreFerm

Process control

Better understand processes and maximize yield

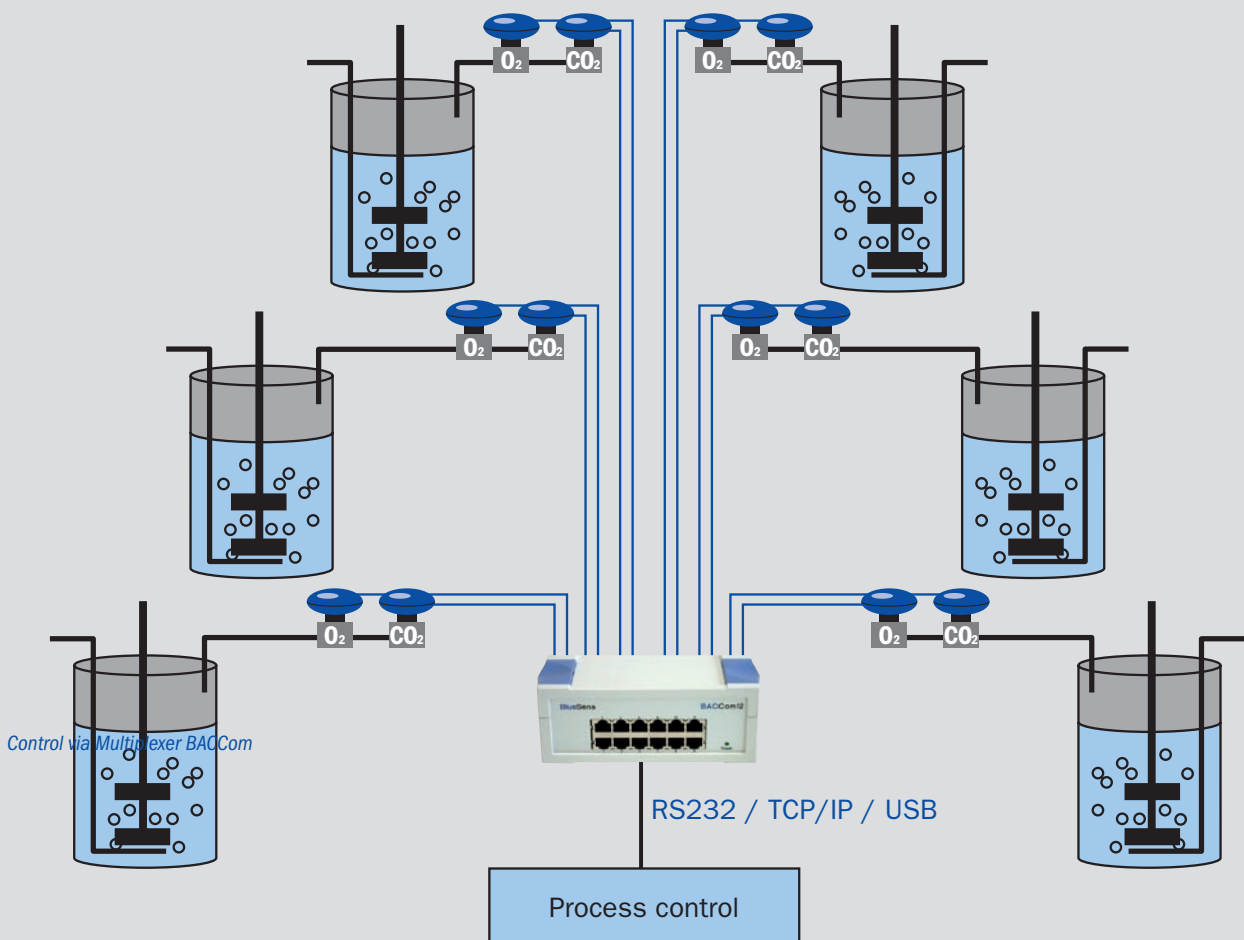
Whether in the laboratory or on the industrial scale - bioprocessing always means the control of biological processes in real time. More information about the bioprocesses means more control options. CO₂ is a very important product or a decisive raw material for metabolic processes. To better understand complex bioprocesses, you depend on a high data stream. BCP-CO₂ detects these data for you in real time. In consequence, this information can be processed by any kind of process control system.



Multiplexer BACCom 12

The values can be transferred without any problem by standard data interfaces (RS232, RS485, 4-20 mA, USB, Ethernet) to the bioprocessing systems. So BCP-CO₂ can be integrated without any problem in existing control systems. In combination with our O₂ sensor, the BlueSens BCP-O₂, fermentation processes can be analyzed highly specific.

Using our Multiplexer BacCom, up to 12 sensors can be readout and contacted by a single interface. The more you learn about the bioprocess, the better you will be able to control and automate it to maximized yield.



Connections

for every application

BCP-CO₂ by BlueSens disposes of universal installation options. So the sensor can be installed easily and cost-effectively. By its multifunctional connections each sensor can be integrated in almost every existent system. In general you have the choice between the use of flow adapters or the use of existing screwed connections. For both alternatives the installation can take place by different connections:

- > any hose connector from 4-12 mm
- > GL45 screw thread
- > 1 ¼" screw thread
- > Tri-Clamp

For the use of flow adapters you can make your choice between the reasonably priced and robust POM-adapters or the high-quality stainless steel adapters. The flow adapters can additionally be fixed with a mounting plate POM and four screws. Then the gas flow to/in flow adapters is simply achieved via hose connections with an inside diameter from 4 to 12 mm.



Sensors with PA housing and GL45 screwed connection on shake flask



Flow adapter POM for hose connections



Aluminum housing with flow adapter stainless steel and self-sealing coupling for hoses



PA housing with flow adapter stainless steel



Tri-Clamp SMS38

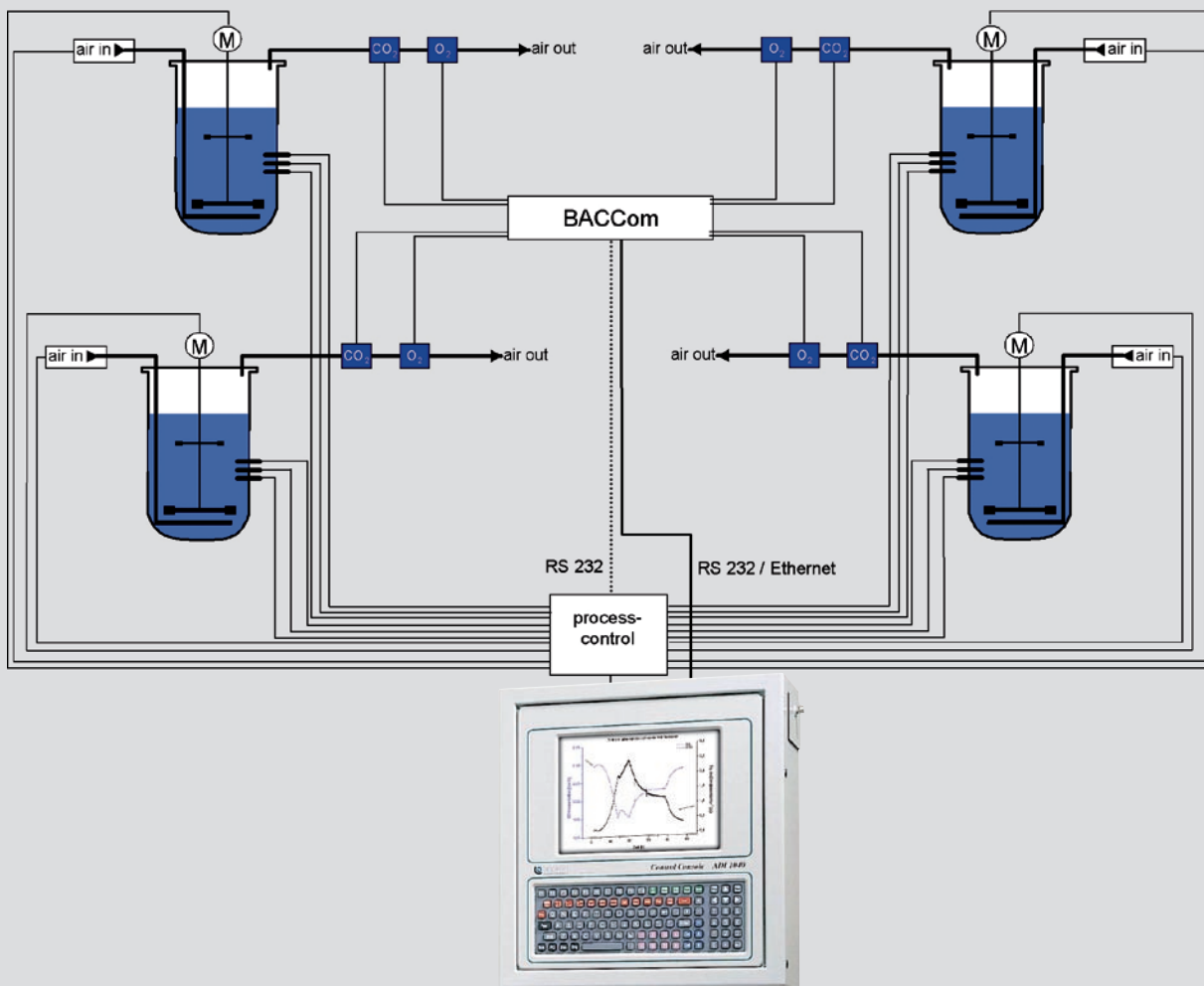


Tube with screwed connection 1 1/4"



Parallel systems: dependable and reliable

The in-situ measurement on parallel bioreactors offers various advantages compared to the conventional method with a single central gas analyzer. The measurement of oxygen concentration by BCP-CO₂ directly in every single fermenter saves the installation of complicated gas lines to a central analyzer and also the complicated processing of the gases can be left out.



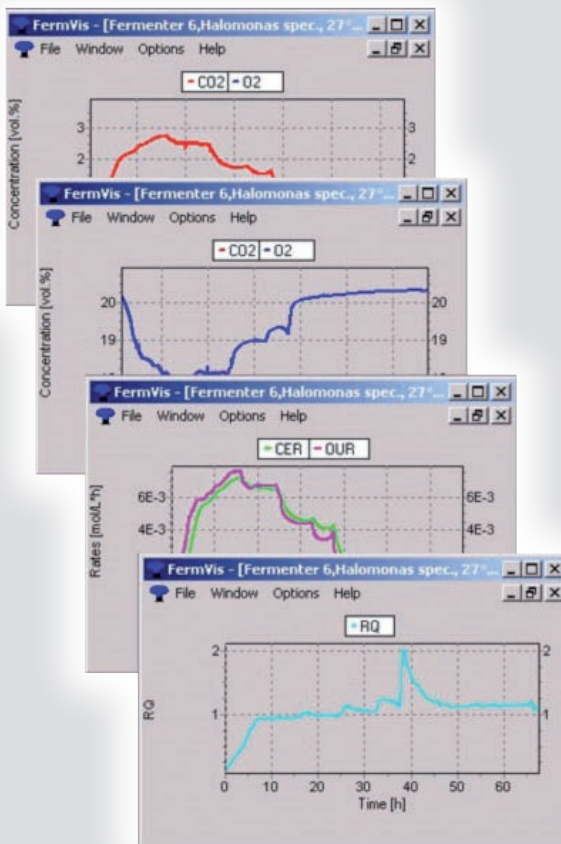
According to PAT, each fermenter processes its own sensor which transfers continuous data in real time to control the process. This is a real advantage in bioprocessing. Such a continuous data stream is extremely difficult to be produced. The central analyzers are often extremely expensive to purchase and to maintain. Often the entire process is on hold, if a component has to be changed or maintained. With the use of many decentralized sensors this problem can be eliminated. When a fermenter is turned off due to maintenance, the remaining bioreactors can continue production without any problems.

With the use of parallel systems you achieve much faster results in research. Under identical environments of cultivation, you can focus your testing on particular bioreactors and more quickly discover the relevant factors (DOE).

Software

FermVis for the parallel measurement of CO₂ and O₂

BCP-CO₂ can be used almost anywhere. Both screwed and clamped connections and the standardized data transfer allow the integration in almost every biotechnical plant. You are also free in the software choice for the process control.



FermVis

The use of the conductible FermVis software is obvious for the parallel measurement of CO₂ and O₂. Oxygen or substrate limitations can be detected along with metabolic transpositions.

Furthermore, a time specific analysis of the respective products is made possible. For improved comparability, the BCpreFerm measurement system can be used for shake flasks and fermenters. FermVis calculates the oxygen uptake rate (OUR), the carbon dioxide emission rate (CER) and the respiratory quotient (RC).

Data sheet

BCP-CO₂

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|---------------------------------------|---|------------------|
| <i>Sensor</i> | BCP-CO₂ | |
| <i>Principle</i> | Infrared, dual wavelength | |
| <i>Measuring range</i> | 0-10 Vol.%, 0-25 Vol.% 0-50 Vol.%* | |
| <i>Drift</i> | < ± 2% value / year | |
| <i>Accuracy</i> | <0,2% FS** ± 3% value | |
| <i>Housing</i> | Aluminium (IP65), PA | |
| <i>Dimension/Weight</i> | 100x100x130 mm WxDxH/750g (Aluminium) 80x130mm DxH/150g (PA) | |
| <i>Mechanical connector</i> | G 1¼", GL 45, Tri-Clamp SMS38, hose connection 4-12 mm etc. | |
| <i>Operating temperature</i> | Temperature difference max. 25°C (45 °F) e.g. 15 - 40 °C (59 - 104°F) | |
| <i>Storage temperature</i> | 0 °C - +60 °C | 32 °F - 140 °F |
| | < 75% RF non-condensing | |
| <i>Pressure range</i> | 0.8 - 1.3 bar | 11.6 - 18.85 psi |
| <i>Lifetime of optical components</i> | approx. 3 years | |
| <i>Power Supply</i> | 12 oder 24 VDC, 1A | |
| <i>Output</i> | RS 232, RS 485, 4-20 mA, USB, Ethernet | |

*others on request ** full scale