

# Bioprocess Lab and Pilot Equipment

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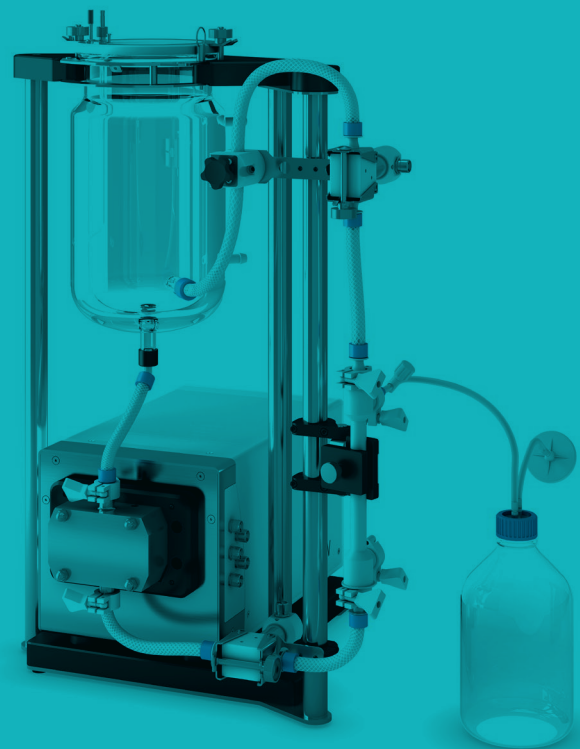
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**M1**



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M2

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MARTA & ROSITA

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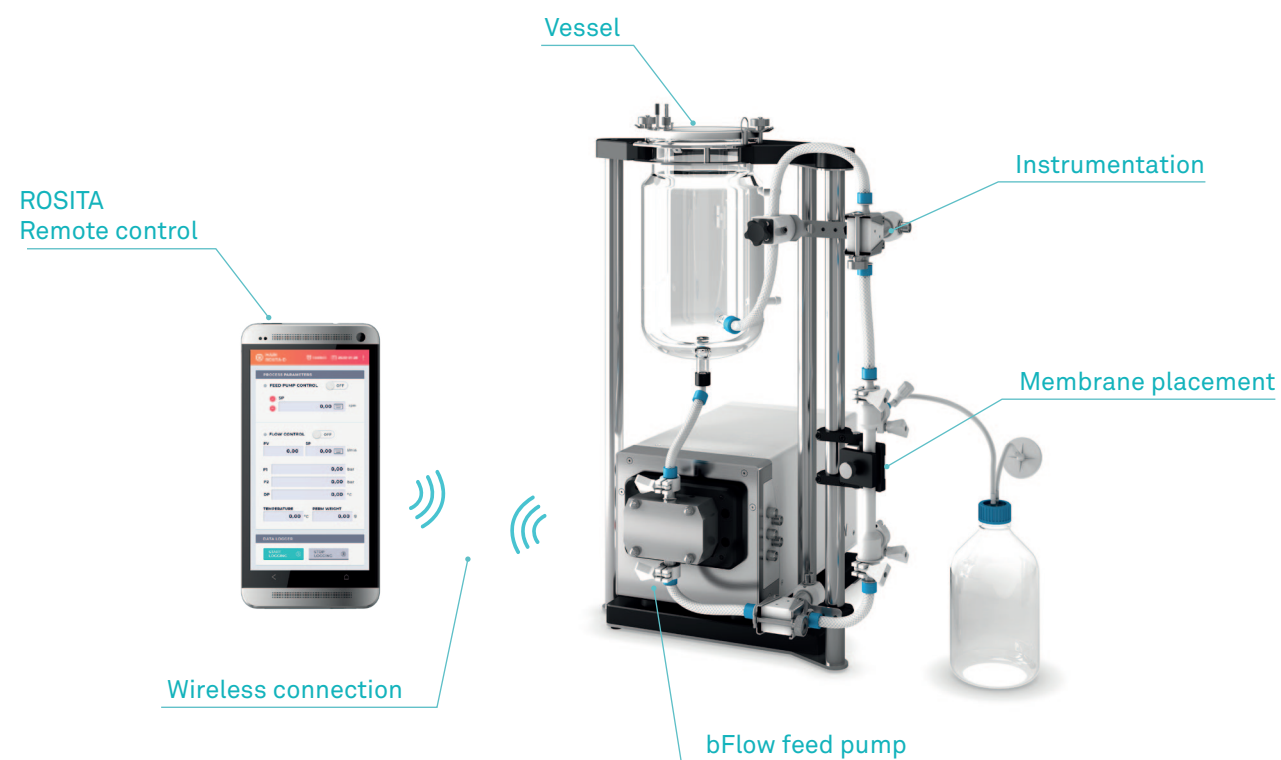
# M1

## Bioprocess Lab and Pilot Equipment JUMP!

IT'S TIME TO DEVELOP YOUR DOWNSTREAM AND CHOOSE A SUITABLE LABSCALE TFF SYSTEM!

Don't hesitate in jumping ahead and testing Tangential (Cross) Flow Filtration (TFF) for your bioprocess downstream

The M1 unit is a unique solution for all those seeking a compact system for **concentration and/or clarification** of the **biomass and/or biomolecules** from their microbial fermentation, or cell culture, processes, at lab scale.



### M1 is the right tool for

Study of separation processes using tangential (cross) flow filtration membranes.

- Technology selection (membrane technology and materials)
- Achievable concentration factor and filterability curves.
- Cleaning procedures.
- Optimum membrane pore size.
- Impact of the operative parameters (cross-flow velocity, pressure and temperature) regarding yields, flows and product quality.
- Small productions.

### WHY IS M1 A UNIQUE LABSCALE SYSTEM FOR TECHNOLOGY SCREENING, OPTIMIZATION AND SCALE-UP ACTIVITIES?

There are a number of product characteristics and technology configurations that have an impact in the potential of TFF to your process and its scalability to larger scales.

The M1 offers the flexibility (**in the form of modularity and membrane selection**) required for creating the right configuration for your filtration system.

Moreover, it provides you with the right technological components (e.g. recirculation pump) for your **process scalability**. Meaning you can be confident that your results can be transferred to a production scale.

Finally, the combination of an IOT-based architecture and our ROSITA software solutions renders your **process consistent and reproducible, and provides the data for a complete test analysis**.

### Membrane selection

The M1 allows you to select the most optimum membrane technology and use a complete range of pore sizes, surface and channel size, so you can choose the right solution; without the limitations of membrane vendor systems.

Three types of membranes, **Cassettes, Ceramic and Hollow Fibre**, from main leading vendors, can be interchangeably integrated and tested in the M1. This allows for un-parallel capabilities for comparing membranes using identical process conditions and data registration for analysis.



These membranes are available in a number of configurations:

- 21 different pore sizes in the microfiltration, ultrafiltration and spaces (from 1.4  $\mu\text{m}$  in the microfiltration space to less than 1kDa in the ultrafiltration space).
- Different size and number of channels (in ceramic) and thereby membrane surface area available.

### bFlow: A SMART FEEDING PUMP

The bFlow is the smart pump used as a feeding pump in the M1. Is the core of our M1 series and is part of our **Bionet bSmart** family of lab process modules. It is an exceptional pump with capabilities beyond standard lab pumps.

What makes it so exceptional?

- **A unique range of flows and pressure.** From 800 to 10,000 ml per minute and from 0 to 6 barg working pressure. All driven by a servomotor for precise control of rpms.
- **The right pump technology.** The multilobe pump technology guarantees your lab results are truly valid for scale-up and provides extraordinary gentleness for sensible biomass and biomolecules.
- **Connected and smart.** The bFlow comes with ready connections to multiple sensors and data logging for batch data recording for a later analysis. Beyond that you can automate some process parameters.
- **Double interface.** You can control the pump through a physical control panel with buttons and display or through a web interface through a wireless connection with ROSITA SW.



### PROCESS CONTROL

The M1 is a manual unit with some automatic controls and full data registration of system and process parameters. Some of them are data from actuators or instruments and other are the result of calculations which can be made based on the registered data.

- **Cross flow rate.** Or recirculation rate or retentate flow can be monitored and controlled with the addition of a Flowmeter (Optional) with a control loop with the pump driver.
- **Filterability.** Permeate flux (in l/h) can be monitored with a connected scale (Optional).
- **Product temperature.** With a TT on the vessel
- **Pressure.** Pressure is measured in 2 points as standard (feed and permeate) and one optional (permeate) allowing for calculation of Transmembrane Pressure and other critical process parameters.

M1		PROCESS CONTROL	Manual/ Non-feedback Automated	Feedback Automated (a.k.a control loop)	Data log	Description
<b>APPLICATION DETAILS</b>						
Applications	Microfiltration, Ultrafiltration	bFlow speed (rpm)	●	○	●	Basic: configurable pump "rpm" and pump data log Optional: feedback-automatic control and flow data log (if recirculation flow meter is installed)
Batch volume	Up to 20L (assuming a good filtrability)	Recirculation flow	●	○	○	
<b>DESIGN DETAILS</b>						
Operation footprint (H x W x D)	540 x 650 x 600 mm	TMP (Transmembrane Pressure)	●	—	○	Basic: manual control of retentate manual valve Optional: calculation and data log (if permeate pressure is installed)
Vessel working volume	3 L (other volumes available)	Permeate pressure	○	—	○	
Vessel type	Single wall (jacketed vessel available)	Feed Pressure	—	—	●	Basic: indirect control; data log (since sensor is installed)
Vessel material	Borosilicate Glass	Retentate Pressure	●	—	●	
Dead volume (ml)	200	Permeate Flow	○	—	○	Optional: manual control (if manual valve is installed); data log (if scale is installed)
<b>MEMBRANES</b>		Product temperature	—	—	●	
Membrane vendor	Neutral					
Membrane type	Reusable and single-use					
Membrane types	Ceramic, Hollow Fiber and Cassettes					
<b>Pore Size (for MF)</b>						
Ceramic (µm)	0.05, 0.1, 0.14, 0.2, 0.4, 0.45, 0.5, 0.8, 1.2, 1.4					
Hollow Fiber (µm)	0.1, 0.2, 0.45, 0.65					
Cassette (µm)	0.1, 0.2, 0.45, 0.65					
<b>Pore Size (for UF)</b>						
Ceramic	1, 5, 10, 20, 50, 100, 150, 300 kD 20, 50 nm					
Hollow Fiber	1, 3, 5, 10, 30, 50, 70, 100, 300, 500, 750 kD					
Cassette	1, 3, 5, 8, 10, 30, 50, 70, 100, 200, 300, 500, 1000 kD					
<b>Surface área</b>						
Ceramic	up to 0,01 m2					
Hollow Fiber	up to 0,079 m2					
Cassette	up to 0,5 m2					
<b>bFlow (recirculation pump)</b>						
Material	SS 316L Rotor and casing, EPDM Elastomers					
Surface finishes	Inner surfaces finished to Ra 0.6µm					
Motor	Servo-motor drive for maximized flow range with Integrated servo controller					
Operation details	Fully drainable CIP compatible design					
Flow range	0.8-10 L/min					
Pressure range	0 – 6 barg					

## Bionet Engineering

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