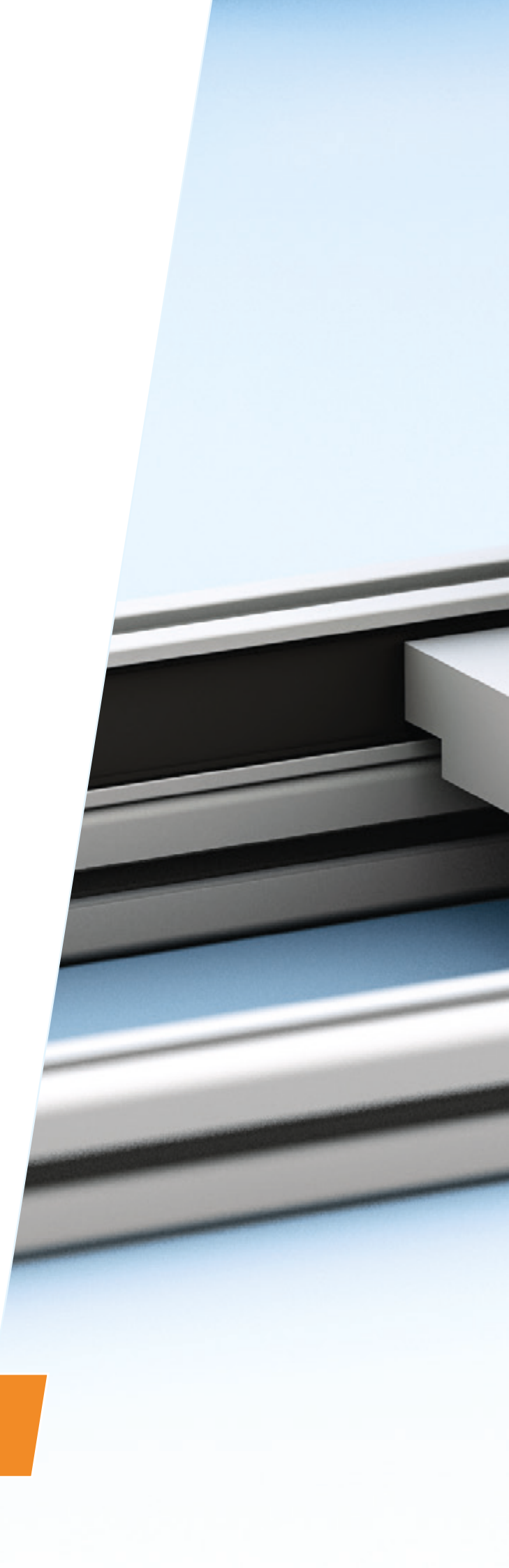
DELO

# DELO-DOT PN5 &
# DELO-DOT PN5 LV
Microdispensing valves

# DELO-DropX VP2
Cleaning station

# DELO-DOT PN5 & DELO-DOT PN5 LV Pneumatic jet valves

## Precise, powerful, perfect handling.



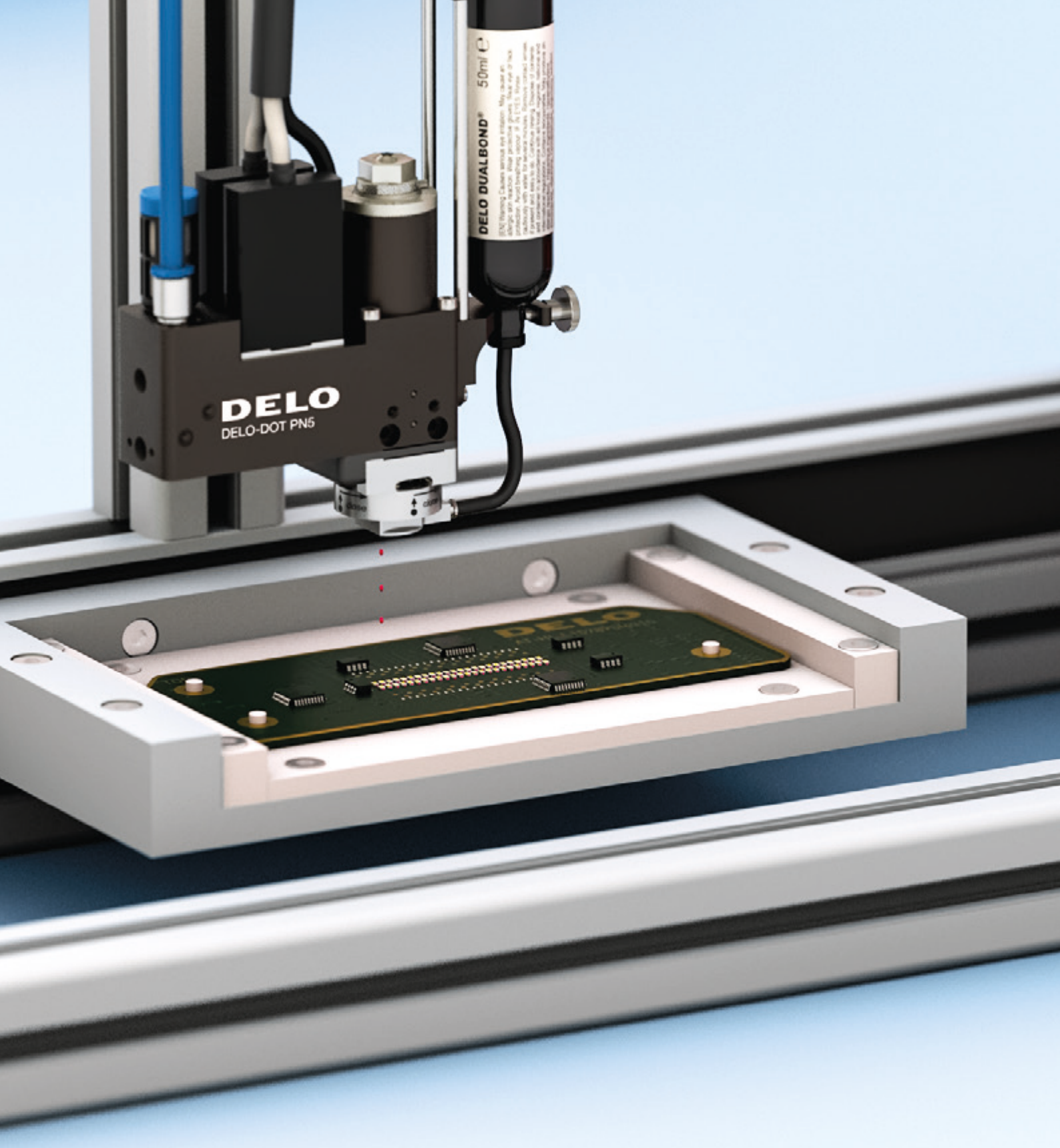
Short cycle times and fast, reproducible processes are decisive criteria in industrial serial production. With high plunger speeds and a dispensing frequency of up to 300 Hz for continuous dispensing, the DELO-DOT PN series of pneumatic jet valves is ideally suited for complex microdispensing applications.

Whether extremely low in viscosity or highly viscous with filler materials, any fluids can be dispensed precisely, reliably and entirely contactless in tiny drops. The droplet size can be easily modulated using interchangeable nozzles and a plunger stroke that can be adjusted by the customer.

Having a lifetime of more than one billion cycles, the drive is able to meet the highest of demands. The fluid system can quickly and easily be sent for cleaning in exchange for a new one. Thanks to a compact and flexible design, the jet valves and their control units can be integrated in almost any production line in a way that saves space.

Discuss your project and your requirements with our experts:

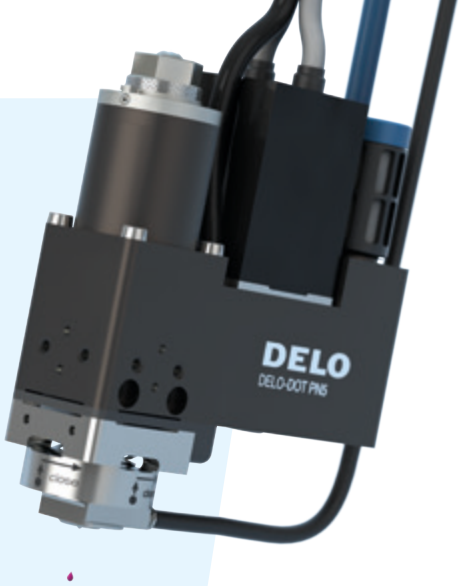
equipment-experts@DELO.de




## Your benefits at a glance:

- High process reliability through high-precision adhesive dispensing
- An ultra-short cycle time of 300 Hz thanks to high dispensing frequency
- Tiny drop sizes, even for high-viscosity adhesives, which facilitate component miniaturization

# DELO-DOT PN5




## Maximum performance, even with demanding materials

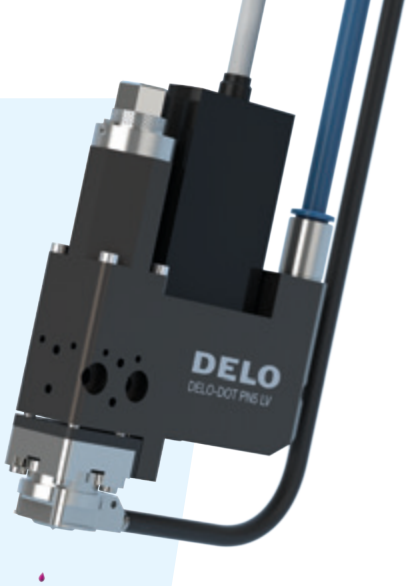
DELO-DOT PN5 is our strongest pneumatic jet valve. It is also suitable for the materials with large viscosities or fillers. Even with such challenging materials, it achieves reproducible results and droplet quantities of just a few nanoliters, all while maintaining an extremely long service life of up to one billion cycles.

| | DELO-DOT PN5 |
|---|---|
| Dimensions (W × D × H) | 86 mm × 28 mm × 99.5 mm |
| Weight | 485 g |
| Protection type | IP54 |
| Viscosity | Up to 500,000 mPa·s (thixotropic)<br>(to be tested depending on application) |
| Min. jetable drop volume | ≈ 3 nl |
| Max. dispensing frequency | 300 Hz<br>Burst mode up to 400 Hz |
| Drive service life (typ.) | 1 billion cycles |
| Reproducible media dispensing | ± 2 % |
| Temperature maintenance | Up to +100 °C temperature specification (regulated)<br>The resulting nozzle temperature depends on the ambient temperature |
| Leakage protection | NC (normally closed)<br>Leakage protection is ensured in the event of power or air compression loss |

Made in GERMANY

The devices shown in this brochure, like all DELO devices, are developed and manufactured in Windach, Germany with the highest quality standards.

# DELO-DOT PN5 LV




## Dispensing low-viscosity media, even in tiny quantities

DELO-DOT PN5 LV (LV = low viscosity) is primarily designed for low-to-medium-viscosity media. Minimum dispensing quantities of around 1 nl are possible, which corresponds to droplet diameters of 250 µm or less.

Thanks to its compact dimensions, it requires little installation space in production lines. Its lightweight construction enables high acceleration as well as a smaller axis and drive design.

| | DELO-DOT PN5 LV |
|---|---|
| Dimensions (W × D × H) | 68 mm × 19 mm × 90 mm |
| Weight | 240 g |
| Protection type | IP54 |
| Viscosity | Up to 35,000 mPa·s (thixotropic)<br>(to be tested depending on application) |
| Min. jetable drop volume | ≈ 1 nl |
| Max. dispensing frequency | 250 Hz<br>Burst mode up to 300 Hz |
| Drive service life (typ.) | 1 billion cycles |
| Reproducible media dispensing | ± 2 % |
| Temperature maintenance | Up to +100 °C temperature specification (regulated)<br>The resulting nozzle temperature depends on the ambient temperature |
| Leakage protection | NC (normally closed)<br>Leakage protection is ensured in the event of power or air compression loss |

# DELO-DropX VP2

## Clean dispensing units easily and thoroughly

DELO-DropX VP2 ensures the efficient cleaning of dispensing devices used in automated systems. Media residue is automatically removed from valve openings without having to make contact with the nozzle. This is achieved by generating negative pressure between 0.1 and 0.9 bar.

The internal adhesive reservoir collects the resulting residue and can hold up to 2 ml of media, ranging from aqueous to the pastiest of viscosities. Thanks to its compact size, DELO-DropX VP2 can be easily integrated into existing machines.


| | DELO-DropX VP2 |
|---|---|
| Dimensions (W × D × H) | 34 mm × 25 mm × 55 mm |
| Weight | 33 g |
| Viscosity | Aqueous to very pasty media |
| Operating media pressure | Negative pressure<br>0.1 to 0.9 bar |
| Adhesive reservoir volume | 2 ml |

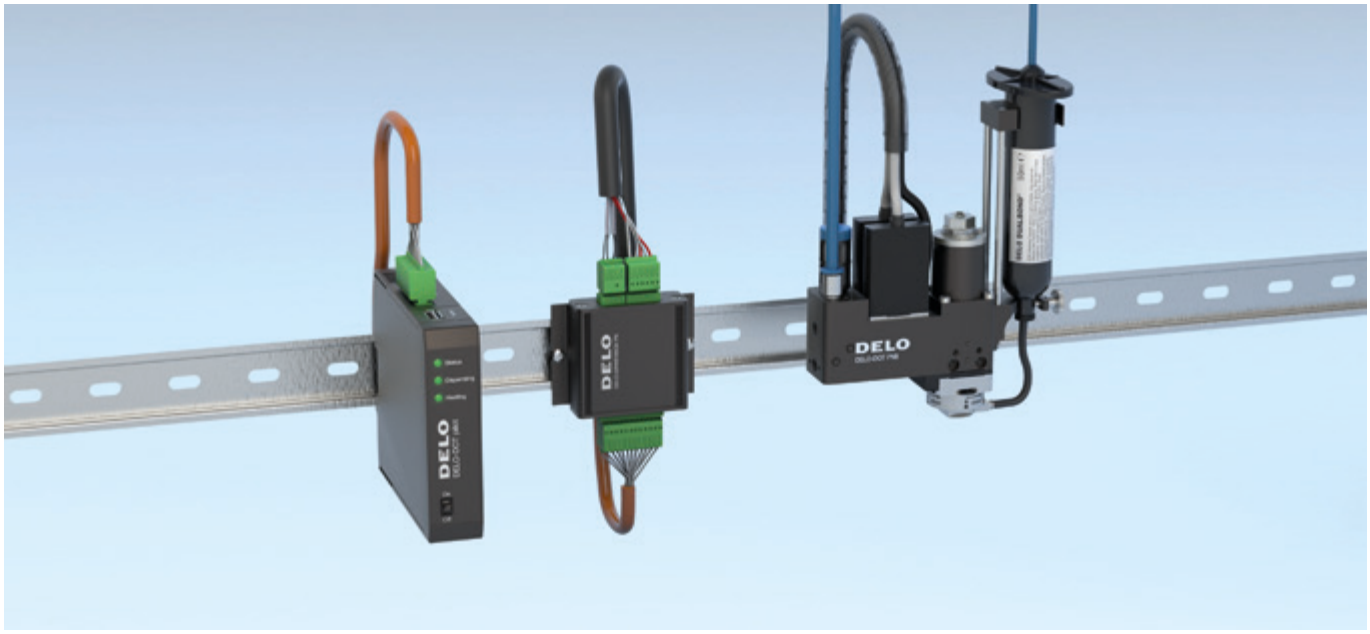

DELO-DOT PN5 (LV) and DELO-DropX VP2 cleaning station that can be integrated into systems

# DELO-DRIVERBOX PN & DELO-DOT pilot

## Compact and easy to integrate

Such reliable control and power supply to all DELO-DOT PN5 valves is provided by the base unit DELO-DRIVERBOX PN. It transmits cycle signals to the valve in real time and supplies the nozzle heater integrated in the valve with power. Control takes place either directly via a powerful PLC or via the available DELO-DOT pilot 1i cycle generator. With this device, cycles, heating signals, and feedback signals can be created or queried easily and with minimal programming effort.


| | DELO-DRIVERBOX PN | DELO-DOT pilot |
|---|---|---|
| Dimensions (W × D × H) | 61.9 mm × 20 mm × 71 mm | 25 mm × 116.6 mm × 100 mm |
| Weight | 73 g | 120 g |
| Power supply | | 24 V (± 10 % max.) |
| Power consumption during operation | | 100 W |
| Power consumption in standby mode | | Idle: 1 – 2 W<br>Off: < 1 W |




DELO-DOT pilot, DELO-DRIVERBOX PN and DELO-DOT PN5 (LV)

# Process flexibility

## User-friendly integration into production systems

Not only do these control units feature a user-friendly and space-saving design; The media supply unit and cartridge holder can also each be inidividually adjusted at a 90° angle. This further simplifies integration into the production systems.

1


2


3


4


5

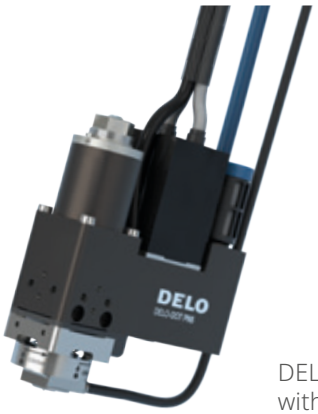

Both the media supply unit and cartridge retainer can be positioned at a 90° angle (› 1 – 4). For horizontal operation of the jet valve, the cartridge can be mounted rotated by 90° (› 5 ).

# Connection possibilities

## Use many kinds of containers

The cartridge retainer is well-suited for connection to small cartridges and provides the necessary stability, even in dynamic dispensing applications. Alternatively, the media can be supplied via a hose from any other container, e. g., large cartridges, 1-liter bottles and hobbocks.


DELO-DOT PN5 (LV)
with small cartridge

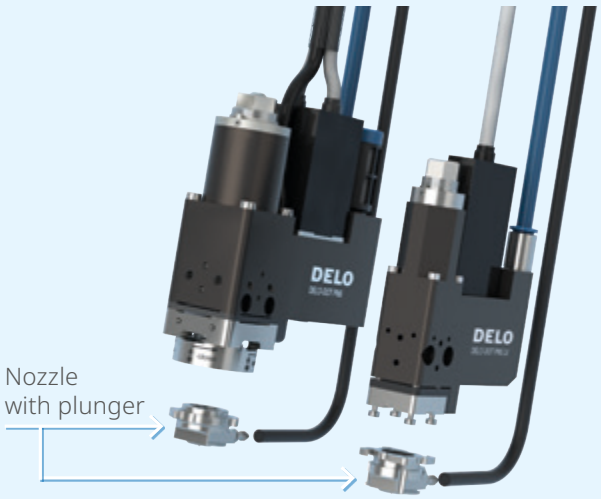



DELO-DOT PN5 (LV)
with product hose

## Simple maintenance and fluid system cleaning

The fluid plunger material found in these jet valves is made of durable materials such as ceramic and carbide. Therefore, it achieves a service life of several hundred million cycles, even when dispensing filled adhesives. Only a few components come into contact with the adhesive, and these are easy to clean.

Thanks to the plunger's two-part design, both the plunger and the nozzle can be replaced by the customer in case of wear at the end of its life cycle. The bayonet lock allows easy removal without any tools.

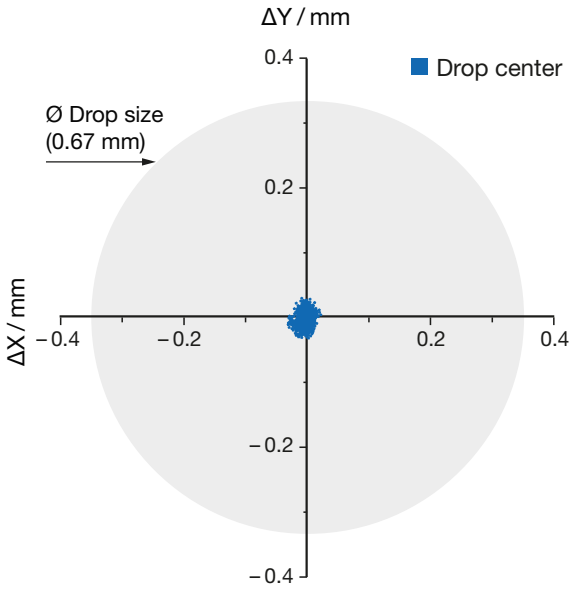


# DELO-DOT PN5 in action

## Standardized tests prove process reliability

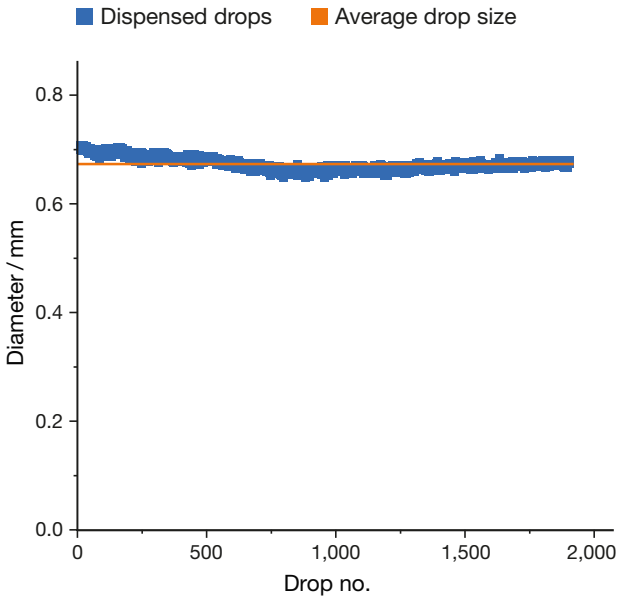
**Precise application**
DELO-DOT PN5 and DELO-DOT PN5 LV microdispensing valves enable precise adhesive application. In this example application with DELO-DOT PN5, the average deviation is ± 1.5 %. The graphs show the drop center positions of 2,000 measured drops in relation to the average drop size. The standard deviation σ = 0.01 mm to the average drop size of 0.67 mm is very small.

### Consistent position of the drop center




Precise adhesive application with an average deviation of ± 1.5 %

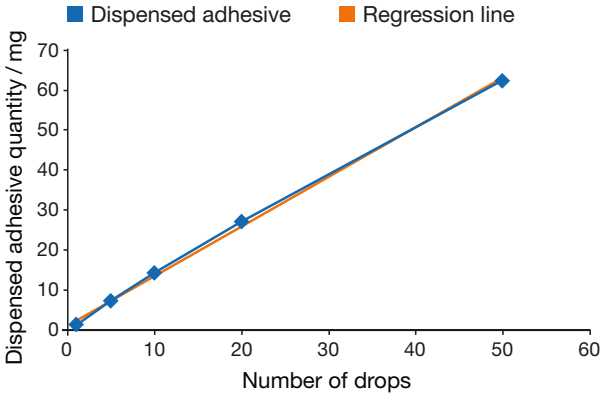
### Consistent drop diameter




Consistent drop diameter with an extremely small standard deviation of σ = 0.01 mm

**Reliable scalability of adhesive quantities**
With a coefficient of determination of $R^2$ = 0.99, the dispensing volume is linear to the number of drops. The quantity of adhesive to be dispensed can therefore be reliably scaled via the number of pulses. This is useful for certain applications, such as the jetting of balancing compounds (› application example p. 11).

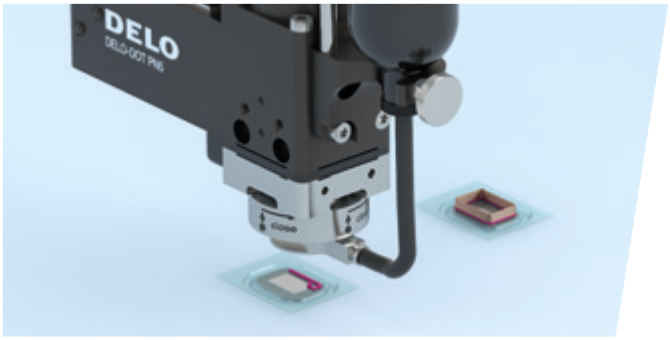
### A linear relationship between number of drops and dispensing volume



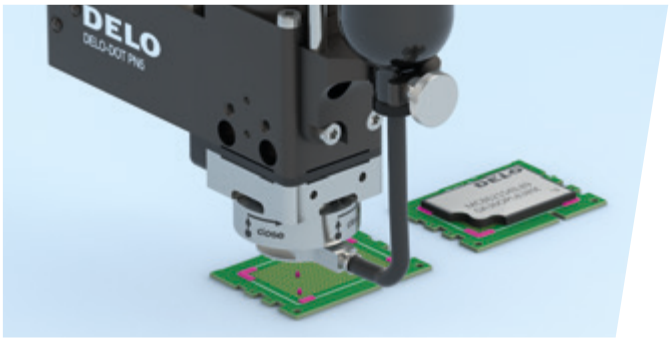

Exceptional scalability due to the linear relationship between number of drops and dispensing volume

# High performance in practice

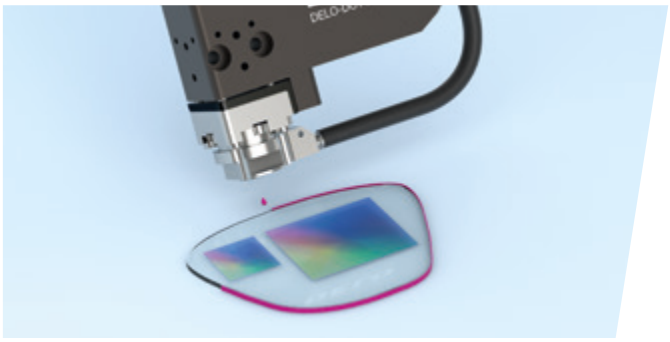
## A wide range of applications in various industries



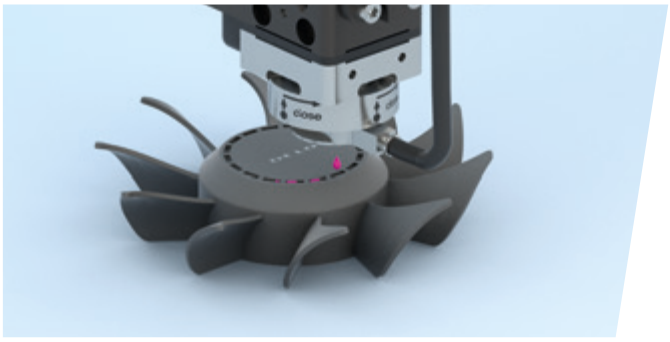

**Jetting for speaker components**
Extremely precise cycles, even at high dispensing frequencies, ensure the uniform and rapid application of adhesive beads in cases such as bonding coils in smartphone speakers.




**Chip edge bonding**
DELO-DOT PN5 can be used for the contactless high-speed application of adhesive beads, as achieved in the edge bonding of chips. It allows the adhesive to be dispensed quickly and precisely without the risk of contaminating or even damaging components with the dispensing needle.



**Edge blackening in AR glasses**
To prevent reflection, the perimeter of AR lenses are covered with black adhesive. Due to the glasses' irregular shape, jetting is the dispensing method of choice, as the dispensing distance can be selected flexibly. DELO-DOT PN5 LV is perfect for dispensing the low-viscosity adhesive in small, even lines on the thin glass rim.



**Jetting of balancing compounds for electric motors**
DELO-DOT PN5 allows even the smallest volumes to be dispensed with precision, repeatability, and linear scalability. This works particularly well with highly filled adhesives, which are used, among other things, as balancing compounds for additive balancing of small rotors or fan impellers in electric motors.

DELO

**DELO Industrial Adhesives**

China | Germany (HQ) | France | Italy | Japan | Korea
Malaysia | Singapore | Thailand | Czechia | USA

The technical data is for informational purposes only. Specific values can be found in the user manual. It is the user's responsibility to test the suitability of the device for the intended purpose by considering all specific requirements. If you need help with using the device, please feel free to contact our Engineering Department.

© DELO – This brochure including any and all parts is protected by copyright. Any use that is not explicitly permitted by copyright law requires the prior consent of DELO Industrial Adhesives. This applies in particular to duplication, distribution, processing, translation, and microfilming as well as storage, processing, duplication, and distribution using electronic systems.

CE

www.DELO.de

05/24