

BIOBOOK UP



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Biobook UP: Advancing Bioreactor Systems for enhanced research and development

The Biobook UP, developed by Vinci Life Science Applied SA, represents a significant advancement in the field of bioreactor/fermentor systems, offering an expanded range of capabilities and features. Designed to meet the ever-evolving needs of scientific researchers and developers, this pushes the boundaries of experimental possibilities and increases the level of performance in scientific and process development in comparison to the compact model.

ENHANCED FLEXIBILITY AND MODULAR DESIGN:

The Biobook UP is built upon a modular framework, providing researchers with enhanced flexibility and adaptability for their specific experimental requirements. The system boasts an increased number of ports for probes, facilitating the seamless integration of a broader range of sensors. This expanded probe connectivity allows for comprehensive monitoring of vital parameters, empowering scientists to gain precise insights and optimize their bioprocesses effectively.

Additionally, due to its modular nature, the Biobook UP offers extensive customization options to researchers. Meaning that scientists can tailor the system to meet their specific needs and experimental setups. The modular design allows for easy integration of additional components and functionalities, such as specialized sensors, actuators, or modules for specific applications.

With a wide range of options available, researchers can select and incorporate the necessary modules that align with their experimental requirements. This flexibility enables them to create a highly personalized setup that suits their unique research goals and objectives.

ADVANCED LIQUID HANDLING

Acknowledging the crucial role of accurate liquid handling in bioprocessing, the Biobook UP features an upgraded pumping system. With an increased number of peristaltic pumps, researchers can achieve more complex experimental setups, enabling precise control over media addition, feed strategies, and sample collection. The enhanced liquid handling capabilities of the Biobook UP empower scientists to design sophisticated feeding regimes and conduct parallel experiments, thereby unlocking new avenues of scientific exploration.

EXPANDED GAS CONNECTIVITY:

The Biobook UP addresses the diverse gas requirements encountered in modern bioprocesses by offering an expanded range of gas connectivity options. Researchers can now connect a wider variety of gases, including commonly used options such as O₂, CO₂ and compressed air, as well as more specialized gases like H₂ or Ar. This heightened gas compatibility enables scientists to explore a broader spectrum of applications and fuels innovation in diverse fields, spanning microbial fermentation to mammalian cell culture. More gas lines and more types of MFC and rotameters can be added to the unit, allowing a single vessel to connect with a variety of different gassing systems.

INTEGRATION OF THIRD-PARTY SENSORS:

Acknowledging the importance of comprehensive monitoring and data acquisition in bioprocessing, the Biobook UP provides an increased number of ports for probes, offering researchers the ability to connect and integrate a greater variety of sensors within each vessel. This expansion in probe connectivity allows for a higher density of sensor placement, enabling researchers to monitor and measure multiple parameters simultaneously and obtain a more detailed understanding of their bioprocesses.

Compared to its smaller version, the Biobook Compact, the Biobook UP offers an enhanced capacity for probe integration, enabling scientists to gather more extensive and precise data. This increased number of probes per vessel facilitates in-depth monitoring of crucial parameters such as pH, redox potential, dissolved oxygen, biomass, and carbon dioxide levels. With a higher density of probes, researchers can capture a more comprehensive view of the bioprocess dynamics, enabling them to make informed decisions and optimize process conditions.

The additional probe ports of the Biobook UP enhance experimental flexibility, allowing scientists to explore complex process configurations and conduct more sophisticated experiments. Researchers can select the most appropriate combination of sensors to suit their specific research objectives, enabling precise monitoring and control of key parameters throughout the bioprocessing cycle. This advanced probe connectivity promotes a deeper understanding of the underlying processes, leading to improved process control, reproducibility, and overall experimental outcomes.



Applications

The Biobook UP by Vinci Life Science Applied SA offers a wide range of applications, making it suitable for diverse research and development purposes:

- Bacterial fermentation

- Yeast fermentation

- Fungal fermentation

- Batch Fermentation: The Biobook UP allows researchers to perform batch fermentations, where a fixed volume of culture medium is inoculated and allowed to grow until the desired end point is reached. Batch fermentation is commonly used for process development, strain characterization, and production of metabolites.

- Fed – batch Fermentation: This mode of fermentation involves the addition of nutrients or substrates during the cultivation process to sustain prolonged cell growth and enhance the production of desired products. The Biobook UP supports fed-batch fermentations, enabling researchers to optimize productivity and yield.

- Continuous Fermentation: The Biobook UP offers the capability for continuous fermentation, where fresh medium is continuously added, and culture broth is simultaneously removed. This mode allows for stable, long-term cultivation and is suitable for studies requiring a constant supply of products or metabolites.

- Perfusion Cultures: Researchers can utilize the Biobook UP for perfusion cultures, a technique involving continuous medium exchange while retaining cells within the system. Perfusion cultures are commonly used for high-density cell growth and the production of sensitive biologics, such as monoclonal antibodies.

The Biobook UP's versatility and flexibility in accommodating various cell types, fermentation processes, and cultivation modes make it an ideal choice for a broad range of applications in the fields of cell biology, biotechnology, pharmaceutical development and industrial bio processing.

Biobook UP Specifications

Control Unit		
	<u>Imperial Unit</u>	<u>Standard Unit</u>
Dimensions:	Width: 12.4 inches Height: 8.7 inches Depth: 17.7 inches	3125W x 220H x 450D
HMI:	Bioflex software able to run any Windows © running systems, the computer can be directly purchased with the bioreactor system	
Communication:	N.4 Modbus 485 Ports N.4 4-20 mA Ports N.1 Mixer motor Port N.1 Data Chiller RS 232-Modbus Port N.1 Heating mantle Port N.1 ETH Port (PC)	
<u>Utility</u>	<u>Connection</u>	<u>Requirements</u>
Electrical	IEC-C14 (with regional plug types)	100-120/208 - 240 (±10%) V, 50/60Hz, 10A, Single Phase
Water	Quick connection (only for models with no Chiller)	1 barg max, recirculating pressure for tap water. No water source required in case of chiller purchase.
Gas Supply	Quick connection	2 bar gas lines for each gas
Operating Conditions	0-30°C, up to 80% RH, non - condensing	

Sensors

<u>Available Sensor</u>	<u>Range</u>	<u>Communication protocol</u>
pH (Arc Hamilton Series or Other)	pH 0 to 14	4-20 mA or Modbus 485
DO (Arc Hamilton Series or Other)	4 ppb to 25 ppm (DO) 0 to 62.85 %-vol or 0 to 300 %-sat	4-20 mA or Modbus 485
Biomass (Arc Hamilton Series or Other)	$\lambda=860$ nm (NIR) - e.g. 0-200g/l cell dry weight yeast - 0-4 AU - 0-30'000 NTU	4-20 mA or Modbus 485
ORP (Arc Hamilton Series or Other)	-1500mV to +1500mV	4-20 mA or Modbus 485
DCO2 (Arc Hamilton Series or Other)	5 - 1000 mbar or 0.5 - 100 % vol or 7.5 - 1500 mg/L in liquid phase at 101.3 kPa and 25°C	4-20 mA or Modbus 485
Conductivity (Arc Hamilton)	1 μ S/cm to 300 mS/cm	4-20 mA or Modbus 485
PT100 (Temperature sensor)	+100°C / + 150°C	4-20 mA
Antifoam Sensor	No range (on-off relais)	4-20 mA

Gas analyzer system

<u>Gas</u>	<u>Range</u>	<u>Communication protocol</u>
CO2	0-500ppm 0-1% / 0-1000ppm 0-3% / 0-2000ppm 0-5% / 0-3000ppm 0-10% / 0-5000ppm 0-30% / 0-100%	4-20 mA
O2	0-25%	Modbus RS 485
CH4	0-1% / 0-5% / 0-10% / 0-30% / 0-100% / 0-100% Biogas	4-20 mA
CO	0-3% / 0-10% / 0-30% / 0-100%	4-20 mA
H2	0 ~ 99.999%	Modbus RS 485 (standard) – RS232 (optional)
Custom gas	-	-

Pumps

<u>Motor type</u>	<u>Range</u>	<u>Number per unit</u>
Fixed speed DC motor	1-45 ml/min	1-6
Stepper variable speed motor	1-45 ml/min	1-6

Agitation

<u>Type of drive</u>	<u>Available speed</u>	<u>Available for:</u>
DC Motor	50 RPM to 1200 RPM	Every SQVESSEL – QVESSEL and SUB Vessel
Brushless Motor	50 RPM to 1200 RPM	Every SQVESSEL – QVESSEL and SUB Vessel
Magnetic Stirrer	Custom*	Custom*

Gas rotameters

<u>Range</u>	<u>Gas</u>	<u>Number of rotameter</u>
(500-20 lt/min)	Any gas, custom label	1-6

MFC

<u>Range</u>	<u>Gas</u>	<u>Number of MFC</u>
10cc-20 lt/min	Any gas	1-6

Thermo Regulation Options

<u>Type</u>	<u>Range</u>	<u>External Utilities required</u>
Thermo Chiller Peltier for SJ Vessel + heating mantle	15°C- 45 °C (Environment Temperature Dependent)	No
Thermo Chiller Peltier for DJ Vessel	Cooling capacity up to 220 W / Heating capacity up to 500 W	No
Heat Exchanger	Custom Range	Yes, Glycol or cooled water line
Cold finger (tap water connection) + heating mantle for SJ Vessel	15°C- 45 °C (Environment Temperature Dependent)	Yes, tap water

Vessel Compatibility

<u>Vessel Type</u>	<u>Size</u>	<u>Customization</u>
QVESSEL (Double wall)	300ml to 20L	Yes
SQVESSEL (Single wall)	300ml to 20L	Yes
QXVESSEL (Single/double wall inox vessel)	Up to 20L	Yes
SUB Vessel	100ml to 20L	No

Connectivity ti probes

<u>Number of ports</u>	<u>Type of connectivity</u>
4	Modbus 485 Ports
4	4-20 mA ports

Scales

<u>Size</u>	<u>Communication protocol</u>
Depending on the vessel different available sizes	4-20 mA, RS 232

Specifications are subject to change without notice

Spec. Version A



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