

PLUG & PLAY

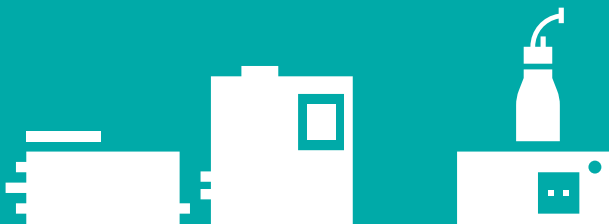
Bioreactor
complements



bionet

**bSmart
Modules**

Process
equipment



Powered by
ROSITA

Bionet Plug & Play

bSMART

**What is
bSMART
about?**

THE bSMART PRODUCT LINE CONSISTS OF PLUG&PLAY MODULES THAT BRING TOGETHER THE HARDWARE AND SOFTWARE SOLUTIONS TO EXPAND THE FUNCTIONALITIES OF YOUR BIOREACTOR AND OTHER BIOPROCESS EQUIPMENT. ITS PLUG&PLAY DESIGN ALLOWS FOR THIS EXPANSION TO BE IMMEDIATE, ADAPTING TO THE EVOLUTION OF YOUR PROCESS NEEDS AND REDUCING YOUR INVESTMENT REQUIREMENTS.

bBREATH



bVSP



bCPM



bSCALE



FLEXIBLE GAS MODULE





SIMPLE, ABSOLUTE & SMART

SIMPLE

Easy to install, connect, operate and maintain

Include everything needed for a quick and simple connection to most Bionet's bioprocess equipment models and the subsequent recognition and automatic upgrade of the software capabilities.

ABSOLUTE

Multiple module combinations for new functionalities

Functionalities adapt to specific bioreactor configurations and increase exponentially with the combinations of additional Plug&Play modules.

SMART

Advanced control and analysis thanks to HW and SW architecture

Robust hardware together with the integration of associated functionalities in software ensure reliable and advanced data registration, visualization, control and analysis possibilities for your bioprocess.

ROSITA

WHAT IS ROSITA?

AN INTUITIVE, SCALABLE AND EXPANDABLE SOFTWARE SOLUTION FOR THE AUTOMATION, VISUALIZATION AND DATA REGISTRATION OF YOUR MICROBIAL AND CELL CULTURE LABSCALE BIOPROCESS. IT INCREASES EXPERIMENTAL CONSISTENCY AND REPRODUCIBILITY AS WELL AS ENHANCES DEEP UNDERSTANDING OF THE CELL AND THE PROCESS PARAMETERS, FACILITATING PROCESS CHARACTERIZATION AND THEREBY ITS FUTURE OPTIMIZATION AND SCALABILITY.



bBREATH

Bioprocess
Exhaust Gas
Analyzer

FOR THE MEASUREMENT
OF HIGH QUALITY DATA ON
METABOLIC ACTIVITY (O₂/CO₂
EXHAUST GAS COMPOSITION
AND DERIVED INDICATORS)
IN A NON-INVASIVE, PRECISE,
INSTANT, CONTINUOUS AND
ANALYSABLE WAY.

bBreath 1

Type of interface **Modbus**
Dimensions **139x268x192 mm**
Weight **3Kg**

bBreath 4

Type of interface **Ethernet**
Dimensions **263x245x271 mm**
Weight **5Kg**



USES AND APPLICATIONS



1

Accurate monitoring of the bioprocess, which facilitates troubleshooting and allows for correction of metabolic deviations in critical phases.

2

Improved process characterization and thereby improved replicability and controlled scaling of the bioprocess.

3

Tight control of the batch on the basis of metabolic data in control loops, which enhances process efficiency and productivity. This includes halting the process at the optimum point for maximum yield, of particular interest when turbidity measurements are not accurate enough.

HARDWARE FEATURES

Measurement stability derived from the possibility for pressure regulation.

Continuous calibration verification thanks to the presence of a reference gas line.

State-of-the-art sensing technology from reputed specialist manufacturers.

Availability of real-time data, provided the IoT-based architecture and independent datalogger standards, in accordance to industrial communications.

Low maintenance, including simple calibrations by user, yearly factory calibration and cost-effective consumables replacement.



bBreath 1 Gas Lines

Gas Lines

1 gas line

Recommended flow per line

0,5-60/20 slpm

Measurement O2

10⁻²⁰ - 30 % Zirconia sensor from Cambridge Sensotec

Measurement CO2

CO2 0-20% Infrared sensor from Vaisala



bBreath 4 Gas Lines

Gas Lines

4 gas lines with multiplexing function

Recommended flow per line

0,5-60/20 slpm

Measurement O2

10⁻²⁰ - 30 % Zirconia sensor from Cambridge Sensotec

Measurement CO2

CO2 0-20% Infrared sensor from Vaisala

SOFTWARE FEATURES



THE BBREATH COMES WITH ITS OWN ROSITA APP (ON PHONE, TABLET OR PC). CONNECTING THE BBREATH TO THE BIOREACTOR RESULTS IN AUTOMATIC RECOGNITION BY THE SOFTWARE, AND ITS UPGRADE IN TERMS OF PROCESS CONTROL AND DATA VISUALIZATION AND REGISTRATION CAPABILITIES:

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ROSITA



Control features

The bBreath allows for additional control possibilities, since it offers the possibility to use the measured and calculated data as a programmable transition in the recipe-based control mode by ROSITA.



Data features

The bBreath module also activates data registration and visualization features:

Online visualization of gas composition and calculation of the OUR, CER and RQ values, in a wide range of tools (e.g. graphs, tables).

Data registration and exportation in csv. format.

Bionet Plug & Play

bVSP

**Variable
Speed
Pump**

FOR THE ADDITION OF
SUBSTRATES TO THE
BIOREACTOR IN A PRECISE,
VERSATILE AND ANALYSABLE
WAY

Bioreactor Complements

Type of interface **Electrical**
Dimensions **263x245x271 mm**
Weight **5Kg**



USES AND APPLICATIONS



1

Fed-batch processes with addition of nutrient in a number of ways, such as according to growth profiles or upon related measurements.

2

Semi-continuous and continuous processes by substrate additions in combination with different withdrawal actions.

3

Addition of any substrate according to dissolved oxygen values, within the cascade control.

4

Addition of substrates (e.g. nutrient, inductors) according to turbidity or weight measurements, when the associated instrumentation is present.

5

Customized addition of substrates according to the measurements of other parameters.

HARDWARE FEATURES

A variety of flow ranges available, due to the availability of a wide selection of head and speed formats, as well as tube bores.

Accurate and repeatable flows of fluids with varying viscosities.

Applicable also with shear-sensitive fluids.

Minimum maintenance, as no valves, seals or glands to wear or replace.

Adjustable direction for user comfort.

Speed Control	Tube Bore (mm)	Flow rates (mL/min)
WM 114 0,8-4 rpm	1,6 – 4,8	0,6 – 3,4
WM 114 6-30 rpm		4,2 – 25,5
WM 114 20-100 rpm		14 – 85
WM 114 40-200 rpm		28 – 170
WM 313 9-45 rpm	1,6 – 8	12 – 225
WM 313 18-90 rpm		24 – 450
WM 313 35-175 rpm		48 – 875
WM 313 70-350 rpm		95 – 1750

SOFTWARE FEATURES



THE CONNECTION OF THE BVSP TO THE BIOREACTOR TRIGGERS ITS AUTOMATIC RECOGNITION AND THE UPGRADE OF THE SOFTWARE FEATURES IN TERMS OF PROCESS CONTROL AND DATA REGISTRATION AND VISUALIZATION TOOLS.

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ROSITA



Control features

The bVSP allows for advanced feeding control possibilities, including:

Non-feedback configuration of constant, lineal and exponential feeding profiles, with the possibility of setting up to 20-step time profiles.

Configuration of feedback control loops that link flow rates with turbidity, weight, or other PATs measurements or with the DO value, within the DO cascade control.

Recipe feature allows the linkage of the addition with a measured parameter through a recipe transition.



Data features

The bVSP module also activates data registration and visualization features:

Online visualization of real-time registered flow measurements by the pump as Present Values and Set Points, summary tables, as well as trend and comparative graphs.

Data registration and exportation in csv. format.

Bionet Plug & Play

bCPM

Bioreactor Complements

Type of interface **Ethernet**
Dimensions **263x245x312 mm**
Weight **7Kg**

**Continuous
Process
Module**

FOR ADVANCED ADDITION AND WITHDRAWAL FUNCTIONS AND CONTROL FOR EXECUTION OF CONTINUOUS PROCESSES IN A PRECISE, REPRODUCIBLE AND ANALYSABLE WAY.



USES AND APPLICATIONS



1

Advanced application of a range of continuous process strategies to improve bioprocess productivity.

2

Chemostat process strategy with constant addition and withdrawal rates, while limiting one nutrient.

3

Turbidostat process strategy for maximum growth rate by manipulating the addition, rate while maintaining turbidity constant.

4

For semi-continuous processes which require harvesting of the broth after sedimentation.

5

Semi-continuous processes with additions in cycles.

HARDWARE FEATURES

A variety of flow ranges available, due to the availability of a wide selection of head, speed formats, as well as tube bores.

Accurate and repeatable flows of fluids with varying viscosities - also shear-sensitive fluids.

Minimum maintenance, as no valves, seals or glands to wear or replace.

Adjustable direction of pumps, for ergonomic use.

Adjustable direction for user comfort.

Speed Control	Tube Bore (mm)	Flow rates (mL/min)
WM 114 0,8-4 rpm		0,6 – 3,4
WM 114 6-30 rpm	1,6 – 4,8	4,2 – 25,5
WM 114 20-100 rpm		14 – 85
WM 114 40-200 rpm		28 – 170
WM 313 9-45 rpm		12 – 225
WM 313 18-90 rpm	1,6 – 8	24 – 450
WM 313 35-175 rpm		48 – 875
WM 313 70-350 rpm		95 – 1750

SOFTWARE FEATURES



THE CONNECTION OF THE BCPM TO THE BIOREACTOR TRIGGERS ITS AUTOMATIC RECOGNITION AND THE UPGRADE OF ROSITA SOFTWARE FEATURES IN TERMS OF PROCESS CONTROL AND DATA REGISTRATION AND VISUALIZATION TOOLS.

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ROSITA



Control features

Non-feedback configuration of constant, lineal or exponential flow rates, with the possibility to configure cycles, and to pause gas and agitation supplies to favor sedimentation before the withdrawal action.

Configuration of feedback control loops that link flow rates with specific measurements, including turbidity, weight, or another pump's flow with additional module or PATs such as the bScale or an OD probe.

Recipe feature allows the linkage of the pumps actions with a measured parameter through a recipe transition.



Data features

The bCPM module also activates data registration and visualization features:

Online visualization of real-time registered flow measurements by the pump as Present Values and Set Points, summary tables, as well as trend and comparative graphs.

Data registration and exportation in csv. format.

Bionet Plug & Play

bScale

Bioreactor Complements

Type of interface **Ethernet**
Dimensions **80x75x98 mm**



**Smart
Scale
Connection**

FOR THE CONNECTION OF
A VARIETY OF SCALES, TO
ENHANCE PROCESS PRECISION

USES AND APPLICATIONS



1

Processes requiring a scale, for extra precision and smart scale connection in its operations.

2

Accurate control of addition and/or withdrawal activities, based on gravimetric functions.

3

Continuous processes strategies aiming for the maintenance of a constant volume in the bioreactor vessel through control of the vessel weight.

HARDWARE FEATURES

Designed to operate as a gateway from a scale communication interface to an ethernet connection.

Allows for the connection of different scales, from a range of scale brands.

Compatible with scales of different precisions used in lab and production.

Included by default in all Bionet's standard scale models.

User to use their own scale.

Max Weight (kg)	Accuracy Options (g)	
6	0,1	0,5
15	0,2	1
30	2	
35	0,5	
60	1	5

SOFTWARE FEATURES



THE CONNECTION OF THE BSCALE TO THE BIOREACTOR TRIGGERS THE AUTOMATIC RECOGNITION OF THE CONNECTED SCALES AND THE UPGRADE OF ROSITA SOFTWARE FEATURES IN TERMS OF PROCESS CONTROL AND DATA REGISTRATION AND VISUALIZATION TOOLS.

Powered by

ROSITA



Control features

The bScale allows for additional control possibilities, since it offers the possibility to use the weight data as a trigger for process actions, in several ways:

Configuration of feedback control loops between the weight data and the addition and withdrawal pumps - gravimetric control, in the form of AWC (Addition Weight Control) and BWC (Bioreactor Weight Control) functions.

Use of weight data as a trigger for a transition between configured stages in the recipe-based control mode by ROSITA.



Data features

The bScale module also activates data registration and visualization features in relation to the connected scale:

Online visualization of real-time and registered weight measurements as Present Values, summary tables, as well as trend and comparative graphs.

Weight data registration and exportation in csv. format

FGM

**Flexible
Gas
Module**

**FOR FREE ASSIGNATION OF
SPECIFIC GASSES TO DIFFERENT
GAS LINES**



USES AND APPLICATIONS

1

A SW module for the selection of different gas lines from air and O₂ to upgrade your bioprocess gassing strategy.

2

Offers up to 5 gas combination possibilities, covering a wide range of gassing requirements for specific bioprocesses.

3

Photobioreactor, aerobic and anaerobic processes

4

Permits the linkage of CO₂ supply to the pH control for acid-sensitive processes.

4

Allows configuration of N₂ as part of the DO cascade.

HARDWARE FEATURES

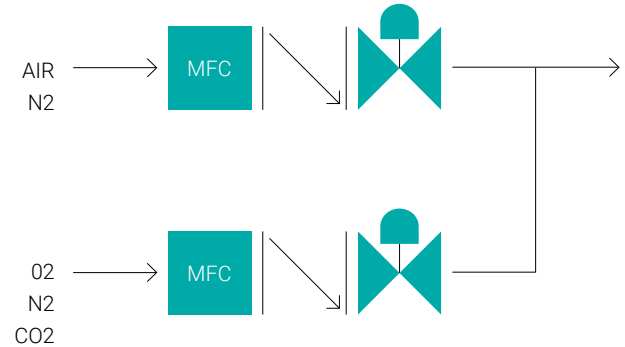
Flexible Gas Module allows for selection of a gas for each of the two gas lines.

The first gas line can be selected to feed Air or Nitrogen.

The second gas line can be selected to feed Oxygen, Nitrogen or Carbon dioxide.

Both gas lines come with MFCs, which are calibrated to control a specific type of gas at a particular range of flow rates.

Safety valve controls pressure in the system.



Gas Line 1

1 & 3 L	0.2 – 10 slpm
5, 8, 10 L	0.2 – 18 slpm

Gas Line 2

1 & 3 L	0.1 – 5 slpm
5, 8, 10 L	0.1 – 9 slpm

SOFTWARE FEATURES



THE FGM ACTIVATION IN ROSITA GENERATES AN AUTOMATIC UPGRADE OF ALL THE RELATED CONTROL OPTIONS, AS WELL AS THE VISUALIZATION AND REGISTRATION TOOLS.



Control features

The FGM allows for the supply of distinct gasses, and thereby allows different control strategies depending on which gas is selected:

Non-feedback configuration of independent, total gas flows or gas composition percentages in a time profile of up to 20 time points.

Configuration of feedback control loops between gas supply and related process parameter values including:

Linking any of the gas controls with a measured parameter through a recipe transition, thanks to the recipe control feature.



Data features

The FGM module also activates data registration and visualization features in relation to the assigned gas, automatically changing gas labels:

Online visualization of real-time registered flow measurements as Present Values and Set Points, summary tables, as well as trend and comparative graphs.

Data registration and exportation in csv. format.



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