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biotech

BIOSTAT[®] A

Your Professional Start in Cell Cultivation
and Microbial Fermentation



turning science into solutions



BIOSTAT® A

BIOSTAT® A is an entry-level bioreactor | fermenter designed for easy control of cell growth and fermentation. It is therefore ideal for educational purposes.



- Simple and automatic aeration system
- Intuitive operation for easy control by beginners and experienced users alike
- Integrated recirculating chiller for fermentation in any lab



GERMAN
DESIGN
AWARD
SPECIAL
2016

BIOSTAT[®] A at a Glance

The control tower of the BIOSTAT[®] A combines all features and functions for measurement and control: Fast Load pumps, aeration module and conveniently located connections for utilities and sensors. Featuring a compact footprint, the BIOSTAT[®] A saves valuable space in your laboratory.



Simple and Automatic Aeration Control

The aeration system provides continuous automatic flow control over the full range of each gas used. As a result, BIOSTAT[®] A does not require any manual adjustment of flow meters and therefore eliminates problems with pulsed aeration. Setting up the bioreactor for use is straightforward: Just connect the aeration tubing, configure the aeration profile, enter the DO setpoint – that's it!

For cell culture applications, interfaces for four gases (air, O₂, CO₂ and N₂) are available for DO and pH control. The microbial version features two gas lines (air and O₂) for DO control.



Integrated Chiller for Microbial Fermentation

The chiller allows fermentation in any laboratory and minimizes water usage. You won't need to worry about finding a suitable cooling water source for your bioreactor. Each BIOSTAT[®] A for microbial fermentation is equipped with a chiller that

effectively removes heat from your culture. The only utility connections you need are electricity and gas supply to operate the BIOSTAT[®] A.

Easy Status Checks for your pH and DO probes

BIOSTAT® A is equipped with digital pH and DO probes. These help you immediately recognize whether you can use a probe for the next cultivation batch. Moreover, the moisture-resistant plug connector ensures secure data transmission to the BIOSTAT® A at all times.



Intuitive Operation of BIOSTAT® A – Even Outside a Laboratory

Thanks to the intuitive user interface, operating the BIOSTAT® A is ideal for beginners, reduces operating errors and speeds up training. Operation using a tablet or smartphone is a mode offered in the Advanced package and enables you to monitor and control the BIOSTAT® A on the move – in the laboratory, in the office or even at home.



BIOSTAT[®] A – It's the Little Things ...

... That Make Your Life Easier ...



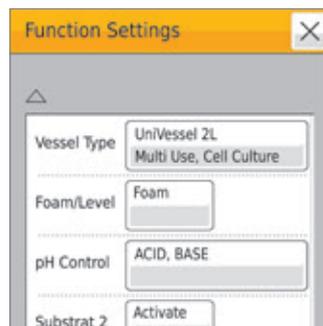
Fast Load Peristaltic Pumps

Install tubing in three seconds: Open, insert tubing, close – done! No more pinched fingers, torn gloves or tubing slippage in the peristaltic pump head.



Convenient Data Storage and Analysis

Save your process data directly on the BIOSTAT[®] A; then easily transfer this data to your PC or laptop spreadsheet application for convenient analysis.



Flexibility Made Easy

Select the type and size of your culture vessel on the BIOSTAT[®] A menu, and all settings including PID parameters will be automatically adjusted.

... and Enable You to Take the Next Step.



Higher Cell Densities with Fed-batch Processes

The Advanced package version of the BIOSTAT[®] A with fed-batch control lets you achieve higher cell densities than with standard batch control. Easily implement substrate profiles in the menu to control an external variable-speed pump.

Glass and Single-use for More Flexibility – Every Day

The BIOSTAT® A is available with single-wall glass vessels in a choice of working volumes of 1, 2 or 5 liters maximum. Whether you select our reusable UniVessel® Glass version or our disposable UniVessel® SU unit with a maximum 2 liter working volume, you can use the same system controller.

Both the UniVessel® Glass and the UniVessel® SU feature the classic stirred-tank design to give you comparable results. The advantage: The same motor drives the stirrer of both vessels so you can easily change over from reusable to single-use or vice versa.

UniVessel® Glass

- Classic stirred-tank design for easy scaling to larger volumes with all characterization data available up to 2,000 L
- Proven sterile design and robustness
- Also fits in small autoclaves, saving you additional investment costs



UniVessel® SU

- Easy handling as the culture vessel is fully pre-assembled and sterilized: no parts to mount, no cleaning – just connect to get started
- No room for an autoclave to sterilize your culture vessel? No problem! The UniVessel® SU is single-use, from the vessel to the sensors.
- Eliminates preliminary setup and post-cleaning procedures so you can better meet your tight experimental deadlines and utilize your time for more important tasks

BIOSTAT[®] A – Technical Specifications

Base Unit

Control Tower	
Weight	13.5 kg 29.7 lbs.
Footprint bench surface (W × H × D)	200 × 495 × 300 mm 7.9 × 19.5 × 11.8 in.
Required space incl. connectors, pump heads etc. (W × H × D)	320 × 495 × 475 mm 12.6 × 19.5 × 18.7 in.
Power supply	100 to 240 VAC, 50/60Hz, 8 A
Housing	Metal housing, coated
Operating Temperature	0 °C – 40 °C
Maximum relative humidity	80% for temperatures up to 31 °C decreasing linearly to 50% relative humidity at 40 °C
Motor drive	<ul style="list-style-type: none"> – Maintenance-free – Quiet direct drive – 150 W
Motor rpm, direct coupling	1 L Glass: 30 – 1,400 rpm 2 L Glass: 30 – 1,100 rpm 5 L Glass: 30 – 800 rpm 2 L SU: 30 – 400 rpm
Interfaces	<ul style="list-style-type: none"> – 2 × external signal inputs 4 – 20 mA – Ethernet – Potential-free alarm contact – USB – Interface to chiller – Interface to external pump
Regulatory compliance	CE, NRTL recognized by the U.S. OSHA (Occupational Safety and Health Administration)
System requirements for operation by tablet and smartphone	iOS 7 or higher; Android 4 or higher

Pump Module

Integrated Pumps	
Quantity	3
Controller	Fixed speed (regulated on/off)
Speed	43 rpm
Pump head	Watson Marlow 114, Fast Load pump head
Flow rates (tube wall thickness 1.6 mm)	ID 0.5 mm: 0.8 mL/min ID 0.8 mm: 1.7 mL/min ID 1.6 mm: 6.0 mL/min ID 2.4 mm: 12.5 mL/min ID 3.2 mm: 20.2 mL/min
External Pumps	
Quantity	1 (only in the Advanced package)
Controller	Regulated rpms
Speed	Max. 200 rpm
Pump head	Watson Marlow 120, Fast Load pump head

Process Control and Measurements

Probes and Controllers	UniVessel [®] Glass	UniVessel [®] SU
Temperature, separate sensor	Temperature control 0 – 40°C Display resolution 0.1°C	•
Temperature integrated in pH probe	Temperature control 0 – 60°C Display resolution 0.1°C	•
DO probe, reusable	Polarographic probe Digital communication with Control Tower Range: 0 – 100% Display resolution: 0.1%	•
DO sensor, single-use	DO sensor patch Range: 0 – 100% air saturation Display resolution: 0.1% air saturation	•
pH probe, reusable	Combination electrode, digital communication with Control Tower Range: 2 – 12 pH Display resolution: 0.01 pH	•
pH sensor, single-use	pH sensor patch Range: 6 – 8 pH Display resolution: 0.1 pH	•
Foam, alternative level	Electrical conductivity sensor, stainless steel, ceramic insulated	•

Aeration Module

Gas inlet	<ul style="list-style-type: none"> - Gas pressure 1.5 barg (21.76 psig) $\pm 10\%$ - Gases: dry, oil and dust-free - Gas inlet connections with hose barb for 6 × 3 mm (0.24 × 0.12 in.) reinforced tubing
Gas outlet	<ul style="list-style-type: none"> - Gas outlet pressure: max. 0.8 barg (11.6 psig) - Outlets to the culture vessel with hose barb for 3.2 × 1.6 mm (0.12 × 0.06 in.) silicone tubing

Two-gas System for Microbial Fermentations

Continuous and automatic aeration control for air and O₂

Gas flow control units	Total of two; one per gas segment
Flow rates of the gas flow control units (all vessel sizes)	Air and O ₂ : 100 – 7,500 ccm
Measuring and control accuracy of the gas flow control units	$\pm 5\%$ full scale

Four-gas System for Cell Culture Application

Continuous and automatic aeration control for air, O₂, N₂ and CO₂

Gas flow control units	Total of four; one per gas segment
Flow rates of the gas flow control units (all vessel sizes)	Air and N ₂ : 10 – 500 ccm O ₂ and CO ₂ : 5 – 250 ccm
Measuring and control accuracy of the gas flow control units	$\pm 5\%$ full scale

Temperature Control Module

Cooling (only included in the BIOSTAT® A for microbial fermentation)

Chiller with automatic cooling water valves for recirculated cooling of the culture vessel and exhaust cooler via cooling finger

Weight	19.5 kg 43 lbs.
Dimensions (W × H × D)	220 × 495 × 325 mm 8.6 × 19.49 × 12.8 in.
Volume of cooling water tank	1.5 L
Power supply	BB-8822002: 230 VAC, 50 60 Hz, T2.5 A BB-8822003: 115 VAC, 60 Hz, T4 A
Supply temperature	8°C ± 2 °C at an ambient temperature of 21°C
Cooling capacity	150 W at an ambient temperature of 21°C
International protection rating	IP21 (protected from solid objects > 0.5 inch and vertically dripping water)
Cooling water hardness	Max. 12° dH

Connection with cooling finger via quick-connect coupling

Heating

Temperature control with electric heating jacket for culture vessel

Electrical filter heating for exhaust air filter (only included in the BIOSTAT® A for cell culture applications)

Culture vessel temperature control range	See above
Heating power	<ul style="list-style-type: none"> - 1 L Glass: 66 W - 2 L Glass: 112 W - 5 L Glass: 264 W - 2 L Single-use: 132 W

UniVessel® Culture Vessels – Technical Specifications

UniVessel® Glass Culture Vessel

Autoclavable, single-wall glass vessel	1 L	2 L	5 L
Material	Borosilicate glass, stainless steel AISI 316L, EPDM		
Total volume [L]	1.6	3	6.6
Working volume [L]	0.4–1	0.6–2	0.6–5
Cover ports 19 mm 12 mm 6 mm	3 2 6	3 2 9	3 3 8
Weight ¹ kg (lbs.)	4.4 (9.4)	5.9 (13.0)	10.5 (23.1)
Space requirements [W×H×D in mm] [W×H×D in inches]	156×558×196 6.1×22×7.7	176×619×217 6.9×24.4×8.5	231×757×266 9.1×29.8×10.5
Space requirements, reduced ² [W×H×D in mm] [W×H×D in inches]		490×391×217 18.9×16.1×11.8	530×510×410 20.9×20.1×16.1

¹ With stand and cover, without medium

² Exhaust air cooler adapters for height reduction in the autoclave are available as accessories

UniVessel® SU Culture Vessel

Disposable pre-sterilized polycarbonate culture vessels for cell culture applications	
Material	Polycarbonate
Sizes [L]	2
Total volume [L]	2.6
Working volume [L]	0.6–2

Equipment Packages

BIOSTAT® A is available in pre-defined product packages. The standard equipment packages include everything you need for cultivation. With the advanced package, you can conveniently control your BIOSTAT® A using your table or smartphone and perform fed-batch processes.

BIOSTAT® A package for microbial fermentation

Standard equipment package with UniVessel® Glass
BIOSTAT® A Control Tower incl. motor
Two-gas aeration (air, O ₂)
Three internal pumps, fixed speed
Digital probes for pH and DO
Foam Level probe
Two external analog signal inputs, 4 – 20 mA
pH control: acid, base
DO control
Combined foam level control
Chiller for culture vessel and exhaust cooler
Exhaust cooler
UniVessel® Glass 1 L, 2 L or 5 L, single-wall
Motor coupling
Six-blade disk impeller
Agitator shaft
Cooling finger
Heating blanket
Blind plugs for all ports
Ring sparger
Four-way addition port
Manual sampler
Baffles
Harvest pipe, adjustable height
Inoculation port
Air filter
Tool and accessory set
Laptop

BIOSTAT® A package for cell culture applications

Standard equipment package with UniVessel® Glass
BIOSTAT® A Control Tower incl. motor
Four-gas aeration (air, O ₂ , N ₂ , CO ₂)
Three internal pumps, fixed speed
Digital probes for pH and DO
Foam Level probe
Two external analog signal inputs, 4 – 20 mA
pH control: acid CO ₂ , base
DO control
Combined foam level control
Filter heater
UniVessel® Glass 1 L, 2 L or 5 L, single-wall
Motor coupling
Three-blade segment impeller
Agitator shaft
Heating blanket
Blind plugs for all ports
Micro-sparger
Four-way addition port
Manual sampler
Universal adapter
Harvest pipe, adjustable height
Inoculation port
Air filter
Tool and accessory set
Laptop

Standard equipment package with UniVessel® SU

BIOSTAT® A Control Tower incl. motor
Four-gas aeration (air, O ₂ , N ₂ , CO ₂)
Three internal pumps, fixed speed
Two external analog signal inputs, 4 – 20 mA
pH control: acid CO ₂ , base
DO control
Filter heater
Two UniVessel® SU 2 L
Heating blanket
UniVessel® SU motor adapter
UniVessel® SU holder
UniVessel® SU holder adapter ring, 2 L
Temperature sensor, Pt100
Safety valve station

Advanced equipment package

Operation using tablet or smartphone*
Substrate controller in the operator software for fed-batch process management
External, variable speed pump for substrate

Advanced equipment package

Operation using tablet or smartphone*
Substrate controller in the operator software for fed-batch process management
External, variable speed pump for substrate

* Tablet | smartphone not included

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