

Ensuring the right pressure

High-precision pressure controllers ensure reliable laboratory processes

Higher demands on throughput and precision – this is only possible with more automation in laboratory technology. Sensapex already equips more than 800 customers worldwide with high-precision micromanipulators, microscopes, and pressure controllers – from neuroscience research to in vitro fertilization (IVF) – to name only a few application examples. To work successfully the pressure controllers from Sensapex rely on the decentralized pressure and vacuum generator PGVA from Festo.

Many experiments in the life sciences depend on highly precise and reliable pressures. In neuroscience research, for example, all steps – from (viral) injection into the intact brain to patch-clamp recordings – require a controlled pressure source. In the past, researchers have even generated pressure by mouth. When higher pressures were required, syringes were used to manually apply pressure through a syringe. But even with gauge readings, neither method produces reproducible results because the stability of pressure application, precise timing and actual pressure levels can vary significantly.

Reproducible results

"We developed the uMc pressure controllers to simplify and automate common tasks in life science experiments while enabling reproducible experiments and workflows," explains Mika Niemi, General Manager of Sensapex, which is part of the Acuvi Group and based in Oulu, northern Finland. Oulu, a city not far away from the Arctic Circle, is known worldwide for its many high-tech companies in electronics and life sciences.

Switching to an automated pressure application allows preset pressure levels to be applied for specific times – either using internal timers or external trigger signals. Modern devices also allow rapid switching between positive and negative pressure. All Sensapex pressure application devices allow the application of externally set pressure levels. This is convenient, for example, to clean a clogged puff micropipette or to briefly increase the pressure before penetrating the connective tissue with a micropipette.

Automated pipette cleaning

Another interesting application for Sensapex pressure controllers is automated pipette cleaning in electrical recordings from single cells. Automated pipette cleaning allows the same patch clamp pipette to be used up to 100 times. During the cleaning process, the uMc micromanipulator moves the pipette to a special cleaning well containing the cleaning agent Tergazyme. The pressure controller generates precise pressure and vacuum, flushing the pipette tip with the cleaning agent. Meanwhile, the user can freely operate other

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micromanipulators and the microscope during the automatic pipette cleaning process. After cleaning and optional rinsing, the uMp micromanipulator automatically returns the pipette to the starting position and can be used again immediately.

Decentralized pressure and vacuum generator

For Sensapex, an important component for assuring well controlled and reliable application of pressure is the decentralized pressure and vacuum generator PGVA-2 from Festo. PGVA-2 offers a compact complete solution for laboratory applications. It integrates a compressor, air preparation including filtering and buffer storage. Additionally – for the required precise pressure and vacuum control – Sensapex uses up to eight piezo-based proportional pressure regulators VEAB from Festo in their uMc pressure controllers.

“Therefore, Festo’s decentralized PGVA-2 pressure and vacuum generator and the VEAB proportional pressure regulators are exactly the components giving our uMc pressure controllers the precision and reliability they need,” explains Niemi.

In applications, in which built-in regulation is required, the PGVA-1 from Festo is the right choice. This pressure and vacuum generator type integrates the proportional pressure regulators VEAB. The communication relies on a special design web browser based on a graphical user interface (GUI) or a controller. This allows it to operate easily and to have a pressure controller unit in a minimum of space. Regardless of whether laboratory processes such as pipetting medical samples or dispensing with a dosing head are involved, PGVA provides a self-sufficient solution for handling liquids in laboratory applications. All that is needed is a 24-volt power supply to have a pressure- and vacuum-supported solution.

About Acuvi:

Acuvi is a group of companies that provides world-leading systems and technologies that enable higher precision and increased miniaturization. The customers can be found in, among other things, Life Science, the semiconductor industry and advanced optics. Acuvi’s shares are traded on Nasdaq First North Growth Market.



Sensapex - uMc pressure controllers

Higher throughput and accuracy: lab automation with uMc pressure controllers from Sensapex relying on piezo-based pressure regulators VEAB from Festo.



Sensapex - complete system

A complete solution for higher throughput and accuracy in lab automation – including microscopes and pressure controllers from Sensapex as well as the pressure and vacuum generator PGVA-2 from Festo.



Sensapex - Mika Niemi

Mika Niemi, General Manager of Sensapex



Sensapex - VEAB proportional pressure regulator from Festo

Sensapex uses up to eight piezo-based proportional pressure regulators VEAB from Festo in their uMc pressure controllers.



Sensapex - PGVA-2 pressure and vacuum generator from Festo

For Sensapex, an important component for delivering well controlled and reliable application of pressure is the decentralized pressure and vacuum generator PGVA-2 from Festo.