

Smart pipetting for safe laboratory processes

Pressure-controlled liquid handling systems are genuine alternatives

Handling the smallest amounts of liquids down to the microlitre range requires high levels of precision and flexibility because of the changing fluid properties of the different media. Pressure-controlled liquid handling systems enable precise, scalable liquid handling. Festo has suitable solutions for these systems, whether for pipetting, dispensing or aspirating. Individual modules are available, such as the smart pipette head DHOP, but as well the complete multi-axis gantry EXCL, which can process several tasks at the same time thanks to two Z-axes.

Many life science applications rely on precise and repeatable liquid handling, whether for in vitro diagnostics or pharmaceuticals. Sample preparation processes often involve pipetting patient samples as well as dispensing and aspirating reagents in the microlitre range, all carried out in high throughput. Automated liquid handling robots overcome these challenges, but they are expensive and often include functions that are not needed. There is an alternative: pressure-controlled liquid handling systems. They offer a simple, fast and cost-effective way of precisely and reliably handling liquid volumes on a microlitre to millilitre scale by automating and linking sub-processes and, if needed, equipping them with the appropriate kinematics.

Intelligent pipetting

When pipetting sensitive patient samples and filling the microwell plates, it is important to avoid contamination and mixing DNA. The intelligent pipette head DHOP, set up with the finely tuned disposable tips DHAP from Festo, ensures reliable pipetting results. The plug and work solution is a closed-loop controlled pipette with proportional control with piezo technology. Many integrated functions optimise process reliability and simplify operation. This allows the smart pipette head to automatically set the specified target volume, independently of the liquid. Functions such as picking sensing and ejecting the disposable tips or the feedback about the pipetted volume have already been solved in the system.

Efficient dispensing and aspirating

In the next process step, reagents are added to the patient samples. Here, dispensing with a dispense head in the 9 mm grid of the microtitre plates is usually more efficient and reduces the process time. Different or identical liquids are distributed during this process step. This is where the pressure-controlled dispense head VTOE comes into its own: with up to eight channels, it offers many possible applications for precisely dispensing various liquids and filling quantities. The dispense head VTOI, on the other hand, distributes only one liquid. All eight outputs are controlled with just one valve. This means that larger flow rates are possible. Its design also allows it to be mounted in series, so that 12 valves can dispense 96 wells. When working with antigens or cultivating cells, liquids always need to be aspirated quickly and reliably. The dispense head VTOI is also suitable for this purpose, as it can be operated with

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Individually conceptualised and shipped ready-to-install

Reliability, precision and compact dimensions are key when handling liquids in laboratories. Instead of working with individual modules, users can also implement ready-to-install subsystems that have integrated, additional handling systems. Such a solution reduces the engineering effort and increases productivity, as all components are coordinated with each other. One example of this is the three-dimensional gantry EXCL with a small footprint and a motion/motor controller based on a highly integrated circuit board. The functionality of the system can be further extended with two independently traversable Z-axes. It is therefore ideal for analytical processes where sample vessels are to be opened and liquid samples pipetted in the same workspace.

Persfoto's



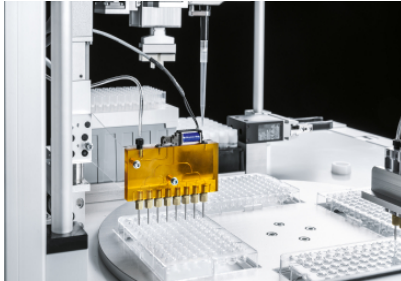
Pipetting

Reliable pipetting results: intelligent pipette head DHOP set up with the finely tuned disposable tips DHAP.



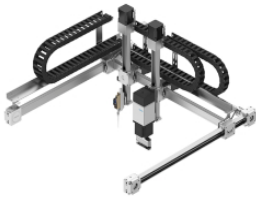
Dispensing

Dispensing various liquids and filling quantities: the dispense head VTOE from Festo offers a wide range of possible applications.



Aspirating

Fast and reliable aspiration: the dispense head VTOI controls all eight channels with just one valve.



Three-dimensional gantry EXCL

The three-dimensional gantry EXCL can accommodate two independent Z-axes, with a rotary gripper for opening and closing on the right and a pipetting system for aspirating and dispensing on the left.