



F1 - 1/10

R&D BIOREACTORS/FERMENTORS

THE COMPANY

***Bionet is a specialist in Bioprocesses Engineering.
We provide equipment (Bioreactors, Cross-Flow
Filtration Systems and Cleaning-In-Place Systems)
and advanced technical services***

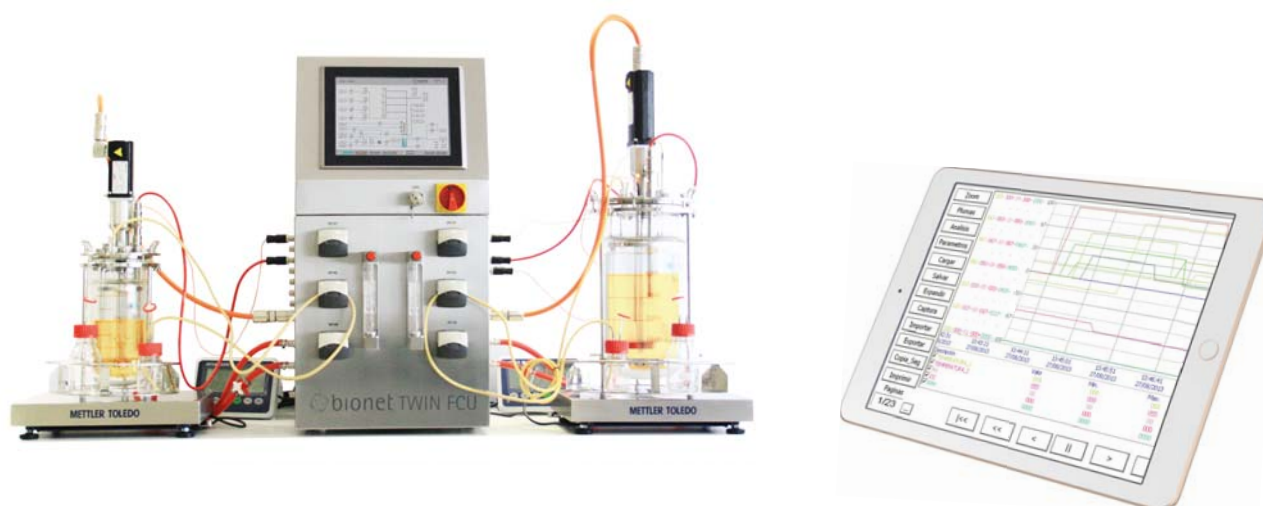


Our clients are industries and R&D organizations which work with bioprocesses in the chemical, food and pharmaceutical sectors.

Bionet has developed a complete range of bioprocess equipment including series of bioreactors / fermentors, cross-flow filtration systems and "Cleaning-In-Place Systems" (CIPs).

In Bionet, quality is part of our core culture and we work under a certified quality management system, based on ISO 9001:2008.

We work in a full documented engineering environment and provide our equipment with IQ (Installation Qualification), OQ (Operation Qualification) and PQ (Performance Qualification). On demand, the design and qualification may be executed according to cGMP standards.



F SERIES

F1 models are autoclavable bench-scale bioreactors designed to meet the R&D requirements in biotechnological and biopharmaceutical processes. The system is user friendly, flexible, and incorporates the latest technology of the sector with a high-quality service.

F1 units are the right tool for initiating and developing your microbial and cell culture processes in stirred reactors. In addition, its design, adapted from the design of larger-scale industrial bioreactors, makes F1 models the best choice for process scaling up.

ROSA+ SOFTWARE

ROSA+ is the advanced SW solution created by Bionet to automate bioprocesses equipment and complete bioprocesses lines.

The core module is designed for fermentation and cell culture process control, and it is installed in all Bionet F Series. It is a powerful tool that incorporates all the necessary functions for integrated process control, process qualification and validation, and allows for easy programming of complex recipes with

numerous steps and control loops. ROSA+ has been designed to easily accept and integrate in the process control new instrumentation in the process control.

The application works in a PC environment and allows LAN & VPN connection via Ethernet port.

All software modules are available in 21CFR Part11 compliant version.

F 1

Models

- ▶ Available in five models (F1-1, F1-3, F1-5, F1-8 and F1-10) with working volumes from 1,5 and 10 liters, respectively, and possibility to work with volumes between 700 mL and 10 L.
- ▶ All five are compatible with the same control unit (FCU) and agitator gearbox.
- ▶ TWIN models are also available. These models include two vessels to choose from the ones above and a double FCU unit for monitoring and control of two fermenters in parallel.

Vessel *1

- ▶ Jacketed vessel made of borosilicate glass. Rest of product-contact surfaces made of stainless steel A316L.
- ▶ Several ports for instrumentation, addition, gas inlet and outlet.

Agitator *2

- ▶ Noiseless, top-mounted agitator. Broad speed range, adapted depending on the nature of the culture.
- ▶ Available with 2 Rushton impellers (6-blades) or marine turbines (cell culture). Third impeller available as an option.

Control and Monitoring *3

- ▶ Controlled parameters: pH, dissolved O₂, temperature and level (foam). Other parameters (OD, weight...) can be easily added on demand, even after the equipment delivery and commissioning.

Additions *4

- ▶ 3-4 peristaltic wall pumps, 1 with variable speed for fed-batch or continuous fermentation.

Air supply *6

- ▶ Includes flowmeter for manual control of aeration supply. 0,22µm sterile filter in air inlet line.

Gas outlet

- ▶ Direct outlet. Tubular condenser available on demand.

Sampling device

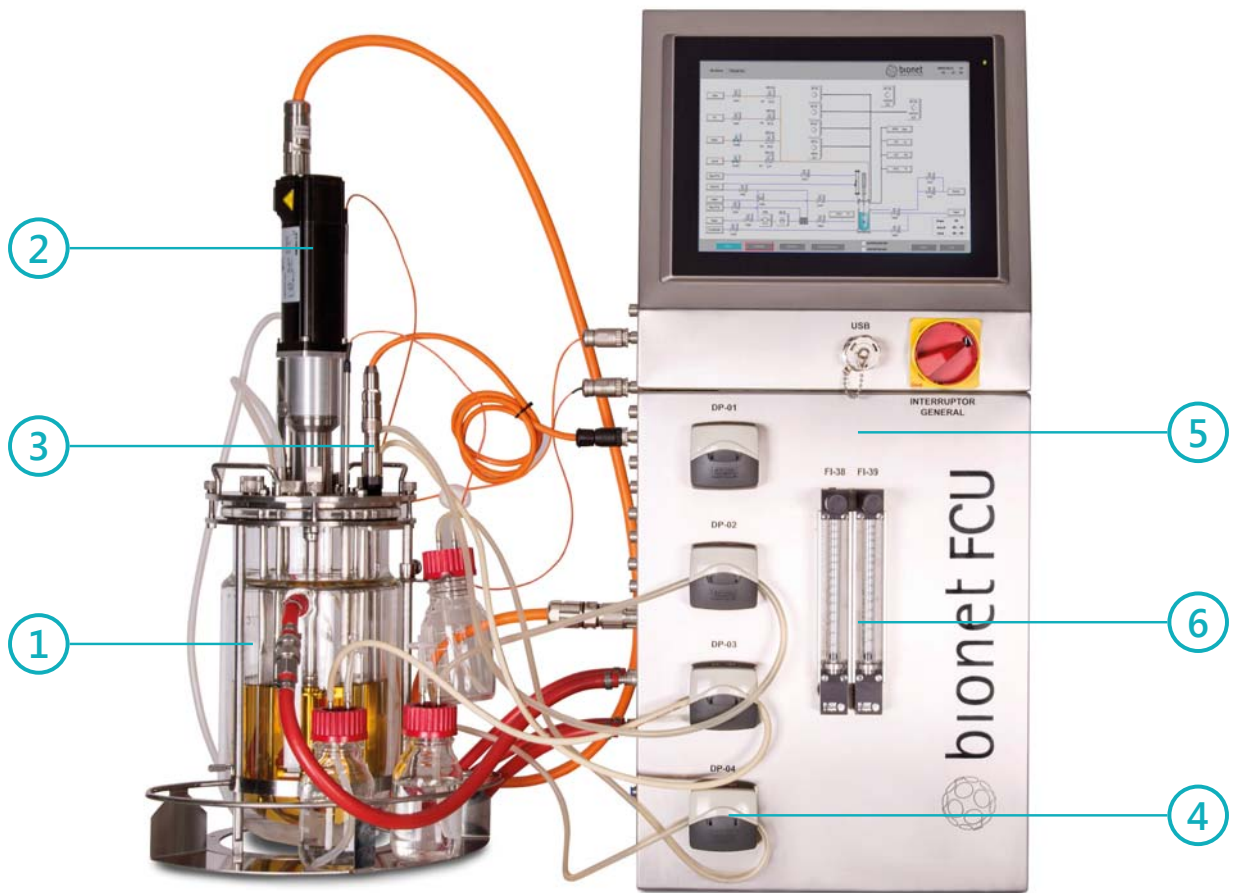
- ▶ Available on demand.

FCU *5

- ▶ Touch Panel PC 12,1" for process visualisation and local control. Services and instrumentation interfaces accessible and unified in one side of the unit to facilitate connection. Various external analog connections available for expansion, accessories and connectivity.
- ▶ Main switch.

Accessibility and ergonomics

- ▶ Accessories available to lift and place fermentors into the autoclave (lifting crane).



TECHNICAL SPECIFICATIONS

MODEL	F1-1	F1-3	F1-5	F1-8	F1-10
Reactor and agitation					
Max. Working volume	1,5 L	3 L	5 L	8 L	10 L
Vessel design	Autoclavable double-wall (jacketed) glass vessel with elliptic bottom				
Agitator	Top-mounted synchronous agitator with servo operation and mechanical seal.				
Impellers	2 (6-blades) Rushton impellers (M) or Marine Impellers (C). Third impeller available as an option.				
No. of Baffles	4				
Materials	Vessel and all product-contact parts made of borosilicate glass and stainless steel A316L, rest of stainless steel A304.				
Microbiology					
Total volume (M)	2,2 L	4,3 L	7,1 L	11,4 L	14,3 L
Working volume % (M)	67	70	70	70	70
Min. Working Volume (M)	0,7 L	1,4 L	3,0 L	3,9 L	5,5 L
Total H:D (M)	2,6:1	2,3:1	2,3:1	2,4:1	2,4:1
Working H:D (M)	1,7:1	1,6:1	1,6:1	1,7:1	1,7:1
Agitation speed (M)	150 - 1200 rpm				
Impeller to vessel inner diameter ratio (M)	0,33				
Motorpower (M)	0,37 kW				
Bioreactor height (M)	323 mm	359 mm	443 mm	453,5 mm	484,4 mm
External diameter (M)	135 mm	175 mm	190 mm	225 mm	235 mm
Cellular					
Total volume (C)	2,2 L	4,3 L	7,1 L	11,4 L	14,3 L
Working volume % (C)	67	70	70	70	70
Min. Working Volume (C)	0,9	1,6	3,6	4,7	6,6
Total H:D (C)	1,9	1,8	1,8	1,8	1,8
Working H:D (C)	1,3	1,3	1,3	1,3	1,3
Agitation speed (C)	50 – 400 rpm				
Impeller to vessel inner diameter ratio (C)	0,4 – 0,5				
Motorpower (C)	0,37 kW				
Bioreactor height (C)	277 mm	316 mm	389 mm	400 mm	419 mm
External diameter (C)	146 mm	186 mm	204 mm	243 mm	253 mm
Dimensions					
Bench height and footprint (vessel + single FCU) (mm)	895(W) x 840(H) x 500(D)	935(W) x 840(H) x 500(D)	950(W) x 840(H) x 500(D)	985(W) x 840(H) x 500(D)	995(W) x 840(H) x 500(D)
Bench height and footprint (2 vessels + twin FCU) (mm)	1120(An) x 840(Al) x 610(F)	1200(An) x 840(Al) x 610(F)	1250(An) x 840(Al) x 610(F)	1310(An) x 840(Al) x 610(F)	1330(An) x 840(Al) x 610(F)
Autoclave space requirement (mm)	424(H) x 190 (ø)	460(H) x 220 (ø)	544(H) x 260(ø)	554(H) x 285(ø)	585 (H) x 295 (ø)

MODEL	F1-1	F1-3	F1-5	F1-8	F1-10
Ports					
Agitator (M36x1.5)	1	1	1	1	1
Out gassing (ø:19 mm - M24x1)	1	1	1	1	1
Quadruple addition nozzle (ø:19 mm - M24x1)	1	1	1	1	1
pH sensor (PG 13.5)	1	1	1	1	1
dO ₂ sensor (PG 13.5)	1	1	1	1	1
Temperature sensor (ø: 10 mm - M12x1.5)	1	1	1	1	1
Spare (PG 13.5)	0	1	1	2	2
Level switch (ø: 10 mm)	1	1	1	1	1
Sampling port (ø: 10 mm)	1	1	1	1	1
Gas distribution port (ø: 10 mm)	1	1	1	1	1
Control and Instrumentation (Single FCU)					
Automation	Industrial PLC (Siemens) + Modules E/S. Touch Panel PC 12" SVGA 800 x 600				
SW de control	R.O.S.A.+				
FCU	External 360(W) x 840(H) x 500(D) mm 50 Kg				
Cover Material	Stainless steel A304 (matte finish)				
Communication	2 x Ethernet ports for LAN and VPN communication for remote control. 1 x USB port for data downloads.				
Standard sensors	pH, dO ₂ , temperature, foam level.				
pH control	Range: 0 – 14 (± 0,01)				
dO ₂ control	Optical sensor. Range: 0 – 100% (±0,1%)				
Optional sensors	Optical density/ turbidity, redox, integrates scale, dissolved CO ₂ .				
Temperature control	Sensor: Range 5-130 °C (± 0,01). Integrated recirculation pump. Electric heating (300 W). External cooling water supply (200 W) required.				
Aeration control	1-2 vvm. Air supply y regulation (valve + flowmeter)				
No. of Pumps	3 attached peristaltic addition pumps (Watson Marlow), option to 1 additional attached pump. 1 external addition pump, for fed-batch and continuous systems, available as an option.				
Control and Instrumentation (Twin FCU)					
Automation	PLC Industrial (Siemens) + Modules E/S. Touch Panel PC 15" XGA 1024 x 768				
SW de control	R.O.S.A. +				
FCU	External 420 (An) x 840(Al) x 610 (F) mm 65 Kg				
Cover Material	Stainless steel A304 (matte finish)				
Communication	2 x Ethernet ports for LAN y VPN communication for remote control. 1 x USB port for data downloads.				
Standard sensors	It includes 2 sensors of pH, dO ₂ , temperature and foam level.				
pH control	Range: 0 – 14 (± 0,01)				
dO ₂ control	2 optical sensors. Range: 0 – 100% (±0,1%)				
Optional sensors	Optical density/ turbidity, redox, integrates scale, dissolved CO ₂ .				
Temperature control	Sensor: Range 5-130 °C (± 0,01). Integrated recirculation pumps. Electric heating (300 W). External cooling water supply (200 W) required.				
Aeration control	1-2 vvms. Air supply y regulation (valve + flowmeter)				
Utilities Requirements					
Compressed air supply	1,5 barg / 1-2 vvm	1,5 barg / 1-2 vvm	1,5 barg / 1-2 vvm	1,5 barg / 1-2 vvm	1,5 barg / 1-2 vvm
Utility cost (single unit)	1,1 kW	1,1 kW	1,1 kW	1,1 kW	1,1 kW
Utility cost (TWIN model)	2,2 kW	2,2 kW	2,2 kW	2,2 kW	2,2 kW
Cooling water supply	1 barg 10°C(*)	1 barg 10°C(*)	1 barg 10°C(*)	1 barg 10°C(*)	1 barg 10°C(*)

(*) Cooling water supply temperature will determine the minimum controllable temperature within the fermentor (at least 10 °C higher than the cooling water temperature).



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