

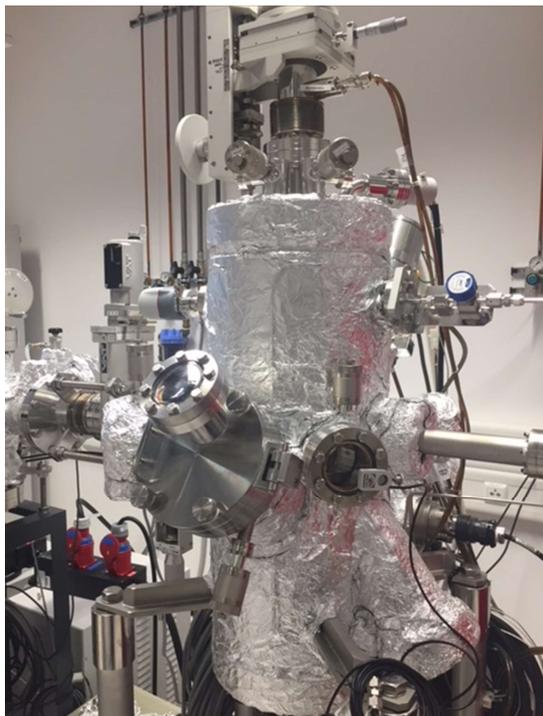
Mass flow control for bioreactors

Biotechnology has led to breakthroughs in many areas of modern industry. From new products and the sophisticated use of raw materials, but also to more efficient and environmentally friendly production of known substances and necessary materials. In addition, consistent quality can be achieved through tightly controlled, repeatable bio-reactor processes.

Besides the pharmaceutical industry, bio processes are being researched to produce fuels in the quest for environmentally friendly fuel alternatives.

With fermentation processes, in which the biocatalytic action of enzymes is used, pharmaceutical or chemical active ingredients are more efficiently produced under sustainable, high yield conditions.

The progression of laboratory processes to industrial scale operations has to be consistent. Mastery of these large-scale processes must now not only have the desired end product, but also cost-effectiveness. The precise determination of the operational parameters, quantities, dimensions and times is crucial and must be accurately recorded in the laboratory plant with ease. With the proper instrumentation, very small flows and dosing quantities can be precisely monitored and dispensed in R & D laboratories and in pilot prototype construction.



Large scale production plants need to be built with an eye on saving both space and costs, which is why the number of instruments and additional lines should be minimized. Measuring instruments are therefore needed which detect both very small and large quantities in single flow circuits, since these circuits must be designed for the greatest possible range of flow to keep production costs as low as possible.

In flow measurement technology this usable range is often problematic, as many measuring instruments in their lower measuring range have a much worse or even unacceptable performance specifications.

Another crucial point in the field of bioprocessing are the materials requirements for all technical components.

The contamination of sensitive bio-reactor environments must be prevented, which is why high grade materials, especially elastomers, must be used in these processes.

In addition, equipment and pipes are often susceptible to backflows of system moisture and should remain functional under these conditions without requiring additional maintenance or cleaning.

And like most modern processes, digitization and connection to data systems require precise multi-parameter data acquisition and fast measurement reaction times to achieve control set points.

Another key factor in cost effective production of bio-process materials is the flexibility of instruments to change as the producer's product offering changes. Processes need to be adapted to new insights and customer requirements. Of course, existing equipment, including measurement devices, should be able to be used without sending them to the manufacturer for reconfiguration.

For these requirements in bioreactor construction, such as upstream or downstream processes, conventional mass flow meters and controllers are often not suitable or very expensive, as they require many customizations to viably be used in the new process.

Flow measurement and control for the bioprocess industry

TrigasDM is now presenting a special mass flow controller for the bioprocess industry in the German market as Alicat's sales and service partner. This new instrument delivers exactly what bioengineers and developers need without unnecessary features of typically offered, option laden, standard devices with higher price points.

The Alicat BIO series offers control ranges of 2000:1, which often means fewer MFCs to control all the flow ranges required for particular gases with high and low flow requirements in a system. The accuracy specification of these devices in special flow-sizes has an excellent +/- 0.5% of the measured value **or** +/- 0.1% of the final value in defined parts of the measuring range. Compared to the previous offerings, this specification is a groundbreaking improvement, since the final value error has so far been additional for all brand-standard products and is also twice as high.

With ultra-fast response times of only 10 ms and optional fast EtherCAT or EtherNet / IP interfaces, the BIO series is ideally suited for Pharma 4.0.

Our mass flow controller is resistant to inline water contamination and is only made of USP Class VI (FDA) corrosion-resistant elastomers, as well as 316L stainless steel, which are on the ASME recommendation list and do not contaminate the bioreactor environments. All units are also certified not to contain any animal components.

An ultra-sharp, modern color display provides an overview of the process status at a glance. In addition, each BIO device has innovative features such as "gas selection".



This means that any device with CO₂, air, O₂, N₂ or more than 100 other gases can be used without sacrificing precision or requiring recalibration. The conversion and adaptation to new requirements is done simply via the device menu.

The devices also feature innovative process diagnostics of valve drive percentage right on the display panel, and via the digital feed. So for example, if the position of the control valve begins to increase under the same flow conditions, it could indicate blockages in the systems or other potentially process damaging conditions to be investigated.

Optionally, IP66 protection is also available.

Alicat underpins its high reliability with a lifetime warranty of the devices.

With the Alicat Bio-Series, TrigasDM is now at the forefront of the bioprocess industry in order to make processes highly repeatable and more precise, i.e. more efficient and cost-effective.



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