



Flow control

Precise gas flow control
for repeatable fermentation processes

We make ideas flow.

bürkert
FLUID CONTROL SYSTEMS

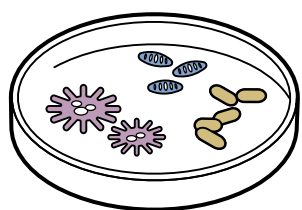


What matters is the mixture

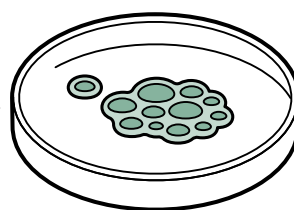
Be it research laboratory or pilot plant: The key to fermentation is controlling gases and liquids exactly. This is the only way to ensure the required quality of the end product. Besides a safe and clean working method, reproducibility of the processes plays a key role. Why is it so important? If you want to produce an identical product at a later date, you need retrievable data for precise gas dosing.

Moreover, you need to be able to specifically influence the fermentation process at any time in order to optimise growth of the end product. The right mixture allows you to control gases continuously.

Fermentation in the laboratory places high demands on the applied bioreactors or fermenters. Whether you are cultivating cells or microorganisms – the materials used must be compliant and approved, the process data documented and evaluable. It is important to operators to have everything under control – which is why they rely on processes that are traceable at all times.



Bacteria, yeast and fungi



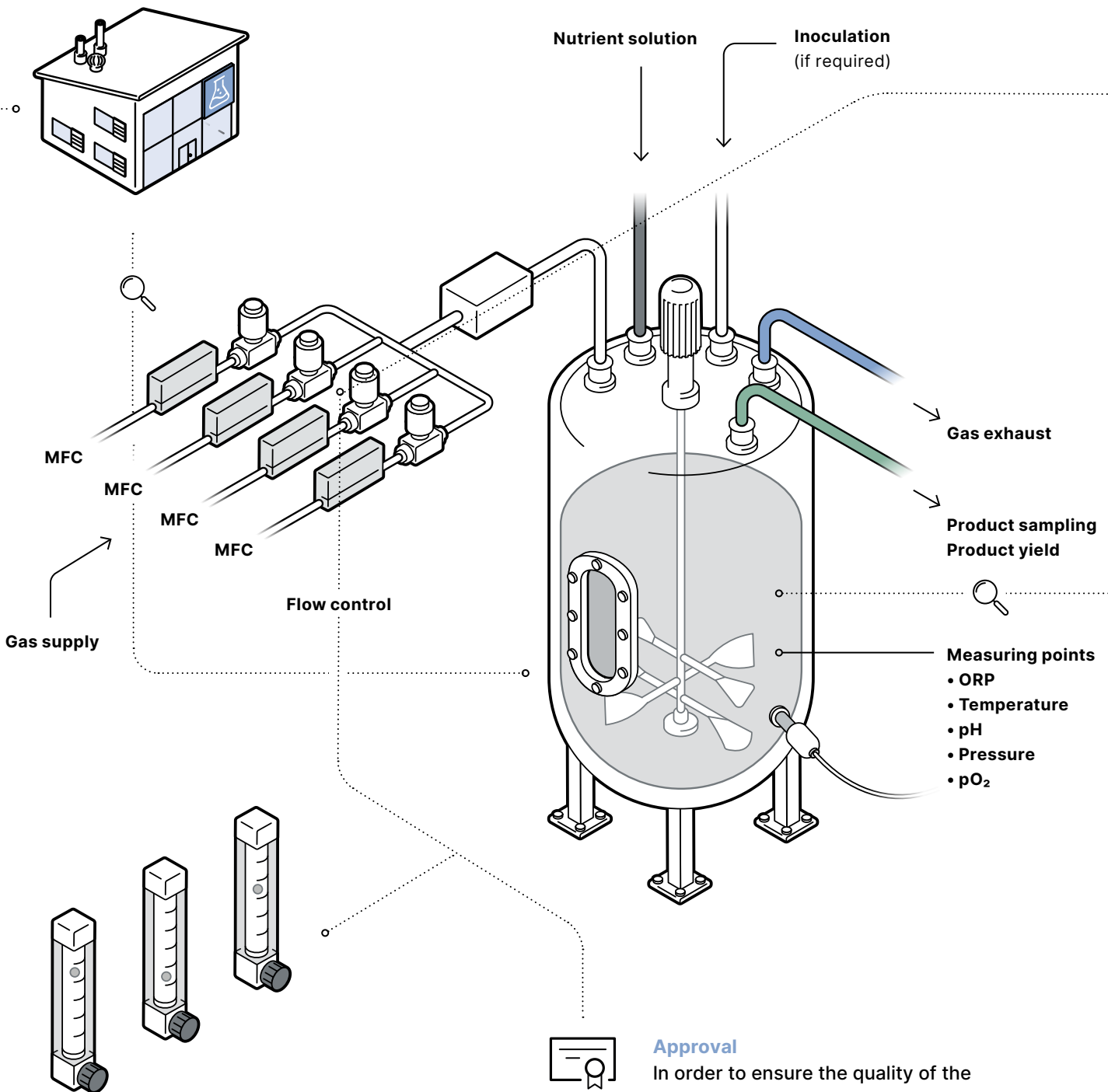
Cell cultures

Do your bioreactors or fermenters have to dose and control gases precisely and with a high degree of repeatability?

Discover on the following pages what difference the right mass flow controller can actually make.

Permanent quality

A bioreactor or fermenter in a laboratory must ensure consistently high quality. To do so, it needs optimum inner conditions for the respective end product.



Conventional solution

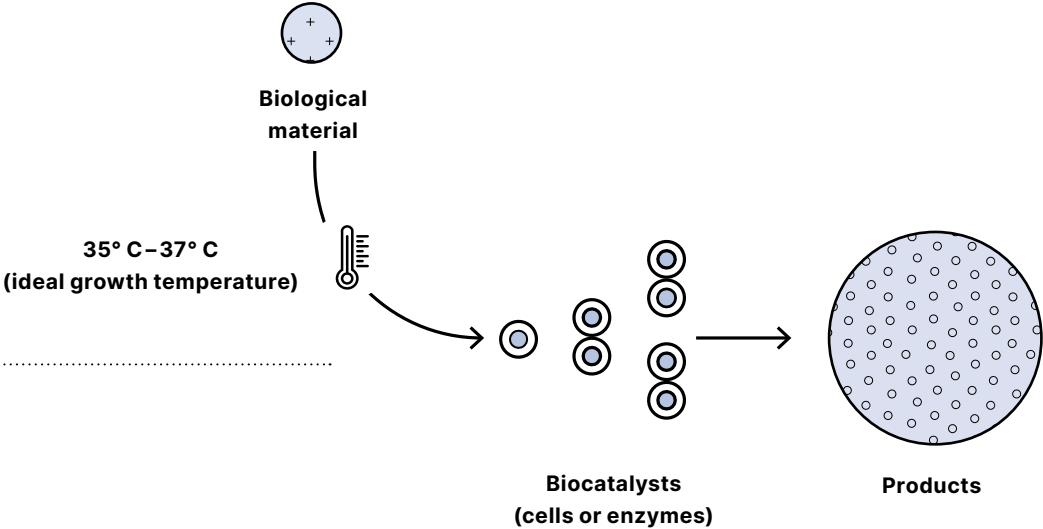
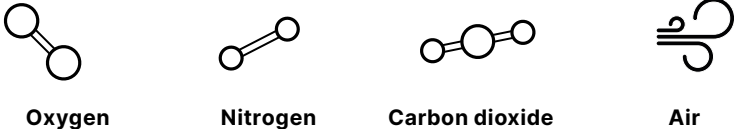
Rotameters are mechanically acting floating flow meters. The principle is based on a volume flow measurement. They must be accurately calibrated and only work at the pressure and the temperature to which they have been set.

Approval

In order to ensure the quality of the end product, the components used must conform to the applicable approvals.

Gas supply

Four gases are mainly used in the fermentation process: Oxygen O₂, nitrogen N₂, carbon dioxide CO₂ and air. To ensure optimum product growth, they need to be controlled properly.



In biotechnology, **fermentation** refers to the conversion of biological materials with the aid of biocatalysts (e.g. enzymes or cells) and optimum temperature conditions.

Controlling gases precisely

Bürkert mass flow controllers (MFCs) make the fermentation process reproducible. Because they can help automatically set the flow rate with the highest repeatability. The devices comply with USP Class VI, FDA and can be delivered with a 3.1 certificate. In contrast to measurements with rotameters

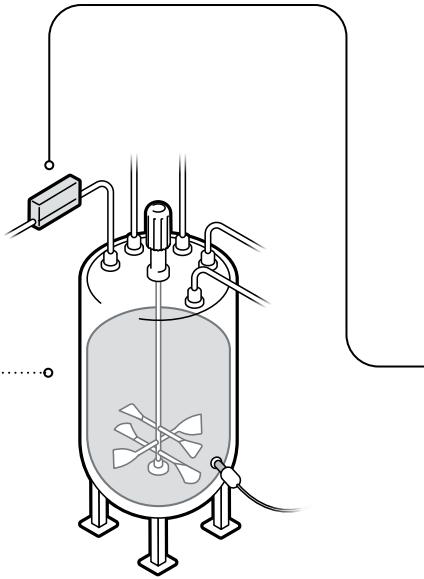
and needle valves, they guarantee high quality and identical processes. Thanks to the high control range, they precisely control the smallest and greatest quantities of gas.



**Mass flow controller
Type 8741 and Type 8745
Ethernet**

The available interfaces:

- Industrial Ethernet: PROFINET, EtherNet/IP, EtherCAT, Modbus TCP
- Fieldbus: CANopen, RS485/ Modbus and PROFIBUS-DP via a gateway
- Standard signals : 0/4 ... 20 mA, 0 ... 5/10 V (switchable)



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Biocompatible

Bürkert MFCs are biocompatible and USP Class VI compliant. This guarantees you, as a manufacturer, reliability for your processes.



Long-term stable

Due to the direct sensors used, which have no sensor drift, the calibration intervals are significantly longer than with conventional sensors.



Reproducible

MFCs make your processes reproducible using precise sensors with a high degree of repeatability and proportional valve technology.



Available

Process data is permanently available, thereby enabling 24/7 control and monitoring of the fermentation process.



Ready to use

The MFCs are compact, ready-to-use components. Simple cabling and configuration facilitate fast start-up.



Traceable

Bürkert products comply with 3.1 certificates, thus ensuring the origin of the stainless steel used can be clearly documented and traced.



Scalable

High control ranges (> 100:1) to adapt the gas control to the respective process progress at any time.



Reliable

Due to the tight closing proportional valves in the MFC, no additional on/off valves are necessary to ensure 100% tightness.

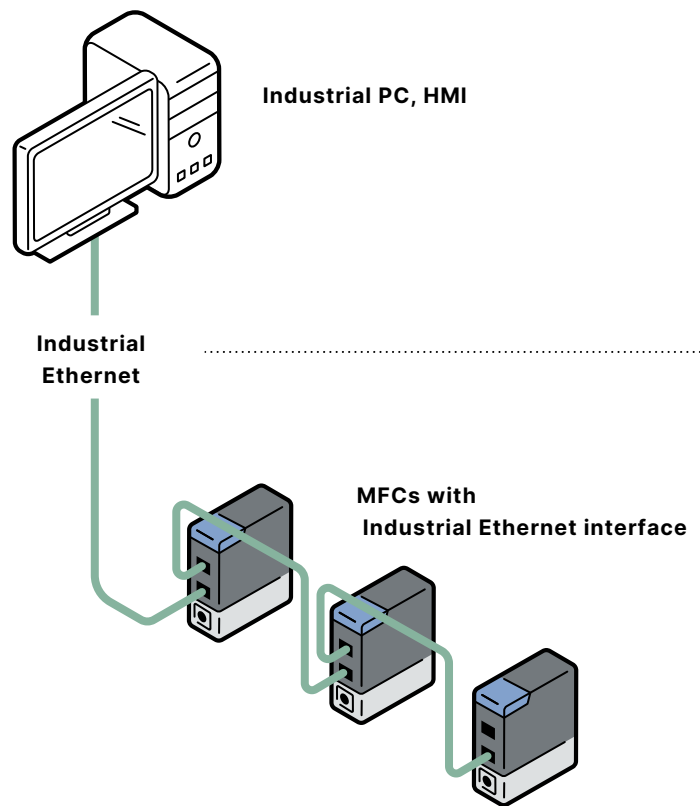


Precise

Direct-measuring thermal and direct-acting proportional valves ensure maximum precision and quick reaction times.

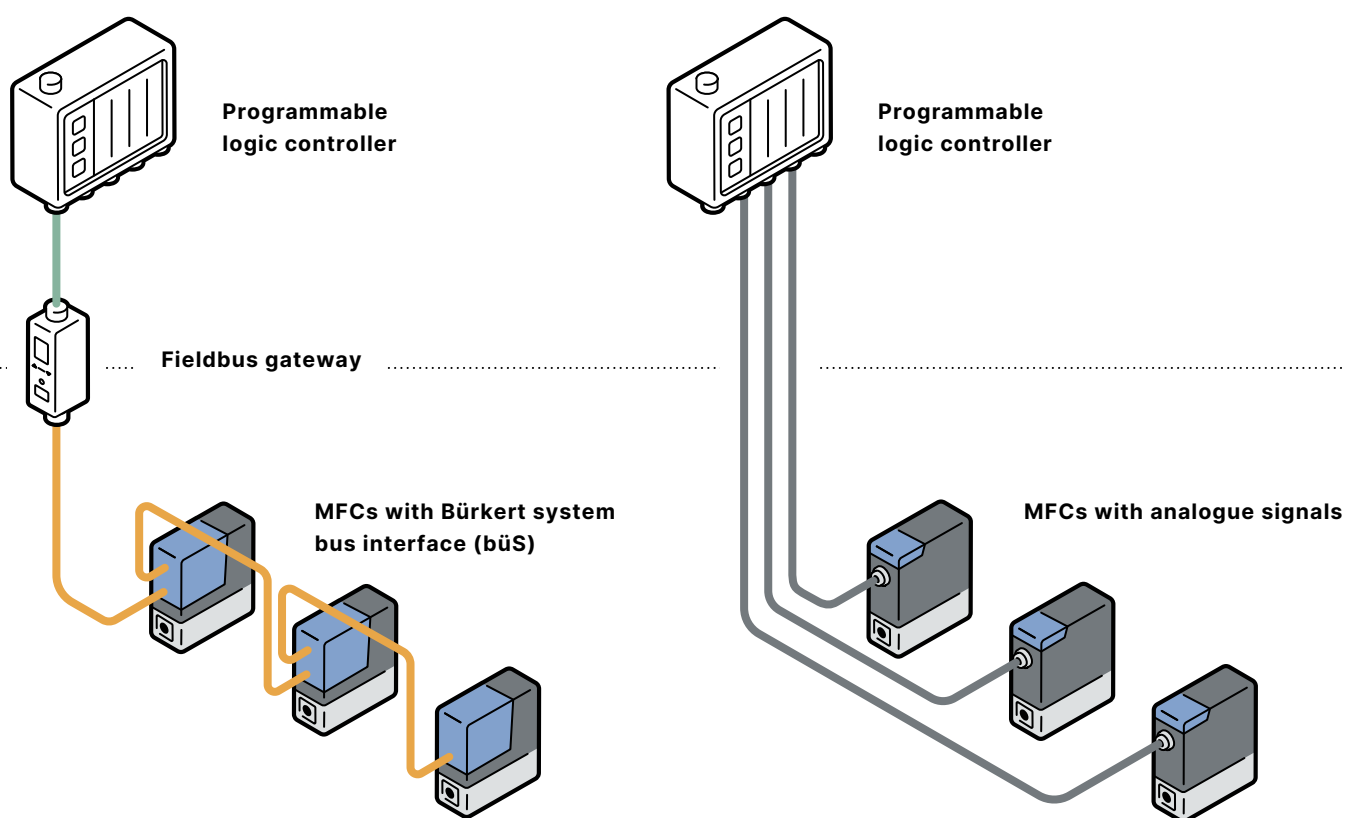
Simple connection

Regardless of which communication standard you use, the MFC solutions can be easily and flexibly connected to your existing interfaces.



Ethernet concept: MFCs are connected directly to the higher visualisation level with an integrated Industrial Ethernet switch.

Connection via Ethernet guarantees direct access to the field devices. No further modules are required.



Bürkert system bus concept: MFCs are connected to the Bürkert fieldbus gateway via the CANopen-based bÜS interface.

This solution is suitable for applications with numerous gas flow control loops. Start-up is simple: If required, you receive preconfigured MFC systems and connect them to the PLC via a gateway. Digital communication gives you permanent access to the status of your devices.

Standard signal concept: MFCs are connected to the existing I/O system via analogue interfaces.

If you connect MFCs via analogue standard signals, you can continue to use the existing automation concept. An additional advantage: You simply adapt the concept to the number of MFCs required.

Plug-and-play systems

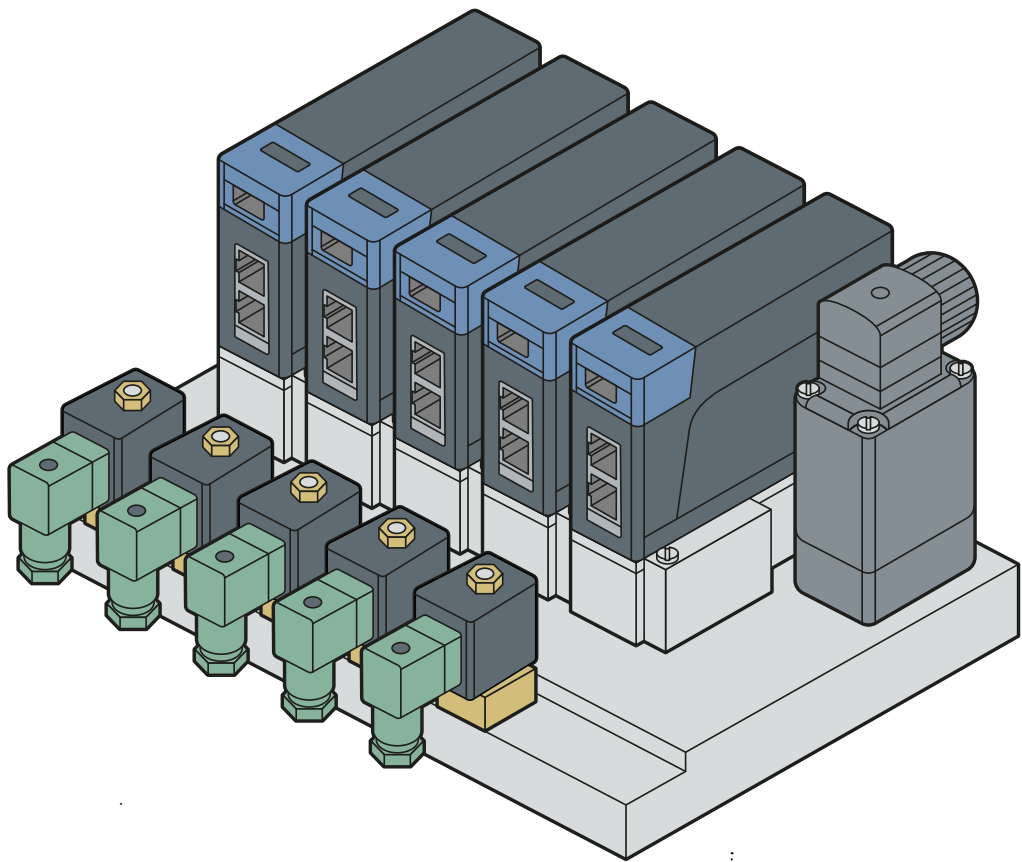
Why install individual MFCs when you can have a customised complete solution? We assemble your gas mixing unit exactly according to your requirements – thus saving you both time and money. The compact unit consisting of space-saving

mass flow controllers arranged side by side, including valves, can be integrated into your plants in no time at all.



Modular gas mixing units - customer specific

You profit several times over from plug-and-play system solutions: This means you do not need to order, store and assemble any individual parts. Additionally, you also avoid the need to test the tightness, electrical function and pressure resistance. And you receive compact and easy-to-use systems.



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