BIOSTAT® B-DCU II

Advanced Additive Flow

The BIOSTAT® B-DCU II is the second generation of a well proven Fermentor | Bioreactor system, designed for meeting demanding requirements in both research and process development. Unrivalled for scale-down and scale-up modelling of various culture processes, the BIOSTAT® B-DCU II provides a new level of power and flexibility.
The BIOSTAT® B-DCU II Advanced Additive Flow packages are specially configured for cell culture. The integrated automatically-controlled gas mixing system for up to 6 gas flow path provides Sparger and Overlay or optional individual gas out lets. Each gas has its own rotameter for individual flow rate adjustment.

Control Tower
- Graphical user interface with color display and touch screen operation
- Measurement and control for Temperature, pH, DO, agitation and Foam
- User configurable 5-stage DO cascade
- Up to 4 feed controller per vessel
- Automatic gas composition controlled by pH & pO_2 controller
- Level control via Level probe balance
- Totalizers with digital calibration for valves and pumps
- In-process pH-recalibration
- Trend display for up to 8 process values
- Up to 4 balance connections per vessel
- Culture vessel pressure measurement and control

Supply Tower

Advanced Additive Flow Gassing System
- Sparger and Overlay or optional individual gas out lets
- Gasmixing of Air, O_2, N_2, CO_2 for Sparger gassing via solenoid valves
- Air for Overlay gassing
- Additional optional gas flow path
- Optional gas switch Sparger to Overlay
- Up to 6 optional mass flow controller

Pumps
- 3 integrated pumps, expandable up to 6
- Up to 4 feeding pumps

Temperature System
- Powerful heater (1 kW)
- Integrated controlled cooling water valve
- Circulation pump
- Temperature range 8°C above cooling water up to 80°C

Agitation System
- Speed range 20 up to 2,000 rpm
- Maintenance free
- Gear-free for quiet operation

Culture vessel
Jacketed culture vessel fully equipped with:
- Sensors for Temperature, DO, pH and Foam
- Stirrer shaft with single mechanical seal
- 3-blade segment impeller
- Aeration tube with micro Sparger, Overlay aeration fitting, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support
- Addition bottles with stainless steel head piece and sterile filters
- Inoculation | addition septum port
- Multiple way addition port
- Tube, O-ring and tool kit

SCADA Software MFCS/DA
To accelerate your research activities, a powerful supervisory software MFCS/DA for extended visualization, data acquisition and trend display is included.
- Plug and Play configuration
- Batch-oriented software package
- Online data acquisition
- Sample Data Management
- Enhanced Plotting
- Export functions
- Easy to use programming interface

Features
- Powerful industry rated BioPAT® DCU control system with 15" TFT color touch screen
- Independent process control for up to six culture vessels
- UniVessel® from 0.5 L to 10 L working volume
- Up to six integrated peristaltic pumps with choices for fixed and analogue speed pumps
- Choice of polarographic or optical pO_2-sensors
- Superior gas mixing with up to 6 Rotameter and Mass Flow Controller
- Culture vessel pressure control
- Easy on-site Supply Tower | Culture vessel upgrade
- Improved connectivity of utilities and probes
- Easy upgrade of cell culture packages for multi-purpose use
- Inclusive Supervisory Process control software
- Validation support available, inclusive Logbook and 3-Level password protection

Technical Specification

Space requirements | Enviromental conditions:					
Space requirement 1-fold | 2-fold | 3-fold | 4-fold | 5-fold | 6-fold [W × H × D] (without options)	800 | 1200 | 1700 | 2050 | 2550 | 3000 × 780 (10L: 820) × 800 [mm				
Space requirement autoclave ∅ H (with BB-8844593 flexible adaptor for exhaust cooler) 0.5 L | 1 L | 2 L | 5 L | 10 L without tray for storage bottles	170 × 340 (N/A) | 240 × 500 (340) | 270 × 550 (400) | 300 × 700 (510) | 350 × 820 (620) [mm]				
Ambient temperature | relative humidity (non-condensating)	5–40°C | 85%				
Control Tower					
Housing material	Stainless steel AISI 304				
Display	Touch Screen 15"				
Resolution	1024 × 768 dpi				
Communication Control Tower/Supply Tower | Control Tower/Host	Ethernet | Ethernet				
Measurement ranges | resolution					
Stirrer speed 0.5 L | 1 L | 2 L | 5 L | 10 L	tbd | 20–2000 | 20–2000 | 20–1500 | 20–800 [rpm] | 1 rpm				
Temperature	0–150°C | 0.1°C				
pH	2–12 | 0.01 pH				
pO_2	0–250% | 1%				
Foam and Level	on/off | 4 user selecatable sensitivities				
Turbidity (option)	0-6 AU | 0.01 AU				
Redox (option)	-2000–2000 mV | 1 mV				
Pressure (option)	0 - 1000 mbarg | 1 mbar				
Gassing System "Advanced Additive Flow" with up to 6 gas flow paths	4-gas mixing system with Spager and Overlay gas outlets				
Outlet design	Hose tube OD 6 mm				
Flowmeter	Air calibrated @ 1.21 bara 20°C				
	0.5 L	1 L	2 L	5 L	10 L
Gas flow range "Sparger" for Air & N_2	0.53-53	0.53-53	13-133	13-133	26-266 [mL/min]
Gas flow range "Sparger" for O_2 & CO_2	1.5-15	1.5-15	3.3-33	3.3-33	13-133 [mL/min]
Gas flow range "Overlay" for Air	0.11-1.05	0.11-1.05	0.16-1.6	0.42-4.2	1.3-13 [L/min]
Additional gas flow path to "Sparge" or "Overlay"	Various flow ranges available from 1.5–15 mL/min to 2.3–23 L/min				
Accuracy	+/– 2% FS				
Thermal Mass Flow Controller (option)	Calibrated to specific gas				
	0.5 L	1 L	2 L	5 L	10 L
Gas flow range "Sparger" for Air & N_2	0.5-50	0.5-50	3-150	3-150	6-300 [mL/min]
Gas flow range "Sparger" for O_2 & CO_2	0.15-15	0.15-15	0.6-30	0.6-30	3-150 [mL/min]
Gas flow range "Overlay" for Air	0.02-1.0	0.02-1.0	0.03-1.5	0.1-5	0.2-10 [L/min]
Additional gas flow path to "Sparge" or "Overlay"	Various flow ranges available from 1.5–15 mL/min to 0.4–20 L/min				
Accuracy	+/– 1% FS				
Agitation	Maintenance and gear-free servo drive				
Motor performance torque 0.5 L | 1 L, 2 L, 5 L, 10 L	75/0.28 | 200/1.03 [W]/[Nm]				
Integrated pumps	on | off, pulse-width modulated controlled				
Pump head	Watson Marlow 102R, for tubing with 1.6 mm wall thickness				
Rotation speed speed	20 rpm				
Flow rate tube dependent (bore × wall tubing) 1.6 × 1.6/3.2 × 1.6 [mm]	0.4-4.4 | 1.6-16.2 [ml/min]				
Integrated feed pump (option)	Speed-controlled				
Pump head	Watson Marlow 102R, for tubing with 1.6 mm wall thickness				
Rotation speed speed	1-10 | 5-50 [rpm]				
Flow rate tube dependent (bore × wall tubing) 1.6 × 1.6/3.2 × 1.6 [mm]	0.2–2/0.8-8 | 1.1–11/4–40 [ml/min]				
Temperature control system	Thermostat system with recirculation pump and soleniod valve for cooling water				
Temperature control range	8°C above cooling water to 80°C				
Electrical heater	1000 W				
Connections to culture vessel | Exhaust cooler	Quick couplings | Quick couplings				
External connections					
Balance standard | option/interface/connector	2 | 4/RS232/M12				
CO_2 exhaust analyzer interface/connector	1/RS232/M12				
Feed pump connection qty./interface/connector	2/0–10 V/M12				
External inputs qty./interface/connector	2/0-10 V/M12				
Culture vessel	**0.5 L**	**1 L**	**2 L**	**5 L**	**10 L**
Design	Jacketed glass vessel with stainless steel head pleate				
Total volume	0.75	1.6	3	6.6	13 [L]
Working volume	0.15-0.5 L	0.4 -1	0.6-2	0.6-5	1.5-10 [L]
Headpleate ports 19 mm | 12 mm | 6 mm	– | 6 | 4	3 | 2 | 6	3 | 2 | 9	3 | 3 | 8	7 | 2 | 9
Volume storage bottles	250	250	250	500	500 [mL]
pO_2 sensor | connector	Polarographic or optical (option) | VP				
pH sensor | connector	Gel-filled | VP				
Temperature sensor | connector	Pt100 with pocket | M12				
pH | Redox sensor (option)	Gel-filled | VP				
Turbidity sensor (option)	Single Channel NIR Absorption Probe				
Pressure transmitter (option)	Piezoresistive | M12				
Material (product wetted parts)	Borosilicate glass | Stainless steel AISI 316L | EPDM				
Utility consumption					
Power consumption max. DCU Tower | Supply Tower	200 | 2000 [W]				
Water consumtion max. per Power Supply	5 L/min				
Gas consumption max. per Power Supply 0.5 L | 1 L | 2 L | 5 L | 10 L	1 | 1.6 | 4.2 | 13 | 20 [L/min]				
Utility requirements | Housing connection					
Power supply DCU Tower | Supply Tower	110 – 230V/6A GFIC: 32mA | 120V/15A or 230V/10A GFIC: 32mA				
Gasses	Controlled @ 1.5 barg (22 psig); dry, particle and oil-free | hose connector OD 6 mm				
Water	Controlled @ 2 – 4 barg (29 – 58 psig) | hose connector OD 10 mm				
Drain	Gravity drain with zero backpressure required | hose connector OD 10 mm				
Regulatory compliance	CE (build according to UL & CSA requirements)				

Ordering information

Description	BIOSTAT® B-DCU II Advanced Additive Flow				
Culture vessel working volume	0.5 L	1 L	2 L	5 L	10 L
Cat. No. 120 VAC					
BIOSTAT® B-DCU II Single	RBD1C5DLATSDG1	RBD1C01LATSDG1	RBD1C02LATSDG1	RBD1C05LATSDG1	RBD1C1ALATSDG1
BIOSTAT® B-DCU II Upgrade Kit (Vessel + Supply Tower)	RBD1C5DLATSDG1E	RBD1C01LATSDG1E	RBD1C02LATSDG1E	RBD1C05LATSDG1E	RBD1C1ALATSDG1E
Cat. No. 230 VAC					
BIOSTAT® B-DCU II Single	RBD1C5DLATSDG2	RBD1C01LATSDG2	RBD1C02LATSDG2	RBD1C05LATSDG2	RBD1C1ALATSDG2
BIOSTAT® B-DCU II Upgrade Kit (Vessel + Supply Tower)	RBD1C5DLATSDG2E	RBD1C01LATSDG2E	RBD1C02LATSDG2E	RBD1C05LATSDG2E	RBD1C1ALOTSDG2E
Control Unit					
Control Tower 15'' color display with touch screen operation	•				
Automatic pH and pO_2 calibration routine Single probe and group calibration	•				
Control Capabilities per Vessel					
Temperature, pH, DO (5-stage cascade), Stirrer speed, Foam, Substrate	•				
Vessel Pressure measurement | control	○ | ○				
Turbidity measurement	○				
Gravimetric Feed Control	○				
Gravimetric Harvest Control	○				
Extended Password Module	○				
Logbook Module	○				
Supply Tower					
Gas mixing (integrated)	Advanced Additive Flow				
Gas outlets Sparger & Overlay | Individual	• | ○				
Rotameter Sparger	• Air, O_2, N_2, CO_2				
Rotameter Overlay | Additional gas	• Air | ○ O_2 or CO_2 or N_2				
Solenoid valves for gas mixing of Air, O_2, N_2, CO_2	•				
Gas switch Sparger to Overlay	○				
Mass Flow Controller	○ (up to 6)				
Stirrer Motor	•				
Peristaltic Pumps (integrated)	3				
Feed Pumps speed controlled (integrated | external)	○ (up to 3) | ○ (up to 2)				
Thermostat system (integrated) Jacketed vessel | Single wall vessel	• | ○				
Supervisory Process Control Software					
MFCS/DA for data storage	•				
Culture Vessel	UniVessel®				
Jacketed vessel | Single wall vessel	• | –	• | ○	• | ○	• | ○	• | ○
Stirrer shaft with Single Mechanical Seal Direct coupling | Magnetic coupling	• | –	• | ○	• | ○	• | ○	• | ○
Magnetic drive	–	–	○	○	○
3-blade segment impeller	1				
Storage bottles	3	3	3	3	3
Air Inlet and Exhaust filter	3				
Aeration tube with µ-Sparger | Overlay port	•				
Inoculation | Addition port	•				
Exhaust Cooler	•				
Addition fitting	2 × 3-way	4-way	4-way	4-way	4-way
Sample- | Harvest pipe	•				
Manual sampler	•				
Tray for storage bottles	–	•	•	•	•
pH Electrode, cable	•				
DO Electrode , cable, Clark principle | Optical	○ | •				
Foam sensor, cable	•				
Level sensor, cable	○				
Temperature sensor Pt 100	•				
Turbidity sensor	○				
Exhaust CO2 sensor	○				
Pressure sensor| control	○ | ○				
Tubing, O-Ring (spare set)	•				

Broad range of accessories available; Configurable and customizable solutions are available outside of this package. Please contact us for further information.

• = standard, ○ = option, – = not available

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