



BIOSTAT® Cplus

Additive Flow



The BIOSTAT® C plus Additive Flow packages are specially configured for cell culture applications. The integrated, automatically controlled gas mixing system provides Sparger and Overlay gassing. Air is routed to Overlay. Air, O₂, N₂ and CO₂ is routed to Sparger, automatically controlled via DO and pH controller. Each gas has its own rotameter for individual flow rate adjustment. By an easy upgrade of culture vessel components and rotameter flow rates, the system can also be used for microbial culture. Furthermore, each BIOSTAT® Cplus package comes with safety containment valves (Saco-va), which eliminates the risky needle operation for e.g. inoculation and other liquid additions to the sterile culture vessel.

Digital Controller

- Graphical user interface with color touch screen display
- Measurement and control for Temperature, pH, DO, agitation, Foam| Level
- Multi-stage DO cascade control
- 2 × feed controller
- High-Foam alarm with safety shut down of aeration and agitation
- Optional level control via Level probe or culture vessel weight
- Totalizers with digital calibration for gassing valves and pumps
- In-process pH-recalibration
- Trend display for up to 6 process values
- Up to 2 direct balance connections
- Optional internal Redox and Turbidity measurement
- Optional automatic or manual pressure control

"Additive Flow" Gassing System

- Sparger and Overlay gas outlet
- Gasmixing of Air, O₂, N₂, CO₂ for Sparger gassing
- Air for Overlay gassing
- Controlled via pH/DO controller
- Optional mass flow controller for Overlay and Air Sparger flow

Pumps

- 3 integrated pumps
- Configurable to feed controller
- Up to 2 external feed pumps
- Optional integrated speed controlled pump

Temperature System

- Closed loop pressurized thermostat system with recirculation pump and two heat exchanger for heating and cooling, alternately electrical heating
- Temperature range 8 °C above cooling water up to 90 °C
- Sterilization temperatures up to 130 °C

Agitation System

- Speed range 20 up to 1500 rpm
- Maintenance free
- Gear-free for quiet operation
- Double mechanical seal

Culture vessel

- Aspect ratio (H:D) 2:1
- Jacketed culture vessel fully equipped with: Probes for Temperature, DO, pH, Foam|Level and High Foam
- Operation pressure gauge
- Stirrer shaft with double mechanical seal
- 3-blade segment impellers
- μ-Sparger

- Stainless steel filter housing for aeration and exhaust with 0.2 μm grade sterile filters
- Overlay aeration assembly with stainless steel filter housing and 0.2 μm grade sterile filter
- High efficiency exhaust cooler
- 1- Channel safety containment valve
- 3-channel safety containment valve
- Resterilizable sampling valve
- Bottom harvest valve
- Removable bottle support
- Addition bottles with stainless steel head piece and sterile venting filters
- Installation and start up kit

BioPAT® MFCS/DA software package

- Plug and Play configuration
- Online data acquisition
- Sample Data Management
- Enhanced Plotting
- Export functions
- Easy to use programming interface

The BIOSTAT® Cplus Additive Flow packages are applicable for:

- Cell culture of insect, mammalian and plant cells
- Microbial culture by easy upgrade
- Industrial and academic research
- Process development
- Process optimization
- Up- and Down-scale studies
- Batch, fed batch and continuous culture
- Easy upgrade to perfusion operation
- Small scale production
- High-cell density culture
- Suspension and micro carrier cultures

Key Features

- Sanitary stainless steel design
- Small footprint
- Easy multipurpose use upgrade
- Automatic SIP sequence
- Needle free operation via safety containment valves (Saco-va)
- Culture vessels from 5 L to 30 L working volume
- Choice of steam or electrical heating
- High foam detection with safety shut-down
- Automatically controlled gas mixing
- Individual gas flow rate adjustment
- Sparger and Overlay aeration
- Graphical user interface with color touch screen display
- Maintenance and gear free high-performance agitation motor
- Trend display with up to 6 process values
- Various process control possibilities
- Inclusive Supervisory Process control software (BioPAT® MFCS/DA)
- Validation support available

Technical Specifications

Space requirements Environmental conditions	Dimensions				
BIOSTAT Cplus 5L Bench space requirement [W × H × D]	1000 × 1300 × 750 [mm] Benchttop version				
BIOSTAT Cplus 10-30 L Floor space requirement [W × H × D]	1020 × 1900 × 750 [mm] Floor standing				
Ambient temperature relative humidity (non condensating)	5-40°C 85%				
Control unit					
Housing material	Stainless steel AISI 304				
Display	Touch Screen 10.4"				
Resolution	800 × 600 dpi				
Host communication	Ethernet/RS422/RS232				
Measurement ranges					
Agitation motor speed 2L/5L/10L 15L/20L 30L	20-1500 20-1000 20-600 rpm				
Temperature	0-150 °C				
pH	2-12				
pO ₂	0-100%				
Pressure (option)	-0.5-2 [barg]				
Turbidity (option)	0-6 AU				
Redox (optional)	-1000-1000 mV				
Gassing System	Additive Flow 4-gas mixing with Sparger and Overlay outlet				
Outlet design	Hose tube OD 6 mm/ Reinforced silicon tubing connected to aeration line				
Flowmeter	Air calibrated @ 3 barg 20 °C/ scale lenght 120 mm				
Gas flow range "Sparger" for Air & N ₂ for 5L 10 L 15L 20L 30L	16-166 16-166 33-333 33-333 50-500 [mL/min]				
Gas flow range "Sparger" for O ₂ & CO ₂ for 5L 10 L 15L 20L 30L	3.3-33 3.3-33 16-166 16-166 33-333 [mL/min]				
Gas flow range "Overlay" 5L 10 L 15L 20L 30L	0.42-4.2 1.3-13 1.3-13 2-20 3.6-36 [l/min]				
Accuracy	+/- 2 % FS				
Thermal Mass Flow Controller (option)	Air calibrated				
Flow range "Overlay" 5L 10-30 L	0.1 - 5 slpm 0.6 - 30 slpm				
Flow range "Air Sparger flow"	0.2-10 slpm				
Accuracy	+/- 1% FS				
Agitation motor	Maintenance and gear free servo drive				
Performance 5L 10L/15L 20L/30L	500 800 1200 [W]				
Integrated pumps	Digital pulse width modulated controlled				
Pump head	Watson Marlow 102R				
Rotation speed	20 rpm				
Flow rate integrated pumps	0.04 - 33 [ml/min] (tube dependent)				
Integrated feed pump (option)	Speed controlled				
Pump head	Watson Marlow 102R				
Rotation speed	5-50 rpm				
Flow rate integrated pumps	1 - 83 [ml/min] (tube dependent)				
Temperature control system	Closed loop thermostate system with recirculation pump, heat exchanger for cooling and heating or electrical heater				
Temperature control range (operation sterilization):	8°C above cooling water to 90°C up to 130 °C				
Temperature measurement (jacket)	Pt100				
Heat exchanger (cooling heating)	Stainless steel, copper soldered Stainless steel, copper soldered (optional: Stainless steel welded)				
Electrical heater 5L 10L-30L (optional)	3 kW 6 kW				
External connections					
Balance connection	RS232				
2 × Feed pumps	0-10 V				
4 × External inputs	0-10 V				
Culture vessel	5L	10L	15L	20L	30L
H:D ratio	2:1	2:1	2:1	2:1	2:1
Total volume	6.8	15	22	30	42 [L]
Working volume	1.6-5	3.5-10	5.5-15	7.5-20	9-30 [L]
Top plate ports with fixed installations Air inlet/ Exhaust cooler/ Agitation system/ sight glass for illumination (10-30L only)/ safety valve (PEO vessel only)	5	5	5	5	5
Top plate ports 19 mm Total/ Used (Addition valves, Overlay aeration, Foam/Level Probe)/ Spare ASME vessel: Additional 19 mm port	4/4/-	5/4/1	5/4/1	5/4/1	5/4/1
Upper side ports 25 mm ASME vessel: Additional port for bursting disc	-	3	3	3	3
Lower side port 25 mm Total/ Used (Pt100, pH, DO, sampling valve)/ Spare (12 mm port for Pt 100)	5/4/1	5/4/1	5/4/1	5/4/1	5/4/1
Bottom port (harvest valve)	1	1	1	1	1
Vessel design	Jacketed stainless steel with upper glass cylinder Jacketed stainless steel vessel with vertical sight glass				
Volume storage bottles	500	1000	1000	1000	1000 [mL]
Material (product wetted parts)	Stainless steel AISI 316L/ Borosilicat glass / EPDM				
Surface finish product wetted	Ra <= 0.8 µm, electropolished				
Pressure design criteria 5L Vessel Jacket	2.5barg/ -1 @ 150°C 4 barg/ -1 @ 150°C				
Pressure design criteria 10-30L Vessel Jacket	3barg/ -1 @ 150°C 4 barg/ -1 @ 150°C				
Fabrication 208 VAC 400 VAC packages	ASME PED (5L PED only)				
Probes					
pO ₂ electrode	Polarographic				
pH electrode	Gel filled				
Foam / Level probe	Conductive probe, stainless steel ceramic isolated				
Temperature probe	Pt100				
Redox electrode (option)	Gel filled				
Pressure sensor (option)	Piezoresistive sensor				
Turbidity probe (option)	Single Channel NIR Absorption Probe, Gap 20 mm				
Utilities Requirements Regulatory compliance					
Power supply	208 VAC (Plug: NEMA L 21-20P) or 400 VAC (Plug CEE)				
Gases	4 - 6 barg; dry, particle and oil free				
Process steam	2.5 - 3 barg, controlled, prefiltered				
Clean steam	1.5 - 2 barg, controlled, prefiltered				
Water return	Return to close loop cooling system				
Condensate	Gravity drain with zero backpressure required				
Regulatory compliance	CE				

Ordering information

Description	BIOSTAT® Cplus-MO Additive Flow				
	5L	10 L	15L	20L	30L
Cat. No. 208 VAC Culture vessel H:D ration	RCP-C05L ATSES3 2:1	RCP-C10L ATSES3 2:1	RCP-C15L ATSES3 2:1	RCP-C20L ATSES3 2:1	RCP-C30L ATSES3 2:1
Cat. No. 400 VAC Culture vessel H:D ration	RCP-C05L ATSES4 2:1	RCP-C10L ATSES4 2:1	RCP-C15L ATSES4 2:1	RCP-C20L ATSES4 2:1	RCP-C30L ATSES4 2:1
Control Unit					
Digital controller, color display with touch screen	•	•	•	•	•
Control capabilities					
Temperature, pH, DO (2 stage cascade), Stirrer speed	•	•	•	•	•
Substrate A and Substrate B	•	•	•	•	•
Foam via conductive probe	•	•	•	•	•
High Foam alarm	•	•	•	•	•
Automatic sterilization sequence	•	•	•	•	•
Agitation motor (Servo drive)	•	•	•	•	•
Gasmixing					
Additive Flow					
Rotameter Sparger for Air; O ₂ ; N ₂ ; CO ₂	•	•	•	•	•
Rotameter Overlay for Air	•	•	•	•	•
Automatic Gasmixing of Air, O ₂ , N ₂ , CO ₂	•	•	•	•	•
Peristaltic pumps (integrated)	3 for Acid/ Base/ Afoam unused pump can be configured as substrate pump				
Supervisory Process Control Software					
MFCS/DA for data storage	•	•	•	•	•
Supply frame					
Open frame design					
Temperature control system	Closed loop system with recirculation pump and heat exchanger for heating and cooling – Alternative: Electrical heating				
Agitation motor holder	•	•	•	•	•
Solenoid valves and steam traps for automatic in-situ sterilization	•	•	•	•	•
Installation kit, Tubing, O-Ring (spare set)	•	•	•	•	•
Culture Vessel					
Jacketed Stainless steel vessel with upper glass cylinder					
Stirrer shaft with Double Mechanical Seal	•	•	•	•	•
3-blade segment impeller	1	2	2	2	2
Stainless steel filter housing for Air Inlet and Exhaust filter ' incl. filter cartridges	•	•	•	•	•
Stainless steel filter housing for Overlay aeration incl. filter cartridges	•	•	•	•	•
Filter assembly for Overlay aeration	•	•	•	•	•
Pressure gauge –1 / 3 barg	•	•	•	•	•
Aeration tube with micro-sparger	•	•	•	•	•
Exhaust Cooler	•	•	•	•	•
Resterilizable sampling valve; complete	•	•	•	•	•
1-Channel Sacova valve for needle free additions	•	•	•	•	•
3-Channel Sacova valve for needle free additions	•	•	•	•	•
Lamp for vessel illumination	--	•	•	•	•
Storage bottles	3	3	3	3	3
Removable tray for storage bottles	--	•	•	•	•
Combined Bottom harvest/ sampling valve	•	•	•	•	•
pH Electrode, cable	•	•	•	•	•
DO Electrode, cable	•	•	•	•	•
Foam sensor, cable	•	•	•	•	•
Temperature sensor Pt 100	•	•	•	•	•
High-foam sensor with installation adaptor, cable	•	•	•	•	•
Options					
MFC (Overlay flow)	◦ 8847789 0.2–10 [l/min]	◦ 8848521 0.6–30 [l/min]	◦ 8848521 0.6–30 [l/min]	◦ 8848521 0.6–30 [l/min]	◦ 8848521 0.6–30 [l/min]
MFC (Air Sparger flow)	◦ 8848580 0.05–0.5 [l/min]	◦ 8848580 0.05–0.5 [l/min]	◦ 8848580 0.05–0.5 [l/min]	◦ 8848580 0.05–0.5 [l/min]	◦ 8848580 0.05–0.5 [l/min]
Electrical heating instead of steam heat exchanger	◦ 8845964	◦ 8842507	◦ 8842507	◦ 8842507	◦ 8842507
Top plate lifting device	--	◦ 8842516	◦ 8842516	◦ 8842516	◦ 8842516
Pressure control Manual Automatic	◦ 8842512 8842513	◦ 8842512 8842513	◦ 8842512 8842513	◦ 8842512 8842513	◦ 8842512 8842513
Vessel weight measurement	--	◦ 8842514	◦ 8842514	◦ 8842514	◦ 8842514
Feed pump (integrated); speed controlled	◦ 8843468	◦ 8843468	◦ 8843468	◦ 8843468	◦ 8843468
Feed pump integrated; digital	◦ 8843466	◦ 8843466	◦ 8843466	◦ 8843466	◦ 8843466
Turbidity measurement (amplifier + probe)	◦ on request	◦ on request	◦ 8846618 + 8846605	◦ 8846618 + 8846605	◦ 8846618 + 8846605
Empty vessel sterilization	◦ 8842508	◦ 8842508	◦ 8842508	◦ 8842508	◦ 8842508

Broad range of accessories available, Please contact us for further details
Please note: Due to technical/ space limitations may not all options can be combined

• = included, -- = not included, --- = unavailable, ◦ = option

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