



# 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 microbial applications.



### All this – and more.

The Minifors 2 comes as a complete package with everything you will need for the culture of microorganisms. The fully equipped culture vessel is located on a compact base unit with four freely configurable pumps, pH and pO<sub>2</sub> sensors, two 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.



### 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.

### 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.

### 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. Analyze and compare the results with numerous visualization tools and organise the bioprocess knowledge you obtain as a result.



At the heart of our quality label is Switzerland – a center of research, development and manufacturing, where accredited experts guarantee the top-notch quality of the materials, workmanship, safety and reliability that characterize our shakers and bioreactors.



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## 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 optimized 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 of up to 1600 min<sup>-1</sup>
- 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, pO<sub>2</sub>, 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 (MFC)
- Operation with air, air/O<sub>2</sub>, or air/N<sub>2</sub>
- Integrated pressure sensor for detecting a blocked filter
- Gassing optimized for bacteria applications: specific gassing rate (vvm) up to 2.0 min<sup>-1</sup>
- Multiple cascades for pO<sub>2</sub> 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)
- Profile-based control of pump speed (requires eve®)

## Sensors

- Robust, digital connection of pH and pO<sub>2</sub> sensors
- Optical pO<sub>2</sub> sensor: immediately ready for use as no polarization is required
- Storage of calibration data in the sensor head
- Product calibration of the pH sensor for reliable measurements during long-running bioprocesses
- Compatible with Hamilton ARC



## Operating unit

- Integrated 7" touch screen (17.8 cm)
- Simple handling through intuitive menus and practical on-screen help
- Calibration of pH, pO<sub>2</sub> 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               | Direct drive with 150 min <sup>-1</sup> to 1600 min <sup>-1</sup>   |
| Temperature         | 20 °C via coolant to 60 °C  |
| Gassing             | 2 mass flow controllers for gassing rate (vvm) up to 2.0 min <sup>-1</sup>  |
| 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 3.46 mL min <sup>-1</sup> (standard),<br>0.017 to 17.16 mL min <sup>-1</sup><br>0.0012 to 1.24 mL min <sup>-1</sup>           |
| Ports               | 4 x 10 mm, 4 x 7.5 mm, and maximum 7 x 12 mm (Pg13.5): pH, pO <sub>2</sub> , exhaust gas cooler, inoculation and 3 are freely available |
| Standard parameters | Stirrer speed, temperature, pH, pO <sub>2</sub> , (anti-) foam, TotalFlow, GasMix, pumps 1–4  |
| Connectivity        | OPC UA via Ethernet   |

Contact us for individual advice.

[www.infors-ht.com/minifors2](http://www.infors-ht.com/minifors2)

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## Options

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 organization
- Communication using the latest OPC UA standard
- Synchronization of process-related events such as sampling or inoculation

### Additional balance

- Connection of an external balance possible
- Use for precise gravimetric feeding 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
- BlueInOne sensor from BlueSens
- Connects directly to Minifors 2
- Additional information gained via eve® soft sensors such as
  - Oxygen Uptake Rate (OUR)
  - Carbon Evolution Rate (CER)
  - Respiratory Quotient (RQ)

### Biomass sensor

- ASD12-N sensor from Optek
- Based on IR turbidity measurement from 840 nm to 910 nm
- Connects directly to Minifors 2 through an integrated transmitter
- Provides real time information about the biomass concentration without sampling