BlueSens

understanding bioprocesses

Monitor your process in real-time – with BlueInOne

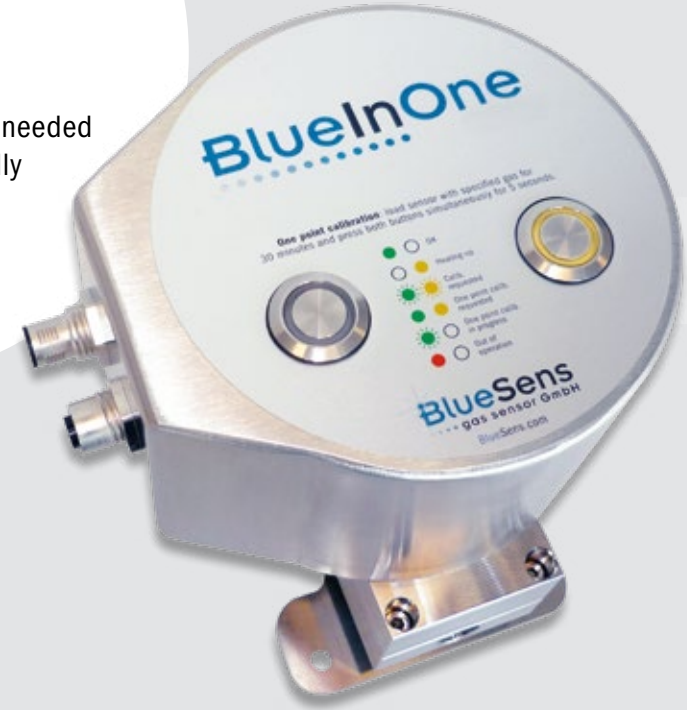
BlueInOne

Measurement of CO_2, O_2, pressure, humidity for: **OUR CER RQ**

Combined CO_2/O_2 gas analyzer for microbial processes

Just one device for the parallel online measurement of:

- O_2 and CO_2
- Humidity
- Pressure
- No minimal gas flow needed
- Pressure automatically compensated



Gain information about your process in real-time*:

CER, OUR, RQ

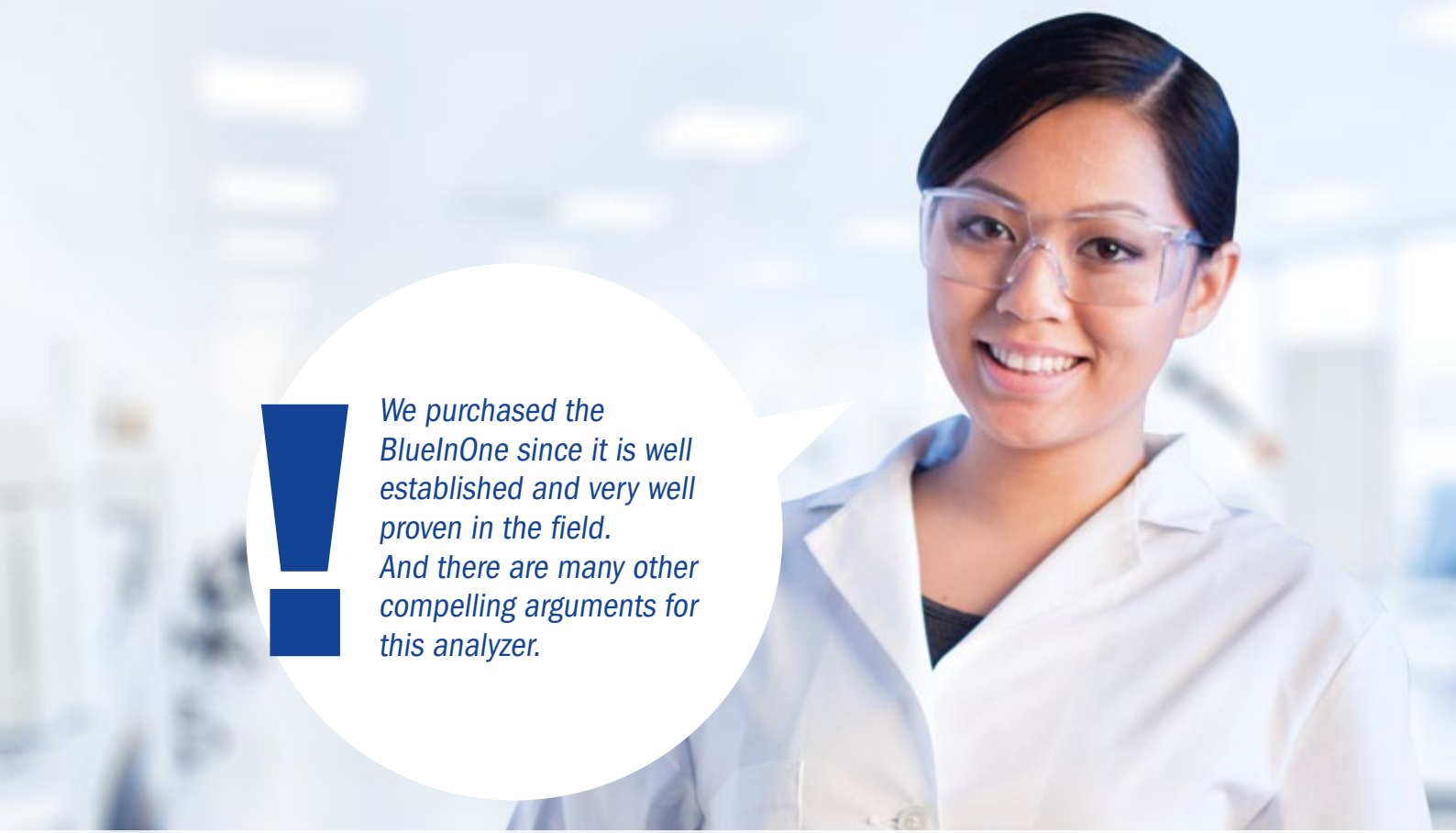
Biomass

Growth rate

μ_{max}, X_s, Y_{xs}

*The usability of the soft sensors requires the BlueVis software and depends on the set-up of the process and may require additional equipment. Soft sensors by EXPUTEC® GmbH.

Contemporary bioprocessing is frequently involving the use of parallel processes. Each BlueInOne is dedicated to one process, allowing a very large amount of data to be obtained continuously and without interruptions, and practically eliminating the risk of inter-process contamination.



The BlueInOne sensor series is used by an overwhelming number of companies and universities since many years. The analyzers have proven themselves as tough and highly reliable. The majority of the renowned fermenter manufacturing companies like Sartorius®, Eppendorf®, INFORS HT®, Applikon® Biotechnology are also distributing the BlueInOne.

Arguments for the BlueInOne

Know your process:

- Gain vital information about your running process. Change your “black box” process into a well characterized.

Be sure:

- No sampling and no multiplexing means no danger of contamination.
- One analyzer per process means that you get a continuous real-time measurement without interruptions. Nothing will be overseen and you are in time with the process.
- Get alarmed if sampling/testing of the process is needed.

Save time and money:

- The BlueInOne is reasonably priced.
- Understand your process in real-time to save time.
- No personnel expenses for sampling or operating a mass spec.
- Valuable instrument for the scale-up phase.

No stress:

- High grade of automation in your bioprocess.

Flexible and easy to install:

- Low risk of investment: Low initial cost, start with one and scale up.
- No installation costs. You can easily install the BlueInOne.
- If needed, you can use the BlueInOne for a new measurement set-up (e.g. for different steps of a scale-up process).

Be on the winning team:

- The leading fermenter-suppliers use BlueSens’ measuring solutions.
- Use state of the art off-gas analysis.

Use all features with the new BlueVis software

Unified bioprocessmanagement

SENSORS & PROBES

LOGGING & VISUALIZATION

MEASUREMENT

PROVIDES

Blue VIS

OPTIMIZES & CONTROLS

CALCULATES & PROCESSES

Mass flow controller

Pumps

Feeding

Stirrer

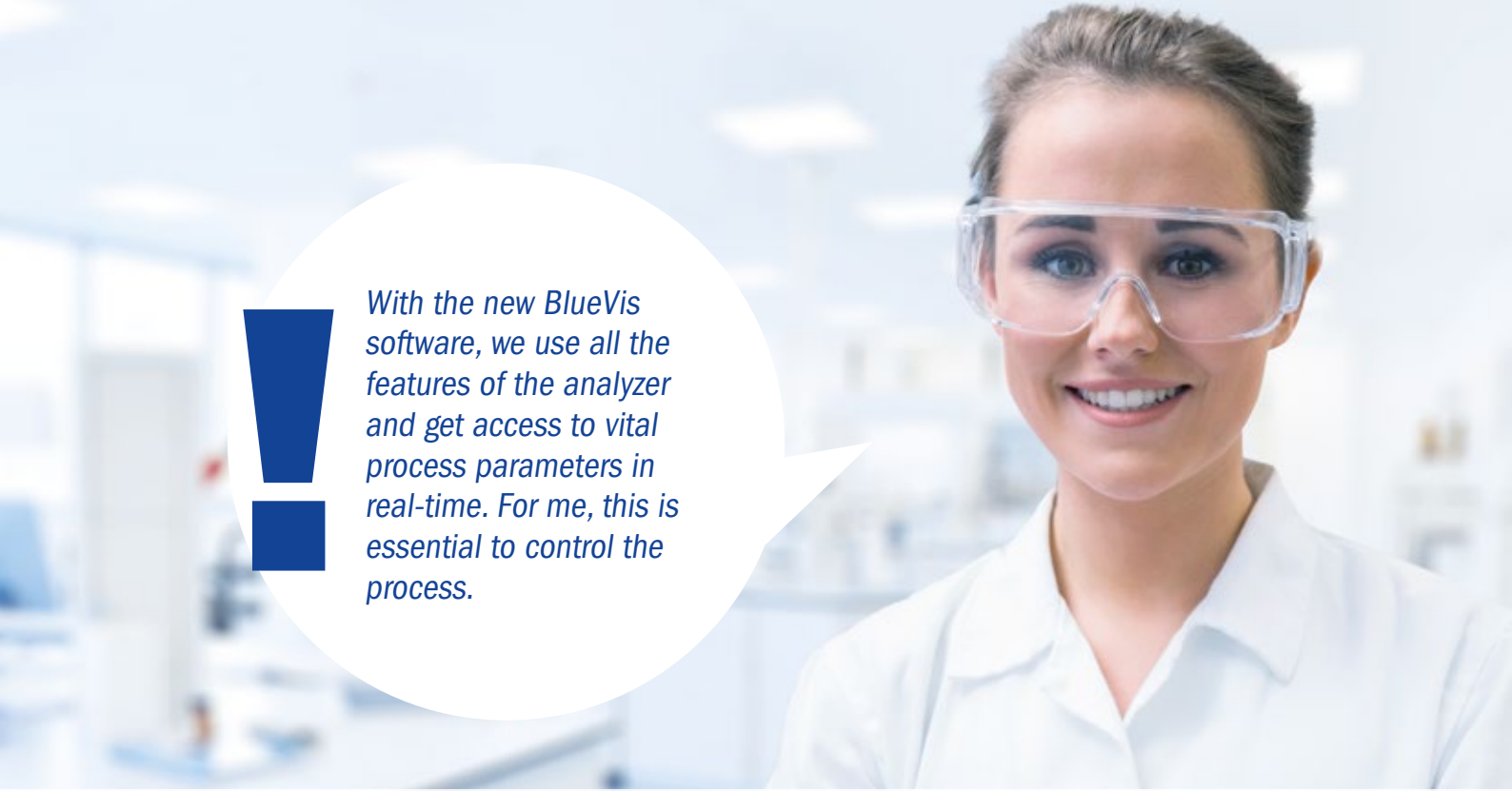
CER, OUR, RQ

Biomass by EXPUTEC®

Growth rate by EXPUTEC®

BIOPROCESS

PROCESS PARAMETERS



With the new BlueVis software, we use all the features of the analyzer and get access to vital process parameters in real-time. For me, this is essential to control the process.

With the new BlueVis you are now able to manage your bioprocess. You can connect the BlueInOne and other sensors and probes to log and to monitor all vital data in real-time. BlueVis will process the data and calculates key parameters via integrated soft sensors. The data from the BlueInOne can be used to calculate CER, OUR and the RQ. BlueVis is able to optimize and control your process via connectable pumps, stirrers cryostats/thermostats and mass flow controllers of various manufacturers.

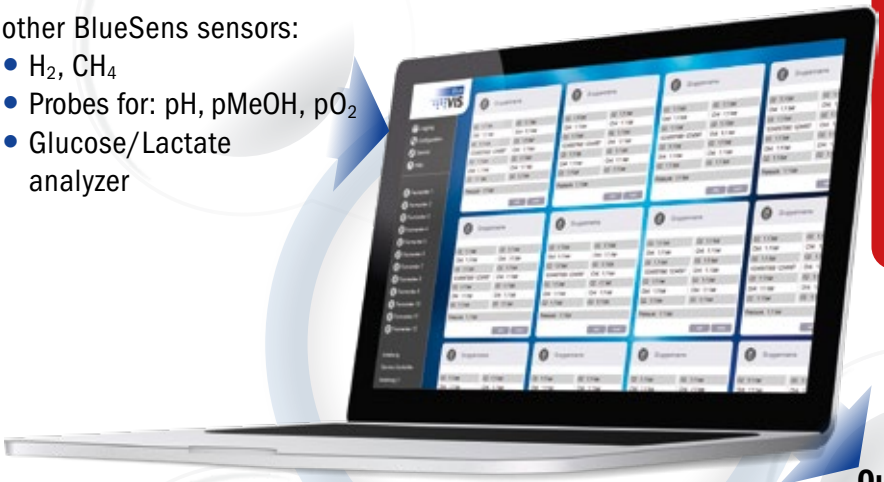
Get you bioprocess connected with BlueVis

Input:
BlueInOne series and all other BlueSens sensors:

- H_2, CH_4
- Probes for: pH, pMeOH, pO_2
- Glucose/Lactate analyzer

Your advantages:
Connect all kind of probes and sensors to BlueVis

- Run up to 12 parallel bioprocesses
- Visualization of the of the data
- Easy to use
- Overview of all current measuring results
- Log all data
- Provide all data and calculations via OPC



Process control:

- Pumps
- Temperature
- Mass flow
- Feeding rates
- Stirrer

Output:
Logging and visualization of all measurements

- CER, OUR, RQ
- Biomass by EXPUTEC®
- Growth rate by EXPUTEC®

All data can be served to other lead systems provided via OPC

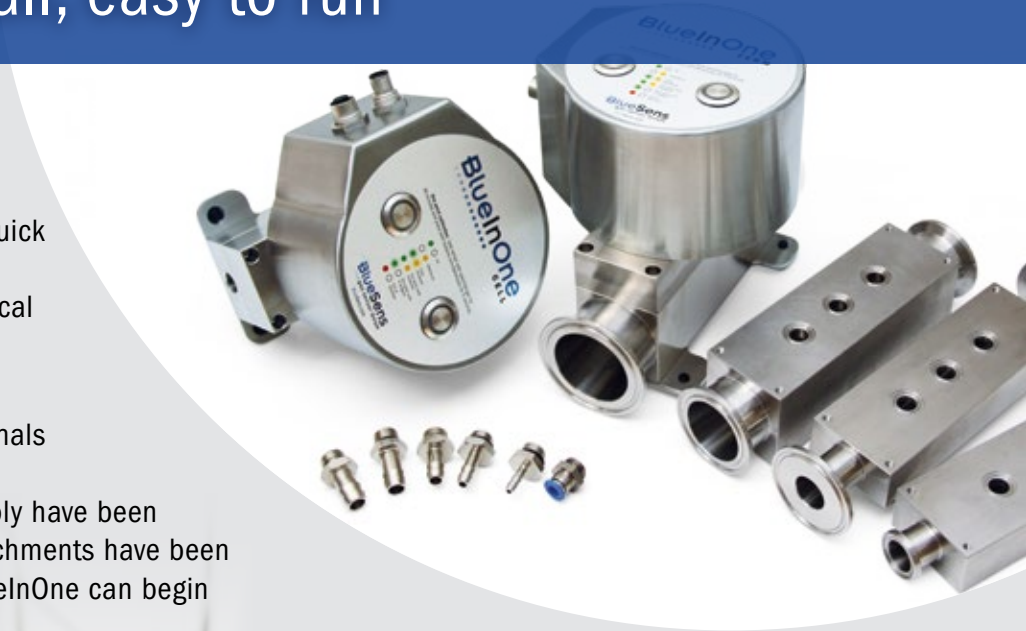
Which BlueInOne is the right one for you?

The BlueInOne series is currently comprised of two models, the BlueInOne Ferm and the BlueInOne Cell. The two models have got **different oxygen sensors**, therefore allowing them to take reliable measurements under a variety of process conditions. The BlueInOne Ferm is using an oxygen meter based on a zirconium dioxide sensor. BlueInOne Cell, in contrast, measures the oxygen concentration by a galvanic cell. Otherwise, both models are identical. Which sensor might be best suited for your process depends on the process conditions, the accompanying gases which are produced and the expected concentration of each gas. Each sensor will also be individually adapted and calibrated for your process in order to provide the best possible results for your particular application.

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	✔	–

Technical specs at a glance: see last page

Easy to install, easy to run

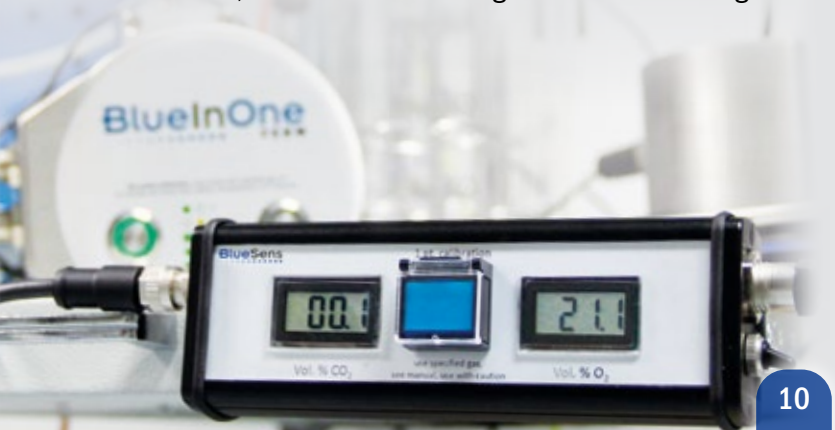


Mechanical connection:

- Easy installation in exhaust line
- Various standardized hose nozzles, quick connector, Swagelok, Tri-Clamp
- Connections for all types of mechanical connections on request

Data Output:

- RS485, RS232, USB, 2x 4-20mA signals
- OPC (with BlueVis)
- Once a data line and the power supply have been connected, and the mechanical attachments have been connected, measurements using BlueInOne can begin



A convenient external display for the BlueInOne:

- See the current CO_2 and O_2 concentrations
- Start the calibration
- No separate power supply needed

In our laboratory, experiments change from time to time. The BlueInOne is easy to install and also easy to dismount from a fermenter so I can use it for different applications and for various scales. The BlueInOne gives me all the flexibility I need for all my different setups.

Datasheet

	BlueInOne FERM		BlueInOne CELL	
Sensor unit	O_2	CO_2	O_2	CO_2
Concentration ranges***	0.1 - 25 Vol.% O_2 / 1 - 50 Vol.% O_2	0 - 10 Vol.% CO_2 / 0 - 25 Vol.% CO_2	0 - 100 Vol.% O_2	0 - 10 Vol.% CO_2 / 0 - 25 Vol.% CO_2
Measuring principle	Zirconium dioxide	Infrared: dual wavelengths	Galvanic cell	Infrared: dual wavelengths
Accuracy	< ± 0.2% FS* ± 3% value			
Drift	< ± 2% value / year			
Lifetime of sensor element	~15 000 operating hours	~3 years	~900 000 Vol.% h operating hours at 1 bar (14.5 psi)	~3 years
Temperature inside of the sensor unit	580°C / 1076°F	3°C / 5.4°F higher than process temperature	Approx. room temperature	3°C / 5.4°F higher than process temperature
General				
Temperature range	15 - 40°C / 59°F - 104°F			
Pressure range	0.8 - 1.3 bar / 11.6 – 18.85 psi absolute pressure, integrated pressure compensation			
Operating humidity	0 – 100% RH, integrated humidity compensation		5 – 100% RH, integrated humidity compensation	
Housing	Stainless steel, IP65			
Dimension (WxLxH) / weight	170 x 150 x 120 mm (6.69" x 5.91" x 4.72") ** / 4 kg (8.82 lb)			
Mechanical connection	4, 6, 8, 10, 12mm outer diameter, 4,6,8mm inner diameter, ¼", ⅛" , 1 ¼", ¼" and ½" swagelok, TriClamp***			
Materials in contact with process gas	Stainless steel, viton, sapphire, PTFE, polymer H.L., nitrile			
Filters	PTFE 0.22 µm, PTFE 5 µm			
Power supply	24V 1A, power supply is included			
Storage conditions	0 - +60°C / 32- 140°F ; < 75% RH noncondensing		0 - 60°C (32-140°F); 5 - 75% RH noncondensing	
Electronic connections				
Power supply	8 pin M12 male			
Output connection	8 pin M12 female			
Electronic Output	Active output, maximum 500 Ohm at 24V power supply RS232, RS485 Modbus, 2x 4-20mA, USB, Modbus OPC server (with BlueVis)			
Maintenance	One point calibration with ambient air (0.04 Vol.% CO_2, 20.97 Vol.% O_2) once a month (other conditions possible), optional factory calibration once a year			
CE/FCC/ICES	EN61326-1:2006 / FCC 15:2009 Subpart 107/109, ICES-001:2006			
Remarks	Don't use in explosive atmosphere, in anoxic atmosphere, in gases with polymers or silicon components or in gases with halogens (F, Cl, Br, etc.), CFC or SO_x and H_2S		High concentration of NH_3 or O_3 could minimize the lifetime of the O_2 sensor element. Do not use continuously in dry gas.	
	Do not use with volatile organic compounds, etching substances such as NH_3, H_2O_2 etc.			

* FS= full scale ** depends on flow adapter dimension ***others on request

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