BIOREACTOR

BR110 Series

> Flexible Configuration & Easy Scalability

> Microbial Cultivation

> High-parallel

> High-Throughput

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Labfirst Scientific Instruments (Shanghai) Co., Ltd.
www.lab1st.com | sales@lab1st.com

Advantages

1 **High efficiency:**
Run multiple process conditions in parallel - accelerate development and reduce R&D costs in a single campaign

2 **Reliable precision performance:**
Equipped with globally top-tier hardware components for unmatched control accuracy.

3 **One-click synchronization:**
Parallel control with one-click parameter synchronization

4 **Reliable solid-state heating and cooling**

5 **Small-scale first:**
Engineered for small volume process development, empowering your early-stage research with precision, reliability, and scalability

6 **Remote communication:**
Remote monitoring and control via local area network (LAN)

7 **Optimized vessel engineering:**
Premium materials with modular construction for easy disassembly and maintenance.

8 **Modular design:**
Modular design for maximum space efficiency and easy installation

9 **Advanced software capabilities:**
Feedback-, time-, condition-, and script-based control strategies.

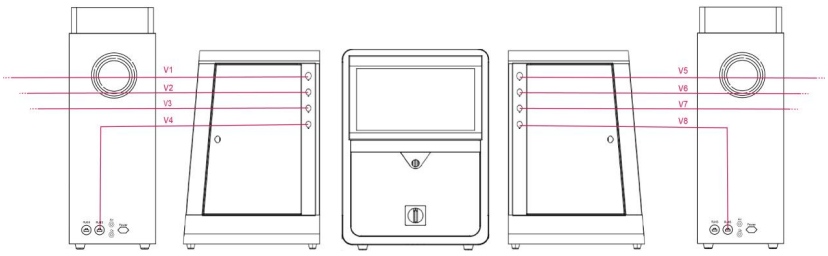
10 **Flexible upgrades & customization:**
A wide range of modular options and tailored solutions to meet your unique application requirements.

Functions

designed for 21CFR Part 11™

High-Throughput Control System

- Supports synchronized operation of multiple bioreactors, enabling parallel studies across multiple dimensions—including strain screening, media optimization, feeding strategy validation, and pH/DO control—within a single batch.
- Accelerates process development by covering diverse process conditions in one run, significantly shortening R&D timelines and reducing early-stage development costs.
- Offers flexible centralized management with independent control per vessel: users can instantly synchronize all online bioreactors via the "One-Click Sync" function, ensuring consistency without sacrificing individual parameter customization.



Exceptional Flexibility and Scalability

- Modular split-design maximizes valuable benchtop space—keeping your lab organized and workflow efficient.
- Seamlessly accommodates vessel sizes from 0.7 L to 15 L, eliminating the need for multiple systems and reducing long-term investment while accelerating process development.
- Solid-state heating and cooling delivers safe, efficient thermal control—no external chillers, heaters, or water lines required.

Simple to Operate, easy to Use

- Complete turnkey system — everything you need for immediate operation is included, pre-configured, and ready to run out of the box. No additional accessories to source or purchase.
- All critical components are integrated into the vessel headplate, enabling quick, tool-free removal and reassembly for effortless cleaning and maintenance.
- 15.6" touchscreen with intuitive software interface delivers full bioprocess oversight—making complex operations feel simple.

Features

High-throughput parallel bioreactor system:

- Modular
- Scalable
- Purpose-built for diverse process development needs

Software Capabilities:
Intelligent Control & Connected Process Management

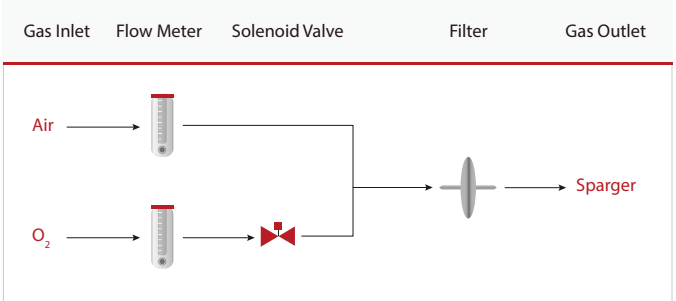
- Synchronized control functions : one-click sync of fermentation parameters across all bioreactors; one-click synchronization of all control switches (e.g., pumps, ga s valves, agitation); one-click start for simultaneous fermentation runs
- Comprehensive control including manual, automatic, sequential, cascaded, conditional, etc. addressing diverse experimental needs with flexible process management.
- 24 programmable recipes with unlimited steps enable fully automated bioprocess execution, reducing manual intervention.
- One-click calibration of sensors and peristaltic pumps across all online bioreactors—ensuring precise, reliable, and highly parallel process control.
- Multiple cascades for DO control integrates agitation speed, oxygen on/off, and feeding for enhanced control responsiveness and fermentation precision.
- Expandable trend monitoring provides real-time bioprocess visualization with customizable data display parameters.
- Comprehensive data security features 4GB expandable storage with multi-year batch/alarm/operation record retention and export/backup functionality.
- Remote connectivity enables real-time monitoring and software updates via PC/mobile devices for off-site process management.

Advanced Culture Vessel:
Hygienic Construction & Optimized Performance

- Single-wall cylindrical vessel combines stainless steel heating base for uniform temperature distribution and efficient cleaning (0.7-2L vessels).
- Quick-release solid-state exhaust condenser - compact and highly efficient
- Pharmaceutical-grade materials including electro-polished 316L stainless steel, Boro 3.3 glass, EPDM and Silicon sealings meet stringent hygienic standards.
- Optimized 2:1 aspect ratio delivers superior mass/heat transfer efficiency to meet demanding bioprocess requirements.
- Multiple standardized ports support seamless integration of accessories and sensors for flexible system configuration.
- Quick-release design enables tool-free assembly and disassembly, streamlining cleaning and maintenance procedures.

* Gassing Strategy Diagram

>>> Microorganism



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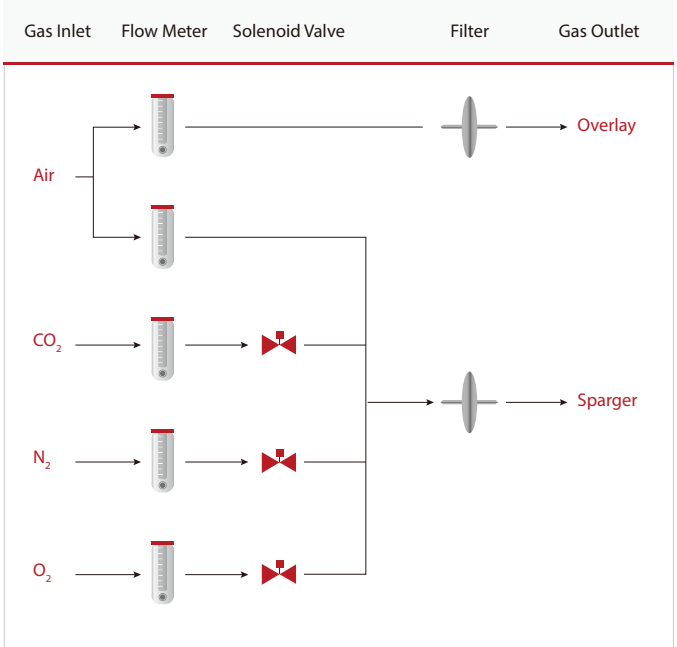

Specification

>>> Independent Control Tower

Model	Slave	Master
Housing Material	Cold rolled steel plate + white powder coating	Cold rolled steel plate + white powder coating
Dimensions [Wxdxh, mm]	252×626×655	330×500×630
Weight [Kg]	Approx. 30Kg	Approx. 30 Kg
Display I Operation	NA	15.6" color touch screen
Controller	Distributed I/O	Siemens S7000 series PLC + HMI
Integrated Pump	4 x variable-speed peristaltic pumps	NA
Flow Meter	Microorganism: 2 Rotameters Cell: 5 Rotameters	NA
Communication	· 2x Industrial Ethernet	· 8 x Industrial Ethernet · 1 x USB
Interface	· 1 x pH sensor cable · 1 x DO sensor cable · 2 x stirring motor control wires · 1 x temperature sensor interface · 1 x foam sensor cable · 1 x main power interface	NA
Air Interface	Microorganism: 1 × barb [Mixing gas to vessel], 2 ×Gas supply Cell: 2 × barb [Mixing gas to vessel], 4 ×Gas supply	NA
Power Supply	220V (±10%), 50Hz, single phase	220V (±10%), 50Hz, single phase
Rated Power [W]	Max. 1.5 KW	Max. 1.5 KW

>>> Control Capacity

Agitation Control	
Motor	Maintenance-free, low noise servo motor
Speed Range and Accuracy	5 - 1000 rpm, ± 0.5%
Rated Power [W]	Max. 750 W
Gas Control *	
Gas Source	Microorganism: Air, O_2 Cell: Air, O_2, CO_2, N2
Control Method	Rotameters + Solenoid valves
Gas Supply	Microorganism: Ring sparger Cell: Overlay (for Air) + Ring sparger
Flow Range	Microorganism: Sparger - Air: up to 2vvm Sparger - O_2: up to 1vvm Cell: Sparger Air: up to 1vvm; Overlay: up to 0.2vvm O_2: up to 0.2vvm N_2: up to 0.2vvm CO: up to 0.2vvm
Flow Accuracy	1%
Temperature Control	
Control Method	Robust PID algorithm
Heating Method	Stainless steel base heating
Cooling Method	Stainless steel base cooling
Sensor	Germany JUMO Pt100 RTD
Measurement Range and Accuracy	0~150.0℃, ± 0.1°C
Control Range and Accuracy	8.0 °C above coolant to 40.0 °C above ambient (0-65.0 °C absolute), ± 0.2°C
PH Control	
Control Method	Microorganism: · Robust PID algorithm · Cascade control with peristaltic pumps by adding acid and alkali" Cell: · Robust PID algorithm · Cascade control with peristaltic pump by adding alkali or solenoid valve by adding CO_2
Sensor	Hamilton Sterilizable Gel-filled pH electrode
Measurement Range and Accuracy	2.00~12.00, 0.01
Control Accuracy	± 0.05
DO Control	
Control Method	Microorganism: · Robust PID algorithm · Cascade control with different parameters (agitation, O2 on/off and peristaltic pump) Cell: · Robust PID algorithm · Cascade control with different parameters (agitation, gas on/off and peristaltic pump)
Sensor	Hamilton Sterilizable polarographic DO electrode
Measurement Range and Accuracy	0.0~150.0%, 0.1%
Control Accuracy	± 3%
Foam Control	
Control Method	· Cascade control with peristaltic pump by adding antifoam · Mechanical defoaming blade

>>> Glass Vessel

Type	Single-wall flat-bottom cylindrical vessel							
Total Volume [L]	0.7	1	2	3	5	7	10	15
Max. Working Volume [L]	0.5	0.75	1.50	2.25	3.75	5.25	7.50	11.25
Min. Working Volume [L]	0.2	0.25	0.50	0.75	1.25	1.75	2.50	3.75
Material [Wetted Part]	· Glass vessel material: Boro 3.3 high borosilicate glass · Vessel cover and inner parts: SUS 316L · Seal: EPDM and Silicon							
Surface Treatment	· Inner surface: electrolytic polishing, Ra ＜0.4 μm · Outer surface: Ra ＜0.6 μm							
Pressure Design	Autoclavable							
Height to Diameter Ratio [H: D]	Approx. 2:1							
Vessel Dimensions	Refer to "Table A for ST series							
Vessel Weight [Excluding Motor] [Kg]	2	8	9	10	12	13.5	15	18
Vessel Lid Interface	1 × Agitator flange 1 × Inoculation port 2 × Baffle port (based on the volume) 1 × Gas inlet port for ring sparger 1 × Exhaust port 1 × Sampling port 1 × PH sensor port 1 × DO sensor port 1 × PT100 temperature sensor port 1 × Foam sensor port N × Feeding port Cell: 1 × Overlay							
Impellers	· 2 layers, top: foam breaker, bottom: 3-blade elephant-ear impeller · Detachable, height adjustable, various type							
Baffles	Microorganism: · <3L: 2 removable baffles · ≥ 3L: 4 removable baffles Cell: N/A							

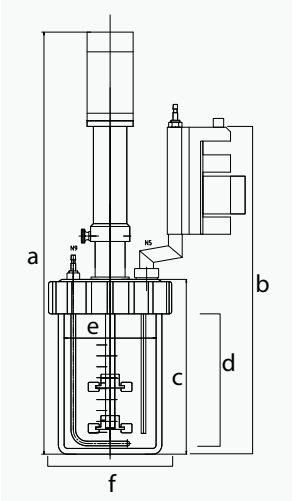

*Table A - ST Series vessel

Dimension								
Vessel Volume [L]	0.7	1	2	3	5	7	10	15
a [mm]	367	450	471	567	622	712	753	851
b [mm]	295	430	450	492	546	636	641	738
c [mm]	152	227	214	292	347	437	442	484
d [mm]	120	170	190	230	280	370	360	450
e [mm]	Ø80	Ø90	Ø110	Ø130	Ø150	Ø160	Ø185	Ø203
f [mm]	115	180	190	190	212	212	248	270
Sterilization Requirement								
Minimum Size [mm]	Ø200x400	Ø220x450	Ø230x470	Ø230x500	Ø265x550	Ø265x640	Ø300x645	Ø335x740
Recommended Size [mm]	Ø280x500	Ø280x500	Ø280x500	Ø280x550	Ø300x600	Ø300x700	Ø350x700	Ø380x800

Options & Upgrades

Item	Description	Function
Culture Vessel	DW Series: Double-wall round-bottom cylindrical vessel + water jacket temperature control	A variety of vessels to meet different needs
Impeller	Lift impeller, oblique leaf impeller, rotary filter, Marine impeller, packed-bed impeller, etc.	Flexible customization to meet different application requirements
pH Sensors	Hamilton® Arc smart pre-pressurized gel-filled sensor for real-time pH monitoring	Pre-calibrated, ready to use, automatic diagnostics
	Mettler Toledo Brand	More brand choices, adaptable to different systems
DO Sensors	Mettler Toledo Brand	More brand choices, adaptable to different systems
	Hamilton® optical dissolved oxygen sensor	No polarization required, quick start
More Sensors	Mettler Toledo Brand	More brand choices, adaptable to different systems
	Hamilton DCO2 sensor	Online real-time monitoring of carbon dioxide dissolved in liquids
	Hamilton VCD sensor	Online real-time monitoring of viable cell density
	Hamilton OD sensor	Online real-time monitoring of cell turbidity
Control Cabinet	Stainless steel 304 housing material	More hygienic
HMI	Siemens	International recognition
Pump	Additional external pumps	Support more in/out materials
Gas	Nitrogen, Methane, etc.	Enables automated flow regulation and precise measurement for specialized application requirement
Flow Meter	MFC (up to 4)	Realize automatic control of gas flow with higher accuracy and calculate cumulative volume
Communication	SCADA	Integrate systems for powerful real-time monitoring and data analysis
Power Supply	110V (± 10%), 60Hz, single phase	Adapt to voltage standards of different countries and regions
Wetted Part Material	2205 duplex stainless steel/titanium	Tolerant to high salinity environments
Aspect Ratio	1.5:1 | 2.5:1 | 3:1 | Customizable	Flexible customization to meet different application requiremen
Stirring Method	Top magnetic stirring	Magnetic coupling further enhances sealing
Sparger Type	Microsparger	Smaller bubble size, stronger gas-liquid mass transfer efficiency
Adapter	Adapter for sensor height adjustment	Flexible positioning of sensor height to suit different vessel volumes
Sampling	Sterile sampling device	Consist of Luer head, one-way valve, T-joint, needle filter, and sterile syringe, suitable for sterile sampling.
Exhaust Gas Analysis	Exhaust gas analyzer for O_2 and CO_2	Online real-time detection of CO_2 and O_2 in exhaust gas, analysis of respiratory metabolic parameters CER/OUR/RQ
Exhaust Gas Heating	Exhaust heater	Heating the exhaust gas filter to avoid filter clogging
Weighing	Vessel weighing | Feed weighing	Weight measurement for level control
Qualification	IQ/OQ documentation	Meet compliance requirements
Certification	Comply with ASME, BPE, UL and other certifications	Meet the certification requirements of different countries and regions

Options & Upgrades

DW Culture Vessel

Lift Impeller

Oblique Leaf Impeller

Rotary Impeller

Marine Impeller

Packed Bed Impeller

Hollow Blade Impeller

MFC

Microsparger

OHAUS Scales

Sensor Height Adapter

Red, Blue And White Light

More Sensors

OHAUS Electronic Scale

Labfirst Scientific Instruments (Shanghai) Co., Ltd.

Website: www.lab1st.com
Online Store: eshop@lab1st.com
Email: sales@lab1st.com
Phone: 844-452-2178