

Operating manual **mzr®-Touch Control**



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Impressum

Original instructions

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This manual has been prepared with care. HNP Mikrosysteme does assume no liability for any errors in this manual and resulting consequences. Likewise, no liability is assumed direct or subsequent damages arising from an incorrect use of the devices.

While using micro annular gear pumps, the relevant standards regarding the specifications of this manual have to be followed.

Subject to change without notice.

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1 General information

This operating manual contains basic instructions to be followed during integration, operation and maintenance of a m zr® micro annular gear pump. For this reason it is necessary to read it carefully before any handling of the device. The present manual should always be kept at the operation site of the micro annular gear pump.

1.1 Application scope of the pumps and controls

The m zr®-Touch Control described in this manual is suitable for controlling micro annular gear pumps.



If you intend to treat any aggressive, poisonous, or radioactive liquids, you must conform to safety measures as according to the regulations in force. Any project concerning handling of corrosive liquids should be previously discussed with the pump manufacturer.



The micro annular gear pumps with m zr®-Touch Control *must not* be used for invasive medical applications, in which the liquid having had contact with the pump is re-introduced to the body.



Micro annular gear pumps with m zr®-Touch Control exclusively are provided for use in the industrial area. A private use is excluded.



The m zr®-Touch Control *must not* be used in aircrafts and spacecrafts or other vehicles without prior consent of the manufacturer.



Data concerning resistance of the pumps to the manipulated liquids have been elaborated according to the best of HNPM's knowledge. However, operating parameters varying from one application case to another, no warranty for this information can be given.



Information given in this manual does not release the customer from the personal obligation to check the integrity, correct choice and suitability of the pump for the intended use. The use of the m zr®-Touch Control should be conform with technical norms and regulations in force.

If you wish to receive more information than comprised in this operating manual please contact directly HNP Mikrosysteme.

1.2 Product information

The present operating manual is valid for the m zr®-Touch Control manufactured after 2017 by HNP Mikrosysteme GmbH, Bleicherufer 25, 19053 Schwerin, Germany.

The date of release of the present manual figures on the cover.

2 Safety instructions

Comply with the general safety instructions listed in the safety section as well as with the special safety instructions listed under the other main sections. All legal and corporate safety instructions have to be obeyed.

2.1 Safety symbols in this operating manual

Please comply not only with the general safety instructions listed below, but also with specific safety instructions mentioned in the following chapters.

Non respect of the safety instructions marked with the following signs represents danger to *people*:

Danger symbol



Safety symbol according to
DIN 4844 – W9

High voltage symbol



Safety symbol according to
DIN 4844 – W8

Non compliance with the safety instructions marked with the following sign:

Warning

represents a risk of damage to the *micro annular gear pump*.

Operating instructions machined directly on the pump such as the indication of liquid input and output should be followed and kept in a clearly readable condition.

2.2 Staff qualification and training

The staff operating, servicing, inspecting and assembling the pumps must evidence the appropriate qualification for these works. Areas of responsibility and competence as well as monitoring of the staff must be precisely regulated by the decision maker. If the personnel do not have the necessary knowledge, they must be trained and instructed accordingly. If necessary, this can be implemented by the supplier or the manufacturer on behalf of the operator. Furthermore, the operator in charge must ensure that the content of the present manual has been fully understood by the personnel.

2.3 Safety-conscious work

The safety instructions listed in this operating manual, applicable national regulations concerning accident prevention as well as internal work, operation and safety regulations of the operator must be complied with.

2.4 Safety instructions for the operator

The surface temperature of the motor under full load may exceed 60°C. If needed, this surface should be protected on site against contact in order to avoid skin burns.

The drive should be protected against dust, water vapor condensation, humidity, splash water, aggressive gases and liquids. Please provide for adequate air ventilation and thus cooling of the motor.

The mZR®-Touch Control must not be used in areas exposed to explosion risks or in the proximity of inflammable gases and vapors.

Possible leaks of dangerous liquids (for example from the shaft sealing) should be guided away in a way not to represent any danger for the personnel and the environment. The pump should be regularly checked for possible leakage. All legal requirements in this matter should be followed.

The existing protections against contact for the moving parts of the pump (such as for example the coupling) must not be removed during operation.

Take care that all risks resulting from the electric energy are excluded. (For details please refer to the instructions provided by the authorities in charge or your power supplier.)

Warning

Please insure, that the totality of the liquid supply accessories such as tubes, hoses, filters etc. are free from dust or dirt particles. Impurities such as metal, plastic or glass particles may impair or damage the pump leading to its failure.

Warning

Please, operate the pump with a filter featuring 10 µm or smaller pores. It will protect the pump.

2.5 Safety instructions for maintenance, check and assembly of the pump

As a rule all maintenance work on the device should be performed when the device is at a standstill. The shutdown procedure described in this manual must be followed. Pumps delivering liquids hazardous to health must be decontaminated. Immediately after the work had been completed all safety equipment and protection measures should be applied.

Warning

Should a malfunction of the pump occur, do not dismantle the pump on your own but contact one of HNP Mikrosysteme's service staff for professional assistance.

2.6 Unauthorized pump conversions and spare part manufacture

Conversions or modification to the device are only permitted with prior consent of the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts will annul the liability of the pump manufacturer for any resulting consequences.

2.7 Improper modes of operation

The safety of operation of the delivered device can only be insured by correct use, as described in chapter 1. The limit values given in this manual must not be exceeded in any case.

2.8 General safety instructions

Please observe the following safety instructions



The pump may operate at high pressures. For this reason please use only the delivered accessories and ensure that the employed fittings and tubing have been prescribed and approved for these pressures.



In order to decrease the pressure, provide the system with a *pressure control valve* directing the excess liquid to the storage tank or back to the suction side. In the case of blockage of the pressure side the operating pressure can multiply, this can lead to the damage of downstream components.



At a standstill, the liquid may flow through the pump in the direction of the falling pressure. In order to avoid this unwanted movement, please integrate *non-return valves* (see accessories).



Protect the micro annular gear pump and the electric drive against strokes and shocks.



Under normal working conditions the shaft sealing rings integrated in the pump prevent the liquid from leaking out of the device. The micro annular gear pumps are "technically leak-proof" however not "hermetically sealed" which means it may occur that gases or liquids enter to or escape from the pump.



The allowed operating parameters of the drive should not be exceeded. In particular an *incorrect polarity setting* of the supply voltage may lead to damage of the control unit.

Warning

Please insure, that the totality of the liquid supply accessories such as tubes, hoses, filters etc. are free from dust or dirt particles. Impurities such as metal, plastic or glass particles may impair or damage the pump leading to its failure.

Warning

Please operate the pump with a filter featuring 10 µm or smaller pores. It will protect the pump.

3 Transport and intermediate storage

3.1 Shipment of the controller and protection measures

The m zr®-Touch Control leaving the factory are secured against corrosion and shocks. The inlets and outlets of the pumps are protected with plastic plugs in order to prevent any foreign bodies from penetrating into the device.

3.2 Transport

In order to avoid any damage related to transport, the package must be protected against shocks. HNP Mikrosysteme guarantees, that all goods leave the factory in the best condition. Any noticed damage should be reported to the concerned forwarding agent, authorized dealer or to HNP Mikrosysteme, as manufacturer.

3.3 Intermediate storage

Following points concerning pump storage should be observed:

- The protective plugs must be left screwed in
- For storage temperature

4 Description of the pump controller

4.1 Technical data

Technical data	Description
Chassis	die-cast aluminum housing, powder coated
Operation	Touch Display
Display	different graphical user interfaces e.g. discrete dosage, continuous dosage, terminal
Version	Type N: connection LP/MO pump series Type H: connection HP/HI/MH pump series Type R: connection over RS-232 Interface
Serial interface (just Type R)	RS-232, SUB-D male, 9-pole
Pump connector (just Type H)	8-pole socked (DIN 45326)
Motion Controller (just Type N)	integrated 16-Bit Microcontroller, 7-pole socked
Power source	24 V DC, 3-pole socket
Analog Interface	0 – 10 V, 5-pole socket
Digital output	Open Collector, 24 V, 0.5 A
Power supply	Power adapter 100 – 240 V AC / 24 V DC/3 A
Protective class	IP 65
Dimensions (L x W x H)	147 x 141 x 37 mm
Weight	ca. 0,7 kg
Ambient temperature	+5 +40°C
Storage temperature	+5 +25°C

table 1 Technical data pump controller

4.2 Type Description

There are three m zr-Touch Control variants to choose from.

4.2.1 m zr-Touch Control type N

Direct connection of ND / MO pumps with brushed DC motor

- 7-pole plug for DC motor of the micro annular gear pump
- Adapter cable for 10-pole pump connector
- 5-pole socket for analog input 0-10 V, trigger input and valve output
- Pump control module includes Faulhaber Motion Controller MCDC3002P RS
- contains the required EMC components

4.2.2 m zr-Touch Control type H

Direct connection HL/HI/MH-Pumps (e.g. m zr-xx05, m zr-xx55, m zr-xx65, m zr-7245)

- 8-pole plug, DIN 45326 for HL/HI pumps and m zr-7245
- Adapter (Harting) for 8-pole Wago-connector of the MH-series
- 5-pole socket for analog input 0-10 V, trigger input and valve output
- Faulhaber Motion Controller external in the motor

4.2.3 m zr-Touch Control type R

connection pump via RS-232

- SUB-D 9-pin HL/HI/MH via S-G05, for ND/MO series via S-ND

4.3 Housing and controls



figure 1

m zr-Touch Control Type H

Nr.	Description	Definition
1	Power In	Power supply 24 V DC
2	In / Out	Connection for external inputs and output
3	m zr-Pump	Connector for m zr-pump
4	On / Off / Lock ⏻/🔒	On/Off- Pushbutton / operating lock Touch display
5	-	Touch-Display

table 2

Operating elements m zr-Touch Control Type H

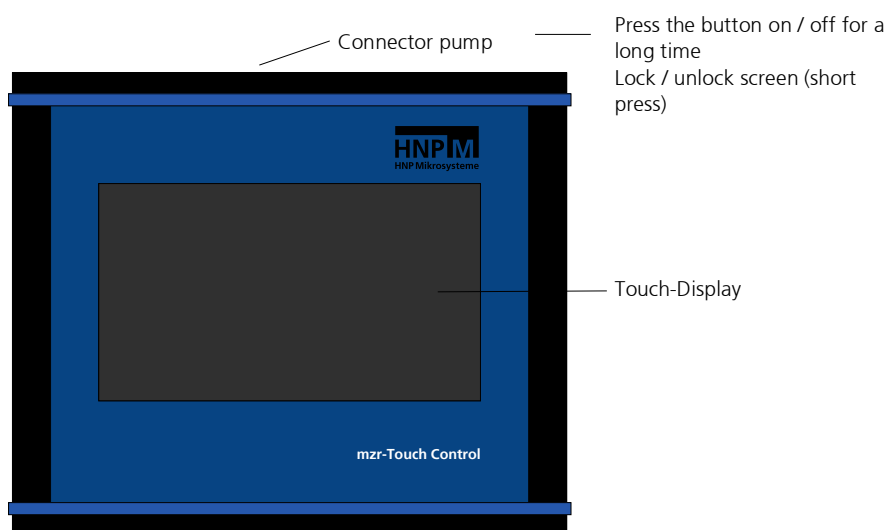


figure 2

View from above

4.4 Connection and operating elements

The rear housing covers differ in the mzs®-Touch Control Types.

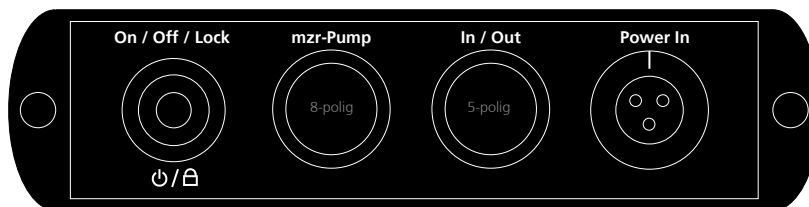


figure 3

Back side mzs-Touch Type H with connection and operating elements

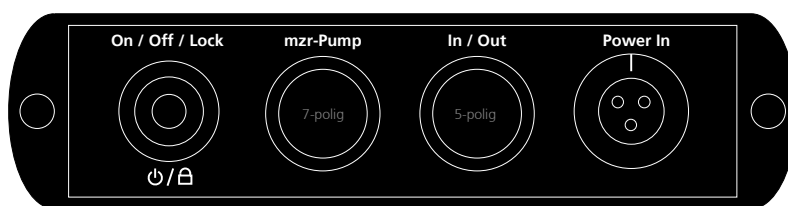


figure 4

Back side mzs-Touch Type N with connection and operating elements

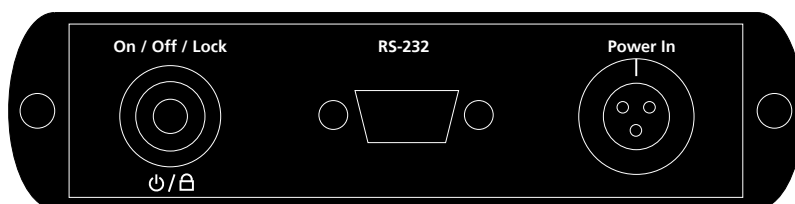


figure 5

Back side mzs-Touch Type R with connection and operating elements

4.4.1 Connector assignment plug

Connector pins Socket / plug	Function
1	Mass / GND
2	Trigger Input (external switch to GND, low active, NPN switching output)
3	Output (+10 VDC / 50 mA)
4	Analog Input (0 ... +10 VDC)
5	Valve Output (24 VDC / 1 A from m zr-Touch)

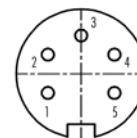


table 3 Pin Assignment In / Out

Connector pins Socket / plug	Function
1	GND
2	Analog Input
3	+24 V
4	Fault out
5	Analog GND
6	RS-232 RxD
7	RS-232 TxD
8	Digital input 3

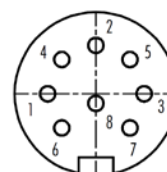


table 4 Pin Assignment m zr-pump 8-pole

Connector pins Socket / plug	Function
1	Motor +
2	Vcc (5 VDC)
3	Channel A
4	Channel B
5	SGND
6	Motor -
7	n.c.

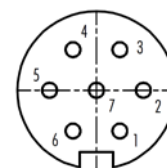


table 5 Pin Assignment m zr-pump 7-pole with integrate Motion Controller MCDC 3002 P RS

Connector pins Socket / plug	Function
1	Sensor A
2	Sensor B
3	Sensor C
4	Ucc
5	GND
6	Motor A
7	Motor B
8	Motor C

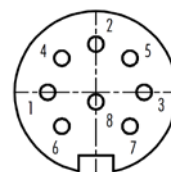


table 6

Pin Assignment m zr-pump 8-pole with MCBL 3002 P RS

Connector pins Socket / plug	Function
1	+24 V
2	GND
3	n.c.

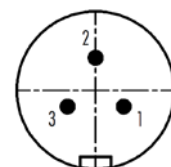


table 7

Pin Assignment Power In

4.5 Status Bar

The status line explains the most important states of the m zr-Touch.

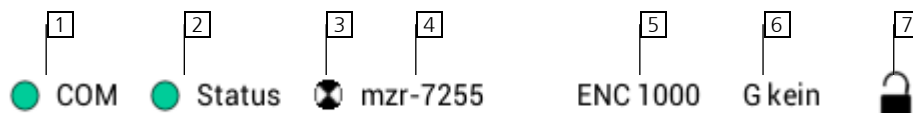


figure 6

Status line (header)

No.	Symbol	Explanation
1	● COM	Communication with pump controller – green ⇒ Communication ok – red ⇒ Communication nicht ok bzw. unterbrochen
2	● Status	Pump status ⇒ importance – green ⇒ no mistake – red ⇒ Current limiter activ – orange ⇒ Deviation error – purple ⇒ Over voltage – yellow ⇒ Over temperature – pink ⇒ Limitation to continuous current
3	⊗	Pump / pump shaft manifestations – stands still⇒ pump stops – rotating movement⇒ Pump or pump shaft is moving, that mean motor rotates (right or left rotation)
4	m zr-7255	currently set / selected type of pump
5	ENC 1000	currently set encoder resolution

No.	Symbol	Explanation
6	G kein	currently selected gear reduction of the engine. Here: no gear
7		Lock icon – Lock opened ⇒ Touch display operation possible – Lock closed ⇒ Touch display operation locked

table 8

Explanation Status line

4.6 Software

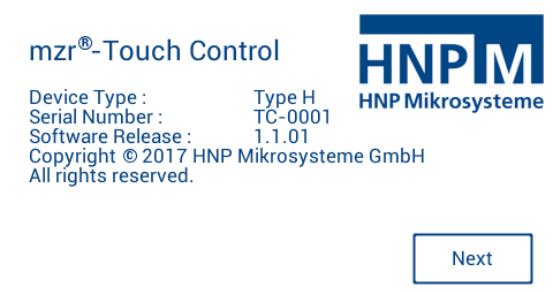
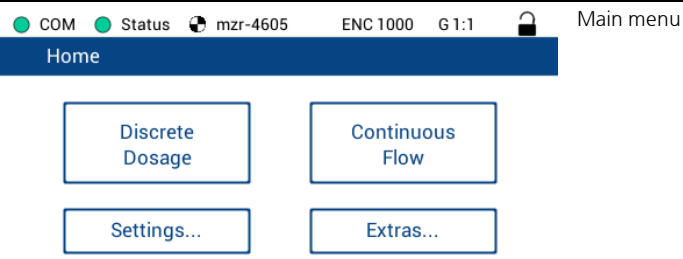
4.6.1 Selection process for pump type

Set Pump Type  mzr-25xx mzr-40xx mzr-63xx mzr-115xx mzr-29xx mzr-46xx mzr-72xx Cancel	1. Pump size selection (consists of 2-3 digits)
Set Pump Type  mzr-4605 mzr-4609X2 Ex mzr-4622X1 mzr-4609 Ex mzr-4622 mzr-4665 Cancel Back	2. Selection of the series and drive variant and, if applicable, explosion-proof version
Set Pump Type  mzr-4605 mzr-4609 Ex Attention The pump has been changed. A wrong selection can damage the pump. Cancel OK Cancel Back	3. Confirmation

table 9

3-stage selection process for pump type

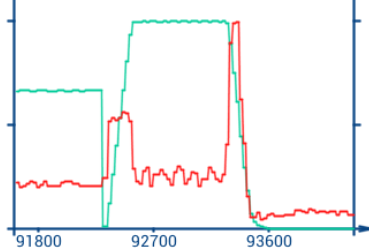
4.6.2 Operating levels

Touch-Display	Explanation
-	Press on the device button Ein / Aus / Lock   hold on for about 3 s.
	Power-up screen is displayed for a few seconds during start-up until the device is ready for use.
	Startup screen when switching on Display of device name, device type, serial number and software version Next to the next screen
	Main menu

Touch-Display	Explanation
Settings Pump Pump Type Encoder Gear Box Calibration + Density Calibration Factor Density Motor Maximum Speed Acceleration Max. Continuous Current Max. Peak current Device and Operation Info... Language Key Tones Device and Operation Info... Language Key Tones Brightness Factory Settings mzr-4665 3000 G 1:1 (none) 1.00 1.0 g/cm³ 6000 rpm 500 rev./s² 600 mA 1500 mA Device Type H English Yes Device Type H English Yes 100 % ... Home	Display settings single screen with swipe gesture to scroll up and down

Settings Max. Continuous Current Max. Peak current Draw Back Enable Device and Operation Info... 300 mA 600 mA Yes Device Type X Home	Display settings Draw back
--	-------------------------------

COM Status mzr-4605 ENC 1000 G 1:1 Discrete Dosage Amount Pause Number of repetitions 00:00:00 100.0 µl 0.5 s 3/ 3 endless Yes No 00:00:00 -00:00:00 Home Stop Start	Discrete Dosage
--	-----------------

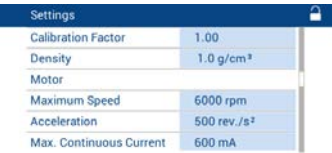
Touch-Display	Explanation
COM Status mzr-2542 ENC 128 G 1:1 Draw Back Amount 3.0 ml Pause 1.0 s Home Dosage	Draw back
COM Status mzr-4605 ENC 1000 G 1:1 Continuous Flow Volume Flow 33.0 ml/min Duration 2.0 s Analog Input Yes No endless Yes No 00:00:02 -00:00:00 Home Stop Start	Continuous Flow
COM Status mzr-4605 ENC 1000 G 1:1 Extras... Graphical Data Analysis Restart Procedure Terminal Home	Selection menu Extras
Graphical Data Analysis I [mA] max: 1200 / output: 88 V [rpm] max: 6000 / output: 0  V 4000 LR 95000 M Stop Back	Graphic Display

Touch-Display	Explanation
COM Status mzr-4605 ENC 1000 G 1:1	Restart Procedure
Restart Procedure	V-100 Speed -100 rpm V0 Speed 0 rpm (Stop motor) V100 Speed 100 rpm
Progress: 0 40	
Back Stop Start	
Terminal TEM 32 History 0 Send TEM 1 2 3 4 5 6 7 8 9 0 Q W E R T Y U I O P A S D F G H J K L - Z X C V B N M Space Back	Terminal mcl commands (mcl = Motion Control Language from Faulhaber) Example: V1000 Speed 1000 rpm V0 Speed 0 rpm (Stop motor) LR10000 10000 Motorinkremente laden M Move TEM Temperature of the internal motion controller GRC Get Real Current = Motor current [mA] Further instructions see operating instructions Faulhaber Communication / Function Manual blue = sent commands; red = answer Abbreviation CMD = Command
-	Press on the device button Ein / Aus / Lock hold on for about 1 s. ⚠ Attention To turn off the power, do not turn off the power or unplug the power supply cable. In this case, already set values can't be saved and will be lost.
Ein / Aus Wollen Sie das Gerät ausschalten? Nein Ja	To switch off the device with Yes to confirm. No does not switch off the device and leads to the last active screen.
	Shutdown screen is displayed for a few seconds while the device is shutting down until all data is saved and the device is completely switched off.

table 10

Operation software mzr-Touch

4.6.3 Buttons

Buttons	Explanation
	tippable, active button
 	inactive button (not tippable)
	active stop button in red
	active start button in green
	active, tippable switching element, No is currently selected
	inactive switching element
	active, tippable (editable) value entry
	inactive, non- tippable value entry (display only, not editable)
	number entry
	Invalid number input (e.g. numerical value too large)
	Scroll menu
	Progress bar; left value current elapsed time, right value, remaining time
	Progress bar; left value ⇒ current number, right value ⇒ remaining number
	delete a character (from the right)
	Delete entry
	Number block for entering floating point numbers +/- inactive, since only positive numbers are allowed

5 Accessories

The accessory range of HNP Mikrosysteme comprises complementary equipment such as hoses, tubes, fluid fittings, filters and non-return valves that are best adapted to your micro annular gear pump. We will eagerly share our long date experience as far as component selection is concerned.

6 Non-liability clause

HNP Mikrosysteme GmbH shall not be liable any damage resulting for the non-respect of instructions comprised in this operating manual.

It belongs to the user to check the integrity, the correct choice and the suitability of the product for the intended use.

It remains at the responsibility of the user to conform to all laws, rules and regulations in force. This applies above all to the treatment of aggressive, poisonous, corrosive and other dangerous liquids.

7 EC Directive

A Directive or EC Directive is a legal instrument of the European Community addressing at the member states and forcing them to implement specific regulations or targets. Leastwise, micro annular gear pumps are covered, by the scope of application of the following Directives: The following directives are of importance for the user of the described mzi[®]-Touch Control:

Low-Voltage Directive (2014/35/EU)

The Low-Voltage Directive is not relevant for mzi[®]-Touch Control described in this manual, because the supply voltage is limited to a maximum of 30 VDC.

Machinery Directive (2006/42/EU)

A micro annular gear pump is a machine and is consequently covered by this Directive. However, it may be a part of a machine or installation.

EMC Directive (2014/30/EU)

The Directive on Electromagnetic Compatibility (EMC) applies to all electronic and electrical devices, installations and systems. Consequently, the Motion Controller of the mzi[®]-Touch Control is covered by the EMC Directive.

RoHS Directive (2011/65/EU)

To our knowledge our products delivered to you do not contain substances or applications in concentrations that are forbidden by this directive. No substances contain our products delivered to you after our current knowledge in concentrations or application, the placing on the market in products according to the valid requirements forbade to the Directive.

WEEE Directive (2002/96/EU)



Disposal of mzi[®]-Touch Control has to be environmentally sound.

All materials and liquids have to be recycled in accordance with the relevant regulations. Electrical parts can not be disposed of as household waste. They have to be delivered to designated collection points.

REACH regulation (EC) No. 1907/2006

HNP Mikrosysteme is not a manufacturer or importer of chemical substances subjected to registration, but in terms of regulation, a downstream user. As downstream user, we conduct the necessary communication with our suppliers to ensure future deliveries of all components necessary to us. We will notify you of all relevant, changes in our products, their availability and the quality of parts/products delivered by us within our business and coordinate the appropriate action in individual cases with you. Previous inspection did not show any limitation in the supply of material from our upstream suppliers.

7.1 Electromagnetic Compatibility (EMC)

Electromagnetic compatibility is defined as the ability of electric or electronic device to function satisfactorily as intended in its electromagnetic environment without introducing intolerable electromagnetic disturbances in that environment.

7.1.1 EMC Directive and Standards

These standards prescribe certain standardised tests for the emitted-interference and interference-immunity tests. The following tests are required due to the connections on the controller:

All tests were conducted successfully.

8 Declarations of conformity

The delivered micro annular gear pump falls within scope of the following EC directives:

- EMC Directive (2004/108/EC)

You may request the declarations of conformity for the micro annular gear pumps from us separately.

EC-manufacturer's certificate (following EMC Directive 2014/30/EU)

We hereby declare that the following device

mzr®-Touch Control

is intended for installation into another machinery/plant and that start of operation is forbidden till it is identified that the machinery/plant into which these micro annular gear pumps shall be installed corresponds to the regulations of the EC guidelines regarding safety and health requirements.

We confirm the conformity of the product described above to the following standards in terms of applied directives

– EMC Directive (2014/30/EU)

Applied standards are particularly

EN 61000-6-4 (10/01): Generic standards – Emission standard for industrial environments

EN 61000-6-2 (10/01): Generic standards – Immunity for industrial environments

This statement does not warrant any characteristics in terms of product liability. Please note the safety instructions in the manual.

Date: 10. November 2017

Signature manufacturer:

Dr. Thomas Weisener
CEO

9 Problems and their removal



Please observe the operating instructions for the respective micro annular gear pump.



If errors occur or if this results in uncertainty when using the m zr® Touch Control, first put the m zr® Touch Control with the micro annular gear pump to stand still immediately. Call the service of HNP Mikrosysteme (see chapter 10) and send the pump back to us for review.

10 Contact persons

Service and maintenance

Mr. Ronny Haberland
Phone +49| (0) 385|52190-325

Drive and control technology

Mr. Lutz Nowotka
Phone +49| (0) 385|52190-346

11 Legal information

Marks

mZR® is a registered German trademark of HNP Mikrosysteme GmbH.

HNPM® is a registered German trademark of HNP Mikrosysteme GmbH.

Teflon® is a registered trademark of DuPont.

Viton® is a registered trademark of DuPont Dow Elastomers.

Kalrez® Spectrum™ is a registered trademark of DuPont.

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Other product names or descriptions not mentioned above are possibly registered trademarks of related companies.

Patents

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.

12 Safety information for the return of already employed micro annular gear pumps and components

12.1 General information

The operator carries the responsibility for health and safety of his/her employees. The responsibility extends also to employees not belonging to the company that have a direct contact with the micro annular gear pump and its components during repair or maintenance works. The nature of media (liquids) coming into contact with the micro annular gear pump and its components must be specified in the corresponding declaration form.

12.2 Declaration of liquids in contact with the micro annular gear pump

The staff performing the repair or maintenance works must be informed about the condition of the micro annular gear pump before starting any work on the device. The »Declaration of media in contact with the micro annular gear pump« should be filled in for this purpose.

The declaration should be sent directly to the supplier or to the company designated by the supplier. A second copy of the declaration must be attached to the shipment documents.

12.3 Shipment

The following instructions should be observed for the shipment of the micro annular gear pump.

- drain any remaining liquid from the pump
- flush the pump with an adapted flushing liquid
- remove the filter elements from the integrated or loosely delivered filters
- all the openings should be air-tight plugged
- return the pump in the original packing

12.4 Return shipping address

Please send the micro gear pumps and components to the following address:

HNP Mikrosysteme GmbH
Service
Brunnenstraße 38
D-19053 Schwerin

13 Declaration of media in contact with the micro annular gear pump and its components

Type of the device

Pump type/serial number/article no.:

Operating hours/running time:

Number of delivery note or delivery date:

Reason of return:

Contact with media (liquids)

The micro annular gear pump was in contact with:

and has been rinsed with:

Product info sheet / Material Safety Data Sheet: ☐ yes* ☐ no

* Please attach file

or is available on the following web site: www.

If a pump which had contact with dangerous substances could not be properly cleansed prior to shipment, we reserve the right to entrust a specialized company with cleansing of the device. The return of the pump in original packing is advisable. It is necessary in order to protect the employees and delivery staff.

Nature of media contact:

☐ explosive

☐ oxidizing

☐ sensitive to moisture

☐ toxic (toxic byproducts)

☐ radioactive

pH-value: approx. to

☐ carcinogenic

☐ microbiological

other:

☐ irritant

☐ corrosive

R-statements: S-statements:

Declaration

Hereby I/we affirm that the stated information is complete and correct. Micro annular gear pump and accessories are shipped in conformity with the applicable regulations.

company: ☐ Mrs ☐ Mr title:

division: name:

street, no.: phone:

ZIP/city: e-mail:

country:

city, date: authorized signature /

company stamp:

14 Appendix

– Data sheet

