

μ Flow

Low gas flow
measurements



bioprocess
CONTROL

www.bioprocesscontrol.com

Innovation in low gas flow measurement

A compact and elegant solution

The μ Flow is a compact and elegant instrument for measuring ultra-low gas flows with high precision. It has been designed for the online, real-time monitoring of all inert and slightly aggressive gases, over a wide detection range and for most indoor laboratory scale applications. Suitable applications include biogas process studies, ethanol fermentation, dark fermentation for bio-hydrogen and leak rate detection.

An entirely new level of precision

The μ Flow is a flow meter for ultra-low gas flow detection. Its design and precise calibration delivers highly precise measurements ($CV \leq 1\%$) with a resolution of 9 or 2 Nml. The μ Flow thus offers a level of precision that is unmatched, meeting the needs of the most demanding labs and user applications.

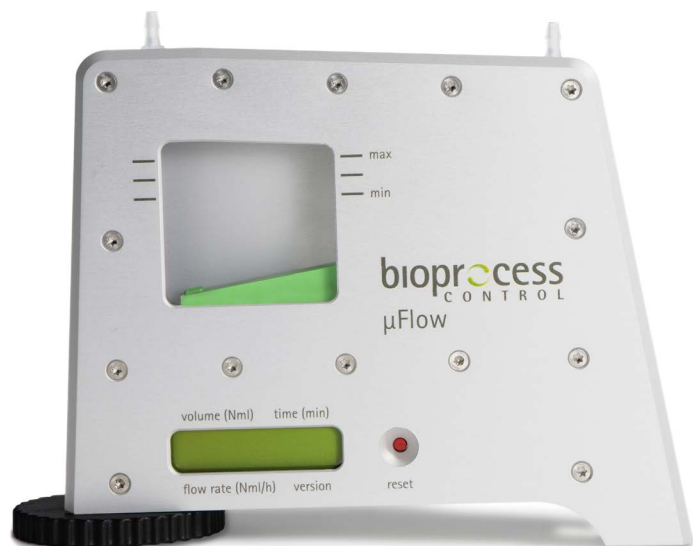
A flow meter with zero labour requirements

Gas flow measurements have never been so easy. The μ Flow has an on-board LCD display for the real-time visualisation of normalised gas volume and flow rate, with a standard analogue output signal option for gas flow rate. Since all gas flow measurements are taken online and in real-time, with the μ Flow there are simply no labour requirements, thus freeing up time for more important activities.

Precision

+/- 1%

2
measuring
resolutions



Automatic normalisation
of gas flow and volume
measurements with
real-time temperature and
pressure compensation



Gas flow and volume normalisation

The µFlow automatically normalises gas flow and volume measurements with real-time temperature and pressure compensation. This allows for gas measurements and data presentation to be standardised and the impact of measurement conditions minimised. The temperature and pressure of the gas are measured every time a flow cell opens, allowing the user to derive exact kinetic information compensated for any variation over time. The volumes are normalised to 0 °C and 1 atm.

Large detection range

The µFlow provides a large detection range, with high linearity from 4 to 850 ml/h for 2 ml flow cell and 20 to 4000 ml/h for 9 ml flow cell. This makes it highly suitable for most lab- and small pilot- scale applications. This flexibility means that the µFlow is an extremely versatile instrument for low gas flow measurements, with a high level of precision. Overall, it is not only an instrument that is a must for biogas labs, but also any application where the precise measurement of inert and slightly aggressive gases is needed.

Measuring range:
4 to 850 ml/h
20 to 4000 ml/h

Highly flexible solution

The µFlow is a highly flexible low gas flow measurement device. Users can operate it as a stand-alone instrument for a specific application or combine it with other technologies, such as the 5 l and 10 l glass and steel bioreactors offered by Bioprocess Control, providing for an accurate simulation platform.

µFlow can also be operated with a data acquisition system, such as µFlow Data Logger or Universal Data Logger offered by Bioprocess Control, for automatic gas flow monitoring. This allows users to conduct multiple gas flow and volume measurements with little effort, and without wasting valuable bench space.

An integrated gas flow solution

The µFlow is an integrated gas flow measurement device from several perspectives. The unit offers a standard analogue current signal output for automatic data acquisition and provides users with an embedded timer and reset button for easy logging of accumulated gas volume and its flow rate over a defined period of time.

The unit is also precalibrated to ensure measurement accuracy, offers a glass window for the viewing of flow cell movement and has an adjustable foot to ensure the correct installation position for high precision measurements.

The µFlow truly offers an unmatched level of integration.

Data acquisition system for μ Flow



A software application designed for real-time monitoring

The μ Flow computer-based software application has been designed for the monitoring and logging of any gas production process, including biogas/biomethane production, ethanol fermentation, dark fermentation for bio-hydrogen and leak detection. This user-friendly application allows you to have a direct visualization of the gas flow variation during the process.

Setting up an experiment and monitoring its progress are straightforward. Moreover, all the results are presented in a simple format suitable for easy analysis. The μ Flow system is a natural and convenient extension for your experiment set-up.

An integrated hardware and software package easy to install and use

Software that
can control up to
eight μ Flow units

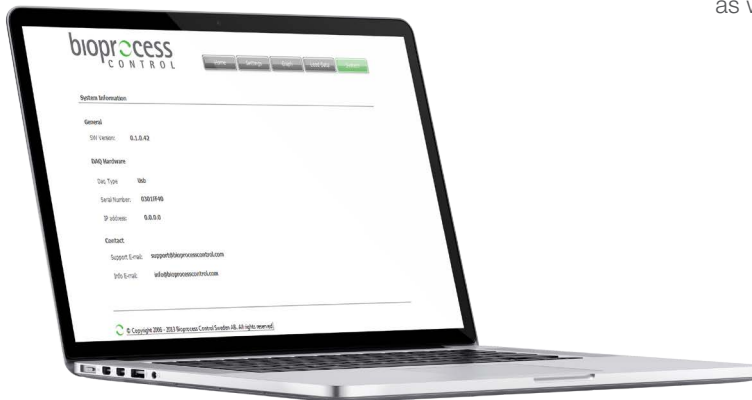
A simple experiment setup

The Settings feature of the μ Flow software application allows users to define up to eight channels. For each channel, the current flow rate is displayed, based upon the mean value over the last minute of gas production.

Full control of an experiment

The Graph feature of the μ Flow software application allows users to follow their experiment in real-time. Users can easily monitor the flow rate of each gas flow channel by selecting and viewing only those channels they wish to see.

Moreover, gas flow measurements are automatically normalised to 1 atm and 0 °C. This flexibility allows μ Flow users to always know the status of an experiment, as well as the data being produced.



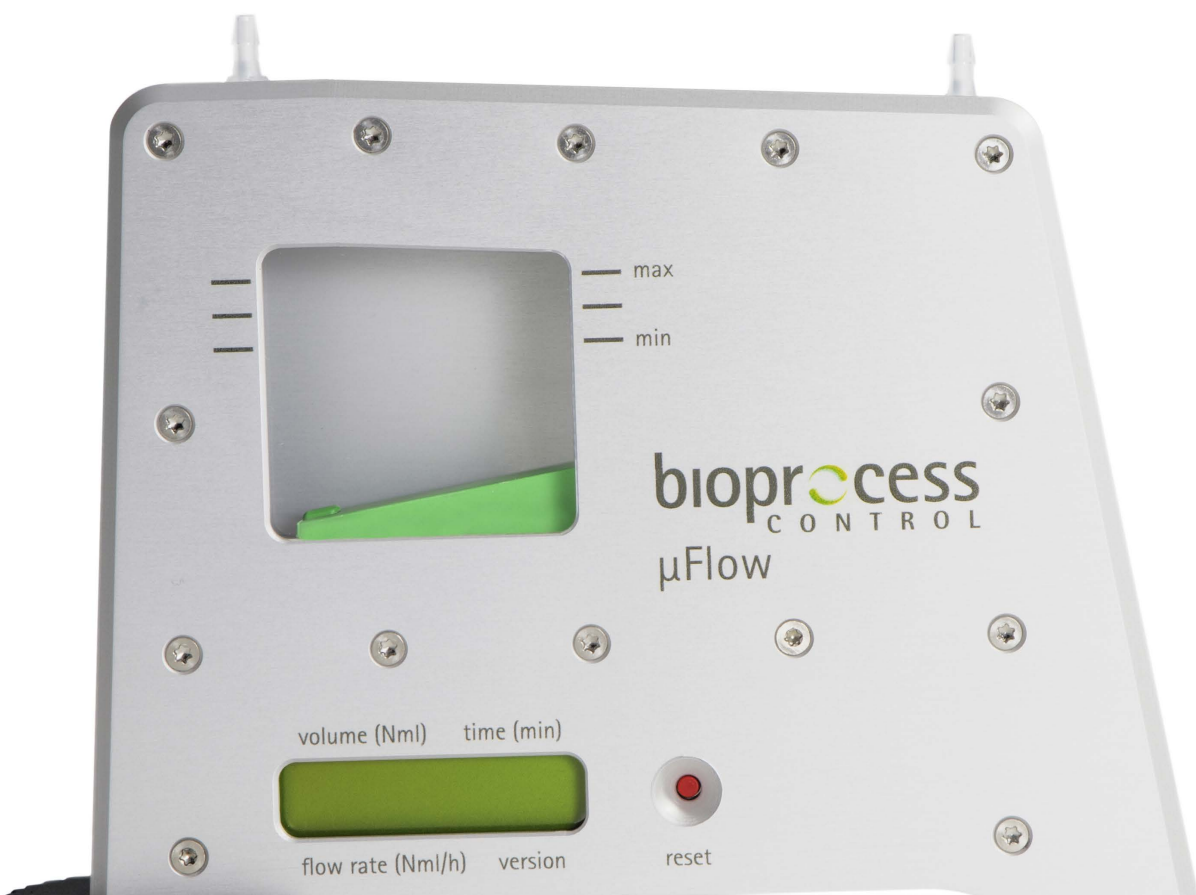
Wide user base and application areas

User base

The μ Flow is currently used by academic scientists, public and private laboratories, organic waste handlers, wastewater treatment plants, food and beverage industries and producers of energy, biogas, bio-ethanol and bio-hydrogen.

Application areas

The μ Flow can be used for the online, real-time monitoring of all inert and slightly aggressive gases, over a wide detection range. It is thus suitable for low gas flow biogas process studies, ethanol fermentation, dark fermentation for biohydrogen production and leak rate detection.



Technical specifications

µFlow unit

Measurement resolution: 9 ml or 2 ml

Measuring range: 20 to 4000 ml/h for 9 ml flow cell and 4 to 850 ml/h for 2 ml flow cell

Signal output for flow rate: 4–20 mA

Repeatability: 1%

Working principle: liquid displacement and buoyancy

Build-in sensors: pressure and temperature

LCD display: normalised gas flow (Nml/h), volume (Nml) and time (min)

Materials: high quality aluminium

Dimension: 19 x 14 x 6 cm

Weight: 1100 g

Power supply: 12 VDC with 100–240 VAC 50/60 Hz power adaptor

Usage: indoor applications for inert and slightly aggressive gases



µFlow data logger
(USB Configuration)



Universal data logger
(Ethernet Configuration)

Software and data acquisition features

- Automatic data acquisition system which supports up to eight µFlow devices
- Automatic logging of process parameters, real-time display of parameters trend curve and report generation. µFlow data logger: gas flow rate. Universal data logger: gas flow rate, temperature, PH, gas composition, etc.
- Unlimited* logging of data points
- Software running on an external computer
- Supported operating systems: Windows** 10/8/7/Vista (32-bit and 64-bit).

- Available in two configurations, either with Ethernet or USB interface
- Power supply: 24 V DC / 1.5 A
- Dimension: Ethernet version 228 x 125 x 53 cm, usb version 170 x 167 x 34 cm
- Usage: indoor

* Depending on the free space available on the HDD used for installation.
** Windows is a registered trademark of Microsoft Corporation in the United States and other countries.

µFlow Features

- Large linear detection range (up to 4000 ml/h) that fits perfectly with most of lab- and small pilot- scale applications
- Embedded timer and reset button for manually logging of accumulated gas volume over a defined period of time
- Automatic gas flow and volume normalisation with real-time temperature and pressure compensation allows for gas measurement standardisation
- Standalone applications and combined usage of the data acquisition system for automatic data logging and display
- Adjustable foot and horizontal gauge to ensure the correct installation position for high precision measurements
- Standard signal output of gas flow rate for automatic data acquisition
- Low maintenance requirements
- Glass window for visualisation of flow cell movement
- Pre-calibration to ensure measurement accuracy
- Available in two measuring resolutions

Bioprocess Control – smart instruments for smart people

Bioprocess Control is a market leader in the area of low gas flow analytical instruments for biotechnology related applications. We invest in innovation and development of smart instruments that allow for more efficient, reliable and higher quality research and analysis, leading to significant reductions in time and labour. We ensure the highest product quality throughout our portfolio, and focus on being service minded and always meeting the needs of our customers.

The company's flagship product, the Automatic Methane Potential Test System (AMPTS), has become the preferred analytical instrument around the world for conducting various anaerobic batch fermentation tests. Bioprocess Control's product portfolio offers academic and industrial actors working with biogas, animal feed, wastewater, and other fields exciting products for low gas flow measurements, substrate analyses and process simulations.

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