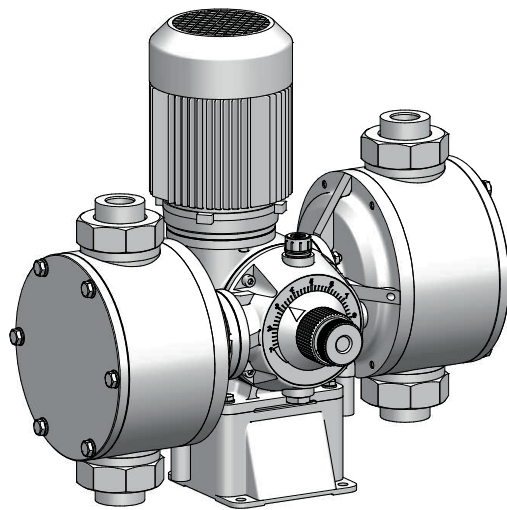
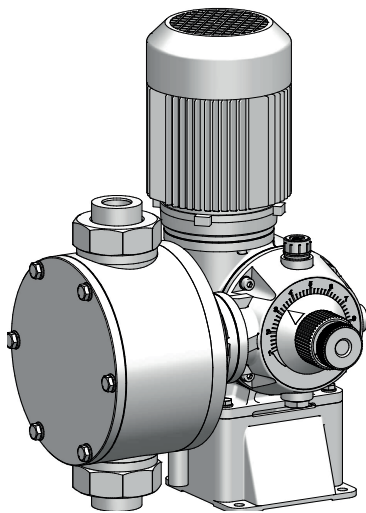


MEMDOS MR/ZMR

Motor-driven diaphragm dosing pump

Operating instructions



Read the operating manual!

The user is responsible for installation and operation related mistakes!

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1 Notes for the reader

This operating manual contains information and behaviour rules for the safe and designated operation of the product.

Observe the following principles:

- Read the entire operating manual prior to commissioning the product.
- ensure that everyone who works with or on the product has read the operating manual and follows the instructions.
- maintain the operating manual throughout the service life of the product.
- pass the operating manual on to any subsequent owner of the product.

1.1 General non-discrimination

In this operating manual, only the male gender is used where grammar allows gender allocation. The purpose of this is to make the text easy to read. Men and women are always referred to equally. We would like to ask female readers for understanding of this text simplification.

1.2 Explanation of the signal words

Different signal words in combination with warning signs are used in this operating manual. Signal words illustrate the gravity of possible injuries if the risk is ignored:

Signal word	Meaning
DANGER	Refers to imminent danger. Ignoring this sign may lead to death or the most serious injuries.
WARNING	Refers to a potentially hazardous situation. Failure to follow this instruction may lead to death or severe injuries.
CAUTION	Refers to a potentially hazardous situation. Failure to follow this instruction may lead to minor injury or damage to property.
PLEASE NOTE	Refers to a danger which, if ignored, may lead to risk to the machine and its function.

Tab. 1: Explanation of the signal words

1.3 Explanation of the warning signs

Warning signs represent the type and source of a danger:

Warning sign	Type of danger
	General danger zone
	Danger of electric shock
	Danger of caustic or other burns
	Danger of explosions

Tab. 2: Explanation of the warning signs

Warning sign	Type of danger
	Danger of electromagnetic radiation
	Danger of automatic start up
	Danger of damage to machine or functional influences

Tab. 2: Explanation of the warning signs

1.4 Identification of warnings

Warnings are intended to help you recognise risks and avoid negative consequences.

This is how warnings are identified:

Warning sign	SIGNAL WORD
Description of danger. Consequences if ignored. ⇒ The arrow signals a safety precaution to be taken to eliminate the danger.	

1.5 Identification of action instructions

This is how pre-conditions for action are identified:

- ✓ Pre-condition for action which must be met before taking action.
- ✗ A resource such as a tool or auxiliary materials required to perform the operating instructions.

This is how instructions for action are identified:

- ➔ Separate step with no follow-up action.
- 1. First step in a series of steps.
- 2. Second step in a series of steps.
 - ▶ Result of the above action.
- ✓ **Action completed, aim achieved.**

2 Safety

2.1 General warnings

The following warnings are intended to help you to eliminate the dangers that can arise while handling the dosing pump. Risk prevention measures always apply regardless of any specific action.

Safety instructions warning against risks arising from specific activities or situations can be found in the respective sub-chapters.

	DANGER
Mortal danger from electric shock! Incorrectly connected or located and damaged cables can cause injuries. ⇒ Only connect the device to an earthed power supply. ⇒ Replace damaged cables without delay. ⇒ Do not use extension cables. ⇒ Do not bury cables. ⇒ Secure cables to avoid being damaged by other equipment.	

	WARNING
Danger from unsuitable materials The materials of the dosing pump and hydraulic parts of the system must be suitable for the dosing medium that is used. Should this not be the case, the dosing media may leak. ⇒ Make sure that the materials you are using are suitable for the dosing medium. ⇒ Make sure that the lubricants, adhesives, sealants, etc. that you use are suitable for the dosing medium.	

	WARNING
Danger of automatic start up! After connecting the mains supply, residual dosing media in the dosing head can spray out. ⇒ Before connecting the mains supply, connect the dosing lines. ⇒ Check that all the screw connections have been tightened correctly and are leak-proof.	

	WARNING
Caustic burns or other burns through dosing media! While working on the dosing head, valves and connections, you may come into contact with dosing media. ⇒ Use sufficient personal protective equipment. ⇒ Rinse the dosing pump with a liquid (e.g. water) which does not pose any risk. Ensure that the liquid is compatible with the dosing medium. ⇒ Release pressure in hydraulic parts. ⇒ Never look into open ends of plugged pipelines and valves.	

	CAUTION
Danger when changing the dosing medium! Changing the dosing media can provoke unexpected reactions, damage to property and injury. ⇒ Clean the dosing pump and the system parts in contact with the media thoroughly before changing the dosing medium.	

	CAUTION
Increased risk of accidents due to insufficient qualification of personnel! Dosing pumps and their accessories may only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will increase the risk of accidents. ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications. ⇒ Prevent access to the system for unauthorised persons.	

2.2 Warnings for use within explosive-risk zones

ATEX certified versions of the MEMDOS MR/ZMR can be used in potentially explosive atmospheres. The following warnings only apply for use in such areas:

	DANGER
Danger to life through explosions! Explosions may result which could result in fatal injuries. ⇒ Use only ATEX certified versions of the MEMDOS MR/ZMR dosing pumps in potentially explosive atmospheres (check the information on the rating plate).	

**DANGER****Danger to life from electrostatic charge!**

Static electricity in explosive risk areas can build up when dosing flammable liquids. Explosions may result which could result in fatal injuries.

- ⇒ Earth the dosing pump, drive motor and all metal parts along the suction and pressure piping route.
- ⇒ Only use dosing heads made of stainless steel. In exceptional cases, carbon-filled PTFE dosing heads are also possible. For this, contact Lutz-Jesco GmbH.

**DANGER****Danger to life from the incorrect spare parts!**

Original ATEX diaphragms are coated with a conductive film to provide protection against static charging. If unsuitable membranes from other manufacturers are fitted, this can lead to electrostatic charging in explosive risk areas. Explosions may result which could result in fatal injuries.

- ⇒ Only use original diaphragms for spare parts.

You will require the minimum of the following personal protective equipment:

Personal protective equipment required

Protective goggles



Protective clothing



Protective gloves

Tab. 3: Personal protective equipment required

Wear the following personal protective equipment when performing the following tasks:

- Commissioning
- Working on the dosing pump while running
- Shut-down
- Maintenance work
- Disposal

2.3 Hazards due to non-compliance with the safety instructions

Failure to follow the safety instructions may endanger not only persons, but also the environment and the device.

The specific consequences can be:

- Failure of vital functions of the dosing pump and the system
- Failure of required maintenance and repair methods
- Danger for individuals through dangerous dosing media
- Danger to the environment caused by substances leaking from the system

2.4 Working in a safety-conscious manner

Besides the safety instructions specified in this operating manual, further safety rules apply and must be followed:

- Accident prevention regulations
- Safety and operating provisions
- Safety provisions for handling dangerous substances (mostly the safety data sheets to dosing media)
- Environmental protection provisions
- Applicable standards and legislation

2.5 Personal protective equipment

Based on the degree of risk posed by the dosing medium and the type of work you are carrying out, you must use corresponding protective equipment. Read the Accident Prevention Regulations and the Safety Data Sheets to the dosing media find out what protective equipment you need.

2.6 Personnel qualification

Any personnel who work on the dosing pump must have appropriate special knowledge and skills.

Anybody who works on the dosing pump should meet the conditions below:

- Attendance at all the training courses offered by the owner
- Personal suitability for the respective activity
- Sufficient qualification for the respective activity
- Training in handling of the dosing pump
- Knowledge of safety equipment and the way this equipment functions
- Knowledge of this operating manual, particularly of safety instructions and sections relevant for the activity
- Knowledge of fundamental regulations regarding health and safety and accident prevention

All persons must generally have the following minimum qualification:

- Training as specialists to carry out work on the dosing pump unsupervised
- Sufficient training that they can work on the dosing pump under the supervision and guidance of a trained specialist.

These operating instructions differentiate between these user groups:

2.6.1 Specialist staff

Thanks to their professional training, knowledge, experience and knowledge of the relevant specifications, specialist staff are able to perform the job allocated to them and recognise and/or eliminate any possible dangers by themselves.

2.6.2 Trained electricians

Due to their professional training, knowledge and experience as well as knowledge of specific standards and provisions, trained electricians are able to do the electrical work assigned to them and to recognise and avoid any potential dangers by themselves.

They are specially trained for their specific working environment and are familiar with relevant standards and provisions.

They must comply with the legally binding regulations on accident prevention.

2.6.3 Trained electricians with additional qualification for explosion protection

Trained electricians with additional qualification for explosion protection fulfil the criteria to act as a competent person to meet all the special requirements needed when working in explosive risk areas.

They are specially trained for their work environment in explosive risk areas and know all the relevant standards and regulations.

Above all, they have the required specialist knowledge about explosion protection like, for example, ignition protection classes, flash points, density ratios, zoning, device categories, temperature classes etc.

2.6.4 Trained persons

Trained persons have received training from the operator about the tasks they are to perform and about the dangers stemming from improper behaviour.

In the table below you can check what qualifications are the pre-condition for the respective tasks. Only people with appropriate qualifications are allowed to perform these tasks!

Qualification	Activities
Specialist staff	■ Assembly ■ Hydraulic installations ■ Maintenance ■ Repairs ■ Commissioning ■ Taking out of operation ■ Disposal ■ Fault rectification
Trained electricians	■ Electrical installation ■ Installing the electric servomotor ■ Rectifying electrical faults
Trained electricians with additional qualification for explosion protection	■ Electrical installation in explosive risk areas ■ Fault rectification in explosive risk areas
Trained persons	■ Storage ■ Transportation ■ Control ■ Fault rectification

Tab. 4: Personnel qualification

3 Intended use

3.1 Notes on product warranty

Any non-designated use of the product can compromise its function or intended protection. This leads to invalidation of any warranty claims!

Please note that liability is on the side of the user in the following cases:

- The dosing pump is operated in a manner which is not consistent with these operating instructions, particularly safety instructions, handling instructions and the section "Intended Use".
- if people operate the product who are not adequately qualified to carry out their respective activities.
- No original spare parts or accessories are used.
- Unauthorised changes are made to the device.
- The user uses different dosing media than those indicated in the order.
- The user does not use dosing media under the conditions agreed with the manufacturer such as modified concentration, density, temperature, contamination, etc.

3.2 Intended purpose

The dosing pump MEMDOS MR/ZMR is intended for the following purpose: the conveying and dosing of liquids.

3.3 Principles

- Before delivery, the manufacturer inspected the dosing pump and operated it under specific conditions (with a specific dosing medium with a specific density and temperature, with specific pipe dimensions, etc.) Since these conditions differ at every location of usage, the delivery capacity of the dosing pump should be measured by gauging it at the operating company's installation. For details on the approximate values and the capacity of the dosing pump, refer to the chapter 14 "Delivery characteristic curves" on page 31.
- Comply with the information regarding the operating and environmental conditions (see chapter "Technical data").
- Any restrictions regarding the viscosity, temperature and density of dosing media must be followed. You must only use dosing media at temperatures above freezing point or below the boiling point of the respective medium.
- The materials of the dosing pump and hydraulic parts of the system must be suitable for the dosing medium that is used. In this connection, note that the resistance of these components can change in dependence on the temperature of the media and the operating pressure.



Information on the suitability of materials combined with different dosing media can be found in the Compatibility Chart of the manufacturer.

The information in this resistance list is based on information from the material manufacturers and on expertise obtained from handling the materials.

As the durability of the materials depends on many factors, this list only constitutes initial guidance on selecting material. In all cases, test the equipment with the chemicals you use under operating conditions.

- The dosing pump is not intended for outdoor use unless appropriate

protective measures have been taken.

- Avoid leaks of liquids and dust into the casing and avoid direct exposure to sunlight.
- You must never operate dosing pumps in a potentially explosive atmosphere if they do not have corresponding nameplates or an appropriate EC Declaration of Conformity for potentially explosive atmospheres.

3.4 Prohibited dosing media

The dosing pump must not be used for these media and substances:

- Gaseous media
- Radioactive media
- Solid substances
- Flammable media, if adequate protective measures are not taken
- All other media that are not suitable for delivery using this dosing pump

3.5 Use in explosion risk areas

- The MEMDOS MR/ZMR dosing pump with ATEX certification is an electric motor-driven, explosion protected of equipment group II, equipment category 2G. When used with an explosion-protected motor, it is used to supply and dose fluids in zone 1 and 2 explosion risk areas.
- When using the dosing pumps in explosion risk areas, you must observe the minimum requirements concerning zoning. The explosion group, category and type of protection which is indicated in the labelling, must meet or be better than the requirements for the intended area of use.
- The operating instructions for the explosion protected motor which are included in delivery must also be observed.

3.6 Ex label of dosing pump and motor

Dosing pumps for use in zone 1 explosion risk areas carry the label: II 2G Ex h IIC T4 - PTB 03 ATEX D086.

Motors for use in zone 1 explosion risk areas carry the label: II 2G Ex db eb IIC T4.

Dosing pumps for use in zone 2 explosion risk areas carry the label: II 2G Ex h IIC T3 - PTB 03 ATEX D086.

Motors for use in zone 2 explosion risk areas carry the label: II 2G Ex e IIC T3.

This information can also be found on the ratings plate on the dosing pump and the ratings plate on the motor.

3.7 Foreseeable misuse

Below, there is information about the applications of the dosing pump or associated equipment that are not considered to be intended use. This section is intended to allow you to detect possible misuse in advance and to avoid it. Foreseeable misuse is assigned to the individual stages of the product lifetime:

3.7.1 Incorrect assembly

- Unstable or unsuitable bracket
- Dosing pump bolted wrongly or loosely

3.7.2 Incorrect hydraulic installation

- Suction and pressure lines dimensioned incorrectly
- Unsuitable connection of the pipes due to wrong material or unsuitable connections
- Suction and pressure lines mixed-up
- Damage to threads due to them being tightened too much
- Bending of pipelines
- No free return flow of the pressure relief valve
- Excessive demand due to the pressure differences between the suction and pressure valves
- Through-suction at installation without back-pressure valves
- Damage due to undamped acceleration mass forces
- Exceeding the admissible pressure on the suction and discharge sides
- Using damaged parts

3.7.3 Incorrect electrical installation

- Connecting the mains voltage without a protective earth
- Unsecured mains or one that does not conform to standards
- Not possible to immediately or easily disconnect the power supply
- Wrong connecting cables for mains voltage
- Dosing pump accessories connected to wrong sockets
- Diaphragm monitoring not connected or defective
- Protective earth removed

3.7.4 Incorrect start-up

- Start-up with damaged system
- Shut-off valves closed at commissioning
- Closed suction or pressure line, e.g. due to blockages
- Personnel was not informed before the start-up
- System was recommissioned after maintenance without all the protective equipment and fixtures, etc. being reconnected.
- Inadequate protective clothing or none at all

3.7.5 Incorrect operation

- Protective equipment not functioning correctly or dismantled
- Modification of the dosing pump without authority
- Ignoring operational disturbances
- Elimination of operational disturbances by personnel without adequate qualifications
- Deposits in the dosing head due to inadequate purging, particularly with suspensions
- Bridging the external fuse
- Operation made more difficult due to inadequate lighting or machines

that are difficult to access

- Delivery of dosing media for which the system is not designed
- Delivery of particulate or contaminated dosing media
- Inadequate protective clothing or none at all

3.7.6 Incorrect maintenance

- Carrying out maintenance during ongoing operation
- Carrying out work that is not described in the operating manual
- No adequate or regular inspection of correct functioning
- No replacement of damaged parts or cables with inadequate insulation
- No securing against reactivation during maintenance work
- Using cleaning materials that can cause reactions with the dosing media
- Inadequate cleaning of the system
- Unsuitable purging medium
- Unsuitable cleaning materials
- Detergents left in system parts
- Using unsuitable cleaning equipment
- Using the wrong spares or lubricants
- Contaminating the dosing medium with lubricant
- Installing spare parts without following the instructions in the operating manual
- Blocking venting orifices
- Pulling off sections of the plant
- Contamination at installation without a dirt trap
- Mixing up the valves
- Mixing up the sensor lines
- Not reconnecting all the lines
- Damaging or not installing all the seals
- Not renewing seals
- Not paying attention to safety data sheets
- Inadequate protective clothing or none at all

3.7.7 Incorrect decommissioning

- Not completely removing the dosing medium
- Dismantling lines while the dosing pump is running
- Device not disconnected from the power supply
- Using the wrong dismantling tools
- Inadequate protective clothing or none at all

3.7.8 Incorrect disposal

- Incorrect disposal of dosing media, operating resources and other materials
- No labelling of hazardous substances

4 Product description

4.1 Properties

The MEMDOS MR/ZMR is a classic motor-driven diaphragm dosing pump used when a control is not required to achieve constant dosing.

They are characterized by the following properties:

- Robust and durable
- Available as single or double head pump
- Single pump standard version: with the head located on the left-hand side
- Output range from 440 – 980 l/h, up to 5 bar
- Double head pump with the head located diagonally
- Capacity range 55 – 980 l/h per dosing head, up to 10 bar
- Different materials and performance ranges can be combined
- Manually adjustable stroke length from 0 – 100 %
- Materials: PVC, PP, PVDF, PTFE conductivity and stainless steel (1.4571)
- Suitable for frequency converter operation.
- Motors available in three-phase and AC versions

4.2 Scope of delivery

Please compare the delivery note with the scope of delivery. The following items are part of the scope of delivery:

- Dosing pump MEMDOS MR/ZMR
- Suction and discharge side connections
- Gear oil
- Operating instructions
- ATE servomotor (optional)
- Separate fan (optional)

4.3 Structure of the dosing pump

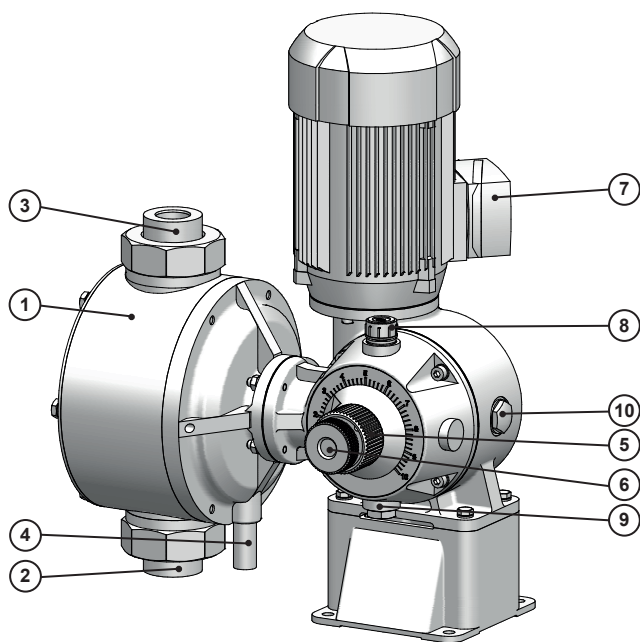


Fig. 1: Structure of the dosing pump

No.	Position
1	Dosing head
2	Valve on suction side
3	Valve on discharge side
4	Drain socket
5	Stroke length adjustment
6	Stroke length adjustment lock
7	Motor terminal box (MEMDOS MR voltage supply)
8	Oil inlet
9	Oil outlet
10	Oil level glass

Tab. 5: Position numbers Structure of the dosing pump

4.4 Function description

Motor-driven diaphragm dosing pumps of the MEMDOS series are used in industry in the process engineering sector, and in water treatment and wastewater processing.

MEMDOS is available in two versions: MEMDOS MR with a single dosing head and MEMDOS ZMR with two dosing heads. If not otherwise pointed out, all specifications of the MEMDOS MR are also applicable for the MEMDOS ZMR.

The MEMDOS MR is used when no control is required for constant dosing. For this the voltage supply is connected directly to the terminal box of the motor. To adapt the dosing capacity the stroke length can be adjusted manually from 0 – 100%, or the motor speed is controlled by means of a separate frequency converter. The MEMDOS MR is optionally available with electrical remote adjustment of the stroke length (ATE).

The MEMDOS MR can be operated in Zone 1 hazardous areas if the corresponding drive is taken into consideration. Further information can be found in section 12 "Troubleshooting" on page 28 on page.

4.5 Rating plate

There is information on the equipment about safety or the product's way of functioning. The information must stay legible for the duration of the service life of the product.

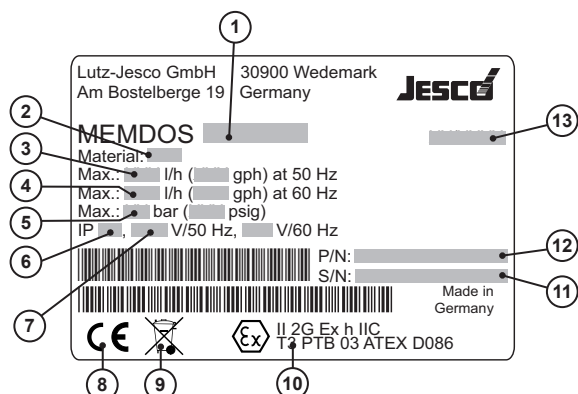


Fig. 2: Rating plate MEMDOS MR/ZMR

No.	Description
1	Product, type, nominal size
2	Materials
3	Maximum delivery capacity in l/h and gph at 50 Hz and maximum back pressure
4	Maximum delivery capacity in l/h and gph at 60 Hz and maximum back pressure
5	Maximum pressure in bar and psig
6	Protection class
7	Voltage supply at 50 Hz and 60 Hz
8	Label showing conformity with applicable European directives
9	WEEE label
10	ATEX marking
11	Serial number
12	Part number
13	Month/year of manufacture

Tab. 6: Rating plate

4.6 Explosion-proof dosing pumps (ATEX)

4.6.1 General



The dosing pump is not intended for dosing gaseous media or solids

The explosion-proof version of the MEMDOS MR dosing pump is an electric motor-driven, explosion-proof diaphragm dosing pump of equipment category 2, group II.

Used in conjunction with an explosion-proof motor (II 2G Ex db eb IIC T4 or II 2G Ex eb IIC T3) it is used to perform the dosing of liquids in a zone I explosive atmosphere. The dosing pump displays the EX marking "II 2G Ex h IIC T3 PTB 03 ATEX D086" or "II 2G Ex h IIC T4 PTB 03 ATEX D086".

4.6.2 Special conditions

The minimum requirements for the zone classification must be ensured if using the dosing pump in areas with a potentially explosive atmosphere. The dosing pump itself and the motor must meet the minimum requirements.

4.6.3 Dosing of flammable media

If dosing flammable fluids, all metal parts in the suction and discharge pipes must be grounded to prevent electrostatic discharge.

Stainless steel is recommended for the dosing head.

5 Technical data

5.1 MEMDOS MR

Specification and Unit			MEMDOS MR		
			400	600	980
Number dosing heads			1		
Delivery capacity* at max. back pressure (per dosing head)	I/h		440	640	980
	ml/stroke		156	154	162
Max. delivery pressure	3 ph motor	bar	5		4
	1 ph motor	bar	2.5		2
Max. stroke frequency*		min ⁻¹	47	70	101
Suction lift for non-gassing media		mWs	2		
Max. supply pressure		mbar	500		
Diaphragms	Diameter	mm	185		
	Material		EPDM/PTFE-coated		
Valve size			DN25		
Protection class			IP55		
Insulation class			F		
Materials			PVC, PP, PVDF, PTFE conductivity, 1.4571		
Weight	PVC, PP, PVDF	kg	~37		~ 39
	1.4571	kg	~57		~ 59
Permitted ambient temperature	PVC	°C	5 – 40**		
	PP, PVDF, PTFE conductivity, 1.4571	°C	5 – 45**		
Approved media temperature	PVC	°C	0 – 35		
	PP, PVDF	°C	0 – 60		
	PTFE conductivity	°C	0 – 80		
Relative humidity		%	max. 90		
Viscosity limits		mPa·s	300/1000***		

Tab. 7: Technical data MEMDOS MR

* Output / stroke frequency with 50 Hz operation; at 60 Hz operation 20 % higher values.

* Use of the dosing pump at ambient temperatures below 5 °C must be checked individually. In such cases, please contact the manufacturer.

*** If the viscosity is above 1000 mPa·s, this must be checked individually and the stroke frequency must be between 50 and 100 strokes/min.

5.2 MEMDOS ZMR

Duplex dosing pumps with equal dosing heads

Specification and Unit			MEMDOS ZMR							
			50/50	75/75	115/115	140/140	210/210	290/290	400/400	600/600 980/980
Number dosing heads			2							
Delivery capacity* at max. back pressure (per dosing head)	I/h		55	90	135	160	240	290	440	640 980
	ml/stroke		20	21	22	38	40	48	156	154 162
Max. delivery pressure	3ph motor	bar	10					5		4
	1ph motor	bar	5					2.5		2
Max. stroke frequency*		rpm	47	70	101	70	101	47	70	101

Tab. 8: Technical data MEMDOS ZMR

Specification and Unit			MEMDOS ZMR								
			50/50	75/75	115/115	140/140	210/210	290/290	400/400	600/600	980/980
Suction lift for non-gassing media		mWs	7			6		4	2		
Max. supply pressure		mbar	500								
Diaphragms	Diameter	mm	90			120		150	185		
	Material		EPDM/PTFE-coated								
Nominal valve width			DN10					DN15	DN25		
Protection class			IP55								
Insulation class			F								
Materials			PVC, PP, PVDF, PTFE conductivity, 1.4571								
Weight	PVC, PP, PVDF	kg	~35					~37	~54		
	1.4571	kg	~52					~ 57	~ 96		
Approved ambient temperature	PVC	°C	5 – 40**								
	PP, PVDF, PTFE conductivity, 1.4571	°C	5 – 45**								
Approved media temperature	PVC	°C	0 – 35								
	PP, PVDF	°C	0 – 60								
	PTFE conductivity	°C	0 – 80								
Relative humidity		%	max. 90								
Viscosity limits		mPa·s	300***/1000****								

Tab. 8: Technical data MEMDOS ZMR

* Output / stroke frequency with 50 Hz operation; at 60 Hz operation 20 % higher values.

* Use of the dosing pump at ambient temperatures below 5 °C must be checked individually. In such cases, please contact the manufacturer.

*** With a viscosity of ~300 mPa·s and above, you must use spring-loaded valves.

**** If the viscosity is above 1000 mPa·s, this must be checked individually and the stroke frequency must be between 50 and 100 strokes/min.

5.3 Voltage supply

Motor and unit			MEMDOS MR		
			400	600	980
Three-phase motors	400/230 V 3ph - 50 Hz	kW	0.55		0.75
	460/270 V 3ph - 60 Hz	kW	0.65		0.9
	400/230 V 3ph - 50 Hz for frequency converter operation	kW	0.75		1.1
	460/270 V 3ph - 60 Hz for frequency converter operation	kW	0.9		1.3
AC motors	230 V 1ph - 50 Hz	kW	0.75		
ATEX motors	400/230 V 3ph - 50 Hz II 2G Ex de IIC T4	kW	0.55		0.75
	400/230 V 3ph - 50 Hz II 2G Ex de IIC T4 for frequency converter operation	kW	0.75		1.1
	400/230 V 3ph - 50 Hz II 2G Ex e IIC T3	kW	0.55		0.75
	400/230 V 3ph - 50 Hz II 2G Ex e IIC T3 for frequency converter operation	kW	0.75		1.1

Tab. 9: Voltage supply MEMDOS MR

Motor and unit			MEMDOS ZMR								
			50/ 50	75/ 75	115/ 115	140/ 140	210/ 210	290/ 290	400/ 400	600/ 600	980/ 980
Three-phase motors	400/230 V 3ph - 50 Hz	kW	0.55					0.75			
	460/270 V 3ph - 60 Hz	kW	0.65					0.9			
	400/230 V 3ph - 50 Hz for frequency converter operation	kW	0.75					1.1			
	460/270 V 3ph - 60 Hz for frequency converter operation	kW	0.9					1.3			
AC motors	230 V 1ph - 50 Hz	kW	0.75								
ATEX motors	400/230 V 3ph - 50 Hz II 2G Ex de IIC T4	kW	0.55					0.75			
	400/230 V 3ph - 50 Hz II 2G Ex de IIC T4 for frequency converter operation	kW	0.75					1.1			
	400/230 V 3ph - 50 Hz II 2G Ex e IIC T3	kW	0.55					0.75			
	400/230 V 3ph - 50 Hz II 2G Ex e IIC T3 for frequency converter operation	kW	0.75					1.1			

Tab. 10: Voltage supply MEMDOS ZMR

6 Dimensions

All dimensions in mm

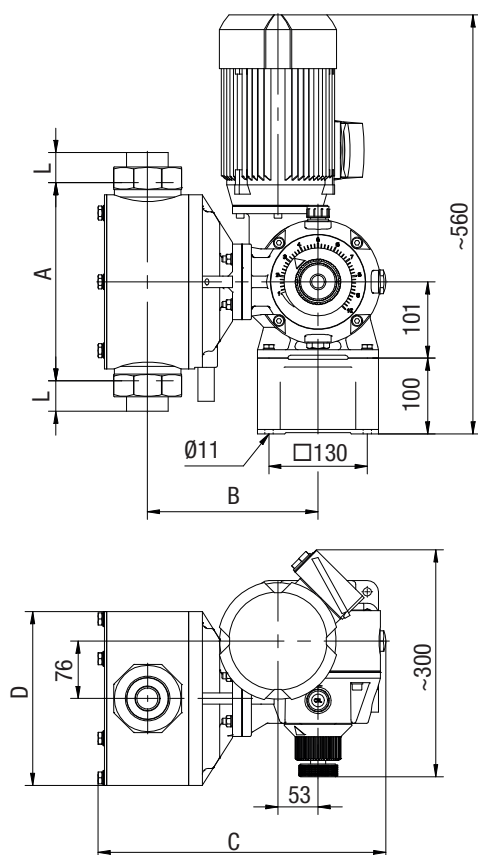


Fig. 3: Dimensioned drawing MEMDOS MR 50 – 980

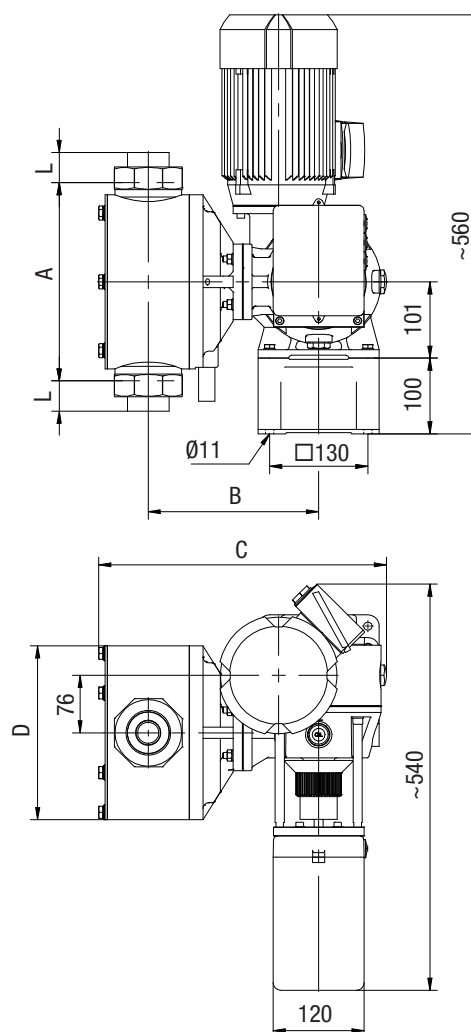


Fig. 4: Dimensions MEMDOS MR 50 – 980 ATE

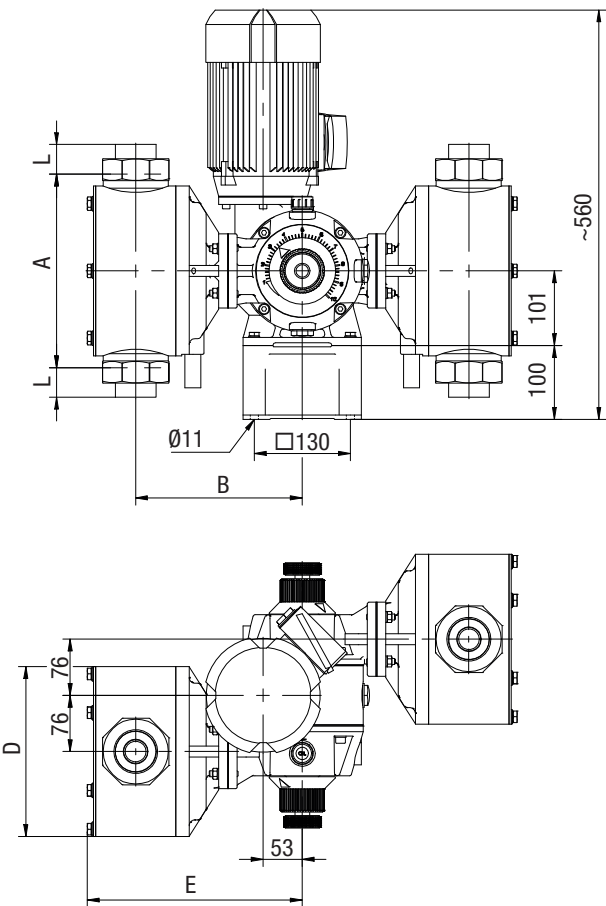


Fig. 5: Dimensioned drawing MEMDOS ZMR 50 – 980

MEMDOS MR/ZMR	A	B	C	D	E
50	272	201	317	Ø152	220
75					
115					
140					
210					
290	296		325	□170	225
400	265	225	378	Ø230	288
600					
980					

Tab. 11: Dimensions MEMDOS MR/ZMR 50 – 980

MEMDOS	Valves	Connection	DN	Pipe	L
ZMR 50 – 290	G1 1/4	Stick-on connector	8	Ø12	22
			10	Ø16	
		Threaded connection	15	Ø20	
			10	G3/8	
MR 400 – 900 ZMR 400 – 900	68.5	Stick-on connector	15	G1/2	40
			25	Ø32	
		Threaded connection	32	Ø40	44
			20	G3/4	
			25	G1	
		Flange	32	G1 1/4	60
			25	Ø32	
		Stick-on connector with thread	25	Ø32	75

Tab. 12: Dimensions MEMDOS MR/ZMR

7 Installing the Dosing Pump

7.1 General Notes

Local rules and regulations must be taken into account when selecting a dosing pump for designing a system, and for installation and operation. This applies to the selection of the appropriate materials for the dosing pump, the handling of chemicals, and electrical installation.

Before installing the pump in explosion-hazard areas, the dosing pump must be checked to ensure that it meets with the minimum requirements imposed by the applicable explosion protection regulations. For this purpose, the data on the dosing pump rating plate must be compared with the local requirements.

Likewise, the dosing pump's technical data (see section 5 "Technical data" on page 12) has to be respected and the plant's layout has to be brought in line with this (e.g. pressure loss during the design of the plant's layout with a view to the nominal diameter and length).

The designer and the operating company are responsible for ensuring that the entire system, including the dosing pump, is designed in such a way that neither system equipment nor buildings are damaged in the case of chemical leakage due to the failure of wearing parts (e.g. diaphragm rupture) or burst hoses. If the chemical system represents a potential source of danger, the installation must be designed in such a way that no unreasonable consequential damage occurs, even if the dosing pump fails. We therefore recommend installing leakage monitors and collecting pans.

The drain socket of the dosing head must be visible so that a diaphragm rupture can be detected. Drainage should be able to flow freely downward through the drain pipe.

To increase the dosing accuracy and to ensure the functional reliability, we recommend the use of additional accessories. These include back-pressure valves, pressure relief valves, leakage monitors and low level indicators, as shown in the installation examples.

Always use appropriate tools for the installation of plastic connection parts. To avoid damage, never apply excessive force.

	WARNING
Caustic burns or other burns through dosing media! A diaphragm rupture, blocked pressure lines or the use of material not suitable for the dosing medium can result in the discharge of dosing medium. Depending on the type and hazardousness of the dosing medium, this can result in injury. ⇒ Wear the recommended personal protective equipment. ⇒ Make sure that the materials you are using are suitable for the dosing medium. ⇒ Make sure that the lubricants, adhesives, sealants, etc. that you use are suitable for the dosing medium. ⇒ Install a leakage drain. ⇒ Install pressure relief valves.	

	CAUTION
Danger of personal injury and material damage! High peak pressures can lead to piping vibrating and cause them to snap. This can result in injury from piping or escaping dosing media. ⇒ Install pulsation dampeners.	

	PLEASE NOTE
Damage to drives due to overloading The pressure conditions between the suction and discharge sides must be balanced; otherwise, overloading can result. This can lead to uncontrolled dosing processes, damage to the piping and to the dosing pump. ⇒ Ensure that the pressure on the discharge side is at least 1 bar than on the suction side.	

	PLEASE NOTE
Locking of threads Stainless steel and plastic parts (particularly those made of PVC) that are bolted together in a detachable connection (e.g. the dosing head and the valves) can lock. This makes them difficult to release. ⇒ Before bolting, grease the corresponding parts with a lubricant (e.g. PTFE spray). Ensure that the lubricant is compatible with the dosing medium.	

Warning notice for installation in an explosive risk zone:

	DANGER
Danger to life through explosions! Systems without a pressure relief valve fitted produce an increased safety risk in an explosive risk zone. Explosions could occur if system parts heat up during an overload or by sparks which may be created if drive parts were to break. ⇒ Install a pressure relief valve on the pressure side of the dosing pump.	

7.2 Set up information

When installing, follow the basic principles below:

- Install the pump so that the suction and pressure valves are in vertical position.
- To ensure stability, the dosing pump must be screwed onto an appropriate surface.
- The system piping must not exert any force on the connections and

valves of the dosing pump.

- To avoid dosing errors at the end of the process, the dosing pump must be locked electrically and hydraulically.
- The installation location of the dosing pump must be easily accessible by operating and service personnel.
- The permissible ambient temperature (see section 5 "Technical data" on page 12) may not be exceeded.
- Radiant heat of apparatus and heat exchangers must be kept in limits allowing the pump to sufficiently dissipate its own heat.
- Avoid exposure to direct sunlight.
- If the dosing pump is installed outside, provide a roof to protect it from the effects of weather.

7.3 Installation of MEMDOS MR with ATE servomotor



PLEASE NOTE

Avoid wear and/or destruction!

Note that the ATE servomotor can only be actuated when the main drive motor of the dosing pump is running. This means that the ATE servomotor must be locked electrically. Otherwise, the adjusting eccentric will suffer excessive wear, or be destroyed.

The ATE servomotor is connected to the dosing pump and adjusted at the factory. When installing, follow the basic principles below:

- When installing, sufficient installation space of at least 150 mm must be provided in order to allow later maintenance.
- The electrical connection of the ATE servomotor must be made according to local regulations and may only be carried out by qualified technical personnel.
- Please follow the installation instructions in the operating manual for the electric servomotor.
- Cable type and cross-section must be chosen according to the motor data.
- The cable passage through the housing must be made professionally. We recommend using gland connections with strain-relief clamp.
- The required protection degree must be ensured by installing the electrical connections professionally.

8 Hydraulic installations

In this chapter, you will find information about the hydraulic parts of a system that you should install or that can install additionally. In many cases, you must install hydraulic accessories to be able to use all the functions that the dosing pump MEMDOS MR/ZMR offers, to guarantee functional safety or to achieve a high level of dosing precision.

	WARNING
Caustic burns or other burns through dosing media!	
A diaphragm rupture, blocked pressure lines or the use of material not suitable for the dosing medium can result in the discharge of dosing medium. Depending on the type and hazardousness of the dosing medium, this can result in injury.	
⇒ Wear the recommended personal protective equipment.	
⇒ Make sure that the materials you are using are suitable for the dosing medium.	
⇒ Make sure that the lubricants, adhesives, sealants, etc. that you use are suitable for the dosing medium.	
⇒ Install a leakage drain.	
⇒ Install pressure relief valves.	

	CAUTION
Danger of personal injury and material damage!	
High peak pressures can lead to piping vibrating and cause them to snap. This can result in injury from piping or escaping dosing media.	
⇒ Install pulsation dampeners.	

	PLEASE NOTE
Damage to drives due to overloading	
The pressure conditions between the suction and discharge sides must be balanced; otherwise, overloading can result. This can lead to uncontrolled dosing processes, damage to the piping and to the dosing pump.	
⇒ Ensure that the pressure on the discharge side is at least 1 bar than on the suction side.	

	PLEASE NOTE
Locking of threads	
Stainless steel and plastic parts (particularly those made of PVC) that are bolted together in a detachable connection (e.g. the dosing head and the valves) can lock. This makes them difficult to release.	
⇒ Before bolting, grease the corresponding parts with a lubricant (e.g. PTFE spray). Ensure that the lubricant is compatible with the dosing medium.	

8.1 Design of the system

- The dosing pumps technical data (see chapter 5 "Technical data" on page 12) must be taken into account and the plant's layout must be set up appropriately (e.g. pressure loss when rating the lines with regard to their nominal diameter and length).
- The entire system and its integrated dosing pump must be designed in such a way that an escaping dosing medium (due to the failure of wearing parts such as the diaphragm, or burst hoses) does not lead to permanent damage to system parts or the premises.
- The leakage opening of the dosing head must be visible so that you can detect a diaphragm rupture. It must be possible for the outflow from the leakage drain to be on a free downwards gradient.
- If you use hazardous dosing media, the installation must be designed such that no disproportionately high consequential damages arise due to dosing media escaping.
- To avoid dosing errors at the end of the process, the dosing pump must be locked electrically and hydraulically.
- To allow you to easily inspect the pressure conditions in the system, you should provide connections for pressure gauges close to the suction and pressure valves.

8.2 System piping

- The system piping must not exert any force on the connections and valves of the dosing pump.
- This means that steel piping should be connected to the dosing pump via flexible pipe sections.
- The nominal diameters of the pipework and the installed fittings should be rated the same as or greater than the nominal diameters of the dosing pump's suction and pressure valves.
- The suction line should be kept as short as possible.
- You should avoid intertwined hoses.
- Avoid loops, since air bubbles can collect.

8.3 Suction and pressure valves

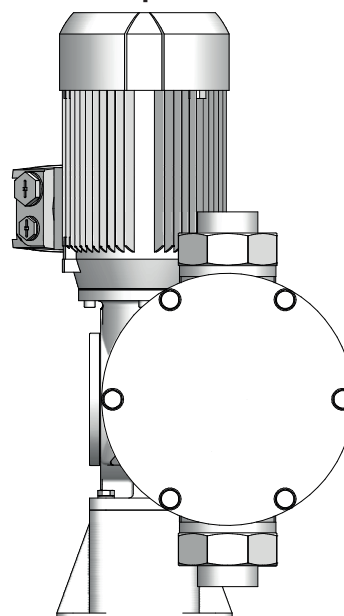


Fig. 6: Dosing head with suction and pressure valves

The suction and pressure valves are hydraulic connections to the dosing pump onto which the suction line or pressure line are attached.

These are double-ball bearing or spring-loaded valves which can only work properly when mounted in a vertical direction. The condition of the valves has a significant impact on the function and the dosing accuracy of the dosing pump.

For this reason, when connecting the dosing lines to the dosing pump, observe the alignment:

- Pressure valve above the dosing head,
- Suction valve under the dosing head.

8.4 Connecting a leakage drain

The products are produced to the highest quality standards and have a long service life. However, some parts are subject to operational wear. This is the case particularly with the diaphragms that are continuously subjected to forces during the suction and discharge strokes and to the effects of the dosing medium.

If a diaphragm ruptures, the dosing medium starts to leak. This leakage is drained via the leakage opening. There is an opening on the dosing head's flange for this purpose.

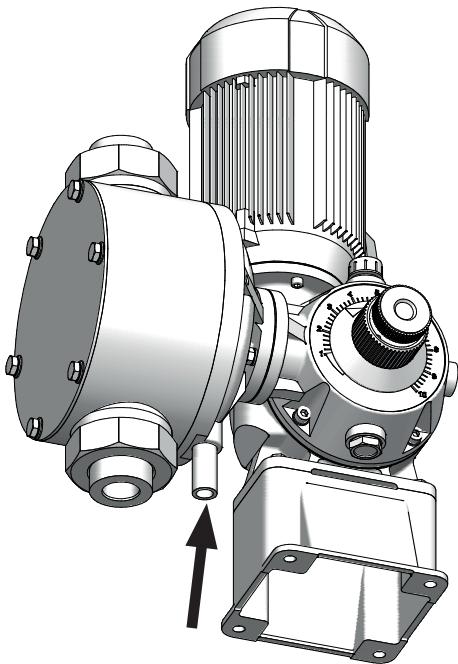


Fig. 7: Leakage drain opening

The use of a diaphragm rupture sensor is recommended.



PLEASE NOTE

Damage to drives due to effervescent media

If a hose is connected to the leakage drain and it is routed back into the dosing tank, effervescent media can enter the drive and damage it.

- ⇒ Collect the leakage in a collecting pan.
- ⇒ As an alternative, you can route the leakage back to the dosing tank using a funnel. You should install the funnel at an adequate distance from the leakage opening.

8.5 Hydraulic accessories

The following chapter is intended to give you an overview of installation options.

Please note that these operating manual are no substitute for the documentation supplied with the accessories. Comply with the safety instructions and all further instructions provided by the product documentation.

8.5.1 Injection nozzle

If the pressure line enters a main line, it is advisable to install an injection nozzle.

Injection nozzles have the following functions:

- Dosing the medium into a main line,
- Preventing flowback into the pressure line through a non-return valve.

Notes on assembly:

- Double-ball injection nozzles must be installed into the main line vertically from the bottom. You can install hose and spring-loaded injection nozzles any way you like.
- With dosing media that tend to crystallize, it is advisable to carry out installation into the main line from the bottom. This prevents air bubbles from being trapped.
- Some dosing media tend to soil the injection nozzle. This can result in blockages. In cases like this, it is advisable to install an injection nozzle that is easy to dismantle and block off.

When installing the injection nozzle, comply with the instructions provided in the operating manual.

8.5.2 Pressure relief valve

Pressure relief valves have an important safety function for protecting the dosing pump and the associated pipes and fittings. The dosing pump can generate a pressure that is many times the rated one. A blocked pressure line can lead to dosing medium escaping.

An improperly high pressure can occur if:

- the shut-off valves are closed even though the dosing pump is running,
- pipes block.

At an appropriate pressure, a pressure relief valve opens a bypass line and protects the system in this way from damage caused by over-pressure.

Notes on assembly:

- The line for returning dosing medium from the pressure relief valve must be routed to the dosing tank or to a collecting pan.
- The pressure in the dosing tank must not be too high so that it is possible to accommodate the returned dosing medium.
- As an alternative, the system can return dosing medium into the suction line in front of the dosing pump. In this case, there must not be a non-return valve or a foot valve in the suction line.
- You should install the pressure relief valve as close as possible to the dosing head.

8.5.3 Back-pressure valve

Back-pressure control valves are necessary if:

- there are considerably fluctuating system pressures,
- the pressure on the suction side is higher than on the discharge side or if you intend to carry out dosing into depressurized lines.

In cases like this, if you do not use a back-pressure valve, imprecise dosing results will occur or overloading will result. The back-pressure valve solves these problems by generating a defined, constant backpressure.

8.5.4 Pulsation dampener

Pulsation dampeners have the following functions:

- Damping pulsating delivery flows for processes that require low-pulsation dosing,
- Reducing the throughflow resistance with long pipelines.

When installed on the suction side:

- Damping of acceleration mass forces and with this reduction of wear on the dosing pump.
- Preventing cavitation (pull-off of the liquid column) due to too high acceleration.

Pulsation dampers also perform important safety functions by preventing pressure peaks which cause the piping to vibrate and tear.

This problem can occur:

- with the high amplitudes of the vibrations,
- when using long pipes (the severity of the pulsation increases with the length of the pipe),
- when using rigid piping instead of elastic hoses.

Notes on assembly:

- You should carry out assembly in the direct vicinity of the location where you want to damp the pressure peaks (directly in front of the suction valve or directly behind the pressure valve).
- Pulsation dampeners should be installed with throttle valves or back-pressure valves installed directly behind them. By setting the valves appropriately, you can further-optimize damping of the pulsations.
- To prevent unnecessary pipe friction losses, you should lay the connecting line straight and in accordance with the rated width of the pulsation dampener.
- You must separately fasten relatively large pulsation dampeners and ones with hose connections.
- Pipelines must not transfer any mechanical tensions onto the pulsation dampener.

8.5.5 Priming aid

Priming aids are particularly advisable:

- in the case of dosing pumps with small volumetric displacements per stroke or with low stroke length settings,
- with high suction heights,
- with highly dense dosing media,
- at priming for the first time due to dry valves and air in the suction line and the dosing head,
- in dosing systems with frequent downtimes.

Further advantages resulting from priming aids:

- preventing cavitation in the suction line,
- gas removal,
- optical dosing control with small amounts,
- smoothing of the suction flow.

8.5.6 Level control

Level monitoring of suction-side feeding of the dosing medium to prevent the tank being sucked dry and to ensure that it can be topped up again in good time.

8.5.7 Dosing suspensions

When dosing suspensions, the dosing head must be rinsed regularly to prevent depositing. To do this, you install a feed line for the rinsing medium (water) in the suction side installation.

8.5.8 Suction pressure regulator

A suction pressure regulator may be necessary if the suction-side installation of the system produces a varying suction pressure or supply pressure:

- Dosing pumps that are installed above dosing tanks deliver less as the tank empties, since the suction head increases.
- Dosing pumps that are installed below dosing tanks deliver less as the tank empties, since the positive delivery pressure reduces.

Further problems that can occur:

- Greater wear on the dosing pump, e.g. diaphragm rupture due to the effects of heavy forces with particularly high tanks and high-density dosing media.
- Idling of the dosing tank in the case of a diaphragm rupture or pipe breakage.
- Impermissibly high forces in the pump transmission that occur when dosing pumps receive the dosing medium directly from the pressure line.
- Reduced performance or destruction of fittings due to cavitation with long suction lines.

The installation of a suction pressure regulator prevents these problems. The suction pressure regulator is opened by the dosing pump's suction pressure. This ensures that no dosing medium can flow if the dosing pump is not running or no vacuum can be generated following a pipe fracture.

Notes on assembly:

When using a large suction pressure regulator, you should provide a pulsation dampener on the suction side.

9 Electrical installation



DANGER

Mortal danger from electric shock!

If there is an electrical accident, you must disconnect the dosing pump from the mains as quickly as possible.

⇒ Install an emergency stop switch or integrate the dosing pump into the plant safety concept.



CAUTION

Danger of automatic start up!

The dosing pump does not have an ON/OFF switch and may start to pump as soon as it is connected to the mains supply. This means that dosing medium can escape. Depending on the type and hazardousness of the dosing medium, this can result in damage to property or to injury.

⇒ Install an emergency stop switch or integrate the dosing pump into the plant safety concept.



PLEASE NOTE

Damage due to incorrect mains voltage

The dosing pump can be damaged if you connect it to the wrong mains voltage.

⇒ Observe the information on the mains supply that is given on the rating plate.

closed motor operating instructions.

- The motor must be connected to the termination box in accordance with the circuit diagram.

9.2 Drive motor connection



PLEASE NOTE

Damage to the gear due to incorrect direction of rotation

It is imperative that you adhere to the rotation direction of the drive motor: anti-clockwise when looking at the fan wheel.

Connection	MEMDOS	Phases	Note
	MR 50 – 980	3 ~	Y-connection (Standard)
			Delta connection

Tab. 13: MEMDOS MR three-phase motors

9.3 Electric wiring diagrams for ATE servomotor for stroke length adjustment

The electrical connection is made in accordance with the separate operating manual for the servomotor enclosed with the scope of delivery.

Safety instructions for installation in a potentially explosive atmosphere:



DANGER

Danger to life through explosions!

Explosions may result which could result in fatal injuries.

⇒ Earth the dosing pump, drive motor and all metal parts along the suction and pressure piping route.

9.1 Principles

- The electrical connection comply with local regulations.
- Cable type and cross-section of the supply lines must be chosen according to the motor data.
- We recommend using gland connections with strain-relief clamp.
- The required protection degree must be ensured by installing the connections professionally.
- The motor must be protected by a suitable motor protection switch.
- The dosing pump must be earthed via a PE conductor for the connection to the termination box.
- If an ATEX certified motor is being used, you must also observe the en-

10 Operation

	WARNING
Caustic burns or other burns through dosing media! After connecting the mains supply, residual dosing media in the dosing head can spray out. ⇒ Wear the recommended personal protective equipment. ⇒ Make sure that the materials you are using are suitable for the dosing medium. ⇒ Make sure that the lubricants, adhesives, sealants, etc. that you use are suitable for the dosing medium. ⇒ Install a leakage drain. ⇒ Install pressure relief valves.	

	CAUTION
Danger of automatic start up! The dosing pump does not have an ON/OFF switch and may start to pump as soon as it is connected to the mains supply. This means that dosing medium can escape. Depending on the type and hazardousness of the dosing medium, this can result in injury. ⇒ Set the stroke length setting to 0% before disconnecting it from the power supply. ⇒ Ensure that the dosing pump has been installed correctly before connecting it to the mains supply.	

	CAUTION!
Increased risk of accidents due to insufficient qualification of personnel! Personal protective equipment as specified by the applicable accident prevention regulations must be worn during all work on the dosing pump/system! ⇒ Wear protective clothing. ⇒ Wear protective gloves. ⇒ Wear protective goggles.	

10.1 Start-up

	For initial commissioning, it is advisable to use water as the dosing medium to check that the system is leak-proof and that the dosing pump is functioning correctly. Check first whether undesirable reactions could occur between the actual dosing medium and the water. We recommend priming the dosing pump without back pressure. For this purpose, we recommend installing a relief valve on the discharge side of the dosing pump.
---	---

Pre-conditions for actions:

- ✓ The dosing pump was fitted and installed in accordance with the sections "Fitting the dosing pump", "Hydraulic installation" and "Electrical installation".

Perform the following steps:

1. Fill the supplied oil into the dosing pump. For oil grade and quantity, see section 11.1 "Lubrication" on page 26 on page
2. Switch on the dosing pump via an external control which needs to be installed.
3. Set the manual power adjustment to maximum stroke to improve priming. During the initial priming, there should be no backpressure. For this purpose, we recommend installing a relief valve on the discharge side of the dosing pump.

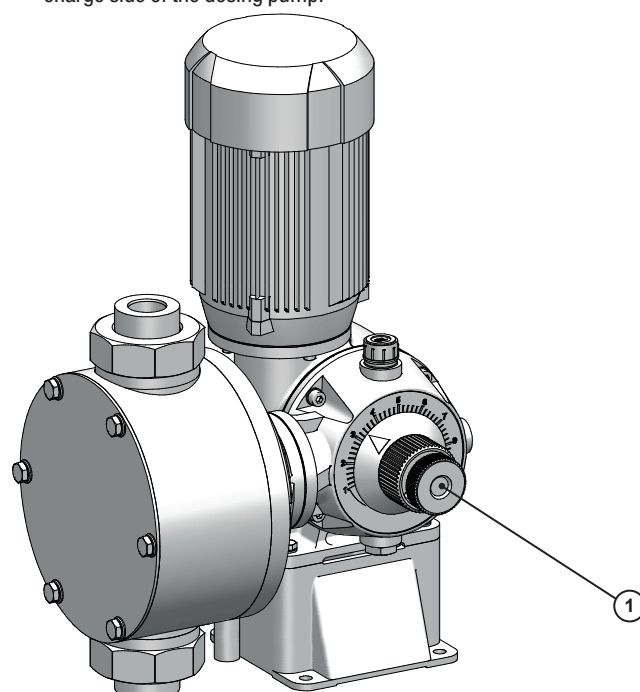


Fig. 8: Power adjustment:

	WARNING
Spray out of chemicals Chemical may spray out. This may lead to chemical or other burns. ⇒ Ensure that there is no positive pressure in the line before disconnecting the pressure connection. ⇒ Then re-install the pressure valve, switch on the dosing pump and let it prime.	

4. If a priming aid has been installed, this must be filled with chemical first. If the dosing pump does not prime, switch off the dosing pump, unscrew the pressure valve and fill the dosing head with fluid. If the medium is not hazardous, it can be used directly; otherwise use a neutral medium which will not disturb the process (water can be used in many cases).

5. If a vent valve is integrated in the dosing head or is presented as a separate fitting, open it while the dosing pump is operating. Close it again as soon as liquid escapes.
6. When correct operation has been established, set the desired delivery rate using the adjusting knob (see section 10.2 "Stroke length adjustment" on page 24) or the remote control adjustment. For an initial approximation, refer to the delivery characteristic curves (see chapter 14 "Delivery characteristic curves" on page 31).

i Depending on the installation and the chemicals used, these values may differ and must be checked under operating conditions.

✓ **The dosing pump is commissioned.**

i The manufacturer of the dosing equipment is not responsible for damage due to excessive or insufficient flow rates at the dosing pump or incorrect or faulty installation of peripheral fittings.

Start up of MEMDOS MR/ZMR with ATE-servomotor

Perform the following steps:

1. Switch on the main drive motor of the dosing pump.
 - ▶ An electrical interlocking system then allows ATE drive adjustment.
2. To check the direction of rotation, send short control pulses to the ATE servomotor.
 - ▶ If the direction of rotation is wrong, the supply lines (terminals 2 and 3 for direct controls) are reversed.
3. Move the ATE servomotor to the respective end position to check the limit switching of the limit switches installed. The factory-set angle of rotation is 270°. If required, the maximum delivery rate can be changed by limiting the angle of rotation. For this purpose, the upper trigger cam is moved by the required value.

✓ **MEMDOS MR/ZMR with ATE-servomotor put into operation.**

10.2 Stroke length adjustment



PLEASE NOTE

Damage to the dosing pump possible!

The stroke length should not be adjusted while the dosing pump is stopped!

⇒ Make sure that the pump works.

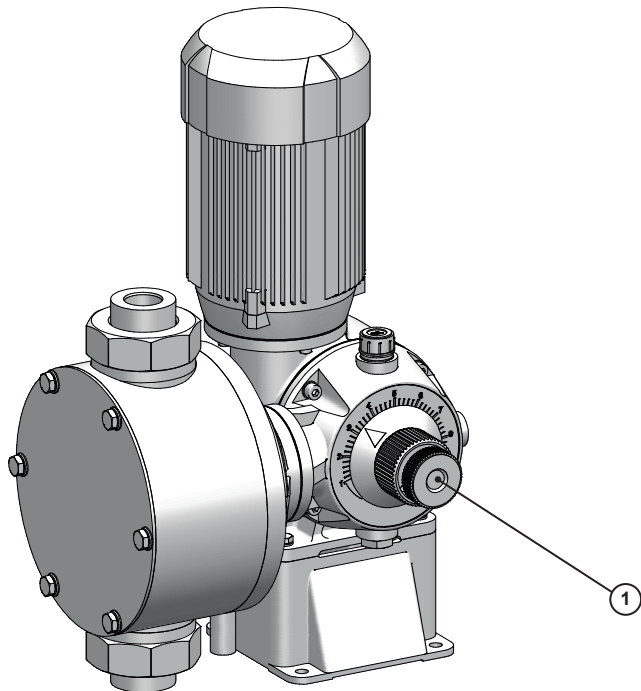


Fig. 9: Stroke length adjustment

Perform the following steps:

1. Release the screw securing(1) the adjusting knob by turning it counterclockwise (to the left).
2. Set the stroke length to the desired value in accordance with the delivery characteristic curve (see section 14 "Delivery characteristic curves" on page 31).
3. While maintaining the stroke length setting, re-tighten the fastening bolt.

10.3 Shut-down



WARNING

Caustic burns or other burns through dosing media!

After connecting the mains supply, residual dosing media in the dosing head can spray out.

- ⇒ Wear the recommended personal protective equipment.
- ⇒ Dispose of the excess chemicals correctly.
- ⇒ Comply with the valid accident prevention regulations.

Before starting any maintenance work or before long downtimes, drain the chemicals from the dosing pump and rinse it thoroughly with a neutral medium.

	DANGER
Mortal danger from electric shock! The dosing pump must be disconnected from the voltage supply and secured to prevent it being restarted. ⇒ Ensure that all work on the electrical installation is performed by a qualified electrician. ⇒ Ensure that all work on the electrical installation is performed in a de-energised state. ⇒ Ensure that the power supply is secured with a fault current protective circuit. ⇒ Replace damaged cables or components without delay.	

	WARNING
Chemical burns or other burns through dosing medium! Before disconnecting the discharge line from the pump pressure valve, release the pressure so that chemicals do not spray out. ⇒ Wear appropriate personal protective equipment, especially for the protection of eyes and skin. ⇒ Avoid skin contact with the dosing medium. ⇒ Check that all the screw connections have been tightened correctly and are leak-proof. ⇒ Never look into open ends of plugged hoses and valves.	

The discharge and suction valves should be unscrewed in order to drain the dosing head.

10.4 Shutting down in an emergency

- In an emergency, you must immediately disconnect the dosing pump from the mains supply or activate the Emergency Stop switch installed in the system.
- Depending on the type of incident, you must depressurized the hydraulic connections or locked to prevent dosing medium from escaping.
- You must follow the safety data sheet of the dosing medium.

10.5 Storage

Storing the dosing pump correctly extends its service life. You should avoid negative influences such as extreme temperatures, high humidity, dust, chemicals, etc.

Ensure ideal storage conditions where possible:

- The storage place must be cold, dry, dust-free and moderately ventilated.
- Temperature and relative humidity see chapter 5 "Technical data" on page 12 on page

10.6 Transportation

	PLEASE NOTE
Machine damage caused by leaking oil The oil inlet at the dosing pump cannot be closed completely tightly. Oil may leak if the device is not transported in an upright position. This might cause damage to the control unit or the motor. ⇒ Drain the oil completely through the oil outlet before you transport the dosing pump.	

Perform the following steps:

- The unit should be thoroughly cleaned. Any dangerous dosing media must be additionally neutralised and decontaminated.
- All accessories should be dismantled.
- All openings should be closed, so that no foreign objects can get into the system.
- The dosing pump must be suitably packed, preferably in the original packing, for transportation.

If the device is sent back to the manufacturer, please follow chapters 17 "Declaration of safety" on page 35 and 18 "Warranty claim" on page 36.

10.7 Disposal of old equipment

If the equipment is being disposed of, it should be washed thoroughly. Residual chemicals should be disposed of properly. The equipment was manufactured in accordance with the ROHS guideline and the waste electrical equipment legislation. The manufacturer will take care of disposal if the equipment is returned free of charge. It should not be disposed of as domestic waste!

11 Maintenance

Dosing pumps from Lutz-Jesco are manufactured to the highest quality standards and have a long service life. Nevertheless, some of their parts are subject to wear due to operation (e.g. diaphragms, valve seats, valve balls). Regular visual inspections are therefore necessary in order to ensure a long operating life. Regular maintenance will protect the dosing pump from operation interruptions. The manufacturer recommends maintenance once per year, provided the local regulations do not specify more frequent maintenance.

11.1 Lubrication

The MEMDOS MR/ZMR dosing pump is designed to permit easy maintenance. The dosing pump gear is lubricated with gear oil of viscosity class ISO-VG460 according to DIN 51519 (corresponds to SAE 140 according to DIN 51512). The initial filling (included in the scope of delivery) is to be replaced after 5,000 operating hours or 1 year, whichever comes first. Additional oil changes should be conducted after 10,000 operating hours or 2 years, whichever comes first. The filling capacity is about 0.75 litre for simplex gears and about 0.9 litre for duplex gears. The actually quantity of gear oil required can be determined by reading the oil level glass. The oil should be filled to approx. the middle of the oil level glass.

11.2 Bearing maintenance

The upper bearing of the pinion shaft is a sealed and permanently lubricated ball bearing. The other rolling bearings in the gearing, and the plain bearings of the diaphragm rod, are lubricated by the gear oil. The oil also performs a heat dissipation function. All bearings must be examined for wear after 10000 hours of operation. The service life of the rolling bearings depends on the applied loads.

11.3 Maintenance of the ATE servomotor (optional)

The ATE servomotor comes with lifetime lubrication ex factory. Nevertheless, regular inspections are recommended if the drive is operated in tough operating conditions, for example in high ambient temperatures or continuous operation. For relubrication of the ATE gear use molybdenum disulfide, e.g. "Molykote BR2plus" and "OKS400".

11.4 Diaphragm replacement

Removing the old diaphragm

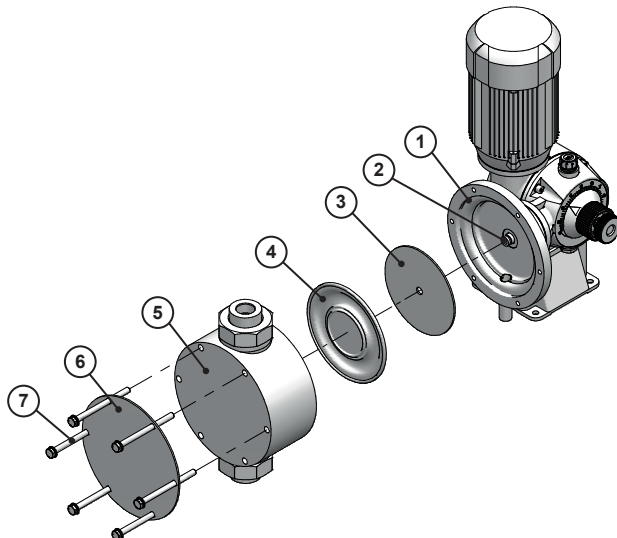


Fig. 10: Dosing head MEMDOS MR

Pre-conditions for actions:

- ✓ You have depressurised the hydraulic sections of the plant.
- ✓ You have rinsed the dosing pump using a safe medium (e.g. water).

Perform the following steps:

1. Set the dosing pump to zero delivery capacity whilst the motor is running.
 - The diaphragm is driven to its fore end position.
2. Switch off the pump.
3. Remove the dosing head screw (7) with a suitable tool. Support the dosing head (5) whilst doing so and if necessary, the pressure plate (6), so that these parts do not fall.
4. Remove the dosing head and the pressure plate.
5. Grip the diaphragm at the left edge and turn it out anti-clockwise.



Before fitting a new diaphragm, the area around the diaphragm flange and support plate must be cleaned to remove any chemicals, otherwise they may corrode the back of the diaphragm.

Inserting the new diaphragm

Pre-conditions for actions:

- ✓ The diaphragm rod (2), diaphragm flange (1) and the support plate (if required) were cleaned thoroughly and checked for damage and wear.
- ✓ The diaphragm (4) thread was lightly greased (e.g. Molykote Longterm W2).

Perform the following steps:

1. Push the support plate (if present) onto the threaded pin of the diaphragm with the curved side facing the diaphragm.
2. Screw the diaphragm to its fullest extent into the diaphragm rod in a clockwise direction together with the support plate.
3. Set the stroke adjustment of the dosing pump to maximum whilst the motor is running.
4. Switch off the motor.
 - The diaphragm is seated in the rim of the diaphragm flange.
5. Place the dosing head and the pressure plate (if present) in front of the diaphragm flange. Watch for the weight of the dosing head during large pumping types. Where necessary, support the dosing head at the correct height.

i The diaphragm will not be sufficiently sealed if the tightening torque is too low. The dosing head may be damaged if the tightening torque is too high.

6. Lead the fixing screws through the drillholes in the dosing head and tighten them cross-wise. The torques are listed in Tab. 17 "Dosing head bolt torques".
7. After the dosing lines are connected, the dosing pump is started as described in section 10.1 "Commissioning" on page 23.

✓ **Diaphragm change finished.**

MEMDOS MR/ZMR	Diaphragm Ø [mm]	Torque (±10%) [Nm]
50 – 115	90	6
140 – 210	120	6
290	150	10
400 – 980	185	12

Tab. 14: Required tightening torque for dosing head bolts

11.5 Change the oil

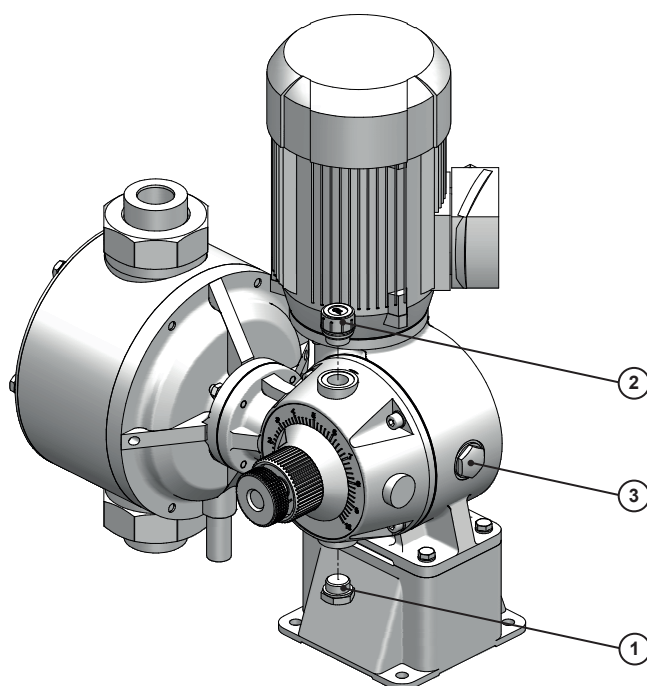


Fig. 11: Change the oil

Precondition for action:

- ✓ The oil collection pan is ready.
- ✗ Gear oil of the viscosity class ISO-VG460 (SAE 140)

Perform the following working steps:

1. Unscrew the closing bolt (1) from the oil outlet and remove the washer seal.
2. Allow the old gear oil to drain completely from the housing.
3. Insert the washer seal and screw the closing bolt in the oil inlet.
4. Unscrew the closing bolt (2) from the oil inlet and remove the washer seal.
5. Fill oil in the oil inlet. Check the oil level in the oil level glass (3) at the same time. The oil level should reach to c. the middle of the oil level glass. The following volumes are required:

MEMDOS types	Filling volumes
MR 50 – 980	0.75 l
ZMR 50 – 980	0.9 l

Tab. 15: Filling levels

6. Insert the washer seal and screw the closing bolt in the oil inlet.

✓ **Oil changed.**

11.6 Valves



WARNING

Chemical burns or other burns through dosing medium!

Chemical may spray out. This may lead to chemical or other burns.

- ⇒ Relieve the pressure before commencing work on the dosing pump.
- ⇒ Rinse with water or a suitable medium.

The dosing pump valves must be cleaned regularly. Dirty valves will affect the dosing accuracy.

i When screwing the valves into the dosing head, observe the tightening torque of 2 Nm ± 20 %.

12 Troubleshooting

See below for information about how to rectify faults on the device or the system. If you cannot eliminate the fault, please consult with the manufacturer on further measures or return the dosing pump for repair.

12.1 Dosing pump not delivering or output too low

Possible cause	Remedy
Wrong type of dosing pump selected	→ Check the dosing pump's technical data and if necessary select a type with a higher delivery capacity.
Valve leaking or blocked	→ Clean the valve and vent the dosing pump. → Tighten the screw connections.
Valve installed incorrectly	→ Reassemble the valve. Ensure that the valve balls are located above the valve seats.
Valve damaged (e.g. valve balls)	→ Remove the damaged parts or install a new valve.
Suction line is leaking	→ Seal the leak locations or replace the parts.
Suction line is blocked (e.g. screen in foot valve)	→ Clean the suction line.
Shut-off valves closed	→ Open the shut-off valves. → Inspect the dosing pump for possible damage.
Suction head too high	→ Set the dosing pump to feed or reduce the suction head. → Install a priming aid.
Viscosity too high	→ Possibly reduce the concentration of the dosing medium or increase the temperature. → Install spring-loaded valves. → Increase the pipe diameter.
Current supply interrupted	→ Restore the power supply.
The drive motor's electrical data does not match that of the mains supply	→ Check the electrical installation.
System backpressure too high (measured at discharge connection of dosing pump)	→ Clean blocked injection nozzle. → Install pulsation dampeners to reduce pressure peaks if pipes are too long. → Check function of safety valves.

Tab. 16: Dosing pump not delivering or output too low

12.2 Dosing pump does not prime

Possible cause	Remedy
Valve leaking or blocked	→ Clean the valve and vent the dosing pump. → Tighten the screw connections.
Valve installed incorrectly	→ Reassemble the valve. Ensure that the valve balls are located above the valve seats.
Valve damaged (e.g. valve balls)	→ Remove the damaged parts or install a new valve.
Suction line is leaking	→ Seal the leak locations or replace the parts.
Suction line is blocked (e.g. screen in foot valve)	→ Clean the suction line.
Shut-off valves closed	→ Open the shut-off valves. → Inspect the dosing pump for possible damage.
Suction head too high	→ Set the dosing pump to feed or reduce the suction head. → Install a priming aid.
Viscosity too high	→ Possibly reduce the concentration of the dosing medium or increase the temperature. → Install spring-loaded valves. → Increase the pipe diameter.
Current supply interrupted	→ Reconnect the current supply
Dry the valves	→ Dampen the dosing head and the valves → Vent the dosing head.
Air in the suction line with simultaneous pressure on the pressure valve	→ Vent the dosing head or the lines.

Tab. 17: Dosing pump does not prime

12.3 Delivery rate varies

Possible cause	Remedy
Valve leaking or blocked	→ Clean the valve and vent the dosing pump. → Tighten the screw connections.
Valve damaged (e.g. valve balls)	→ Remove the damaged parts or install a new valve.
Suction line is leaking	→ Seal the leak locations or replace the parts.
Suction line is blocked (e.g. screen in foot valve)	→ Clean the suction line.
Viscosity too high	→ Possibly reduce the concentration of the dosing medium or increase the temperature. → Install spring-loaded valves. → Increase the pipe diameter.
The drive motor's electrical data does not match that of the mains supply	→ Check the electrical installation.
Suction side pressure too high (pump siphoning)	→ Install a back-pressure valve in the pressure line.
Pressure peaks due to acceleration with long suction lines	→ Install a suction pressure regulator.
Imprecise dosing due to changeable positive and negative suction heads.	→ Install a suction pressure regulator.
System backpressure too high (measured at discharge connection of dosing pump)	→ Clean blocked injection nozzle. → Install pulsation dampeners to reduce pressure peaks if pipes are too long. → Check the safety valves.

Tab. 18: Delivery rate varies

12.4 No stroke movement observed

Possible cause	Remedy
Dosing pump set to zero stroke.	→ Set the stroke length adjusting knob correctly.
Diaphragm return spring broken.	→ Contact the manufacturer.
Current supply interrupted	→ Reconnect the current supply
The drive motor's electrical data does not match that of the mains supply	→ Check the electrical installation.

Tab. 19: No stroke movement observed

12.5 Dosing pump delivery rate too high

Possible cause	Remedy
Suction side pressure too high (pump siphoning)	→ Install a back-pressure valve in the pressure line.
Pressure peaks due to acceleration with long suction lines	→ Install a suction pressure regulator.

Tab. 20: Dosing pump delivery rate too high

12.6 Diaphragm is torn or tears too often

Possible cause	Remedy
Shut-off valves closed	→ Open the shut-off valves. → Inspect the dosing pump for possible damage.
Pressure peaks due to acceleration with long suction lines	→ Install a suction pressure regulator.
The materials are not suitable for the dosing medium being used	→ Check the resistance of the materials.
Diaphragm not screwed up to the end stop on the diaphragm rod	→ Screw a new diaphragm up to the end stop.
System backpressure too high (measured at discharge connection of dosing pump)	→ Clean blocked injection nozzle. → Install pulsation dampeners to reduce pressure peaks if pipes are too long. → Check function of safety valves.
Media sediment in dosing head	→ Clean the dosing head.

Tab. 21: Diaphragm is torn or tears too often

12.7 Loud noises on the dosing pump

Possible cause	Remedy
Drive components worn	→ Contact the manufacturer.

Tab. 22: Loud noises on the dosing pump

12.8 The drive is overloaded

Possible cause	Remedy
Shut-off valves closed	➔ Open the shut-off valves. Inspect the dosing pump for possible damage.
The drive motor's electrical data does not match that of the mains supply	➔ Check the electrical installation.
Pressure peaks due to acceleration with long suction lines	➔ Install a suction pressure regulator.
System backpressure too high (measured at discharge connection of dosing pump)	➔ Clean blocked injection nozzle. ➔ Install pulsation dampeners to reduce pressure peaks if pipes are too long. ➔ Check function of safety valves.

Tab. 23: The drive is overloaded

13 Spare parts

Use the manufacturer's original spare parts. Wearing parts are available for the MEMDOS MR/ZMR in spare parts sets.

The spare parts sets consist of the following components:

- Flat gaskets
- Valve balls
- Valve seats
- Diaphragms
- Shaft seal

The article numbers are listed in the current price list.

12.9 Motor hums and does not start.

Possible cause	Remedy
The drive motor's electrical data does not match that of the mains supply	➔ Check the electrical installation.
Capacitor defective, wrong size or connected incorrectly.	➔ Connect the capacitor correctly or replace.
System backpressure too high (measured at discharge connection of dosing pump)	➔ Clean blocked injection nozzle. ➔ Install pulsation dampeners to reduce pressure peaks if pipes are too long. ➔ Check function of safety valves.
No or insufficient oil in the gearbox	➔ Fill up the gearbox oil.

Tab. 24: Motor hums and does not start.

14 Delivery characteristic curves

The delivery characteristic curves refer to water at 20 °C (68 °F) and a suction lift of 0.5 m. The medium (density and viscosity) and temperature cause the delivery rate to change. Dosing pumps must therefore be gauged in litres during application. At 60 Hz operation, values are increased by a factor of 1.2.

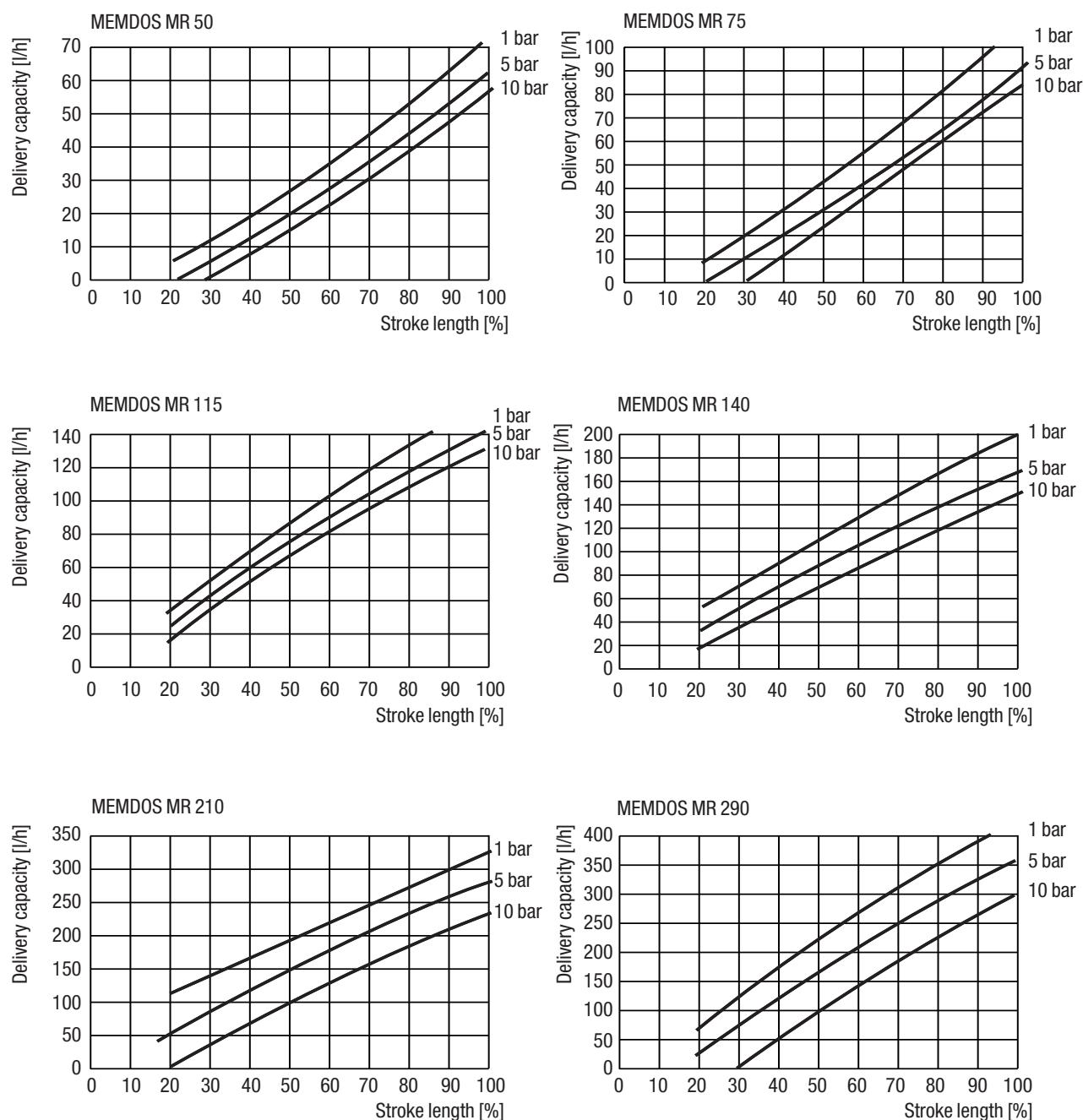


Fig. 12: Delivery characteristic curves MEMDOS MR 50 – 290

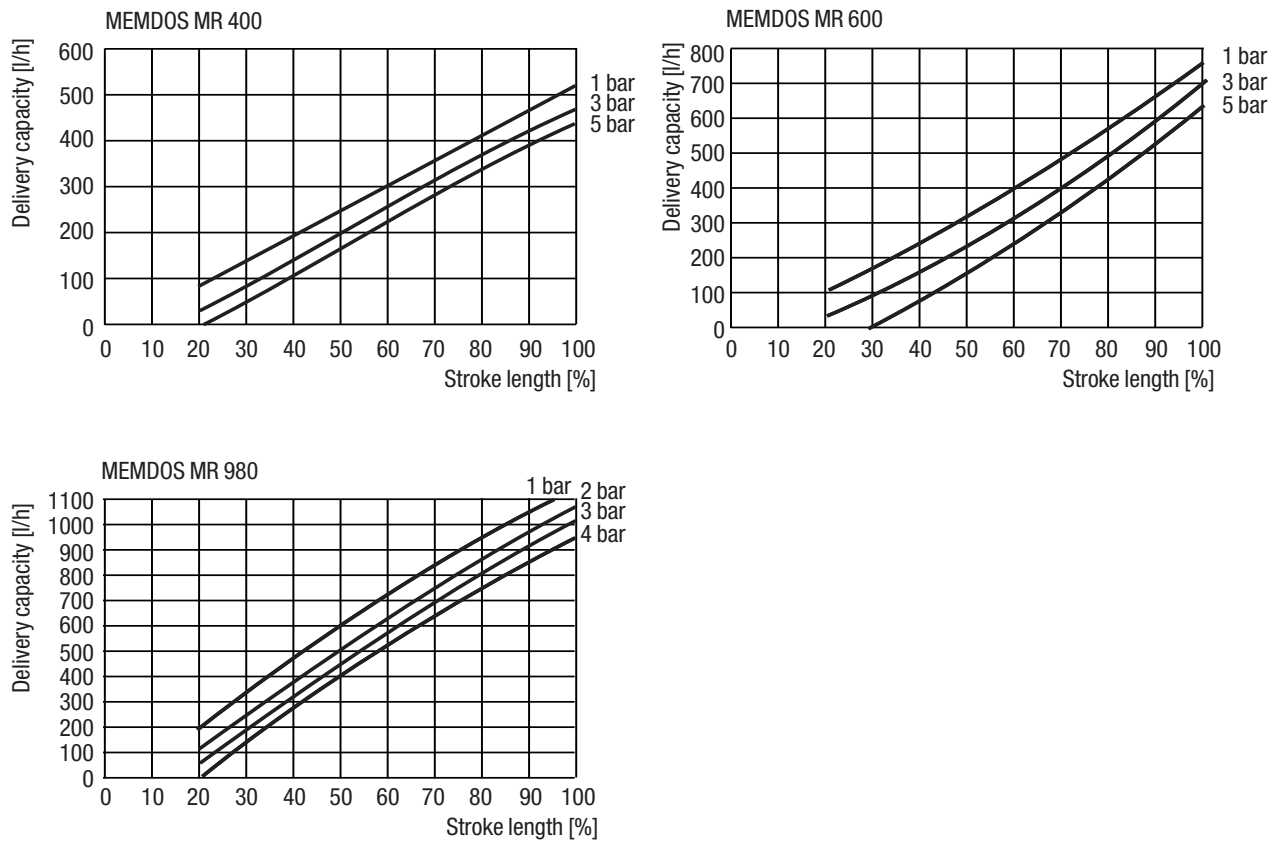


Fig. 13: Delivery characteristic curves MEMDOS MR 400 – 980

15 EU declaration of conformity MEMDOS MR/ZMR



(DE) EU-Konformitätserklärung

Hiermit erklären wir, dass das nachfolgend bezeichnete Gerät aufgrund seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der aufgeführten EU-Richtlinien entspricht. Bei einer nicht mit uns abgestimmten Änderung am Gerät verliert diese Erklärung ihre Gültigkeit.

(EN) EU Declaration of Conformity

We hereby certify that the device described in the following complies with the relevant fundamental safety and sanitary requirements and the listed EU regulations due to the concept and design of the version sold by us.

If the device is modified without our consent, this declaration loses its validity.

(FR) Déclaration de conformité UE

Nous déclarons sous notre propre responsabilité que le produit ci-dessous mentionné répond aux exigences essentielles de sécurité et de santé des directives UE énumérées aussi bien sur le plan de sa conception et de son type de construction que du modèle que nous avons mis en circulation.

Cette déclaration perdra sa validité en cas d'une modification effectuée sur le produit sans notre accord explicite.

(ES) Declaración de conformidad UE

Por la presente declaramos que, dados la concepción y los aspectos constructivos del modelo puesto por nosotros en circulación, el aparato mencionado a continuación cumple con los requisitos sanitarios y de seguridad vigentes de las directivas de la U.E. citadas a continuación.

Esta declaración será invalidada por cambios en el aparato realizados sin nuestro consentimiento.

(PT) Declaração de conformidade UE

Declaramos pelo presente documento que o equipamento a seguir descrito, devido à sua concepção e ao tipo de construção daí resultante, bem como a versão por nós lançada no mercado, cumpre as exigências básicas aplicáveis de segurança e de saúde das directivas UE indicadas.

A presente declaração perde a sua validade em caso de alteração ao equipamento não autorizada por nós.

Bezeichnung des Gerätes:

Motor-Membrandosierpumpe

Description of the unit:

Motor-driven diaphragm dosing pump

Désignation du matériel:

Pompe doseuse à membrane entraînée par moteur

Descripción de la mercancía:

Bomba dosificadora de membrana accionada por motor

Designação do aparelho:

Bomba doseadora de membrana a motor

Typ: Type:

MEMDOS MR
MEMDOS ZMR

EG-Richtlinien: EC directives:

2006/42/EG, 2014/34/EU

Die Schutzziele der Niederspannungsrichtlinie 2014/35/EU wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie 2006/42/EG eingehalten.

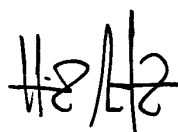
The protective aims of the Low Voltage Directive 2014/35/EU were adhered to in accordance with Annex I, No. 1.5.1 of the Machinery Directive 2006/42/EC.

Harmonisierte Normen: Harmonized standards:

DIN EN ISO 12100:2011-03, DIN EN 809:2012-10,
DIN EN 13463-1:2009-07, DIN EN 13463-5:2011-10, DIN EN 13463-8:2004-01

Dokumentationsbevollmächtigter: Authorized person for documentation:

Lutz-Jesco GmbH



Heinz Lutz
Geschäftsführer / Chief Executive Officer
Lutz-Jesco GmbH
Wedemark, 20.01.2021

Lutz-Jesco GmbH
Am Bostelberge 19
30900 Wedemark
Germany

16 EU declaration of conformity MEMDOS MR/ZMR Ex



(DE) EU-Konformitätserklärung

Hiermit erklären wir, dass das nachfolgend bezeichnete Gerät aufgrund seiner Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der aufgeführten EU-Richtlinien entspricht. Bei einer nicht mit uns abgestimmten Änderung am Gerät verliert diese Erklärung ihre Gültigkeit.

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Nous déclarons sous notre propre responsabilité que le produit ci-dessous mentionné répond aux exigences essentielles de sécurité et de santé des directives UE énumérées aussi bien sur le plan de sa conception et de son type de construction que du modèle que nous avons mis en circulation.

Cette déclaration perdra sa validité en cas d'une modification effectuée sur le produit sans notre accord explicite.

(ES) Declaración de conformidad UE

Por la presente declaramos que, dados la concepción y los aspectos constructivos del modelo puesto por nosotros en circulación, el aparato mencionado a continuación cumple con los requisitos sanitarios y de seguridad vigentes de las directivas de la U.E. citadas a continuación.

Esta declaración será invalidada por cambios en el aparato realizados sin nuestro consentimiento.

Bezeichnung des Gerätes:

Motor-Membrandosierpumpe

Description of the unit:

Motor-driven diaphragm dosing pump

Désignation du matériel:

Pompe doseuse à membrane entraînée par moteur

Descripción de la mercancía:

Bomba dosificadora de membrana accionada por motor

Typ: Type:

MEMDOS MR Ex
MEMDOS ZMR Ex

Registriernummer: Registration number:

PTB 03 ATEX D086

Ex-Kennzeichnung: Ex label:

Dosierpumpe ohne Motor / Dosing pump without motor:

⊕ II 2G Ex h IIC T4

Dosierpumpe mit Motor für Betrieb in Zone 1 / Dosing pump with motor for operation in zone 1:

⊕ II 2G Ex db eb IIC T4

Dosierpumpe mit Motor für Betrieb in Zone 2 / Dosing pump with motor for operation in zone 2:

⊕ II 2G Ex eb IIC T3

Das Gesamtsystem hat in Summe keinen höheren Schutzgrad als die verwendeten Motoren für sich. Der zulässige Einsatzbereich definiert sich somit über den Schutzgrad der Motoren. Dieser wird am Typenschild des Motors vom Hersteller separat ausgewiesen.

In total, the complete system does not have a higher protection class than the motors used in it. The permissible scope of application is therefore defined by the protection class of the motors. This is specified separately by the manufacturer on the rating plate on the motor.

EG-Richtlinien: EC directives:

2014/30/EU, 2014/35/EU

Die Schutzziele der Niederspannungsrichtlinie 2014/35/EU wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie 2006/42/EG eingehalten.

The protective aims of the Low Voltage Directive 2014/35/EU were adhered to in accordance with Annex I, No. 1.5.1 of the Machinery Directive 2006/42/EC.

Harmonisierte Normen: Harmonized standards:

DIN EN ISO 12100:2011-03, DIN EN 809:2012-10,
DIN EN ISO 80079-36:2016-12, DIN EN ISO 80079-37:2016-12

Dokumentationsbevollmächtigter: Authorized person for documentation:

Lutz-Jesco GmbH

Heinz Lutz
Geschäftsführer / Chief Executive Officer
Lutz-Jesco GmbH
Wedemark, 02.12.2022

Lutz-Jesco GmbH
Am Bostelberge 19
30900 Wedemark
Germany

17 Declaration of safety

Declaration of no objection

Please fill out a separate form for each appliance!

We forward the following device for repairs:

Device and device type: Part-no.:

Order No.: Date of delivery:

Reason for repair:

.....

.....

Dosing medium

Description: Irritating: ☐ Yes ☐ No

Properties: Corrosive: ☐ Yes ☐ No

We hereby certify, that the product has been cleaned thoroughly inside and outside before returning, that it is free from hazardous material (i.e. chemical, biological, toxic, flammable, and radioactive material) and that the lubricant has been drained.

If the manufacturer finds it necessary to carry out further cleaning work, we accept the charge will be made to us.

We assure that the aforementioned information is correct and complete and that the unit is dispatched according to the legal requirements.

Company / address: Phone:

..... Fax:

..... Email:

Customer No.: Contact person:

Date, Signature:

18 Warranty claim

Warranty claim

Please copy and send it back with the unit!

If the device breaks down within the period of warranty, please return it in a cleaned condition with the complete warranty claim.

Sender

Company: Phone: Date:

Address:

Contact person:

Manufacturer order no.: Date of delivery:.....

Device type: Serial number:

Nominal capacity / nominal pressure:

Description of fault:.....

.....
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.....

Service conditions of the device

Point of use / system designation:.....

.....
.....

Accessories used (suction line etc.):.....

.....
.....
.....
.....

Commissioning (date):

Duty period (approx. operating hours):

Please describe the specific installation and enclose a simple drawing or picture of the chemical feed system, showing materials of construction, diameters, lengths and heights of suction and discharge lines.

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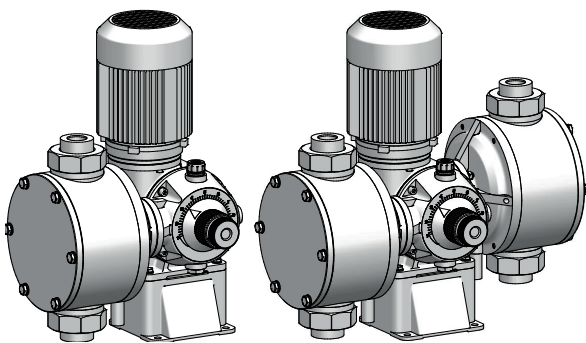
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D-30900 Wedemark

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www.lutz-jesco.com

Operating instructions
MEMDOS MR/ZMR