

High performance series 

## Micro annular gear pumps m zr<sup>®</sup>-2509 Ex / 2909 Ex / 4609 Ex / 7209 Ex

Ex-pumps for application in chemical and process technology



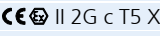
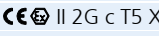
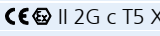
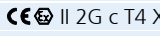
- **Ex-certification ATEX**  
conform with EU Directive 2014/34/EU
- **High dosage precision**  
precision CV < 1 % at low volumes
- **Compact dimensions**  
length < 295 mm, including Ex-motor
- **Broad viscosity range**  
methanol, solvents, adhesives, grease, gel
- **Long service life**  
wear-resistant tungsten carbide
- **Low pulsation delivery, low shear stress**  
rotary micro annular gear technology

The micro annular gear pumps m zr-2509 Ex, m zr-2909 Ex, m zr-4609 Ex and m zr-7209 Ex cover the flow range 0.003-225 ml/min. The highly precise, low pulsation small volume dosage even of non-lubricating liquids or

at high pressure, the compact design of the Ex-pumps, the broad viscosity range and the small dimensions are unique features of this pump series. The pumps are applied in the field of chemical and process technology and are

suitable for both continuous delivery and discrete dosage of watery solutions, solvents, oil and other viscous liquids. Accessories extending the operating parameters of the device are available.

### Technical data

	m zr-2509 Ex	m zr-2909 Ex	m zr-4609 Ex	m zr-7209 Ex
Flow rate	0.0015 – 7 ml/min	0.003 – 14 ml/min	0.012 – 56 ml/min	0.048 – 225 ml/min
Smallest dosage volume	0.25 µl	0.5 µl	2 µl	30 µl
Displacement volume	1.5 µl	3 µl	12 µl	48 µl
Differential pressure range (1 mPas)	0 – 2 bar	0 – 4 bar	0 – 8 bar	0 – 30 bar
(> 16 mPas)	0 – 5 bar	0 – 5 bar	0 – 10 bar	0 – 40 bar
Max. inlet pressure	5 bar (10 bar *)	5 bar (10 bar *)	5 bar (10 bar *)	5 bar (10 bar *)
Ambient temperature range	0 ... +40 °C	0 ... +40 °C	0 ... +40 °C	0 ... +40 °C
Liquid temperature range	-5 ... +40 °C	-5 ... +40 °C	-5 ... +40 °C	-5 ... +40 °C
Viscosity range	0.3 – 5000 mPas	0.3 – 5000 mPas	0.3 – 5000 mPas	0.3 – 5000 mPas
Pulsation	< 1.5 %	< 6 %	< 6 %	< 6 %
Precision (Coefficient of Variation CV)	< 1 %	< 1 %	< 1 %	< 1 %
Ex-certification				
Place of installation	Ex-area zone 1, 2			
Wetted parts	stainless steel 316L (1.4404, 1.4435), Ni-based tungsten carbide shaft seal: graphite-reinforced PTFE, 316L static seals: FPM, optional: EPDM, FFPM			
Drive	DC-motor, 24 V DC, 2 A, 53 W, encoder: 500 counts per turn, type HEDL 5540			
Speed range	1 – 4700 rpm			
Cable length	10 m			
Weight	ca. 2700 g			

Customized solutions on request.

\* with optional fluidic seal module

Even if single parameters are within the indicated performance range of technical data, 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.

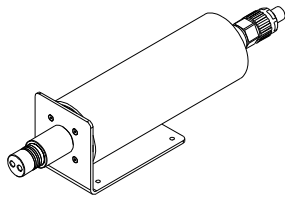
### Contact

HNP Mikrosysteme GmbH  
Bleicherufer 25 · D-19053 Schwerin

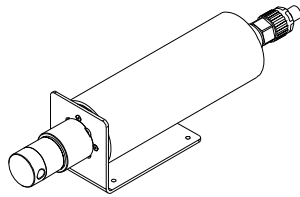
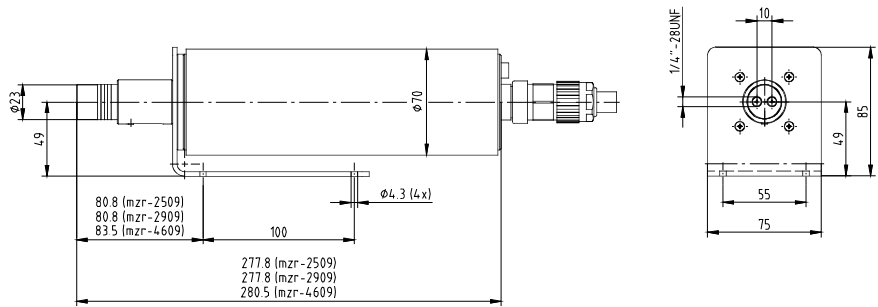
phone +49 385 52190-301  
fax +49 385 52190-333

e-mail [info@hnp-mikrosysteme.de](mailto:info@hnp-mikrosysteme.de)  
<http://www.hnp-mikrosysteme.de>

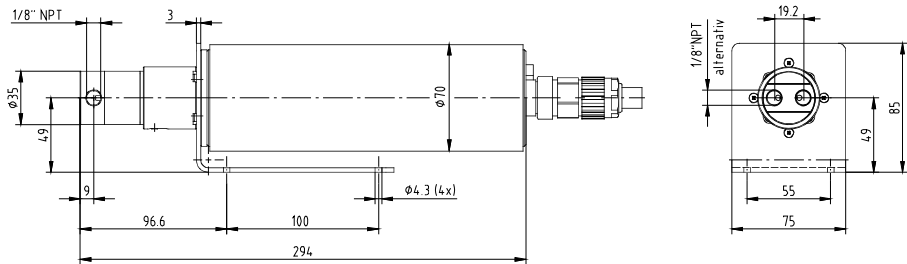
## Dimensions



mZR-2509 Ex / 2909 Ex / 4609 Ex



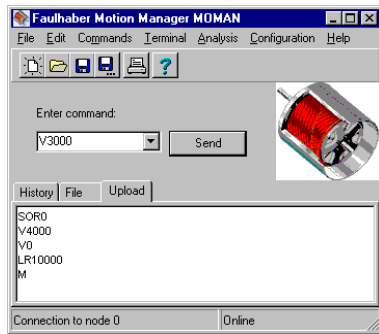
mZR-7209 Ex



All dimensions in mm  
Subject to technical changes.

For flow charts refer to individual product sheets mZR-2505, mZR-2905, mZR-4605, mZR-7205

## Control and software (Accessories)



- speed and position control for continuous and discrete dispensing tasks
- terminal box with potentiometer for speed control
- RS-232 9-pole SUB-D connector to connect directly to a PC or a SPC
- analog input with terminal screw
- power supply with DIN 45323 socket, pin plug or terminal screw
- EEPROM program memory
- simple ASCII command language for parameter setting (velocity profiles) and programming of the motor
- programming with Windows® software »Motion Manager«
- temperature and current limiting
- online dynamic drive analysis
- simultaneous operation of up to 255 pumps with additional multiplexer modules

## Item number

10 03 01 52	pump mZR-2509 Ex, fluid connection 1/4"–28 UNF, frontal
10 03 01 23	pump mZR-2909 Ex, fluid connection 1/4"–28 UNF, frontal
10 03 01 24	pump mZR-4609 Ex, fluid connection 1/4"–28 UNF, frontal
10 03 01 31	pump mZR-7209 S Ex, fluid connection 1/8" NPT, lateral

## Accessories

<i>Liquid supply accessories</i>	threaded fluid connectors, tubes, filters etc.
<i>Fluidic seal module</i>	use of liquids sensitive to air or water or for vacuum applications
<i>Control</i>	S-HD-KL: programmable microcontroller-based control for continuous delivery and discrete dosage, installed outside of the Ex-area
<i>Console drive module</i>	diecast aluminum chassis mZR-S05 ES with control elements and display, installed outside of the Ex-area
<i>Multiplexer module</i>	simultaneous operation of up to 255 pumps with a single RS-232 interface

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 B2, CN 2012 8003 8326.2. In the US, Europe and China additional patents are pending. mZR®, MoDoS®, µ-Clamp®, HNPM® are registered German trademarks of HNP Mikrosysteme GmbH.