BIOSTAT® B-DCU II

O_2 Enrichment

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. Unrivaled for scale-down and scale-up modeling of various culture processes, the BIOSTAT® B-DCU II provides a new level of power and flexibility.
The BIOSTAT® B-DCI II with integrated O_2-Enrichment gassing capability enables high oxygen transfer for high cell density cultures as well as for sheer-stress sensitive gassing for filamentous organisms. Furthermore, it may help to solve foaming problems due to reduced gassing rates.

Control Tower
- Intuitive touch screen operation
- Industrial controller hardware
- Controller for Agitation, Temperature, pH, pO_2, Foam
- Turbidity, Redox or culture vessel pressure measurement and control
- Automatic gas composition controlled by pO_2-controller
- User configurable 5-stage pO_2 cascade control via agitation speed, O_2-Enrichment with optional MFC's and substrate feeding
- Up to 4 feed controller per vessel
- Controller status indication
- Gas and pump totalizers
- Automatic single and group sensor calibration
- In-process pH-recalibration
- Trend display for up to 8 process values
- Up to 4 balance connections

Supply Tower

"O_2-Enrichment" Gassing System
- Gas mixing of Air and O_2
- O_2-Enrichment capability controlled via DO controller
- Optional mass flow controller for Total Sparger flow or for Air and O_2

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
- High torque for power full mixing
- 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
- Rushton impeller
- Baffle assembly (not for 0.5 L vessel)
- Aeration tube with ring Sparger, sterile filters and exhaust cooler
- Manual sampler with sampling pipe
- Removable addition bottle support (not for 0.5 L vessel)
- 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 DCU-4 control system with 15" TFT color touchscreen
- 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 2 Rotameter and Mass Flow Controller
- Culture vessel pressure control
- Easy on-site Supply Tower | Culture vessel upgrade
- Improved connectivity of utilities and probes
- 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 (200W) | 10 L (400 W)	tbd | 20–2000 | 20–2000 | 20–1500 | 20–800 | 20–1200 [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 "O_2-Enrichment"	Air aeration with O_2 supplementation				
Outlet design	Hose tube OD 6 mm				
Flowmeter	Air calibrated @ 1.21 bara 20 °C				
Gas flow range "Sparger" 0.5 L | 1 L | 2 L | 5 L | 10 L	0.11–1.05 | 0.16–1.6 | 0.42–4.2 | 1.3–13 | 2–20 [l/min]				
Accuracy	+/– 2% FS				
Thermal Mass Flow Controller (option)	Air calibrated				
Flow range "Sparger" Total Flow 1 L | 2 L | 5 L | 10 L	0.02–1.0 | 0.06–3 | 0.06–3 | 0.2–10 | 0.4–20 [slpm]				
Accuracy	+/– 1% FS				
Agitation	Maintenance and gear-free Servo drive				
Motor performance torque 0.5 L | 1 L, 2 L, 5 L, 10 L | 10 L	75/0.28 | 200/1.03 | 400/1.32 option [W]/[Nm]				
Maximum impeller tip speed 0.5 L | 1 L | 2 L | 5 L | 10 L (200 W) | 10 L (400 W)	tbd | 4.7 | 5.6 | 5.0 | 3.1 | 4.7 [m/s]				
Integrated pumps	on/off controlled, pulse-width modulated controlled				
Pump head	Watson Marlow 102R, for tubing with 1.6 mm wall thickness				
Rotation 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	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	0.15–0.5L	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 consumption max. per Supply Tower	5 L/min				
Gas consumption max. per Supply Tower 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 230 V/10A GFIC: 32 mA				
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 O_2 Enrichment				
Culture vessel working volume	0.5 L	1 L	2 L	5 L	10 L
Cat. No. 120 VAC					
BIOSTAT® B-DCU II Single	RBD1M5DLOTRDG1	RBD1M01LOTRDG1	RBD1M02LOTRDG1	RBD1M05LOTRDG1	RBD1M1ALOTRDG1
BIOSTAT® B-DCU II Upgrade Kit (Vessel + Supply Tower)	RBD1M5DLOTRDG1E	RBD1M01LOTRDG1E	RBD1M02LOTRDG1E	RBD1M05LOTRDG1E	RBD1M1ALOTRDG1E
Cat. No. 230 VAC					
BIOSTAT® B-DCU II Single	RBD1M5DLOTRDG2	RBD1M01LOTRDG2	RBD1M02LOTRDG2	RBD1M05LOTRDG2	RBD1M1ALOTRDG2
BIOSTAT® B-DCU II Upgrade Kit (Vessel + Supply Tower)	RBD1M5DLOTRDG2E	RBD1M01LOTRDG2E	RBD1M02LOTRDG2E	RBD1M05LOTRDG2E	RBD1M1ALOTRDG2E
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, Level, Substrate	•				
Vessel Pressure measurement | control	○ | ○				
Turbidity measurement	○				
Redox measurement	○				
Gravimetric Feed Control	○				
Gravimetric Harvest Control	○				
Extended Password Module	○				
Logbook Module	○				
Supply Tower					
Gas mixing (integrated)	O_2-Enrichment				
Rotameter for Sparger [l/min]	•				
Solenoid Valve for O_2-Enrichment	•				
Mass Flow Controller Total Sparger Flow | Air and O_2	○ | ○				
Stirrer Motor	•				
Peristaltic Pumps (integrated)	3				
Feed Pumps speed controlled (integrated | external)	○ (up to 3) | ○ (up to 2)				
Thermostat system (integrated)	•				
Supervisory Process Control Software					
MFCS/DA for data storage	•				
Culture Vessel	Jacketed UniVessel®				
Stirrer shaft with Single Mechanical Seal	•				
6-blade disk impeller	2	2	2	2	3
Baffles	–	•	•	•	•
Storage bottles	3	3	3	3	3
Air Inlet and Exhaust filter	2				
Aeration tube with Ring Sparger	•				
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	○				
pH|Redox sensor	○				
Pressure sensor | control	○ | ○				
Exhaust CO_2	○				
Tubing, O-Ring (spare set)	•				
Foam Disc (mechanical foam destroyer)	–	○	○	○	○

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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