



Minifors 2

UNBEATABLE IN ITS CLASS.

This is the Minifors 2

The Minifors 2 is a compact and easy-to-use bioreactor with a full range of application possibilities. It is a complete package that enables both, beginners and experienced users to easily perform applications.



All this – and more.

The Minifors 2 comes as a complete package with everything you will need for the culture of microorganisms and cell cultures. The fully equipped culture vessel is located on a compact base unit with four freely configurable pumps, pH and pO₂ sensors, up to five fully automatic gas lines with mass flow controllers and a touch screen control unit. In addition, the Minifors 2 offers optional features with which you can understand and optimise your bioprocesses even more easily.

Design for practical applications.

The Minifors 2 has a compact, user-friendly design. With its small footprint and few external connections, the bench-top bioreactor takes up little space in the lab. Your work around the bioprocess will be simplified by special details; for example, the practical vessel holder that enables the safe and risk-free transport of the pump heads and the bottles together with the culture vessel. Also, the steel drip tray can be easily cleaned, even if the bioreactor is in operation.



Unpack and get started.

The Minifors 2 will take you directly to your bioprocess. The bioreactor is preconfigured and delivered ready to use. Connect the device, mount the vessel, connect pumps and sensors and begin to work after only 10 minutes.

It speaks your language.

Easy and intuitive means: Get on directly with the bioprocess in only a few steps thanks to understandable controls and without the need for training. The touch screen accompanies you through the experiment in several languages. You can prepare everything in the shortest possible time – from the calibration of the sensors to the configuration of cascades and specification of setpoints.

Work independently or as a part of a platform.

Minifors 2 is open for everything. Use the bioreactor as a stand-alone device and export the measured values in CSV format onto a USB drive. Or connect your Minifors 2 with eve[®]. With the bioprocess platform, a new world of bioprocess control opens up – not only can you plan complex strategies in the blink of an eye, but you can also turn several Minifors 2 into a virtual parallel bioreactor. Analyse and compare the results with numerous visualisation tools and organise the bioprocess knowledge you obtain as a result.



Features

The bench-top bioreactor offers features beyond those of other devices of its class. Just go with your bioprocesses – and have fun thanks to optimised handling and ease of use.

The Minifors 2 already offers multiple features in the standard version.

Culture vessels

- Available in total volumes of 1.5 L, 3 L and 6 L
- Powerful direct drive optimized for cell cultures and microorganisms
- Quick and easy change between culture vessel sizes
- Rounded flat vessel bottom
 - Low minimum working volume
 - Good mixing
 - Stability with or without a vessel holder
- Safe sampling without any dead volume: INFORS HT Super Safe Sampler



Top plate

- Intelligent design for easy access to all ports
- Sufficient ports, for standard fittings and extra inlets, immersion tubes and sensors
 - 4 x 7.5 mm: addition ports available for acid, base, feed & 1 free
 - 4 x 10 mm: sparger, anti-foam system, temperature sensor, sampling/harvest
 - Maximum 7 x 12 mm (Pg13.5): pH, pO₂, exhaust gas cooler, inoculation are pre-allocated, 3 are freely available
- Convenient, tool-free cleaning and maintenance thanks to knurled screws

Gassing

- 2 integrated Mass Flow Controllers for Air/O₂ or Air/N₂ (version for microorganisms)
- 5 integrated Mass Flow Controllers for Air, O₂, N₂, CO₂ and head space gassing (version for cell cultures)
- Integrated pressure sensor for detecting a blocked filter
- Gassing optimised for bacteria applications and cell cultures: specific gassing rate (vvm) up to 2.0 min⁻¹
- Multiple cascades for pO₂ control by means of stirrer speed, gassing rate ("TotalFlow") and/or gas composition ("GasMix")

Features



Pumps

- 4 precision pumps
- Configurable operating mode: digital (fixed-speed) or analogue (variable speed)
- Default setting: 3 x digital (acid, base, anti-foam), 1 x variable (feed)
- Autoclavable pump heads
- Gravimetric feeding possible (requires external balance) with dosing mode
- Profile-based control of pump speed (requires eve®)
- 2 analogue inputs / outputs to connect external pumps

Sensors

- Robust, digital connection of pH and pO₂ sensors
- Optical pO₂ sensor: immediately ready for use as no polarization is required
- Storage of calibration data in the sensor head respectively in the sensor transmitter
- Product calibration of the pH sensor for reliable measurements during long-running bioprocesses
- Compatible with Hamilton ARC and Mettler ISM



Operating unit

- Integrated 7" touch screen (17.8 cm)
- Simple handling through intuitive menus and practical on-screen help
- Calibration of pH, pO₂ and OD sensors using simple install wizards
- Direct data export to USB drive in stand-alone operation
- Multiple display languages

Technical Specifications

Total volume	1.5 L, 3 L, 6 L
Dimensions	(W x D x H): 455 x 375 x 740 mm
Drive	Version for microorganisms: 150 min ⁻¹ to 1600 min ⁻¹ ; version for cell cultures: 24 min ⁻¹ to 600 min ⁻¹
Temperature	+ 15 °C (Coolant temperature + 5 °C) to 60 °C
Gassing	Version for microorganisms: 2 MFCs up to 2 min ⁻¹ ; version for cell cultures: 5 MFCs up to 0.15 min ⁻¹
Pumps	4 x configurable (fixed or variable speed) ex-works: 3 x fixed (acid, base, anti-foam), 1 x variable (feed)
Pump performance	0.0034 to 3.52 mL min ⁻¹ (standard), 0.017 to 16.13 mL min ⁻¹ , 0.0012 to 1.12 mL min ⁻¹
Ports	4 x 10 mm, 4 x 7.5 mm, and maximum 7 x 12 mm (Pg13.5): pH, pO ₂ , exhaust gas cooler, inoculation and 3 are freely available
Standard parameters	Stirrer speed, temperature, pH, pO ₂ , (anti-) foam, TotalFlow, GasMix, pumps 1-4; AirFlow, N ₂ Flow, O ₂ Flow, CO ₂
Connectivity	OPC UA via Ethernet

Options & accessories

The Minifors 2 grows with your requirements: gain deeper insight into your bioprocess with additional sensors or combine several Minifors 2 to form a virtual parallel bioreactor.

Choose from ingenious options to work more efficiently.



eve®: The bioprocess platform software

eve® can do more than just plan, control and analyse your bioprocesses. The eve® software integrates workflows, devices, bioprocess information and big data in a web-based platform that lets you organise your projects. Thus, you maintain an overview of your projects and can efficiently execute them thanks to extensive monitoring and analysis options.

The platform software ready for big data and comprehensive management of bioprocesses

- Planning, control and analysis
- Integrated workflows, devices and bioprocess knowledge
- Web-based project organisation
- Communication using the latest OPC UA standard
- Synchronisation of process-related events such as sampling or inoculation

Additional balance

- Connection of an external balance possible
- Use for precise gravimetric feeding or dosing possible
- For advice in choosing appropriate scales, contact your local INFORS HT service partner

Exhaust gas analysis

- Analysis of oxygen and carbon dioxide concentrations in the exhaust gas of the bioreactor
- BlueInOn or BlueVary sensor from BlueSens
- Connects directly to the bioreactor
- Additional information gained via eve® soft sensors such as
 - Oxygen Uptake Rate (OUR)
 - Carbon Evolution Rate (CER)
 - Respiratory Quotient (RQ)

Biomass sensors

ASD12-N sensor from Optek

- Based on IR turbidity measurement from 840 nm to 910 nm
- Connects directly to the bioreactor through an integrated transmitter
- Provides real time information about the biomass concentration without sampling

CGQ BioR by aquila biolabs

- For microbial applications
- Non-invasive sensor, no autoclaving needed
- Is attached to the external vessel wall
- Provides real time information about the biomass concentration without sampling