

Festo Advances High-Throughput Automated Pipetting with Closed-Loop Control



When dispensing volume is independent of viscosity, as it is with the DHOP, microfluidic speed and flexibility increase.

News Release

ISLANDIA, NY, February 27, 2023 — [Festo](#) introduces the DHOP closed-loop pipette head for high-speed robotic pipetting applications requiring consistent volumes over a wide range of liquid viscosities. The DHOP pipette head provides the utmost in automation flexibility, speed, and feedback when devices handle many liquids.

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Based on Festo's innovative air-over-liquid fluid handling system, the DHOP pipette ensures that aspiration and dispensing are independent of viscosity. By measuring the pressure change when a liquid is aspirated or dispensed, the device is able to calibrate for different viscosities without user input. Faster changeover between liquids leads to higher throughput and maximum device utilization.

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Applications for this closed-loop pipette head include pre-analytical sample preparation of patient samples, where liquid properties of the sample might change patient to patient. Festo Life Science personnel work with OEMs from inception to implementation, which brings products to market faster, with less engineering overhead and risk.

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The DHOP closed-loop pipette head seamlessly integrates with Festo's world-class mechatronic systems, including the new EXCL multi-axis gantry that lowers engineering, acquisition, and assembly costs while increasing machine capabilities.



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In the Festo air-over-pressure system, liquid aspirates into the disposable tip using vacuum and dispenses using pressure. The DHOP is compatible with the new PGVA-2 pressure and vacuum generator, a compact solution for laboratories without a central compressed air supply. A single PGVA-2, which allows the pressure supply to be centralized, can operate up to 8 DHOP. Festo designs its components, such as the EXCL, PGVA-2, pipettes, and other components, to interoperate, which reduces engineering and lowers risk.

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The DHOP is compatible with the just introduced DHAP disposable pipette tips. DHAP disposable tips prevent contamination when handling different liquids because a new tip is automatically used for every pipetting process. Picking, sensing, and ejecting – the complete automated handling process for disposable tips – is integrated into the DHOP pipette-head system.

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DHOP provides the control system with feedback on every pipetted volume for traceability and quality assurance. The internal controller adjusts the target volume and returns the achieved value to the controller. Pressure-based liquid level detection prior to aspiration ensures

maximum precision. Any foam on the surface is ignored in level detection. The liquid velocity is adjusted by changing the pressure on the system; this allows for soft dispensing with sensitive media or better droplet separation with small volumes.



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DHOP advantages include:

- A single product for the complete volume range
- Maximum precision through closed-loop control
- Intelligent functions such as liquid level detection and multiple dispensing
- Complete handling process for the disposable tips, from detecting tip attachment to automatic ejection
- Easy commissioning with integrated WebGUI
- Easy integration with Festo mechatronic systems for a complete microfluidics solution

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Specifications include:

- Pipetting volume 1...1000 μ l
- Viscosity range 0.1...40mPas
- Pipette tip volume 20, 300, 1000 μ l
- 18 mm grid for microwell plates
- Communications Ethernet/Modbus, RS232, and can be operated manually via web interface

For more information on Festo Life Science solutions – dispensing liquids, controlling gases, and handling and gripping vials –

email life.sciences.nam@festo.com and visit [Festo Laboratory](#)

[Automation](#). Visit www.festo.us for the full range of products.

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Closed-loop pipette head

The DHOP closed-loop pipette head provides the utmost in automation flexibility, speed, and feedback when using many liquids.

About Festo U.S.

Festo is a leading manufacturer of pneumatic and electromechanical systems, components, and controls for process and industrial automation. Celebrating 50 years in the U.S., Festo Corporation has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Through advanced technical and industrial education, Festo Didactic Learning Systems and its partners prepare workers for current and future manufacturing technologies.

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