

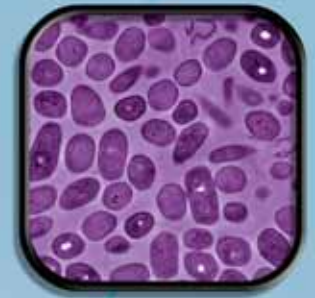


New Brunswick Scientific

Where Quality and Innovation Have Become Tradition

2.5L - 14.0L BIOFLO® 310 FERMENTATION SYSTEM

*The Ultimate Benchtop Fermentor
for Research through Production*



The BioFlo® 310 Fermentor — Advanced Control in a Compact Package.

New Brunswick Scientific's BioFlo 310 benchtop fermentor has been improved to provide you with even greater flexibility. Now, this powerful benchtop system can be used for growth of virtually any bacteria, yeast, or fungi, and can be adapted for mammalian, insect or plant cultures with the use of optional accessories. With the power to regulate up to 32 parameters each, and one to four vessels simultaneously, (128 parameters total), it's virtually impossible to outgrow its control capabilities. This advanced system allows you to easily connect and control your existing analyzers, pumps, sensors and other ancillary devices. A user-friendly touchscreen controller integrates it all, simplifying setup, calibration & operation.

Powerful Fermentor Has it All

- **Compact design** maximizes bench space.
- **cGMP-compliant** to meet your requirements in research through production.
- **Batch, fed-batch & continuous modes** for growing a wide variety of cell types.
- **Fully-integrated system is ready for out-of-the box startup.** Includes a Master Control Station with built-in controller, touchscreen monitor, pumps and thermal mass flow controller with 4-gas control. Vessel, pH/DO/and level/foam probes, hoses, sterile sampler & more are included.

Advanced Touchscreen Controller Simplifies Operation

- **Large 15" touchscreen** clearly displays all setpoints, current values, cascade loops and more. Display screens are straightforward and easy to navigate.
- **Integrate up to ten of your sensors, scales, analyzers or other external devices** for optimized process control.
- **User-customizable trend graphs** make it easy to track and export data. Trends up to 8 loops simultaneously.
- **Built in flexibility to customize all your PI values,** or select factory defaults.
- **Save up to 10 of your recipes** per fermentor for repeat usage.

Available in Four Sizes With Multiple Options.

- **Interchangeable, autoclavable glass vessels** are available in four sizes. 2.5, 5.0, 7.5 and 14.0 liters, total volume.
- **Pre-configured packages simplify ordering.**
- **Customize by selecting from our wide range of options.** Add multiple mass flow controllers, Redox or second pH and second DO probes, BioCommand® supervisory software & more. Validation & training packages are available.



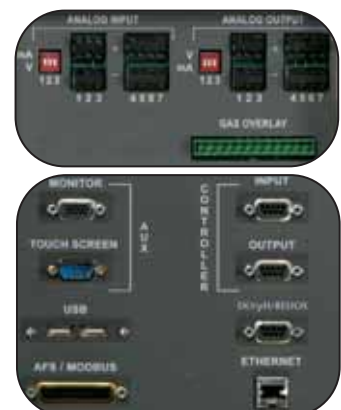
Packed with power, to regulate one to four fermentors from a single controller!



Our new headplate design provides added flexibility so you can insert your probes, sampling tube, and exhaust gas condenser wherever you choose.



Stainless-steel, hemispherical base with built-in heat exchanger for circulation of warm or cool water provide superior temperature control and rapid transfer of heat for temperature inductions. Thick-walled glass vessel resists rough handling and repeated autoclaving. Easily de-couples without tools for cleaning.



Multiple connections are provided for integrating ancillary equipment, a second touchscreen display & BioCommand supervisory software. USB ports for exporting trend data and importing firmware upgrades are also provided. All are easily accessed from the rear of the unit.

Standard Pre-Configured Packages

include a Master Control Station with vessel and probes to simplify ordering

Each Master Control Station

includes a controller & touchscreen monitor interface capable of running one to four fermentors

Cost-Saving Utility Stations

for running optional 2nd, 3rd & 4th fermentor(s) do not include controller & touchscreen interface

A Thermal Mass Flow Controller (TMFC)

with 4-gas control is built into each Master Control Station and Utility Station to precisely control total gas flow rate. Additional TMFCs for individual gas control and gas overlay can be added

Connections for Gases & Vessel Components

are easily accessible

Quick Connects

allow utilities to be added in seconds

Four baffles

ensure thorough mixing

Adjustable-Angle, User-Friendly 15" Touchscreen Interface

controls one to four fermentors simultaneously

New synoptic screen provides pictorial alternative

to the summary screen for viewing & editing process values

Customize PI Values for All Process Parameters

or select factory defaults

pH, DO and Level/Foam Probes are provided.

Options are available for Redox or 2nd pH probe, and 2nd DO probe

On-Off Switch

is front mounted for easy access

Three Assignable Pumps

are standard. Built-in controls and connections are provided for additional pumps. View total pump flow rate & easily calibrate pumps via touchscreen

Unique Heat Exchanger

enables rapid temperature removal after autoclaving & from exothermic cultures; and rapid rises for heat inductions




| Parameter | Setpoint | Current Value | Control Mode | Units | Alarm |
|-----------|----------|---------------|--------------|-------|-------|
| Temp | 30.0 | 30.0 | ON | °C | None |
| pH | 6.75 | 6.80 | ON | pH | None |
| DO | 2.0 | 2.0 | OFF | % | None |
| Agitator | 10.0 | 10.0 | ON | rpm | None |
| Flow | 0.0 | 0.0 | MAN | LPM | None |
| Level | 0.0 | 0.0 | ON | % | None |






The setup screen provides a graphical interface for configuring various system settings, including pump assignments, vessel size selection, and alarm configurations. It includes sections for 'New 22 Probes', 'New Hardware', and 'System Settings'.

Summary Screen lets you conveniently view setpoints, current values, cascade loops and more — for up to 10 parameters simultaneously. All 32 parameters can be viewed simply by scrolling up or down.

Trend graph screen makes it simple to track & export data on up to eight process variables over a six day span. Customize the view by selecting the parameters, colors & interval between sample measurements.

The setup screen lets you easily configure your settings — assign pumps, change vessel size for more accurate PI values, save up to 10 recipes, add additional fermentors, and more.

BioFlo 310 Fermentor Specifications*

| VESSEL VOLUME | Total Capacity | 2.5 Liters | | 5.0 Liters | | 7.5 Liters | | 14.0 Liters | |
|---|-------------------------------|--|-------|--------------------------------------|-------|--------------------------------------|-------|--------------------------------------|-------|
| | Working Volume | 0.75 - 1.75 Liters | | 1.25 - 3.75 Liters | | 2.0 - 5.5 Liters | | 3.0 - 10.5 Liters | |
| HEADPLATE PORTS | Size | (1) 6.35 mm (9) PG 13.5 | | (3) 6.35 & (1) 19 mm (10) PG 13.5 | | (3) 6.35 & (1) 19 mm (12) PG 13.5 | | (3) 6.35 & (1) 19 mm (12) PG 13.5 | |
| VESSEL DIMENSIONS for Autoclave | Height w/ Cond. /Filter | 21" | 53 cm | 24" | 61 cm | 25.5" | 65 cm | 28" | 71 cm |
| | Without Cond. /Filter | 16.5" | 42 cm | 18.5" | 47 cm | 20" | 51 cm | 23.5" | 60 cm |
| | Diameter | 8" | 20 cm | 10" | 25 cm | 11" | 28 cm | 12" | 31 cm |
| VESSEL DIMENSIONS with Slant Rack | Height | 11" | 28 cm | 13" | 34 cm | 16" | 41 cm | 18" | 46 cm |
| | Diameter | 11" | 28 cm | 11" | 28 cm | 11" | 28 cm | 12" | 31 cm |
| CONTROLLER | Master Control Station | Controls 1 to 4 vessels, 32 control loops per vessel. Stores 10 recipes & 8 process variables for trend graphing, per vessel. Includes an industrial touchscreen monitor/ user interface, 3 built-in pumps, and connections for all utilities & communications signals used by the first fermentor | | | | | | | |
| | Utility Station | One each required for optional 2 nd , 3 rd or 4 th fermentors. Each includes 3 built-in pumps & connections for all utilities & communications signals. Built with 7 analog inputs & 7 analog outputs | | | | | | | |
| | Touchscreen Interface/Display | 15" Industrial touchscreen interface / display, capable of supporting up to four fermentors, is standard with a Master Control Station. Optional second touchscreen is available — and replicates the image shown on the first display | | | | | | | |
| TEMPERATURE | Indication & Sensor | Digital display in 0.1°C increments via Platinum RTD probe | | | | | | | |
| | Range & Control ♦ | From 5°C above coolant temperature to 80°C via PID control. (Minimum 4°C.) | | | | | | | |
| AGITATION | Drive | Permanent magnet motor with high torque input | | | | | | | |
| | Indication | Digital display in 1 RPM increments | | | | | | | |
| | Range & Control | 50 - 1,200 RPM via PID control | | | | | | | |
| | Impellers | Two six-bladed Rushton impellers standard. Other options available | | | | | | | |
| | Baffles | Four 316L removable, stainless steel baffles | | | | | | | |
| OXYGEN TRANSFER RATE (OTR) | | 350 mM O ₂ /L/Hr or more | | | | | | | |
| EXHAUST | Condenser & Filter | Stainless-steel exhaust condenser, mounted on the headplate. Uses 0.2µ disposable filter | | | | | | | |
| AERATION | Gas System | Standard: 1 Thermal Mass Flow Controller (TMFC) with four-gas control (4 solenoid valves) Optional: Rotameter or multiple TMFCs for individual gas control | | | | | | | |
| | Gas Inlet | Ring sparger is provided with 0.2µ disposable filter | | | | | | | |
| pH | Sensor | One gel pH probe with digital display in 0.01 increments. 2nd probe optional | | | | | | | |
| | Range & Control | 2 - 14 pH, via PID control. Cascade to pumps, gases and external loops | | | | | | | |
| DO | Sensor | One Polarographic DO probe with digital display in 0.1% increments. 2nd probe optional | | | | | | | |
| | Range & Control | 0 - 200%, via PID control. Cascade to agitation, gases, pumps and external loops | | | | | | | |
| OTHER SENSORS | Foam/Level | One Foam/Level sensor. (Two additional foam/level sensors can be added) | | | | | | | |
| | Optional Sensors | Redox or 2nd pH probe & 2nd DO probe are available. (External sensors can be added) | | | | | | | |
| PUMPS | Standard, Options & Control | 3 Built-in, assignable, peristaltic pumps are standard. External pumps can be added. Control modes: Off, Prime, Base, Acid, Foam, Level 2 Wet, Level 2 Dry, Level 3 Wet or Level 3 Dry | | | | | | | |
| | Speed | Pumps 1 & 2: 12 RPM Fixed speed duty cycle — ability to view total pump flow rates Pump 3: 100 RPM Fixed speed duty cycle — ability to view total pump flow rates | | | | | | | |
| UTILITIES | Water & Gas | Water: 10 PSIG maximum, 50 µ filtration. Gas: 10 PSIG maximum | | | | | | | |
| ELECTRIC | Service | 100 - 120 V 50/60 Hz & 208 - 230 V 50/60 Hz. All are single phase, and draw 15 Amps | | | | | | | |
| NET WEIGHT | Control Station | 88 lbs. [40 kg], including 15 lb. [6.8 kg] touchscreen | | | | | | | |
| DIMENSIONS wide x deep x high | Utility Station | With Touchscreen: 25" x 24" x 34" (63.5 x 61 x 86 cm). Without: 18" x 24" x 28" (46 x 61 x 71 cm) | | | | | | | |
| INPUT / OUTPUT CONNECTIONS & COMM PORTS (Built into the back panel of Master Control & Utility Stations **) | External Devices | Seven analog inputs & seven analog outputs for your external devices such as analyzers, sensors, external pumps, etc. (Reduce by 1 input & output for each additional TMFC added) | | | | | | | |
| | 2 USB Ports ** | Import firmware/software upgrades and export trend data. Connect optional 8-port serial box for scales, etc. (USB Ports built into Master Control Station only) | | | | | | | |
| | Communications Port | For optional BioCommand/SCADA software | | | | | | | |
| | Auxiliary Monitor | For optional second touchscreen display | | | | | | | |
| | Secondary Probes | Optional for Redox or second pH probe, and a second DO probe | | | | | | | |
| REGULATORY COMPLIANCE | |   CAN/CSA-C22.2 Nos. 1010.1 & 1010.2-010 UL Standard UL-61010A-1 & 61010A-2-010 | | | | | | | |

enable use as a cell culture system. ♦ Capable of 1°C/minute temperature rises in vessels up to 7.5L. Ambient operating conditions of 10 to 30°C, up to 80% relative humidity, non-condensing.