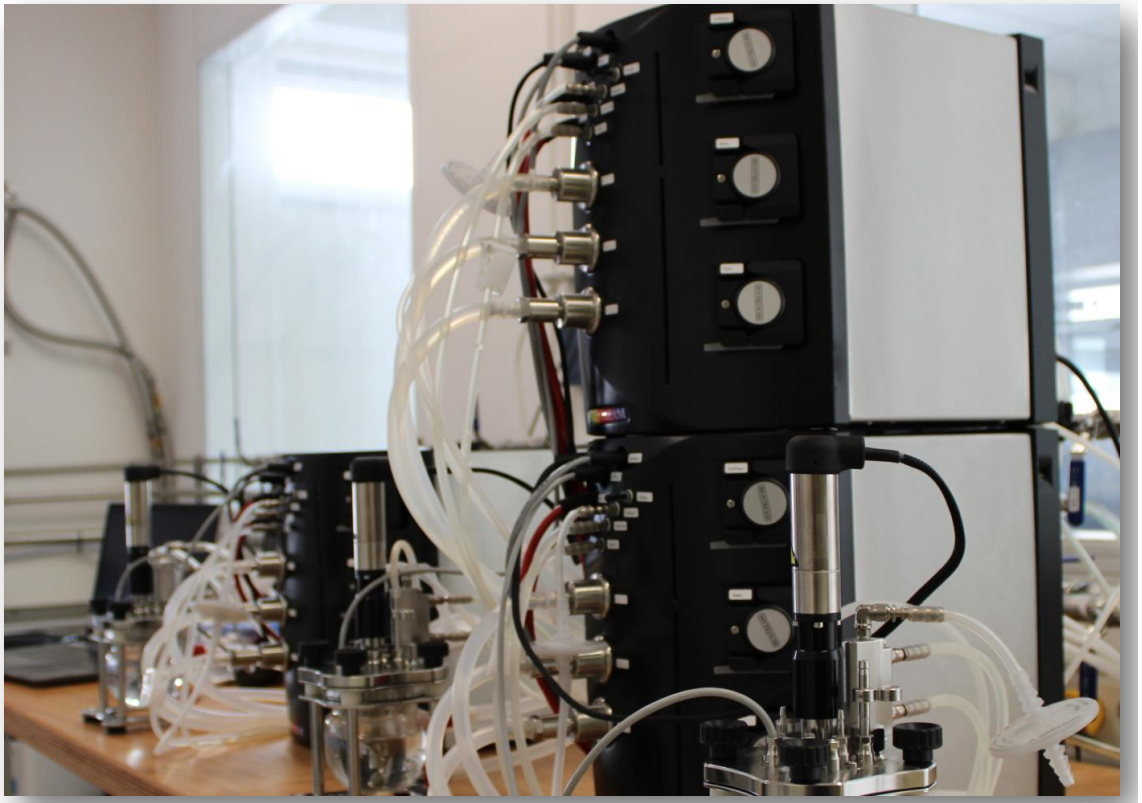
BIOSTREAM



Technical specifications

BioCompact

Autoclavable Borosilicate Jacketed /Non jacketed Vessel
Volume range: 0.2 L to 7.0 L

BIOSTREAM

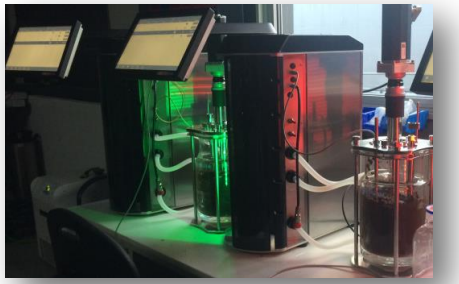
Vision

We offer total solutions

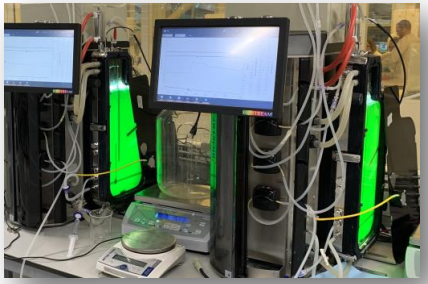
Open relation with the customer/ partner/suppliers and Employee's

Keep customer satisfied

Application fields



Food & Biobased



Algae

Cell culture

BIOSTREAM

All Type of Cells

Mammalian
Insect
micro-organisme
like bacteria, yeast and fungi

Applications

Process development,
optimization and characterization
Scale-up and scale-down studies
Seed expansion and small scale production
Cell bank production
Protein supply

Process Modes

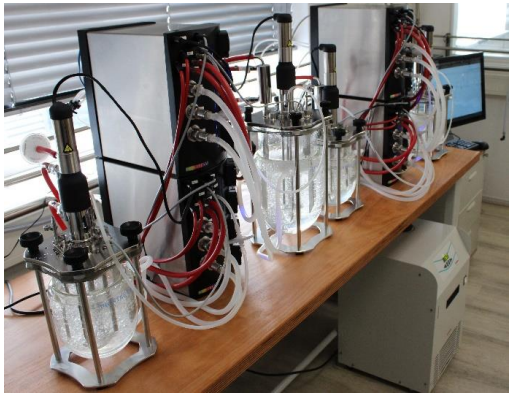
Batch
Fed-batch
Continuous
Perfusion

Industries

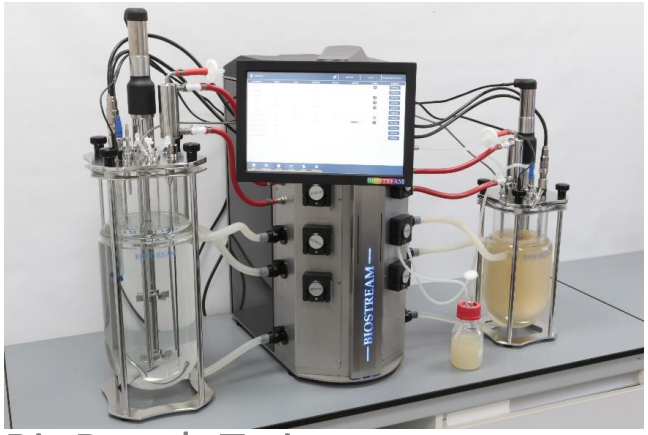
Biopharmaceuticals
Vaccines
Cell therapies
Industrial biotechnology
Basic research
Education

BIOSTREAM

Range of Bioreactors

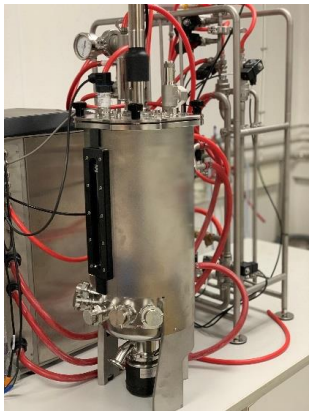


BioCompact multitiple reactor



BioBench Twin

BioBench



BioTwin

Double vessel

BioTwin

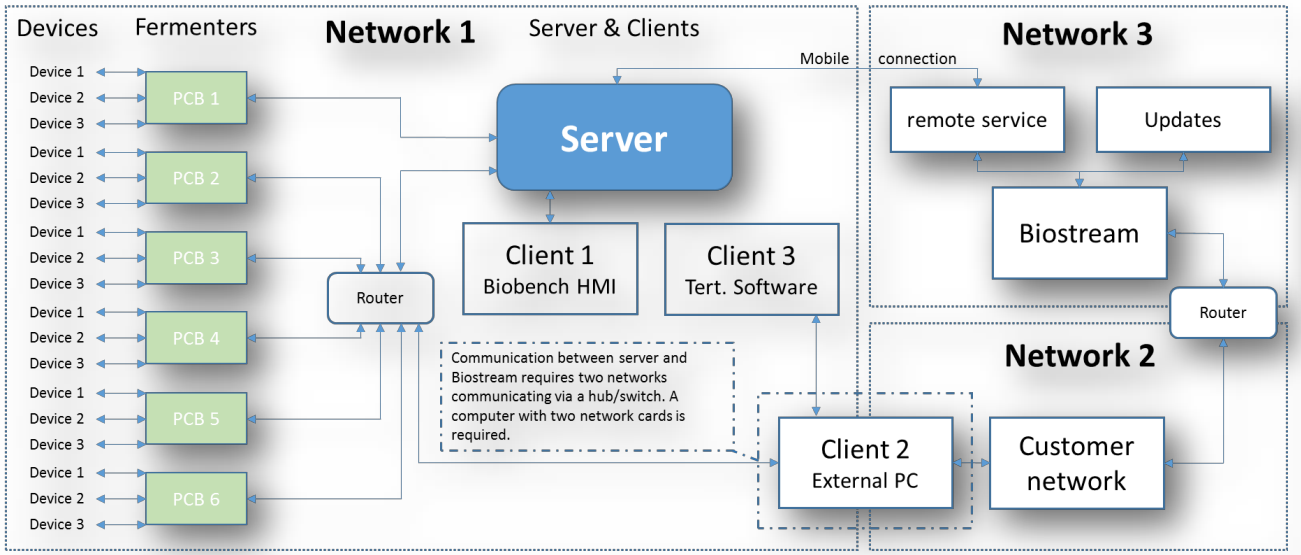
Single vessel

BioPilot

Bioproject

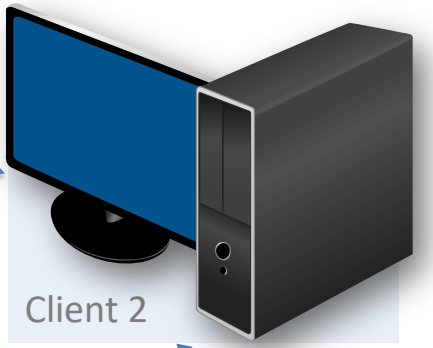
BIOSTREAM

BioBench overview

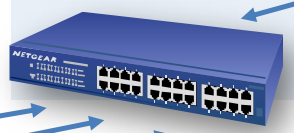


Customer needs to give access to a VPN connection for Biostream if this is allowed
Possible to have Wi-Fi & Bluetooth connection or call in via mobile connection

Customer network



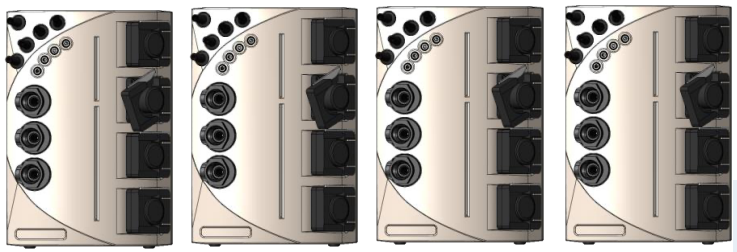
Client 2



hub

Client 1 & Server

(computer or laptop)



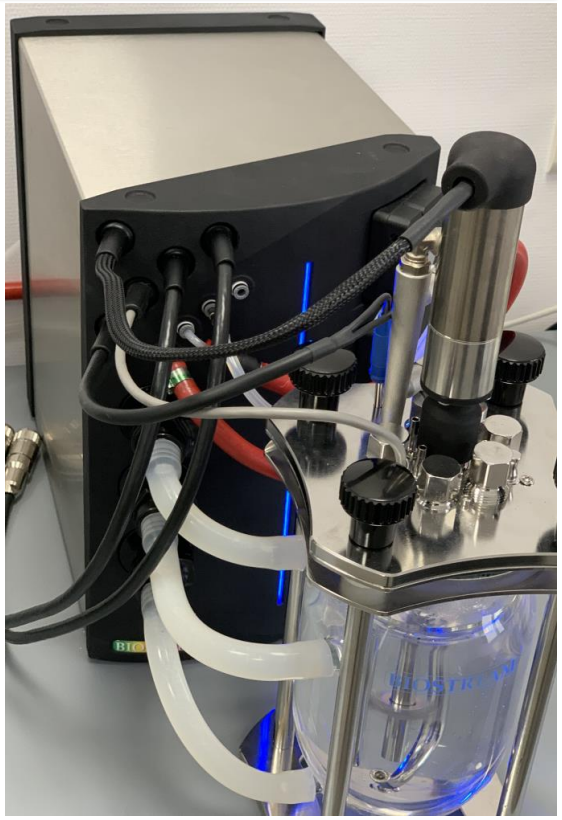
Apps

Expandable to 32 fermentors and more

BIOSTREAM

Integration of Sensors, actuators and PID control loops in a standard BioBench

Setting	Nr. connections	Type of sensor&actuator
Modbus	**64**	**For pO2, pH, MFC, Off gas and other digital sensors**
0-10 V Output	4	For pumps, LED, pressure, gasmix
0-10 V input	4	Redox-sensor, Gas-sensor, OD, Pressure, load cells and more
4-20 mA output	4	For pumps, LED, pressure, gasmix
4-20 mA Input	4	Redox-sensor, Gas-sensor, OD, Pressure, load cells and more
24 volt Output	10	Valves, solid state relais, pumps
24 volt Input	6	Others
CAN Bus	1	Digital motor control
RS-232	4	Balances
PT-100 config	2	pT100 sensor
Connection to pump boards	5	Only for integrated pumps in the Biobench
RGB	1	For alarming and camera option



BIOSTREAM

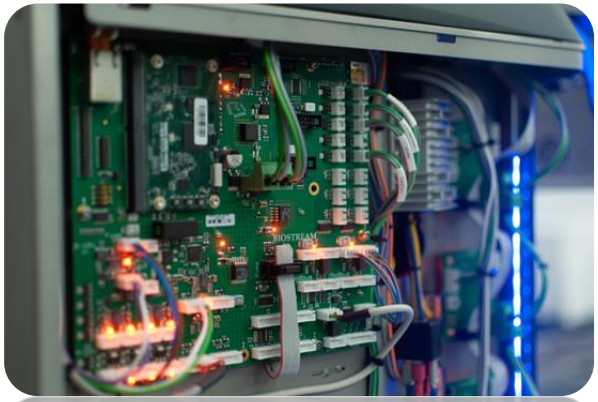
Connections of external equipment

Internal/
External pumps

Biomass/ OD

valves

CO2/O2 Off gas



All kind of motors
with adapter

Mass flow controllers
& Gas mixers

Chillers

CO2 in-line

Balances

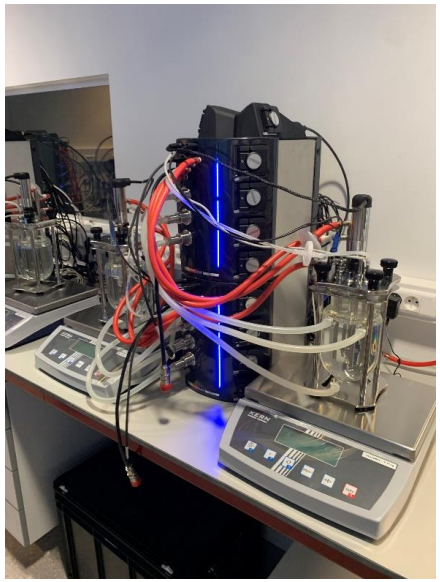
pH and Do sensors
(disposable)

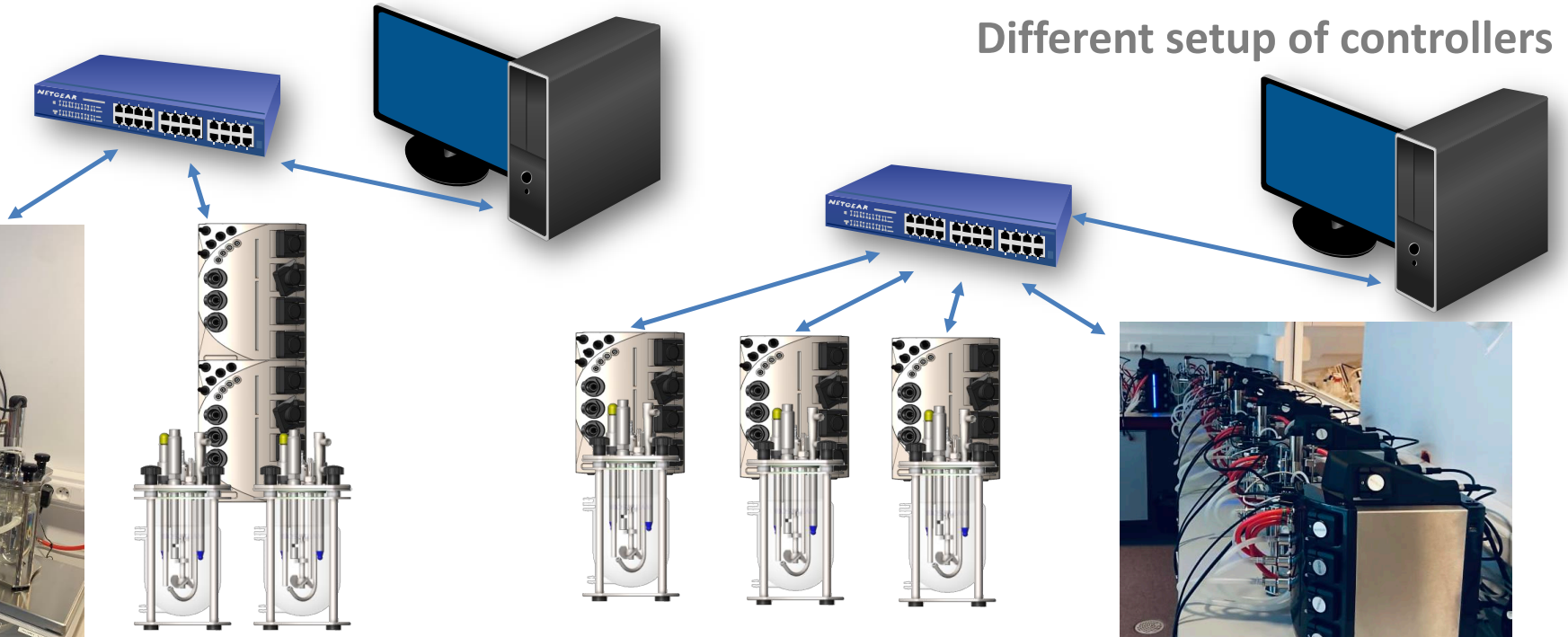
Some Examples are shown in this overview

All measurement devices and actuators with an in- or output can be connected

BIOSTREAM

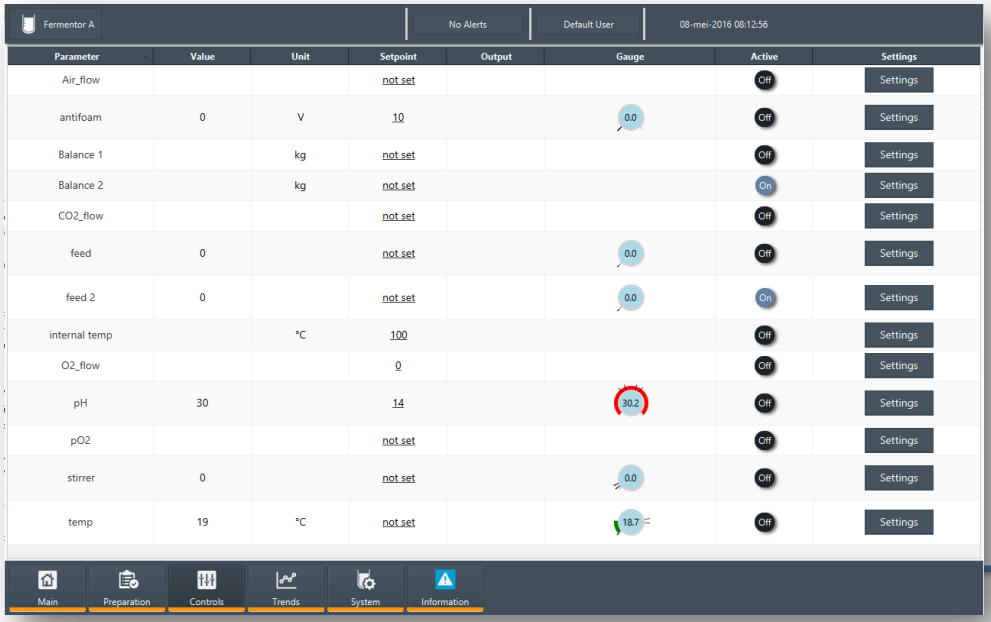
Different setup of controllers





To a maximum of 32 systems

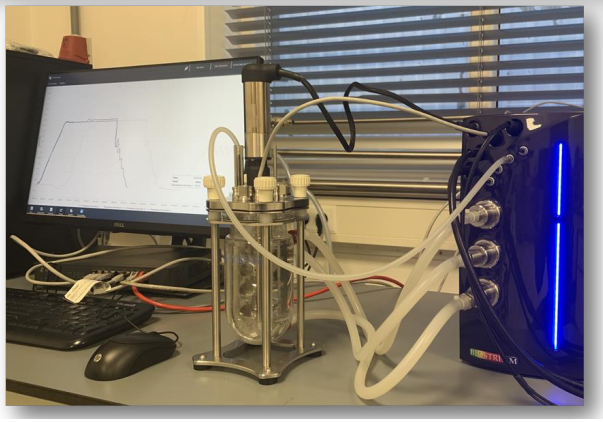
BIOSTREAM



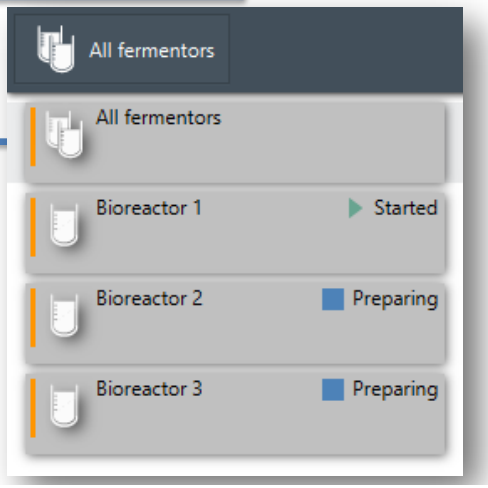
BOS Controlling & Logging Software

Possible to use BOS software via Touch screen, tablet or via computer.
App available for Mobile phones.
Easy and free installation on PC.
Simple and intuitive use.
No license needed for more users.
Control via OPC UA/XML-DA.

FREE upgrades of software. Each 2 months there is a release of new features. This can be downloaded and can be upgraded by yourself.



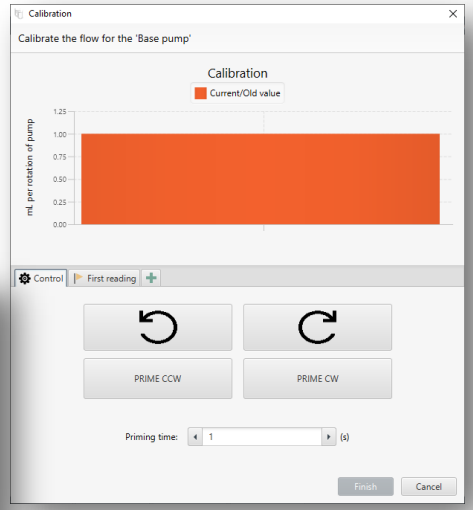
Selecting all the bioreactors or a specific one.
Easy addition of new bioreactors.
Adding new computers in the network where you can Work the same as the local HMI.



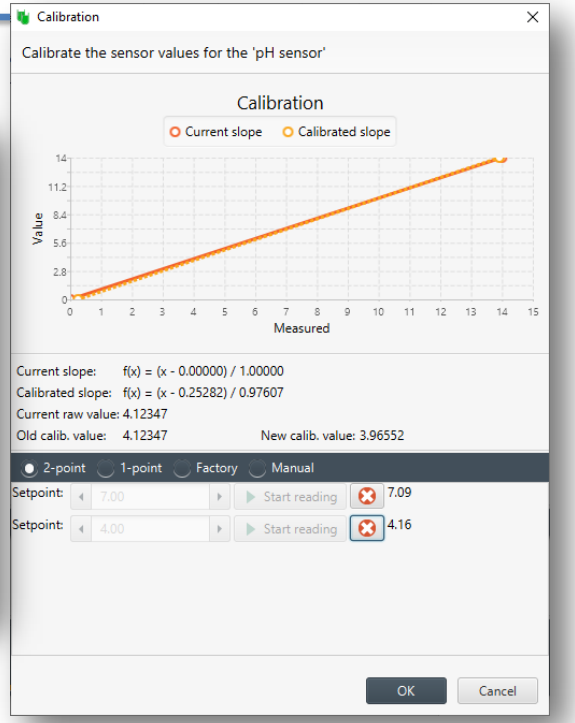
BIOSTREAM

BOS Controlling & Logging Software

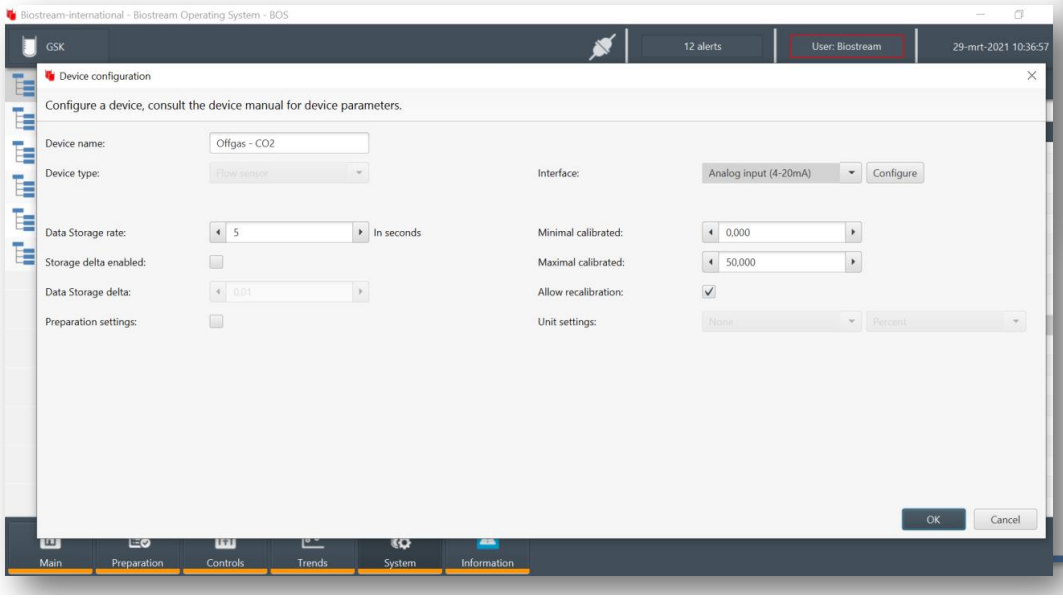
Easy one & two point calibration with graphical view and raw data for all sensors and pumps.
Multiple calibrations available for pumps to get a higher accuracy.
Maintenance information sensors.
Priming and control direction of the pumps.



Example: Pump calibration.

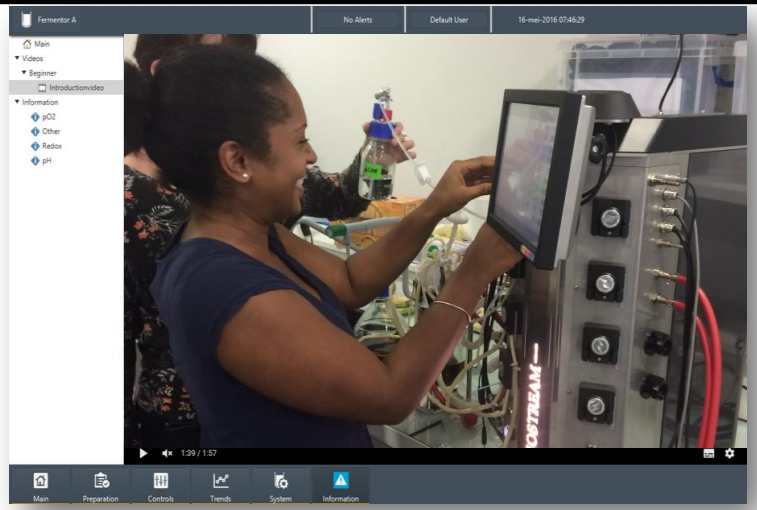


Example: Sensor calibration.

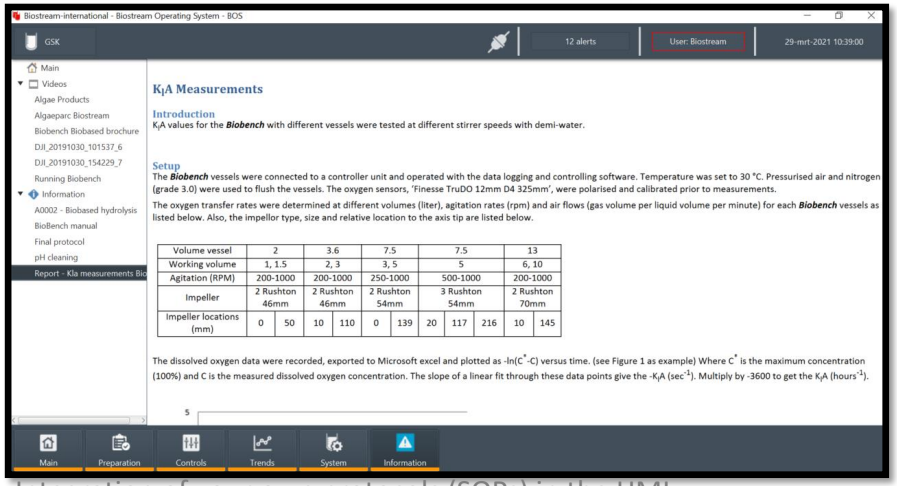


Adding external devices like sensors, pumps and valves yourself.
Design your own parameter control loops.
Parameters can be P&ID controlled

BIOSTREAM



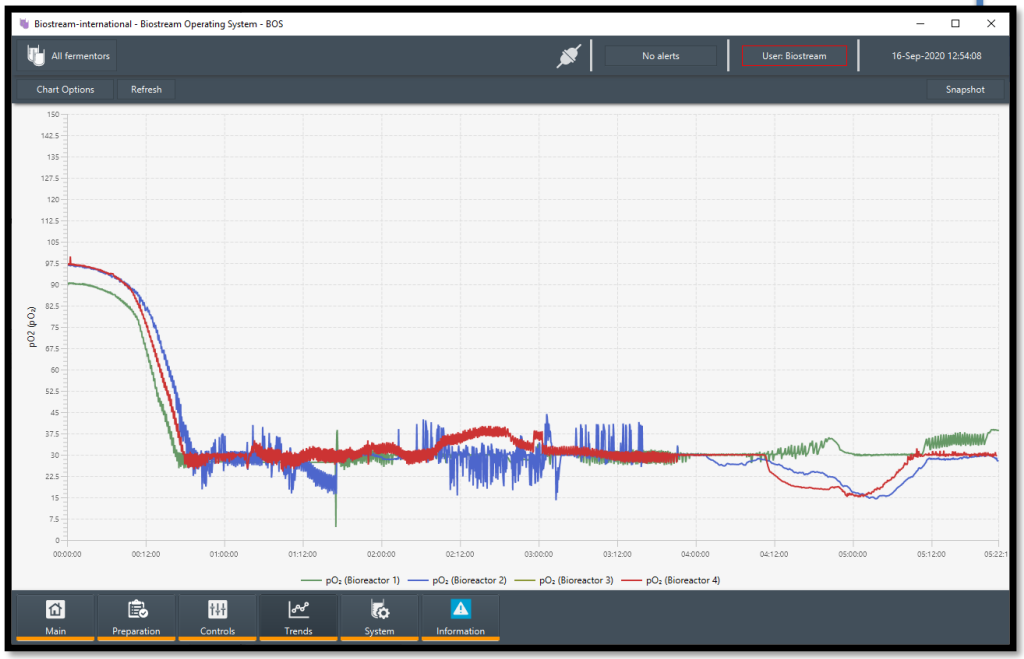
Multimedia integration like movies from phone & tablets in the HMI.



Integration of your own protocols (SOPs) in the HMI.

BOS Controlling & Logging Software

Own defined multiple graphs.
Comparison with on-line and historical data.
Change graph settings during the run.
Store different graphs per user.
Take a snap shots of graphs.
Running with one year of data
For each parameter can be set a logging rate and logging on a change of value

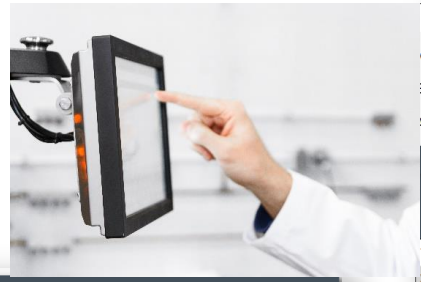


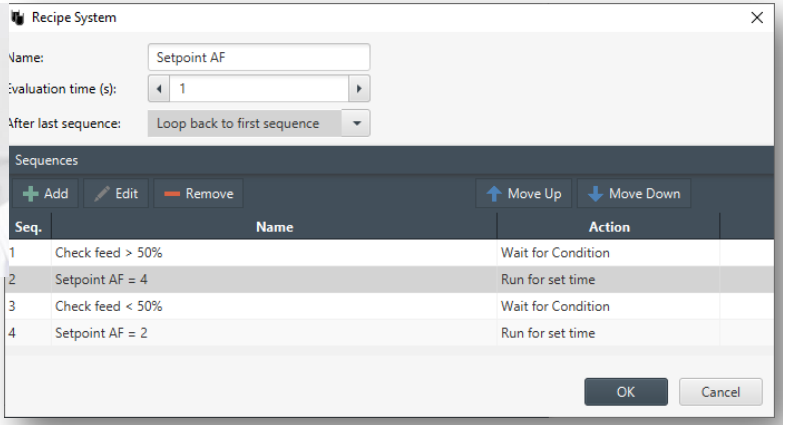
BIOSTREAM

Cascading and automation possibilities

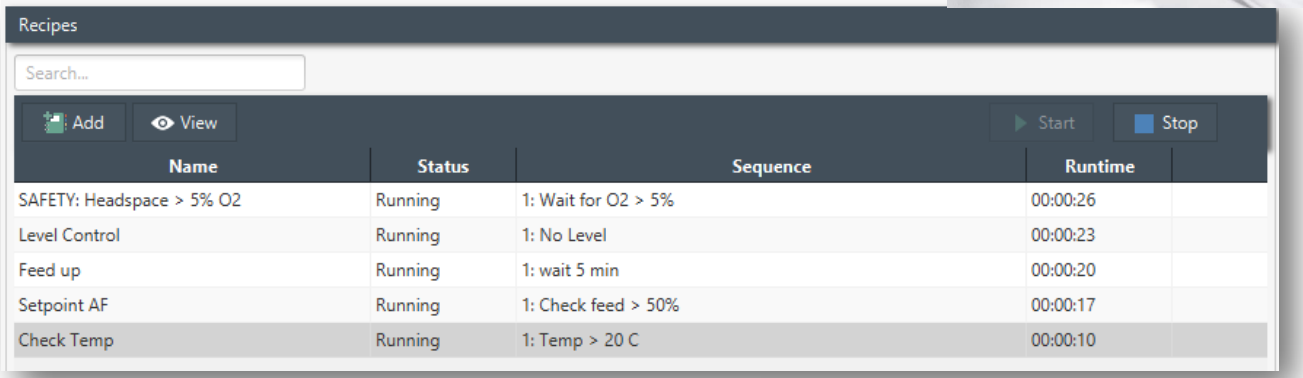
Recipes

Independent automatic control of parameters and also simultaneously.
Unlimited numbers of programs.
All kinds of programming possible.





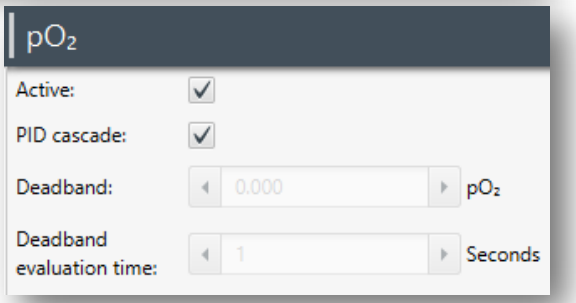
Example: Program block



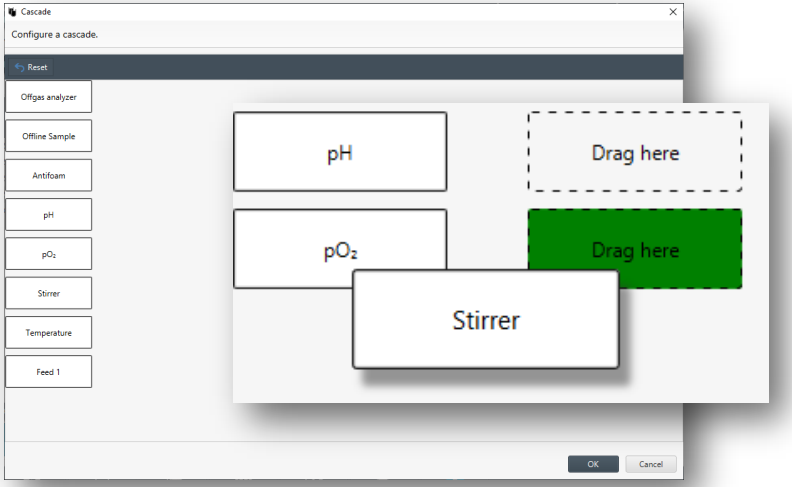
Example: Different automation protocols

Cascading with P&ID

All kind of positive and negative cascades possible.
Selection of simple cascading or with P&ID.



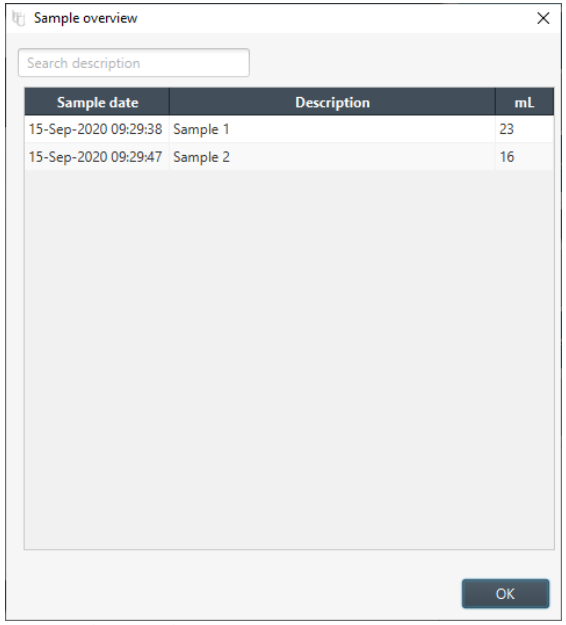
Example: Switch between normal and P&ID cascading



Example: Drag and drop blocks for cascading possibilities

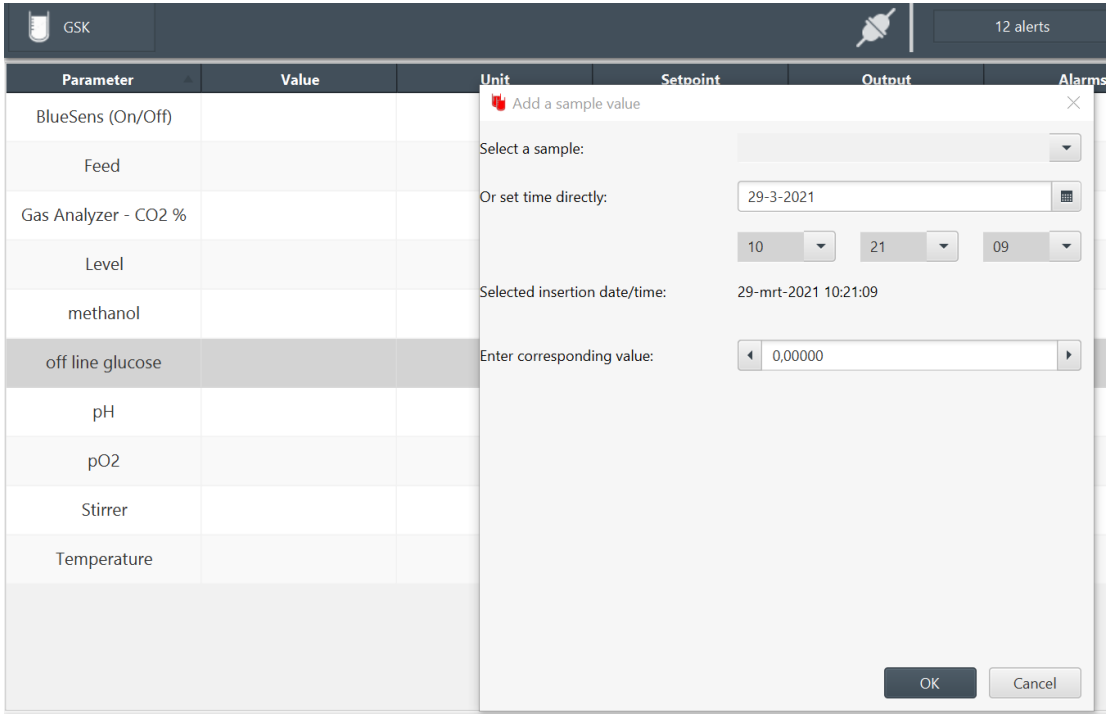
BIOSTREAM

BOS Controlling & Logging Software



Sample tracking

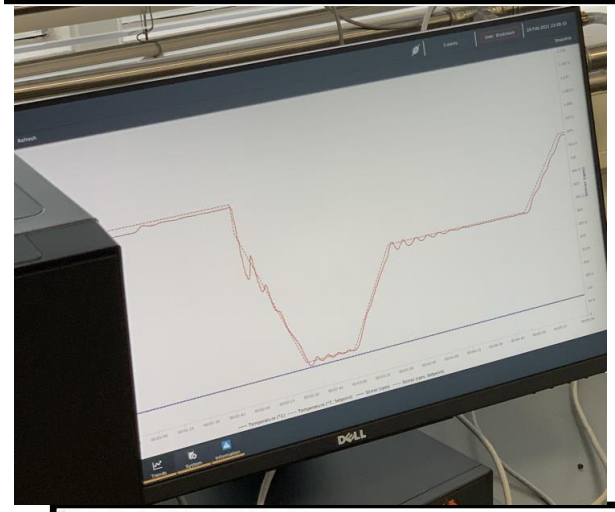
With possible volume correction on total Volume to change feeding protocols

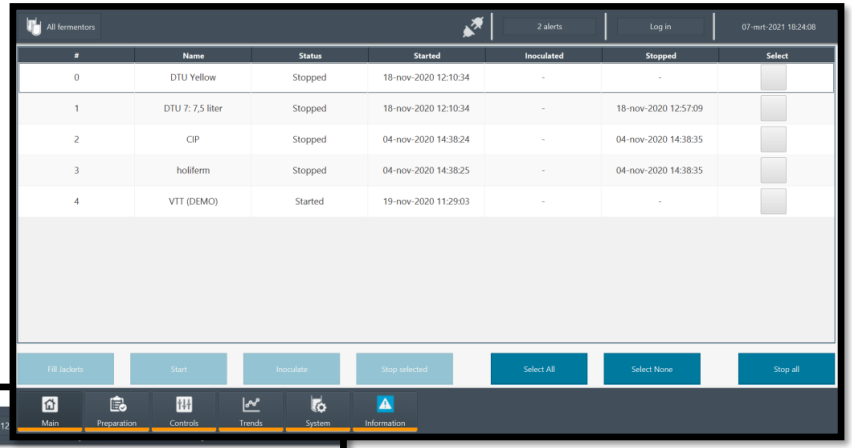


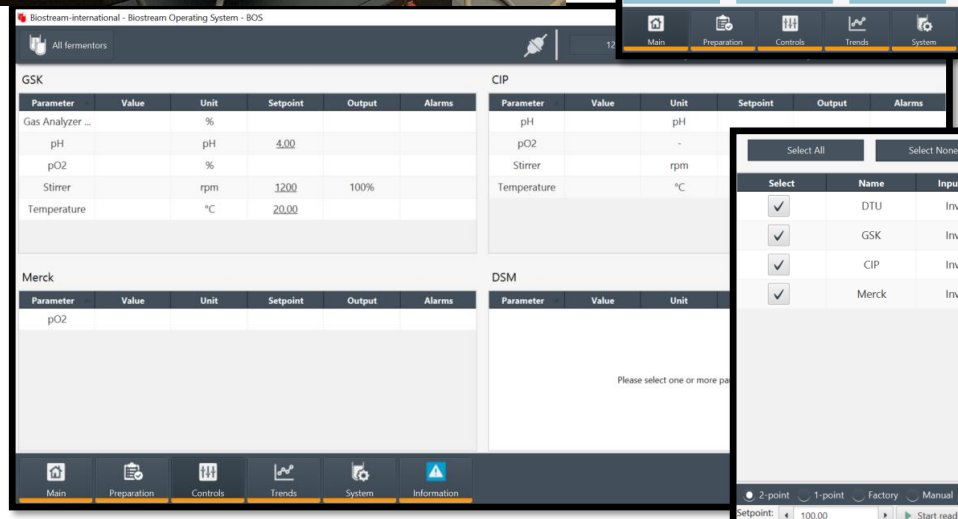
Off-line measurement input

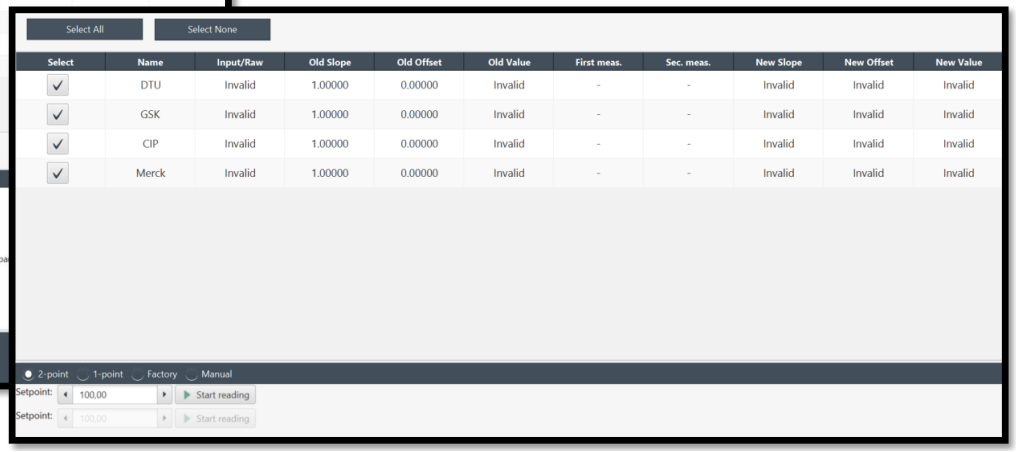
BIOSTREAM

BOS Controlling & Logging Software parallel functions









Parallel starting and inoculation
Parallel calibration of pumps
Overview control of bioreactors
Parallel graphs with existing data and historical data.

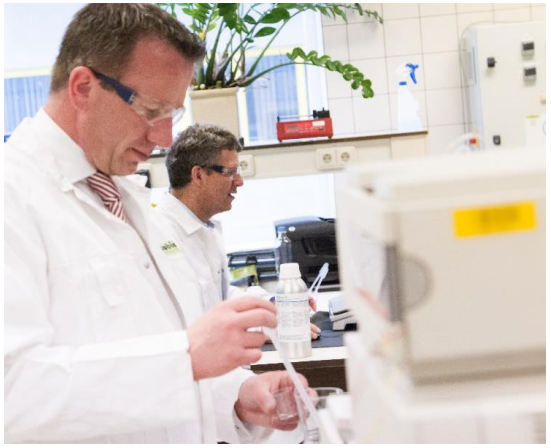
REQUEST a demo for testing

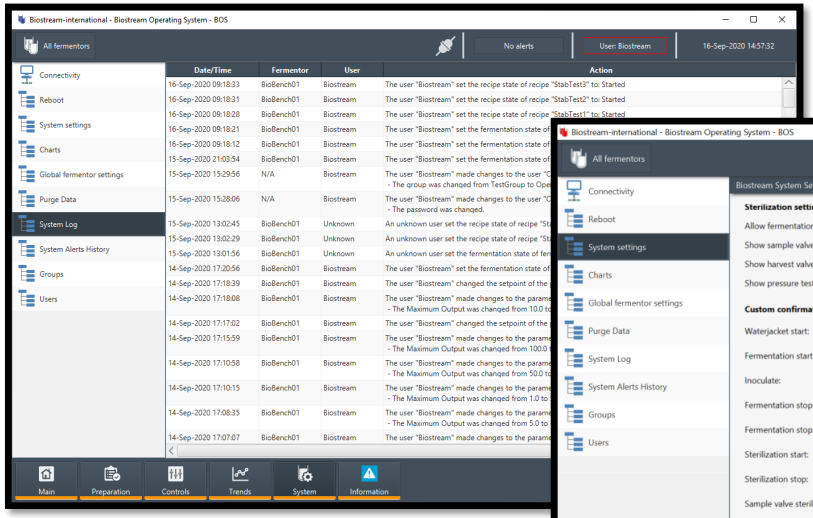
BIOSTREAM

BOS Controlling & Logging Software

On-line service and validation purpose
21 CFR part 11 compliance.
With user login and tracking user actions.
Logging of confirmed alarm overview by user.
Service tools for distance service and assisting.

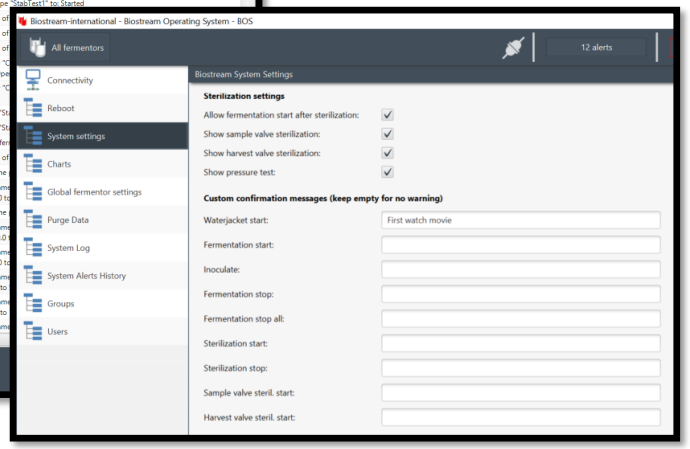
Advanced options:
Filtering of parameters like OD raw value
pH temperature correction
Confirmation to inform users before starting a run
Force check list for completion
Auto log on/off
Auto calibration of pumps



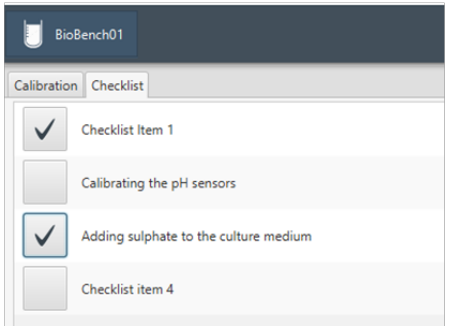


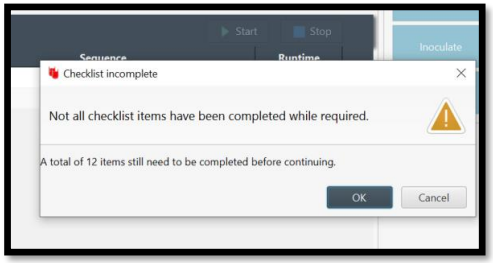
User actions

Advanced options



Create your own simple check list for starting up a bioreactor





Start bioreactor not allowed before check list if finished

BIOSTREAM

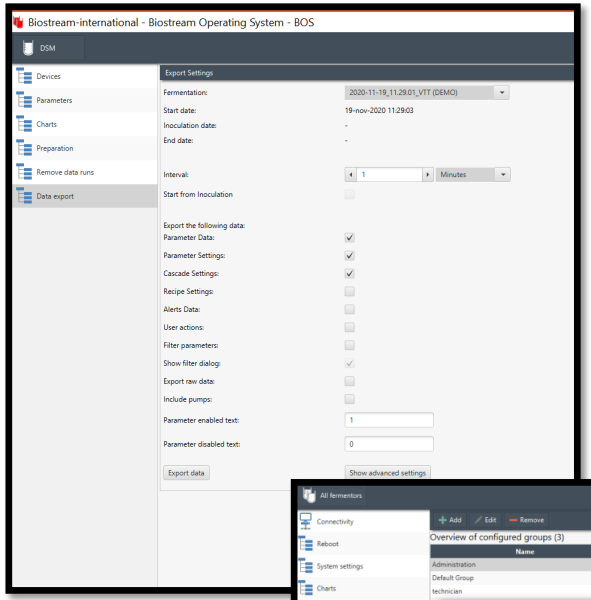
BOS Controlling & Logging Software

Export data and backup

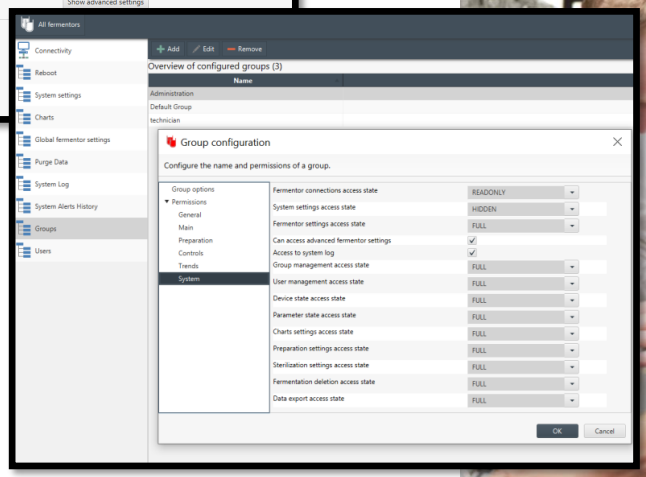
Data export function to excel of csv files
All the information which is stored can be exported

Database back up can also be automatically done
On your network

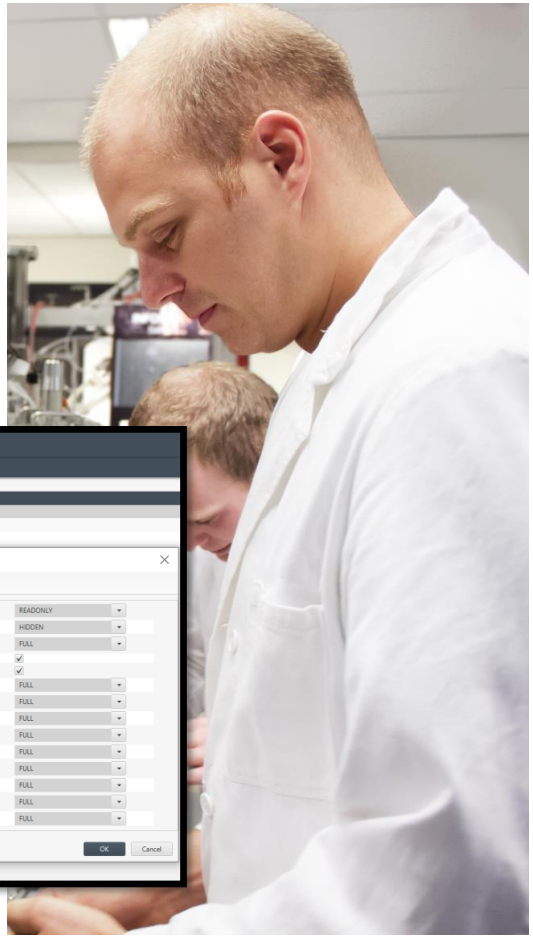
Connection to tertiary programs.
like Lucullus, Matlab, python or even mathematical & prediction software via OPC



Data export



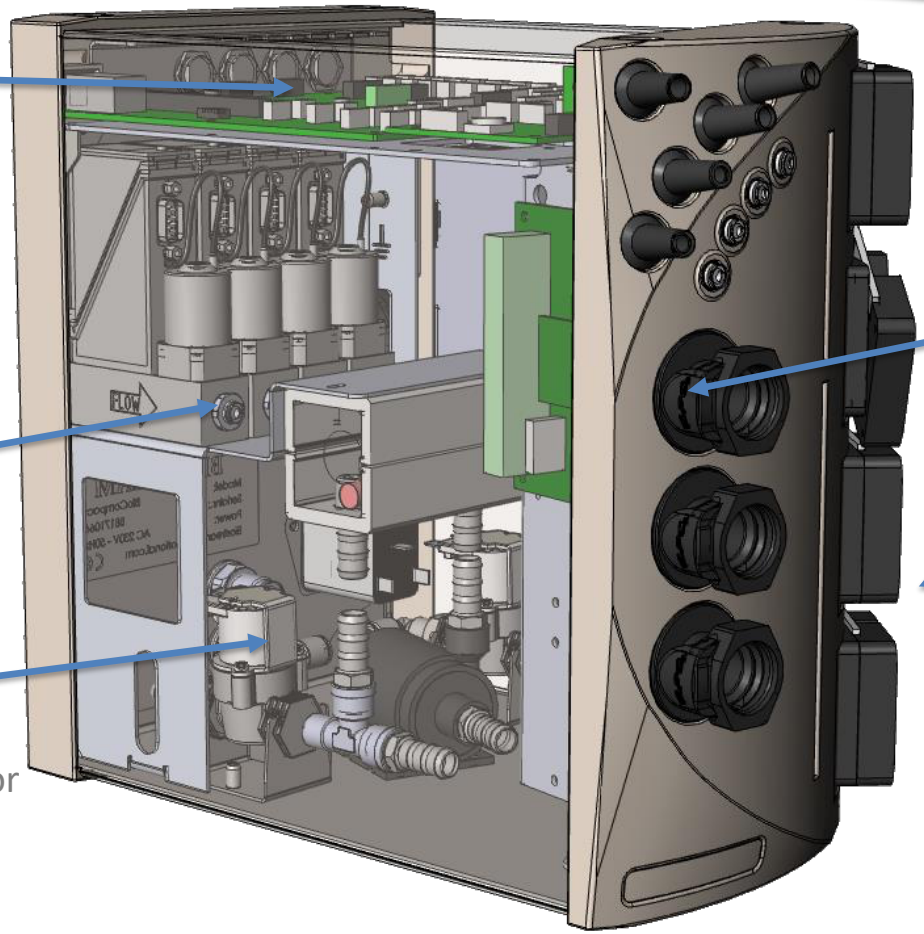
User management



User management system to give access to options.
User should only see the bioreactor and options which are Allowed to see.

BIOSTREAM

Internal room



Stackable

Control board

Front for cables and
temperature control

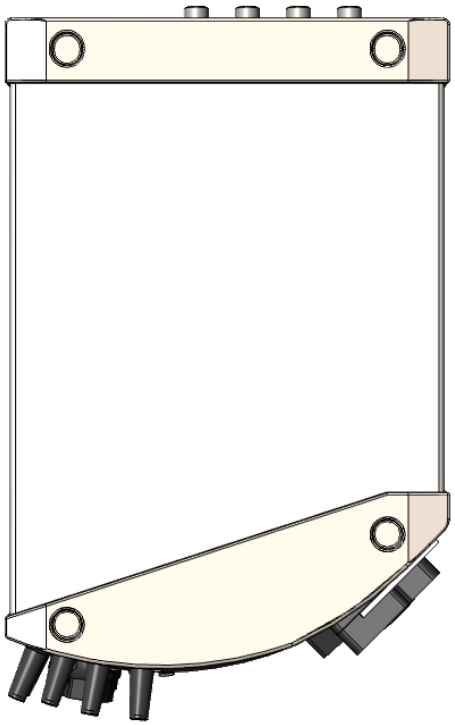
Maximum 4 MFCs

4 peristaltic pumps

Water jacket
Temperature control
And cooling condensor

BIOSTREAM

Dimensions base unit



297 mm

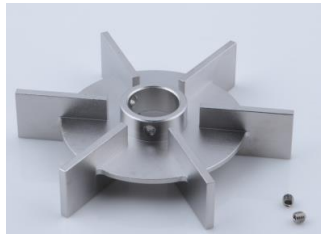
214 mm

288,5 mm

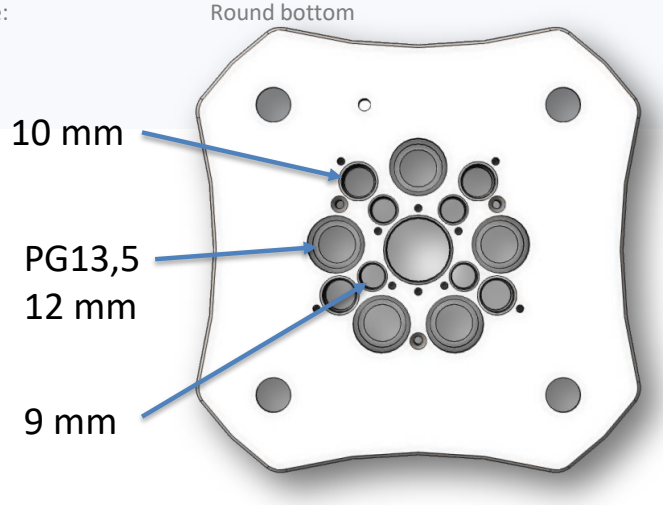
BIOSTREAM

Vessel specifications

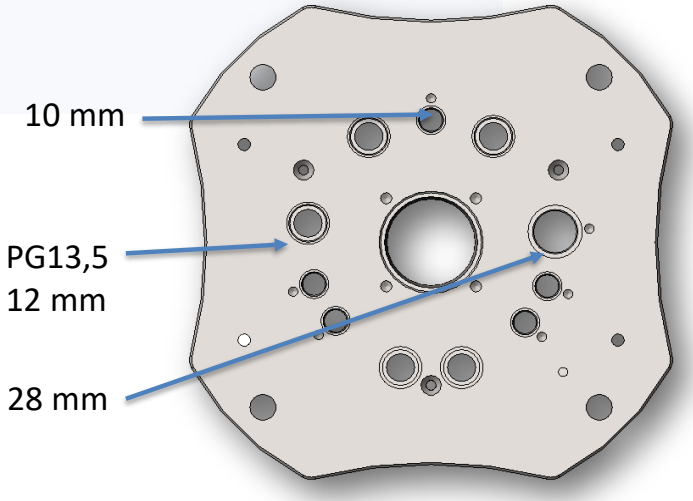
Total Volume	250 ml	500 ml	750 ml	1 .5L	2 L	3L	4L	5L	7.5L
Working volume	50-250ml	100-300ml	100-500ml	0,2-1L	0,4-1,5L	0,4–2L	0,5-3,4L	0,5-4L	0,5-5L
Head plate									
Type op ports (standard)									
8 mm	-	-	4	-	-	-	-	-	-
9 mm	8	9	-	4	-	-	-	-	-
10 mm	-	-	4	4	5	5	5	5	5
12 mm (PG13,5),	3	3	4	4	5	5	5	5	5
28 mm (for four way needle)	-	-	-	-	1	1	1	1	5
Half moon addition	-	-	-	-	-	-	1	1	1
Impellers Rushton (0,33 ID)	2	2	2	2	2	2	2	3	3
Vessel type:	Round bottom								



Rushton



Vessel head plate from up to 1.5 L

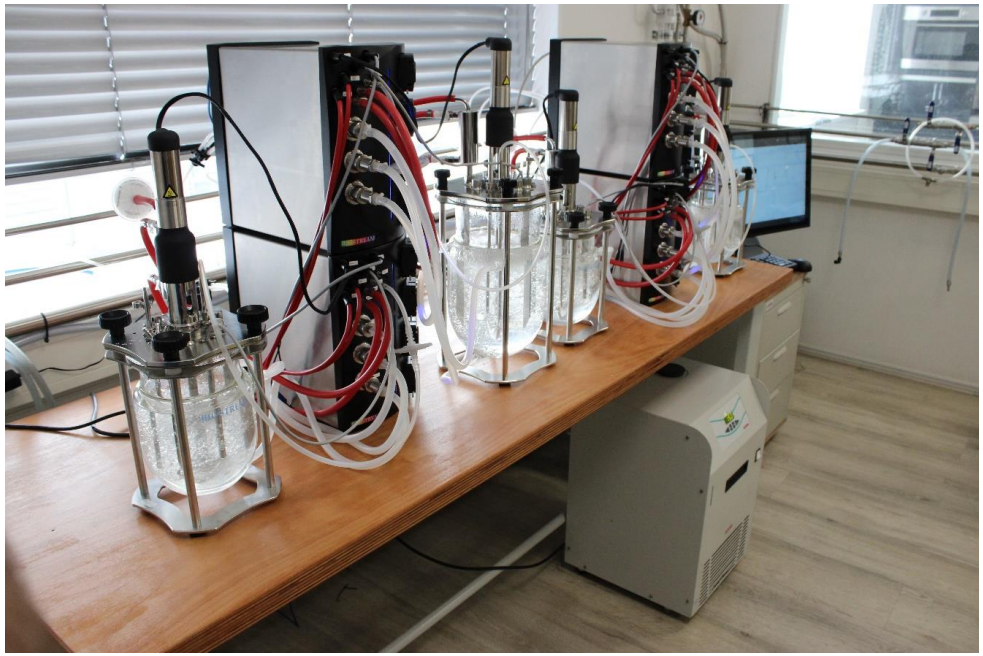


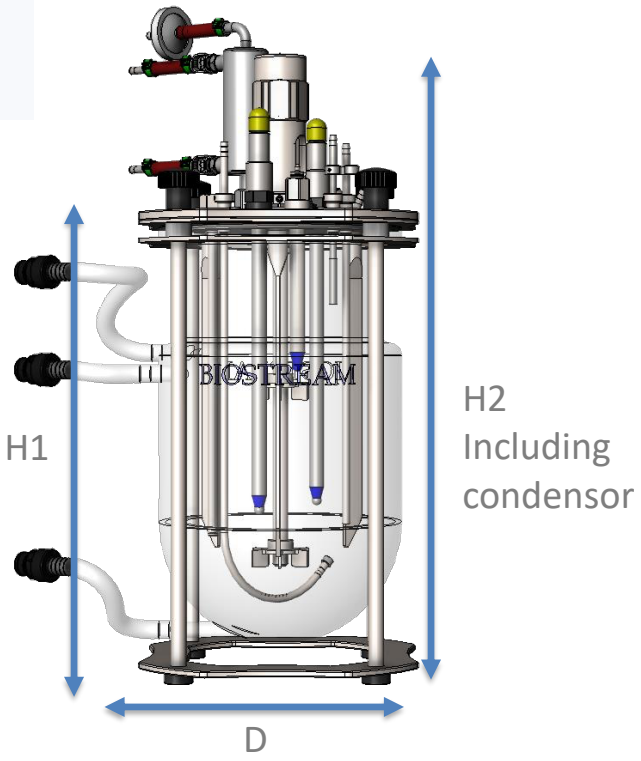
Vessel head plate from 2 to 7.5 L

BIOSTREAM

Universal water jacketed vessel

Total Volume	250 ml	500 ml	750 ml	1 .5L	2 L	3L	4L	5L	7.5L
Dimensions									
H1 (mm)	199	242	269	373	254	345	309	309	496
H2 (mm)	307	351	378	482	377	467	434	434	660
D (mm)	158	158	158	174	208	201	194	194	169





BIOSTREAM

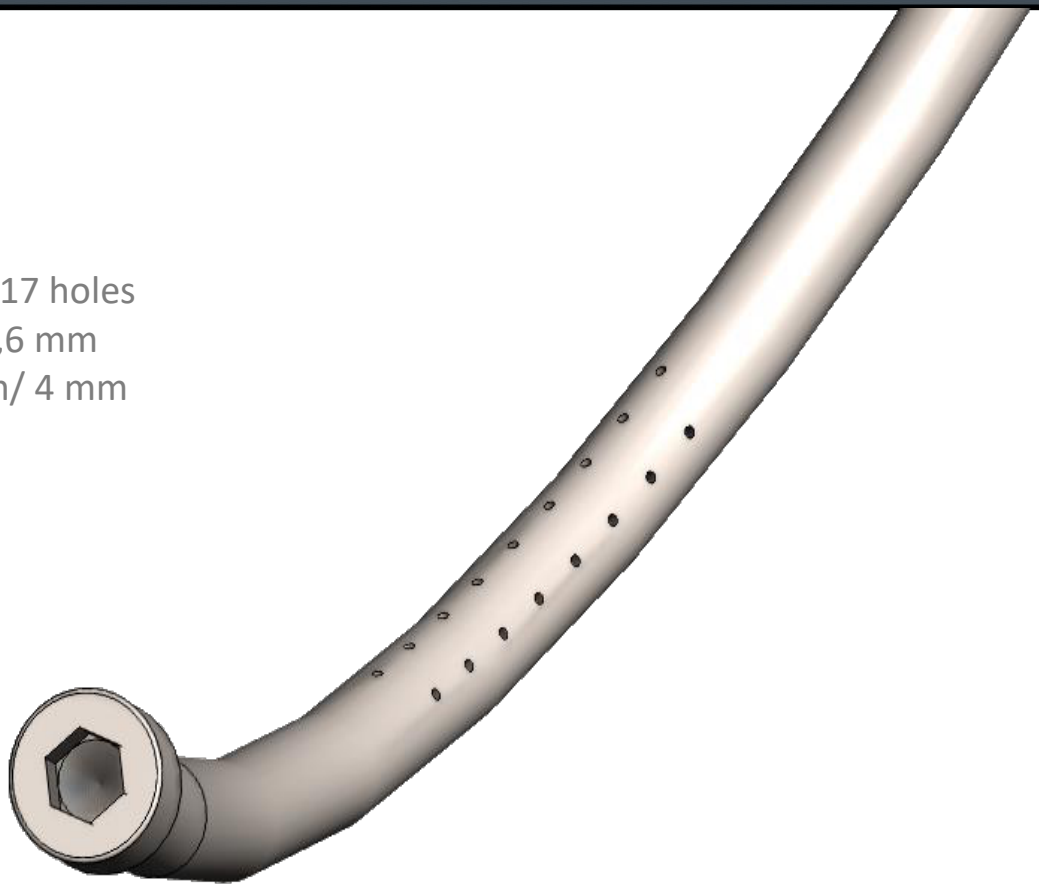
Mechanical drive system

Drive system to maximum 1200 rpm

BIOSTREAM

J-sparger

Specifications:
Number of holes: 17 holes
Diameter holes: 0,6 mm
Tube OD/ID: 6 mm/ 4 mm



BIOSTREAM

Pumps

Free configurable for feed, base, acid, antifoam and more

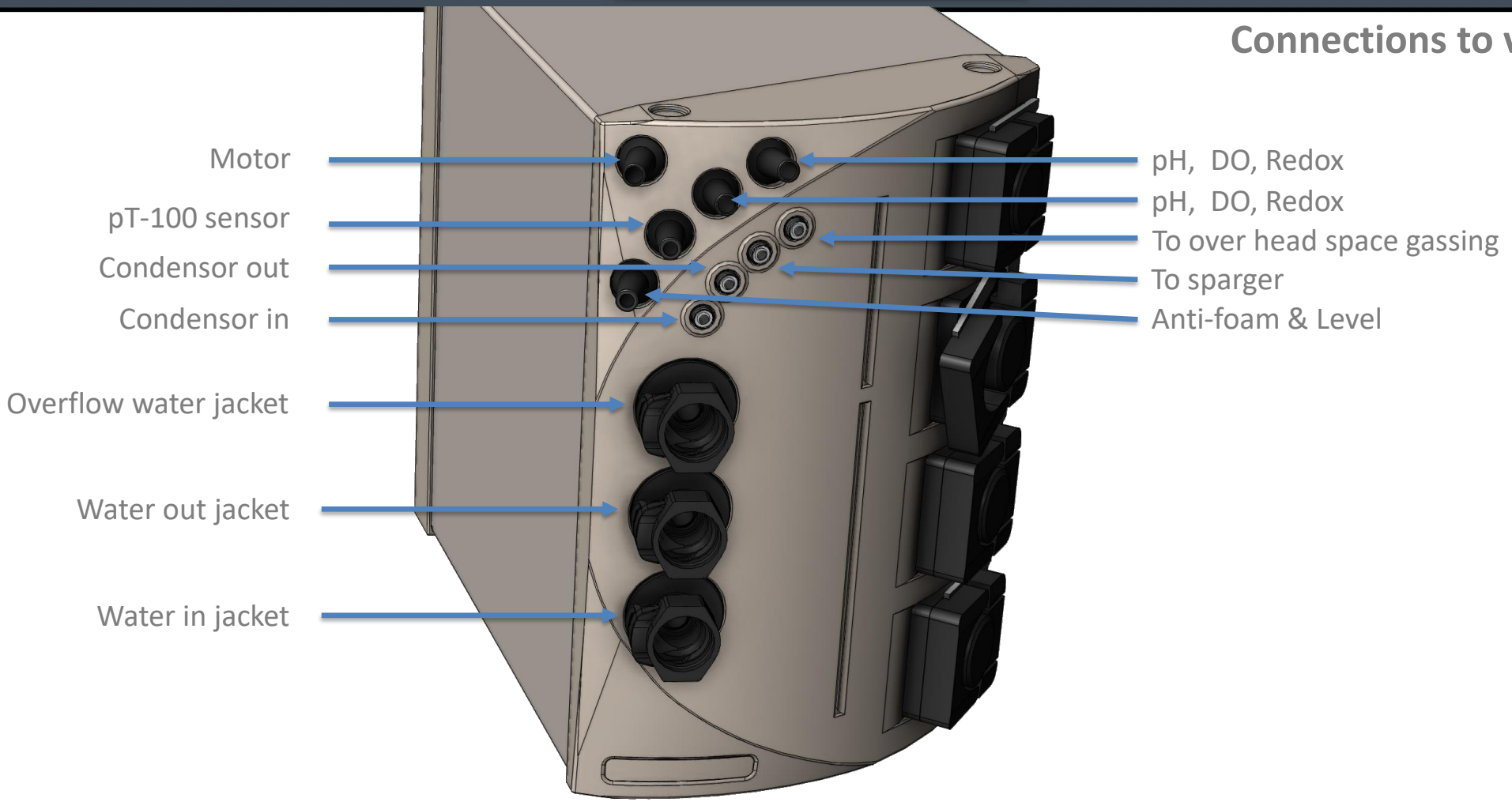
Analog and On/off Pumps (own brand)

Pump possibilities:

- Acid
- Base
- Anti foam
- Feed

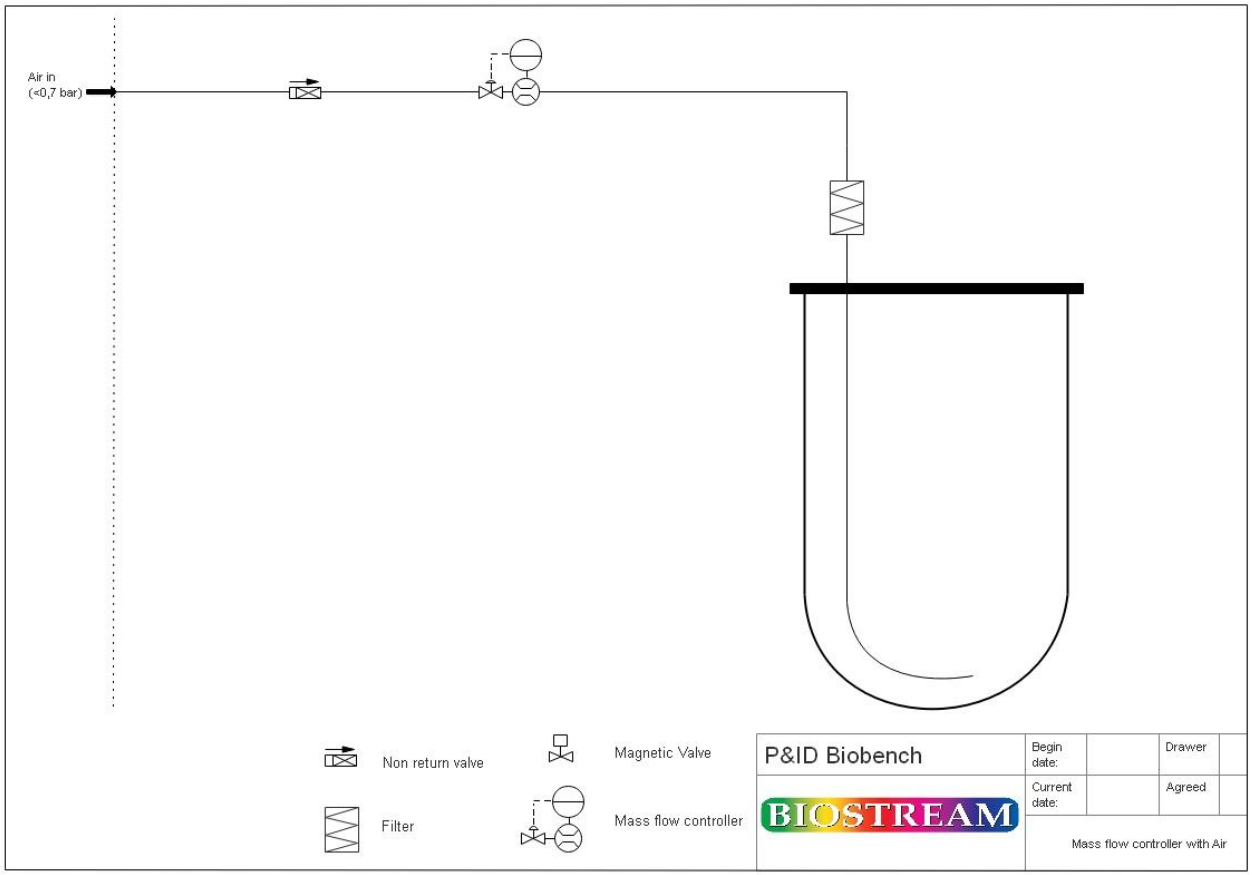
BIOSTREAM

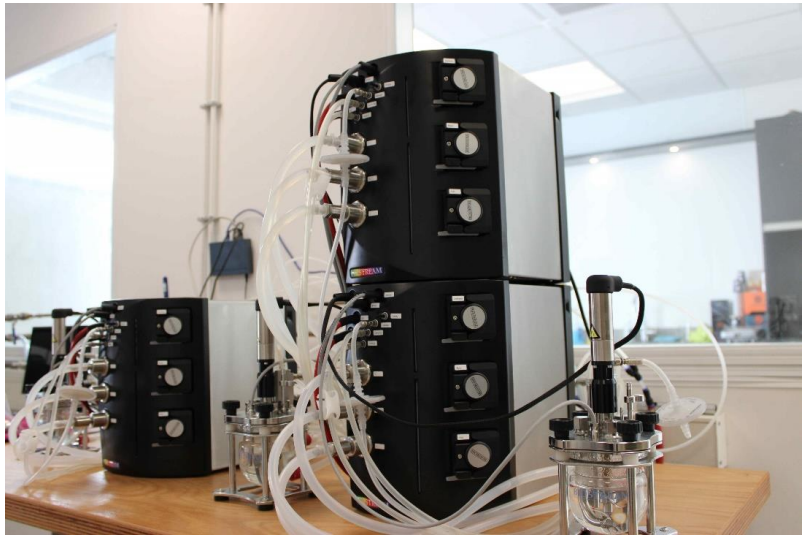
Connections to vessel



BIOSTREAM

Offered gas flow system





BIOSTREAM

Standard controller specifications

1 Controller

Design	Multi touch 9 inch screen computer with advanced control (optional) or your own PC/laptop Capable of communicating with 32 utility stations each a separate vessel.
Function	Monitoring (data storage) and control

2 Agitation

Drive	Depends on vessel
Stirrer speed:	Speed is adjustable between 20-1200 RPM. (depends on application)
Control	PID control.

3 Temperature:

Range	Water jacket vessel 5-8 ° C above coolant (>0°C) from around 5°C above room temp to 55°C.
Sensor	Pt-100 sensor (vessel and water system) Delta temperature control possible
Accuracy	+/- 0.2°C in range +10° to +55°C in fluids.
Control	PID control with cooling valve and water jacket heater
Tempe. security	Automatic safety thermostat

4 pH

Range	2 - 14
Control	PID. Base and Acid addition to control pH. Setting of dead band
Sensor	Intelligent pH probe with calibration data, runs and more (depends on brand)

BIOSTREAM

Standard controller specifications

1 DO

Range	0 – 150 %
Sensor	Intelligent DO probe with calibration data, runs and more (depends on brand)

2 Exhaust

Filter	Standard 0,2 µm absolute filter
Condenser	High condensation and can be dismantled completely.

3 Integrated Pumps

4 corrective reagent and Substrate pumps possible.
Standard 3 on/off (base, acid, foam) and 1 analog (feed)
Easy adjustable from analog to digital and back.
Additional integrated and external pumps possible.
Free configurable with a block at the back

4 Utilities

2 bar oil free gasses
0,5 - 3 bar water (normal tap water pressure)
The Biobench itself has pressure regulation internally for safety issues.

Lab technicians available for assistance

BIOSTREAM

Hamilton digital pH-sensor

The EasyFerm Plus sensors are designed to withstand demanding applications in pharmaceutical, biotechnology, and food & beverages industries. It is also suitable for harsh chemical processes. It withstands steam sterilization, autoclavation and cleaning in place (CIP). The electrolyte of the EasyFerm sensors is pre-pressurized to prevent the diffusion of sample into the sensor. The Everef-F reference cartridge ensures that the reference electrolyte remains free of silver and precipitation of proteins.

Advantages:

- Wide range of applications
- Ceramic diaphragm is an improved barrier of the electrode
- Highly reliable measurements after steam sterilization, autoclavation and CIP cleanings
- Drift-free measurement

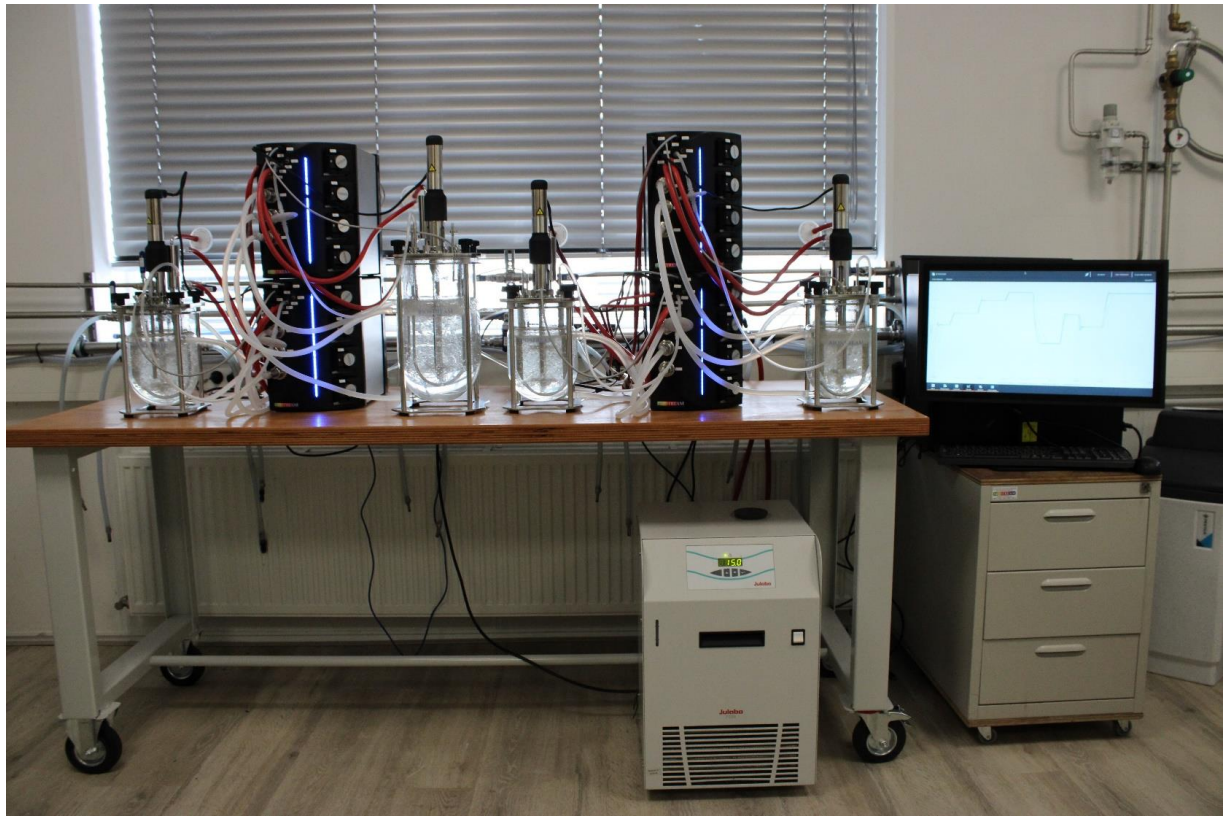
EasyFerm Bio specifically designed for applications in Pharma and Biotechnology (EHEDG, Biocompatibility)

Pre-pressurized reference electrolyte ensures a clog-free diaphragm

Specifications	
Measuring range	0 – 14 pH
Process temperature	0 – 140 °C (Arc: analog 0 – 110 °C, digital 0 – 140 °C)
Pressure range (relative to ambient)	0 – 6 bar (pressurized)
Hygienic aspects	Autoclavable, SIP, CIP
pH glass	PHI
Electrolyte	Phermlyte
Reference system	Everef-F
Diaphragm	HP Coatramic
Temperature sensor	Pt100 in VP version Pt1000 in LEVP version

BIOSTREAM

Optional: Industrial computer



Connection to 32 Bioreactors with upgrading to 96 bioreactors.

With linux operating system

Touch screen.
DELL 23.8" Full HD

Computer, Midi tower.
Hard disk 1 TB SSD
AMD 3700x processor, 8 core,
128 GB work memory
Processor cooler
MSI Radeon RX 570 ARMOR 8G video card

Including:
Keyboard and mouse
16 port Gigabit switch

BIOSTREAM

Option: Digital DO sensor

DO Arc-sensor 12 mm

The VisiFerm DO Arc is the first optical oxygen sensor with integrated opto-electronics, having the full functionality of a measuring device with self diagnostics. It is steam sterilizable, autoclavable and CIP compatible. The VisiFerm requires less maintenance than a classical oxygen sensor as it does not have a mechanically sensitive membrane or a corrosive electrolyte.

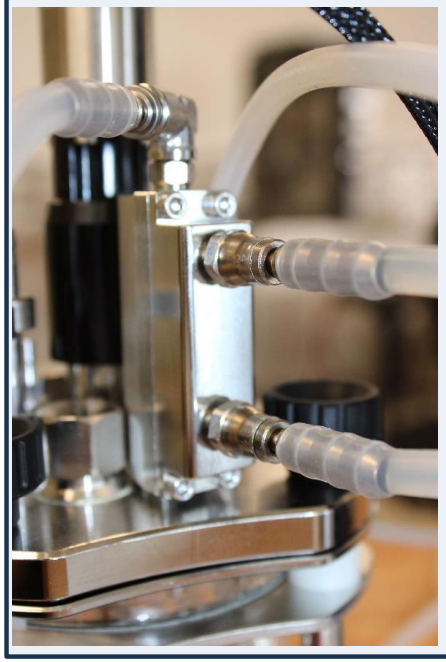
Advantages:
- No electrolyte or polarization is necessary.
- Quality of the sensor
- Calibration data available
- Re-calibration of the sensor during the run.
- Cascade possibilities with Stirrer, Flow, Gasmix and O2

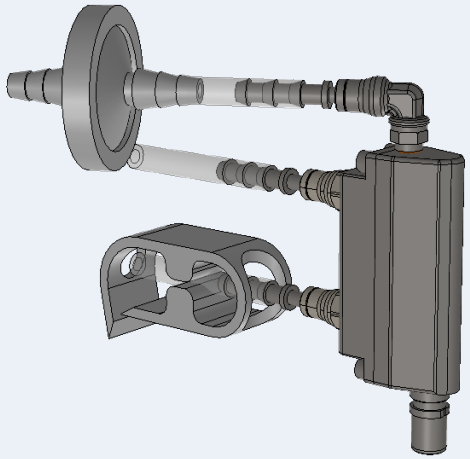
a-length	120 mm
Accuracy at 25 °C	1 ± 0.05 %-vol: 21± 0.2 %-vol; 50 ± 0.5 %-vol
Analog Interface 1	4-20 mA for DO, programmable
Analog Interface 1 and 2	galvanically not isolated; pulse width modulation 3.5 kHz
ATEX Approval	No
Autoclavable	Yes
Baud Rate	4800, 9600, 19200, 38400, 57600,115200 bd
Certificate	Yes, with parameter settings and materials used
CIP	Yes
Diameter	12 mm
Digital RS485 Interface:	Modbus RTU, max 31 addresses
Drift at Room Temp. under Constant Conditions	< 1 % per week
Electrical Connector	VP 8
Electrolyte	None

BIOSTREAM

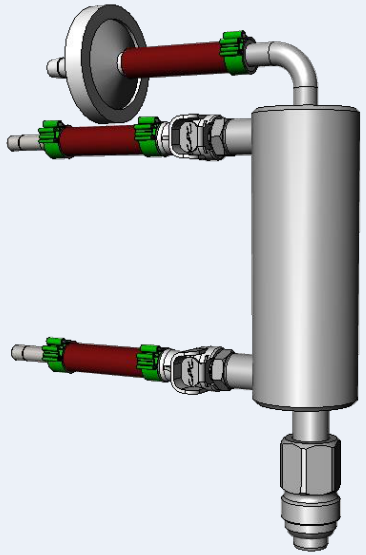
Option: Condensor for cooling gas flow out.

- Water lock on the inlet to prevent water spill
- Dismantlable insert
- .Connection on a 9 mm port
- All kind of fluids can be connected





From 250 ml to 1.5 liter vessel



From 2 to 7.5 liter vessel

BIOSTREAM

Option: Antifoam probe, for port ø10 of PG13,5 mm port

Sensor	Conductive with dosing needle
Control	possible with peristaltic pump (antifoam)
Range	0 / 100 % (ON/OFF)

Adjustable probe	Total length 120mm.
Material product wetted	316L, silicone sheeting
Surface product wetted	0.8µm electro polished
O-Rings	EPDM