

# BR100-M1-10L Microbial Fermentation System

## Technical Specifications

Prepared by Labfirst Scientific, October 2023

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### 1. General Information

<b>Items Included</b>	<b>Control Console</b>	BR100-M1
	<b>Culture Vessel</b>	10L Boro3.3 glass vessel with top mechanical stirring (25~75% working volume), SS316L cover
	<b>Sensors</b>	PT100, DO, foam, pH
	<b>Feeding Pumps</b>	4 peristaltic pump heads, controlled
	<b>Gas Inlet</b>	<ul style="list-style-type: none"> <li>· Sparger from the bottom (Air +O2);</li> <li>· Air inlet controlled by rotameter (manually);</li> <li>· O2 inlet controlled by rotameter and electromagnetic valve</li> </ul>
	<b>Heating &amp; Cooling</b>	Heated by bottom electric hot plate; cooled by stainless steel cooling tube (chilled water)
	<b>Accessories</b>	4 supplement bottles, SS316L feeding needle, etc.
	<b>Consumables</b>	O-rings, fuses, silicone stoppers, inlet air filter, vent filter, 20m silicone tubing, etc.

<b>Sensors Included</b>	<b>pH</b>	Gel-filled pH electrode by Hamilton / Mettler Brand (steam sterilizable), with 1m electrode wire
	<b>DO</b>	Sterilizable probe by Hamilton / Mettler Brand, with 1 meter electrode wire
	<b>Temperature</b>	German made PT100 sensor, sterilizable
	<b>Foam</b>	Foam probe, made in China

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## 2. Specific Information

<b>Functions Included</b>	<b>Temperature</b>	<ul style="list-style-type: none"> <li>· Robust PID algorithm;</li> <li>· Electrical-heating by SS316L electric hot plate at vessel bottom, chilled by tap or chilled water supply;</li> <li>· Sequential control coupled with fermentation process</li> </ul>
	<b>pH</b>	<ul style="list-style-type: none"> <li>· pH control coupled with peristaltic pump;</li> <li>· Manual pH control by peristaltic pump</li> </ul>
	<b>DO</b>	<ul style="list-style-type: none"> <li>· Cascade control, coupled with different parameters (agitation, gas inlet and peristaltic pump)</li> </ul>
	<b>Agitation</b>	<ul style="list-style-type: none"> <li>· Robust PID algorithm;</li> <li>· Manual speed control or speed control coupled with other parameters;</li> <li>· Agitation speed control coupled with other parameters (like DO)</li> </ul>
	<b>Foam</b>	<ul style="list-style-type: none"> <li>· Foam control coupled with peristaltic pump; (anti-foam);</li> <li>· Mechanical defoaming blade;</li> </ul>
	<b>Feeding (peristaltic pump)</b>	<ul style="list-style-type: none"> <li>· Accumulation volume control;</li> <li>· Manual control or control by plan (pre-set) curve;</li> <li>· Coupled with other parameters (DO, pH, etc)</li> </ul>
	<b>Fermentation Sequence</b>	Pre-set fermentation sequences along with timeline (pH, DO, agitation, temperature, etc)
	<b>Others</b>	<ul style="list-style-type: none"> <li>· Historical data export and curves;</li> <li>· Fermentation/culture batch record;</li> <li>· Calibration of sensors and peristaltic pumps;</li> <li>· 3-level authority setting &amp; control;</li> <li>· Record historical operations</li> </ul>

### 2.1 Control Console

<b>General Info</b>	<b>Model</b>	BR100-M1
	<b>Description</b>	Desktop control console for microbial fermentation, 1 console for 1 vessel
	<b>Dimension</b>	380×500×730mm
	<b>Net Weight</b>	60 Kg
	<b>Touch Screen</b>	PLC based 10" touch screen
	<b>Communication</b>	USB (data export), Ethernet interface, RS485
	<b>Electricity</b>	208V-240V, 50-60Hz, single phase, 1.8 kW

<b>Gas Inlet</b>	<b>Control</b>	<ul style="list-style-type: none"> <li>· Sparger from the bottom (Air +O<sub>2</sub>);</li> <li>· Air inlet controlled by rotameter (manually);</li> <li>· O<sub>2</sub> inlet controlled by rotameter and electromagnetic valve</li> </ul>
	<b>Flow Rate</b>	2 vvm
	<b>Filtration</b>	0.2 um
	<b>Connection</b>	8mm hose barb

<b>Temperature</b>	<b>Range</b>	8C above coolant to 40C above ambient (0-65C absolute)
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	<b>Control Accuracy</b>	+/- 0.1C
<b>pH</b>	<b>Range</b>	2.00~12.00 (resolution 0.01)
	<b>Control Accuracy</b>	+/- 0.1
<b>DO</b>	<b>Range</b>	0~150% (resolution 0.1%)
	<b>Control Accuracy</b>	+/- 3%
<b>Upgrades</b>	<b>Analysis or Control</b>	OUR, CER, KLa, RQ,ORP, methanol, exhaust gas (O2, CO2), glucose,
	<b>Gas Inlet</b>	Up to 4 channels (O2, CO2, N2 & air)
	<b>Gas Supply Control</b>	TMFC control (flow rate - automatic)
	<b>Peristaltic Pump</b>	More peristaltic pumps for different function; Upgrade to Watson-Marlow peristaltic pump heads;
	<b>Scale</b>	Tank weight / replenishing
	<b>Light</b>	Light source can be selected from red, blue, and white. Its intensity is adjustable [0-100%]

## 2.2 Vessel Information

<b>General Info</b>	<b>Volume</b>	10L max, with 25-75% working volume
	<b>Material</b>	Boro3.3 glass and SS316L (polishing better than Ra 0.4 um)
	<b>Ratio</b>	Diameter to height, about 1:2
	<b>Rated Pressure</b>	0.15 Mpa
	<b>Working Pressure</b>	<0.1Mpa
	<b>Ports</b>	1 x fire ring, 1 x pH, 1 x DO, 1 x PT100, 1 x foam sensor, 1 x exhaust with condenser, spares
	<b>Sterilization</b>	Off-site sterilization (autoclavable)
	<b>Sparge</b>	SS316L ring sparger in the bottom
	<b>Dimension</b>	300×315×819mm
	<b>Net Weight</b>	35 Kg
<b>Agitation</b>	<b>Seal</b>	Top mechanical sealing
	<b>Speed</b>	50 - 1000 rpm
	<b>Blades</b>	3 detachable layers (top: foam breaker; middle: 4-blade pitched impeller; bottom: 6-blade Rushton impeller)
	<b>Baffles</b>	4pcs
<b>Upgrades</b>	<b>Vessel Type</b>	· Single-layer vessel with electric blanket heating; · Jacketed vessel with water (jacket) heating
	<b>Drive</b>	Top Magnetic drive
	<b>Blades</b>	Customizable blades from different options (Spin filter, Cell-lift impeller, Basket impeller, Pitched Blade Impeller, Marine Blade Impeller)

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