AFC 900 Series Bioreactor Controllers

Cell-Culture & Fermentation Applications
For Research & Process Development Laboratories

Designed as a “drop-in” replacement system for benchtop and pilot scale reactors, the AFC line of bioreactor controllers outclasses its competition thanks to a reliable, dedicated and open process control system.

AFC 928 Dual Bioreactor Controller

*Throw away your syringe pumps!*

- Integrated control of up to 6 MFCs per reactor
- Micro pumps replace syringe pumps for very low flow applications with precise control down to 0.05 ml/hr
- 3 full size & 4 micro Watson Marlow variable speed pump heads per reactor

AFC 900 Series Offers Built-in Support for Smart Probes

- **Mettler-Toledo**: ISM pH, pCO2, Redox, Optical DO, polarographic DO
- **Hamilton**: Optical DO, VisiFerm pH, Incyte Cell Density (MODBUS)
- **ABER**: Biomass Monitor

Optional Water Box for temperature control of jacketed reactors and cooling loops

- Standard 500 W stirrer motor (~0.5 HP) supports 2-15 liter reactors

Design Principles

- Use open, non-proprietary, readily-available, quality components
- Design our equipment to be serviceable by the customer
- Design solutions that are tailored to the customer’s needs
- Customize software & interfaces to match the customer’s requirements
- Provide complete documentation & source code
- Provide ongoing, personal support & technology upgrades for our customers & products

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Warrenville, IL 60555
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info@ils-automation.com
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### Conventional Data Transmitter/Receiver Connections *(per reactor)*

<table>
<thead>
<tr>
<th>Connection</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital Probe Interfaces for Mettler-Toledo ISM (DO, pH, dissolved CO₂)</td>
<td>2</td>
</tr>
<tr>
<td>Mettler-Toledo Optical DO</td>
<td>1</td>
</tr>
<tr>
<td>Hamilton Optical DO</td>
<td>1</td>
</tr>
<tr>
<td>MODBUS (incl. Hamilton’s VisiFerm &amp; Incyte, ABER)</td>
<td>1</td>
</tr>
<tr>
<td>Analog pH</td>
<td>1</td>
</tr>
<tr>
<td>Analog DO</td>
<td>1</td>
</tr>
<tr>
<td>Temperature (PT100)</td>
<td>1</td>
</tr>
<tr>
<td>Foam</td>
<td>1</td>
</tr>
</tbody>
</table>

### Additional Controller I/O *(per reactor)*

<table>
<thead>
<tr>
<th>Connection</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>110V AC Power Plug for Heating Blanket (Heat only temperature control)</td>
<td>1</td>
</tr>
<tr>
<td>RS-232 or RS-485 Serial Ports for Digital Scales (or other devices)</td>
<td>2</td>
</tr>
<tr>
<td>Addt’l 4-20 mA or 0-10 volt Analog Inputs</td>
<td>4</td>
</tr>
</tbody>
</table>

### Communication Connections

- MODBUS TCP Communication Interface
- Kepware OPC Server License
- Direct digital link to Alicat & Brooks MFCs

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### Included Hardware *(per reactor)*

<table>
<thead>
<tr>
<th>Hardware</th>
<th>Qty.</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTD PT100 Temperature Probe with cable (6mm OD)</td>
<td>1</td>
</tr>
<tr>
<td>Servo Motor &amp; Controller</td>
<td>1</td>
</tr>
<tr>
<td>Coupler “Snout” to connect Servo Motor to the Agitator Shaft</td>
<td>1</td>
</tr>
</tbody>
</table>

### Software Specifications

- PID Loops for Temperature, pH, and DO as per customer specification, includes:
  - Temperature - jacket/blanket, heating/cooling
  - DO Cascade to agitation/gas mixing
  - Setpoint Deadband for pH
  - PID Integral Deadband
  - Acid/Base/Gas mixing for pH
  - Setpoint profile
  - Weight Loss PID with Scales & Pumps - Mass Flow, Mass Charge, Level Control
  - pCO₂ PID with CO₂ and Air/N₂
  - Capability for Perfusion setups
  - Calibration for all measurements (pH, temperature, gas flow, agitation, DO, pCO₂)

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**AFC 927 Dual Bioreactor Controller**

AFC controllers are **completely customizable** and built to your exact specifications.

- **8” color HMI touchscreen**
- **Control up to 2 reactors from any vendor**
- **4 Watson Marlow variable speed pump heads per reactor**
- **2 RS-232 or RS-485 ports for scales**
- **Mettler-Toledo ISM**
- **Optical DO**
- **Hamilton/MODBUS**
- **RTD**
- **Analog pH**
- **Analog DO**