

# BR500-C1-50L Cell Culture Fermentation System

## Technical Specifications

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### 1. General Information

|                       |                              |  |
|-----------------------|------------------------------|--|
| <b>Items Included</b> | <b>Control Console</b>       | BR500-C1   |
|                       | <b>Culture Vessel</b>        | 50L tank SUS316L, 3 layers, with top mechanical stirring (25~70% working volume)   |
|                       | <b>Sensors</b>               | PT100, DO, foam, pH  |
|                       | <b>Feeding Pumps</b>         | 4 PreFluid peristaltic pump heads, controlled  |
|                       | <b>Gas Inlet</b>             | · Sparger from the bottom (Air + O <sub>2</sub> + N <sub>2</sub> + CO <sub>2</sub> ): controlled by rotameter and electromagnetic valve;<br>· Overlay (Air): manually controlled by rotameter; |
|                       | <b>Heating &amp; Cooling</b> | The jacketed water bath is electrically heated, cooled by stainless steel cooling tube (for 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 3m cable |
|                         | <b>DO</b>          | Sterilizable probe by Hamilton / Mettler Brand, with 3m cable                           |
|                         | <b>Temperature</b> | PT100 sensor, sterilizable  |
|                         | <b>Foam</b>        | Foam probe, sterilizable  |
|                         | <b>Pressure</b>    | Huba pressure sensor, sterilizable, Swiss Brand   |

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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 or CO<sub>2</sub>;</li> <li>· Manual pH control by peristaltic pump;</li> </ul>   |
|                           | <b>DO</b>                         | · Cascade control, coupled with different parameters (gas inlet and peristaltic pump);  |
|                           | <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> </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>Automatic SIP</b>              | SIP with pre-set automatic sequence   |
|                           | <b>Feeding (peristaltic pump)</b> | <ul style="list-style-type: none"> <li>· Accumulation volume control;</li> <li>· Manual control; Or control by plan or 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>         | BR500-C1  |
|                     | <b>Description</b>   | Floor stand control console for cell culture fermentation, 1 console for 1 vessel |
|                     | <b>Dimension</b>     | 650×650×1492mm  |
|                     | <b>Net Weight</b>    | 110 Kg  |
|                     | <b>Touch Screen</b>  | PLC based 15" touch screen  |
|                     | <b>Communication</b> | USB (data export), Ethernet interface, RS485                                      |
|                     | <b>Electricity</b>   | 208V-240V, 50-60Hz, single phase  |

|                  |                   |  |
|------------------|-------------------|--|
| <b>Gas Inlet</b> | <b>Control</b>    | <ul style="list-style-type: none"> <li>· Sparger from the bottom (Air + O<sub>2</sub> + N<sub>2</sub> + CO<sub>2</sub>): controlled by rotameter and electromagnetic valve;</li> <li>· Overlay (Air): manually controlled by rotameter;</li> </ul> |
|                  | <b>Flow Rate</b>  | 2 vvm  |
|                  | <b>Filtration</b> | 0.2 um   |
|                  | <b>Connection</b> | Pneumatic quick joint  |

|                    |                         |  |
|--------------------|-------------------------|--|
| <b>Temperature</b> | <b>Range</b>            | 8C above coolant to 40C above ambient (0-65C absolute) |
|                    | <b>Control Accuracy</b> | +/- 0.1C   |

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|                 |                            |  |
|-----------------|----------------------------|--|
| <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, ect.                              |
|                 | <b>Pressure Control</b>    | Automatically control pressure   |
|                 | <b>Automatic CIP</b>       | CIP with pre-set automatic sequence  |
|                 | <b>Gas Supply Control</b>  | TMFC control (flow rate - automatic)   |
|                 | <b>Peristaltic Pump</b>    | More peristaltic pumps for different function;<br>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>         | 50L max, with 25-70% working volume   |  |
|                     | <b>Material</b>       | 3 layers, tank SUS316L (polishing better than Ra 0.4 um), jacket SUS304, insulation SUS304 (aluminum silicate filled)   |  |
|                     | <b>Ratio</b>          | Diameter to height, about 1:2   |  |
|                     | <b>Rated Pressure</b> | 0.30 Mpa  |  |
|                     | <b>Ports</b>          | <b>Lid:</b> 1 x fire ring, 1 x foam sensor, 1 x exhaust with condenser, 2 x spray header ports, 1 x illumination, 2 x spares; <b>Body:</b> 1 x pH, 1 x DO, 1 x PT100, 1 x vertical sight glass, 1 x spare |  |
|                     | <b>Sterilization</b>  | Autoclavable  |  |
|                     | <b>Sparge</b>         | SS316L ring sparger in the bottom   |  |
|                     | <b>Dimension</b>      | 1000×928×1790mm   |  |
|                     | <b>Net Weight</b>     | 300Kg   |  |
|                     | <b>Seal</b>           | Top mechanical stirring   |  |
|                     | <b>Speed</b>          | 50 - 1000 rpm   |  |
|                     | <b>Agitation</b>      | <b>Blades</b>   | 2 detachable layers (top: 1 x foam breaker; bottom: 1 x marine blade impeller) |
|                     |                       | <b>Baffles</b>  | 4pcs   |
| <b>Upgrades</b>     | <b>Drive</b>          | Top Magnetic drive  |  |
|                     | <b>Lid</b>            | Optional motor lift   |  |
|                     | <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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