

## **Dispense®**

### **Micro Dispense Module with micro annular gear pump**

Compact and smart dosing system in analytical instrumentation



#### **Dispense Module in syringe pump format**

- size of half-height syringe pumps format
- compatible integration in analytical devices
- modular design (regarding fluid in- and outlet, sensors, filter, materials)
- communication via syringe pump programming commands
- process monitoring
- high accuracy of dispense volume and volume flow (precision and trueness)
- low noise level

#### **Micro annular gear pump**

- long service life
- low life cycle costs
- discrete dosing of smallest liquids amounts
- continuous, uninterrupted volume flow
- wide dynamic range of pump with low dosing volumes and high volume flow for rinsing
- wide volume flow range of one single pump
- fast response

#### **Sensor control and monitoring**

- precise controlled volume flow
- fault detection
- monitoring and documentation

**Dispense®** realizes the precise dosing and metering of liquids in the microliter to milliliter range. The system is characterized in a modular design with connectible fluid in- and outlet, optional actuators and sensors for measuring flow rates. The central element is a micro annular gear pump, a robust and highly precise device with an extremely long service life and low pulsation.

The pump allows dispensing the smallest liquid amounts on the one hand and rinsing with high flow rates on the other.

The ARM Cortex M3 microprocessor provides the necessary system intelligence for integrating sensors and pump into a closed loop control, monitoring the process-accurate dispense and enabling communication and programming.

It can be addressed with the same programming commands than a syringe pump. The Micro Dispense Module  $\mu$ Dispense®, whose size corresponds to the half-height syringe pumps format, guarantees process reliable liquid handling both in new analytical devices as well as when replacing syringe pumps in existing systems and reduces the maintenance and service expenditures.

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## Applications

Analytical instrumentation
Biotechnology
Laboratory automation

## Technical data

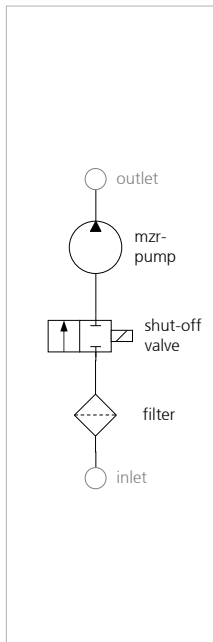
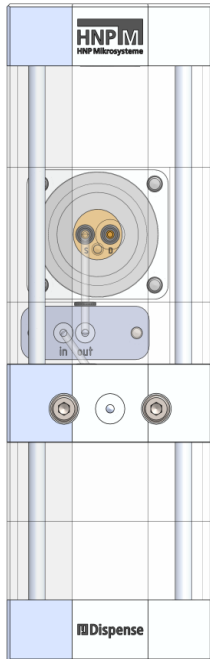
Micro annular gear pump	mzr-2521	mzr-2921	mzr-4622
Flow rate range (without control)	up to 9 ml/min	up to 18 ml/min	up to 72 ml/min
Controlled flow rate range (optional for mzr-2521)	1 ... 100 µl/min 10 ... 1000 µl/min		
Dosing volume	beginning from 1 µl		
Precision (repeat accuracy)	≤ 1 % Coefficient of Variation CV		
Differential pressure range	0 – 1.5 bar		
Storage temperature range	-20 ... +65 °C		
Operating temperature range	0 ... +50 °C @ 20 ... 95 % humidity		
Viscosity	up to 5 mPas		
Liquids	aqueous solutions, solvents		
Materials of pump	stainless steel 316L, ceramics, tungsten carbide Ni based, epoxy resin shaft seal: graphite-reinforced PTFE, stainless steel 316L static seals: FPM, optional: EPDM, FFPM		
Additional materials	manifold: PMMA, optional: PEEK™ valve: PEEK™, FPM, optional: FFPM, EPDM volume flow sensor: borosilicate glass optional filter: stainless steel		
Seal materials	static seal: FPM, optional: EPDM, FFPM		
Motor	brushless DC-motor (BLDC) nominal voltage 24 V, torque 3.3 mNm analog hall sensors		
Electrical connection	D-sub plug, 15-pole (male connector)		
Power supply	24 V DC ±10 %, max. 1.5 A		
Interface	RS-232 and RS-485 with 9600 or 38400 Baud CAN with 100 and 125 kBaud		
Protocol	standard commands of syringe pumps OEM Communication (OC) protocol and Data Terminal (DT) protocol		
Addressing	max. 15 devices with RS-485 Bus ("daisy-chaining") max. 15 devices with CAN-Bus		
Inputs and outputs	2 additional digital inputs with TTL Level 3 additional outputs with TTL level		
Fluid connection	1/4" -28 UNF		
Accessories	additional fluidic inlets and outlets, filter, gear box, volume flow sensor		
Dimensions (L x W x H)	106.7 x 44.4 x 127.0 mm 4.2" x 1.75" x 5.0"		
Weight	approx. 800 g		

Even if single parameters are within their indicated performance range, certain parameter combinations may not be achievable. Single parameters may exceed their indicated performance range under adequate circumstances. For detailed evaluation please contact HNP Mikrosysteme. Actual performance may vary. Specifications are subject to change without notice.

## Optional set-ups and flow charts

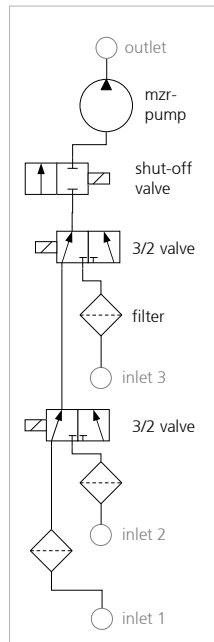
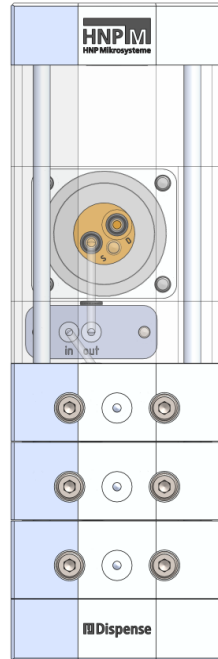
### 1InFV - P - 1Out

- 1 inlet with filter and valve
- micro annular gear pump
- 1 outlet



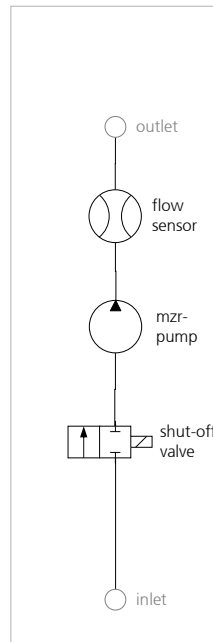
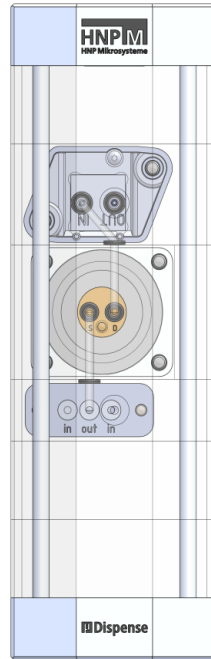
### 3InFV - P - 1Out

- 3 inlets with filters and valves
- micro annular gear pump
- 1 outlet



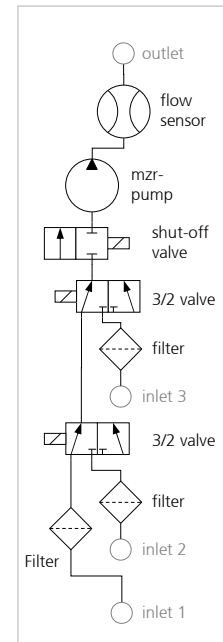
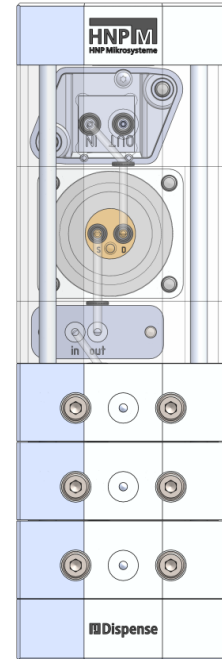
### 1InV - P - Q - 1Out

- 1 inlet with valve
- micro annular gear pump
- closed loop flow control
- 1 outlet



### 3InFV - P - Q - 1Out

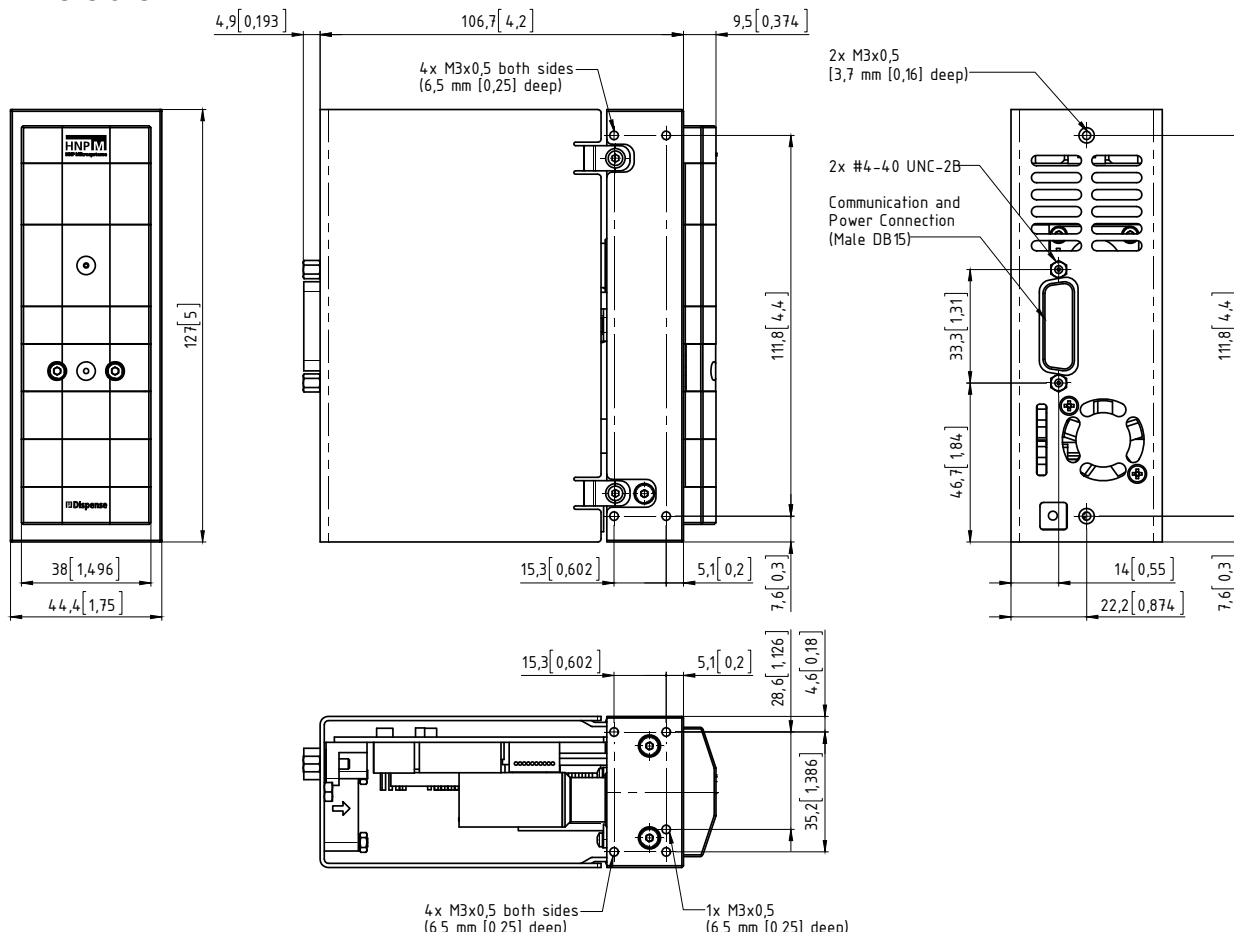
- 3 inlets with filters and valves
- micro annular gear pump
- closed loop flow control
- 1 outlet



The figure above shows four different module variants. Other combinations are possible.

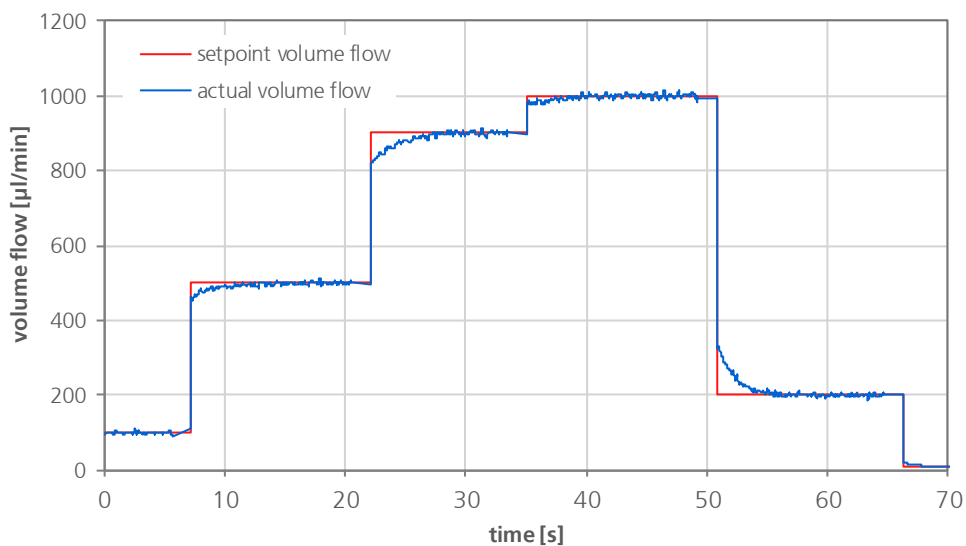
The use of the Micro Dispense Module requires an existing syringe pump environment for controlling the system. Design and integration are carried out according to customer-specific advice.

## Dimensions



Subject to technical changes

## Volume flow sensor mediated closed loop control



Micro annular gear pumps (and housings) are protected by assigned patents: EP 1115979 B1, US 6,520,757 B1, EP 852674 B1, US 6,179,596 B1, EP 1354135, US 7,698,818 B2. Patents pending DE 10 2011 001 041.6, PCT/IB2011/055108, EP 11 81 3388.3, US 13/884,088, CN 2011 8006 5051.7, HK 13 11 2934.9, DE 10 2011 051 486.4, PCT/EP2012/061514, EP 12 728264.8, US 9,404,492 Bw2, CN 2012 8003 8326.2. In the US, Europe and China additional patents are pending. mzi®, MoDoS®, µ-Clamp®, HNPM®, µDispense® are registered German trademarks of HNP Mikrosysteme GmbH. Cavro® is a registered trademark of Tecan Systems, Inc. PEEK™ is a registered trademark of Victrex plc.