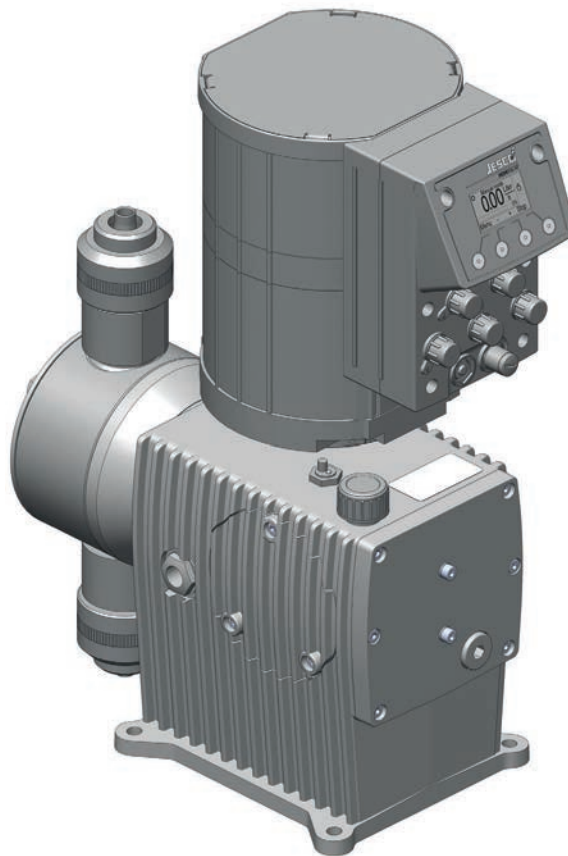


Motor-driven Diaphragm Dosing Pump

MEMDOS LP

Operating Instructions



Read the operating instructions!

The user is responsible for installation and operation related mistakes!

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1 Notes to the Reader

These Operating instructions contain the information and rules of behaviour necessary for safe and correct operation of MEMDOS LP and MEMDOS LP Net dosing pumps.

Follow these principles:

- Read the entire Operating instructions prior to commissioning the unit.
- Ensure that everyone who works with or on the dosing pump has read the operating instructions and follows them.
- Keep the operating instructions for the entire service life of the dosing pump.
- Pass on the operating instructions to any subsequent owner of the dosing pump.

1.1 General non-discrimination

In these operating instructions, 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 Explanations of signal words

Different signal words in combination with warning signs are used in these Operating instructions. 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. Ignoring this sign might lead to death or the most serious injuries.
CAUTION	Refers to a potentially hazardous situation. Ignoring this sign may lead to light injuries or damage to property.
NOTICE	Refers to a danger which, if ignored, may compromise the unit or its function.

Table 1-1: Explanations of signal words

1.3 Explanations of 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
	Danger of automatic start up
	Danger of damage to machine or compromised function.

Table 1-2: Warning signs explanation

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 precautionary measure to be taken to eliminate the danger.

1.5 Identification of instructions for action

This is how pre-conditions for action are identified:

- ✓ Pre-condition for action which must be met before taking action.

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
<p>Danger to life due to electric shock!</p> <p>Wrongly connected or located cables or damaged ones can injure you.</p> <ul style="list-style-type: none"> ⇒ Connect the device only to a socket outlet with earthing contact protected by a ground fault circuit interrupter (GFCI). ⇒ Replace damaged cables without delay. ⇒ Do not use extension cables. ⇒ Do not bury cables. ⇒ Secure cables to avoid being damaged by other equipment. 	


	DANGER
<p>Danger to life through explosions!</p> <p>When using dosing pumps without ATEX certification in a potentially explosive area, explosions can occur that result in fatal injuries.</p> <ul style="list-style-type: none"> ⇒ Never use the MEMDOS LP dosing pump in potentially explosive areas. 	

	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>After connecting the mains supply, residual dosing media in the dosing head can spray out.</p> <ul style="list-style-type: none"> ⇒ Before connecting the mains supply, connect the dosing lines. ⇒ Check that all the screw connections have been tightened correctly and are leak-proof. 	

	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>While working on the dosing head, valves and connections, you may come into contact with dosing media.</p> <ul style="list-style-type: none"> ⇒ 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. 	

	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>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.</p> <ul style="list-style-type: none"> ⇒ 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. 	

	CAUTION
<p>Increased risk of accidents due to insufficient qualification of personnel!</p> <p>Dosing pumps and their accessories may only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will raise the risk of accidents.</p> <ul style="list-style-type: none"> ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications. ⇒ Prevent access to the system for unauthorised persons. 	

	CAUTION
<p>Danger of personal injury and material damage!</p> <p>Changing dosing media can lead to unpredictable reactions.</p> <ul style="list-style-type: none"> ⇒ Thoroughly clean the dosing pump and appropriate sections of the plant avoid chemical reactions. 	

2.2 Hazards due to non-compliance with the safety instructions

Failure to observe the safety instructions can pose a risk not only to the personnel, but consequentially to the environment and the unit.

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 through substances leaking from the system.

2.3 Safe operation

Besides the safety instructions specified in these Operating instructions, 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.

2.4 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.

As a minimum, the following protective equipment is recommended:



Protective clothing



Protective gloves



Goggles

Corresponding protective equipment must be used during these tasks:

- Commissioning,
- working on the dosing pump while running,
- decommissioning,
- maintenance work,
- disposal.

2.5 Personnel qualification

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

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

- Attendance at all the training courses offered by the owner,
- Personal suitability for the respective job,
- Sufficient qualification for the respective job,
- Training in handling of the dosing pump,

- Knowledge of safety equipment and the way this equipment functions,
- Knowledge of these Operating instructions, particularly of safety instructions and sections relevant for the job,
- 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 these user groups:

2.5.1 Specialist staff

Specialist staff are able, thanks to their professional training, knowledge and experience as well as knowledge of the respective provisions, to do the job allocated to them and recognise and/or eliminate any possible dangers by themselves.

2.5.2 Trained persons

Trained persons have been trained by the operator into the tasks they are supposed to perform and into 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	Tasks
Specialist staff	<ul style="list-style-type: none"> ■ Assembly ■ Hydraulic installations ■ Electrical installation ■ Maintenance ■ Repairs ■ Commissioning ■ Decommissioning ■ Disposal ■ Fault rectification
Trained persons	<ul style="list-style-type: none"> ■ Storage ■ Transportation ■ Control ■ Fault rectification

Table 2-1: Personnel qualification

3 Appropriate and intended use

3.1 Notes to 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 the safety and handling instructions and the chapter entitled "Appropriate and intended use".
- If people operate the product who are not adequately qualified to carry out their respective activities,
- No original spare parts or accessories of Lutz-Jesco GmbH are used,
- Unauthorised changes are made to the device by the user,
- 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 MEMDOS LP dosing pump is intended for the following purpose: the conveying and dosing of liquids.

3.3 Device revision

This operating manual applies to the following devices:

Device	Month / year of manufacture	Firmware
MEMDOS LP	07/2012 onwards	1.23 onwards
MEMDOS LP-Net	07/2012 onwards	1.23 onwards

Table 3-1: Device revision

3.4 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 vary at every installation location, you must calibrate the dosing pump after delivery. For information on the calibration procedure refer to Chapter "Calibrating the dosing pump" (see page 39). For details on the approximate values and the capacity of the dosing pump, refer to the chapter entitled "Delivery characteristic curves" (see page 61).
- Information on the usage and environment (see "Technical specifications" on page 11) applies.
- 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 Chemical Resistance List of Lutz-Jesco GmbH. The information in this resistance list is based on information from the material manufacturers and on expertise obtained by Lutz-Jesco 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.

3.5 Prohibited dosing media

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

- Gaseous media,
- radioactive media,
- solid substances,
- combustible media,
- all other media that are not suitable for delivery using this dosing pump.

3.6 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 chapter 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:

3.6.1 Incorrect assembly

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

3.6.2 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 discharge 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

3.6.3 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

3.6.4 Incorrect commissioning

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

3.6.5 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
- Operation not possible due to dirty or illegible display of the dosing pump
- 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

3.6.6 Incorrect maintenance

- Carrying out maintenance during ongoing operation
- Carrying out work that is not described in the operating instructions
- 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
- Cleaning materials left in system sections
- Using unsuitable cleaning equipment
- Using the wrong spares or lubricants
- Contaminating the dosing medium with lubricant
- Installing spares 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

3.6.7 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

3.6.8 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 LP is a motor-driven diaphragm dosing pump that is used when precise dosing results are required.

They are characterized by the following properties:

- Performance range of 4 to 1010 l/h with a backpressure of 16 - 4 bar,
- Reproducible dosing precision of $\pm 2\%$,
- Operating modes: Manual mode, analog input, pulse input, batch mode and network mode (MEMDOS LP-Net only),
- Graphic display: 128 x 64 px, 1.9", monochrome, illuminated,
- Menu languages: English, German, French, Spanish, Portuguese, Dutch,
- Four multifunction keys for operator inputs,
- Real-time clock and date,
- Release code and security code,
- Calibration option,
- Connections: M12x1 connector, A-, B- or D-coded
- Ethernet, network connection (only MEMDOS LP-Net).

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 LP,
- 6 covering caps for electrical connections (mounted on the dosing pump),
- Mains cable,
- Operating Manual,
- Inspection report and test certificate (optional),
- Accessory kit (optional).

4.3 Structure of the dosing pump

4.3.1 General Overview

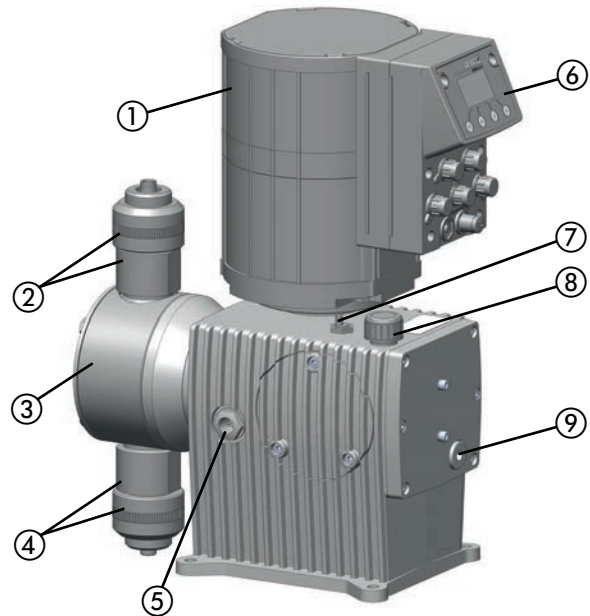


Fig. 4-1: Overview of MEMDOS LP dosing pump

No.	Description
①	Drive motor
②	Valve and connection on the discharge side
③	Dosing head
④	Valve and connection on the suction side
⑤	Oil level glass
⑥	Control unit
⑦	Stroke sensor
⑧	Oil inlet and gearbox ventilation
⑨	Oil drain

Table 4-1: Designation of components

4.3.2 Control elements

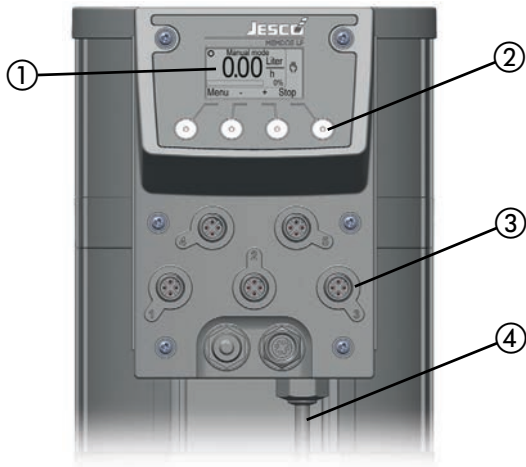


Fig. 4-2: Controller of MEMDOS LP dosing pump

No.	Description
①	Graphic display
②	Multifunction keys on the control unit for operator inputs
③	Connection sockets for external operation or connecting accessories
④	Mains cable for power supply

Table 4-2: Designation of components

4.4 Function description

Dosing pumps are positive displacement pumps. They are used if precisely defined delivery of a medium is necessary. A constant volume per stroke or time is delivered.

The system delivers or meters the dosing medium by means of a repeated sequence of suction strokes followed by pressure strokes. This results in a pulsing flow.

If the dosing pump is in the suction stroke phase, the diaphragm is pulled into the rear final position. Due to the resulting vacuum in the dosing head, the discharge valve closes, the suction valve opens and dosing medium flows from the suction line into the dosing head.

If the dosing pump is in the pressure stroke phase, the diaphragm is moved into the front final position. Due to the pressure in the dosing head, the suction valve closes and the dosing medium flows through the discharge valve from the dosing head into the pressurised pipe.

4.4.1 Ratings 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.

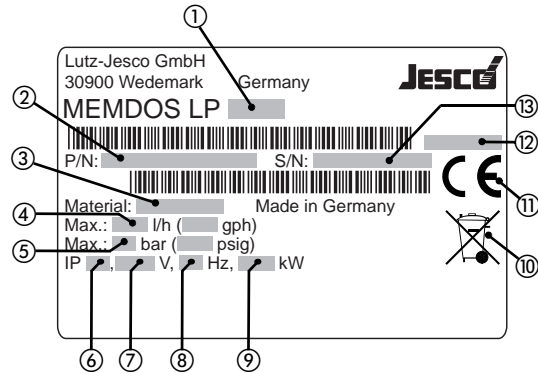


Fig. 4-3: MEMDOS LP nameplate

No.	Description
①	Product, type, nominal size
②	Part number
③	Type of material of dosing head / type of material of seals
④	Maximum delivery capacity in l/h and gph at maximum pressure
⑤	Maximum pressure in bar and psig
⑥	Protection class
⑦	Voltage supply
⑧	Frequency
⑨	Power consumption
⑩	WEEE label
⑪	Label showing conformity with applicable European directives
⑫	Month / year of manufacture
⑬	Serial number

Table 4-3: Ratings plate

5 Technical specifications

5.1 Delivery capacity data

Please note that some of this data only represents guide values. The actual capacity of a dosing pump depends on various factors. For approximate values of the delivery capacity at different pressures, refer to Chapter "Delivery characteristic curves" (see page 61).

5.1.1 MEMDOS LP 4 – 80, 150

Information	Value	MEMDOS LP size									
		4	4-HP	10	10-HP	20	20-HP	35	60	80	150
Delivery capacity at max. backpressure	l/h	4	8.4	14	22.6	22	36.2	36	63	90	156
	ml/stroke	3.0	5.3	3.0	5.3	3.0	5.3	8.5	8.5	20.6	20.6
max. back pressure	bar	12	16	12	16	12	16	10	10	5	5
Max. stroke frequency	RPM	26	26	72	72	120	120	72	120	72	120
Suction height for non-gassing media (with a filled suction line)	mWS	9	9	9	9	9	9	8	8	7	7

Table 5-1: Delivery capacity MEMDOS LP 4 – 80, 150

5.1.2 MEMDOS LP 110, 160 – 1010

Information	Value	MEMDOS LP size								
		110	160	210	260	310	400	510	760	1010
Delivery capacity at max. backpressure	l/h	114	144	210	264	294	390	504	744	1020
	ml/stroke	20.6	20.6	36.6	36.6	52.6	52.6	160.2	160.2	160.2
max. back pressure	bar	10	10	8	7	6	4,5	4	4	3
Max. stroke frequency	RPM	96	120	96	120	96	120	53	76	107
Suction height for non-gassing media (with a filled suction line)	mWS	7	7	6	6	4.5	4.5	1	1	1

Table 5-2: Delivery capacity MEMDOS LP 110, 160– 1010

5.2 Operating conditions and limits

Information	Value	MEMDOS LP (all sizes)
Permitted ambient temperature	°C	0 – 45 (0 – 40 with PVC parts)*
Relative humidity	%	Max. 90
Max. sound pressure level	dB(A)	57 – 65
Max. supply pressure	mbar	500
Viscosity limits	mPa s	300** / 1000***
Adjustable dosing range	%	0 – 100

Table 5-3: Operating conditions and limits

* Use of dosing pumps at ambient temperatures of under 5 °C has to be checked individually. In those 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.

5.2.1 Permitted media temperatures

Information	Value	MEMDOS LP (all sizes)
Dosing head made of PVC	°C	0 – 35
Dosing head made of PP	°C	0 – 60
Dosing head made of PVDF	°C	0 – 80
Dosing head made of stainless steel 1.4571	°C	0 – 80

Table 5-4: Permitted media temperatures

5.3 Other data

5.3.1 MEMDOS LP 4 – 80, 150

Information	Value	MEMDOS LP size									
		4	4-HP	10	10-HP	20	20-HP	35	60	80	150
Weight (dosing head made of PVC)	kg	10,5							11,9		
Weight (dosing head made of PP)	kg	10,5							11,9		
Weight (dosing head made of PVDF)	kg	10,8							13,5		
Weight (dosing head made of stainless steel 1.4571)	kg	12							17,2		
Diameter of diaphragm	mm	52					64		90		
Stroke length	mm	7.5					10				
Protection class		IP 55									
Nominal valve width		DN4					DN6		DN10		

Table 5-5: Other data MEMDOS LP 4 – 80, 150

5.3.2 MEMDOS LP 110, 160 – 1010

Information	Value	MEMDOS LP size								
		110	160	210	260	310	400	510	760	1010
Weight (dosing head made of PVC)	kg	17,8		18,6		20,3		24,8		
Weight (dosing head made of PP)	kg	17,8		18,6		20,3		24,8		
Weight (dosing head made of PVDF)	kg	18,4		19,5		21,8		27,4		
Weight (dosing head made of stainless steel 1.4571)	kg	23,1		26,2		32		47,2		
Diameter of diaphragm	mm	90		120		150		185		
Stroke length	mm	10						12,5		
Protection class		IP 55								
Nominal valve width		DN10		DN15			DN25			

Table 5-6: Other data MEMDOS LB 110, 160 – 1010

5.4 Motor data

5.4.1 AC motors 230 V

Information	Value	MEMDOS LP size		
		4 – 80, 150	110, 160 – 400	510 – 1010
Power output	kW	0.25	0.55	0.65
Speed	RPM	1500		
Nominal current	A	1.8	2.2	8
Voltage	V 1~	230		
Mains voltage		DIN EC 60038		
Frequency	Hz	50		
Operating mode		S1		
Protection class		IP 55		
Insulation class		F		
Motor efficiency		Larger than 90% (energy efficiency class IE4)		
Size		63	71	80
Flange Diameter	mm	90	105	120
Shaft	mm	11 x 23	14 x 30	19 x 40
Cooling		IC 411		
Electrical cable	m	1.8 m (with mains plug)		

Table 5-7: AC motors 230 V

6 Dimensions

All dimensions in mm

6.1 MEMDOS LP 4 – 80, 150

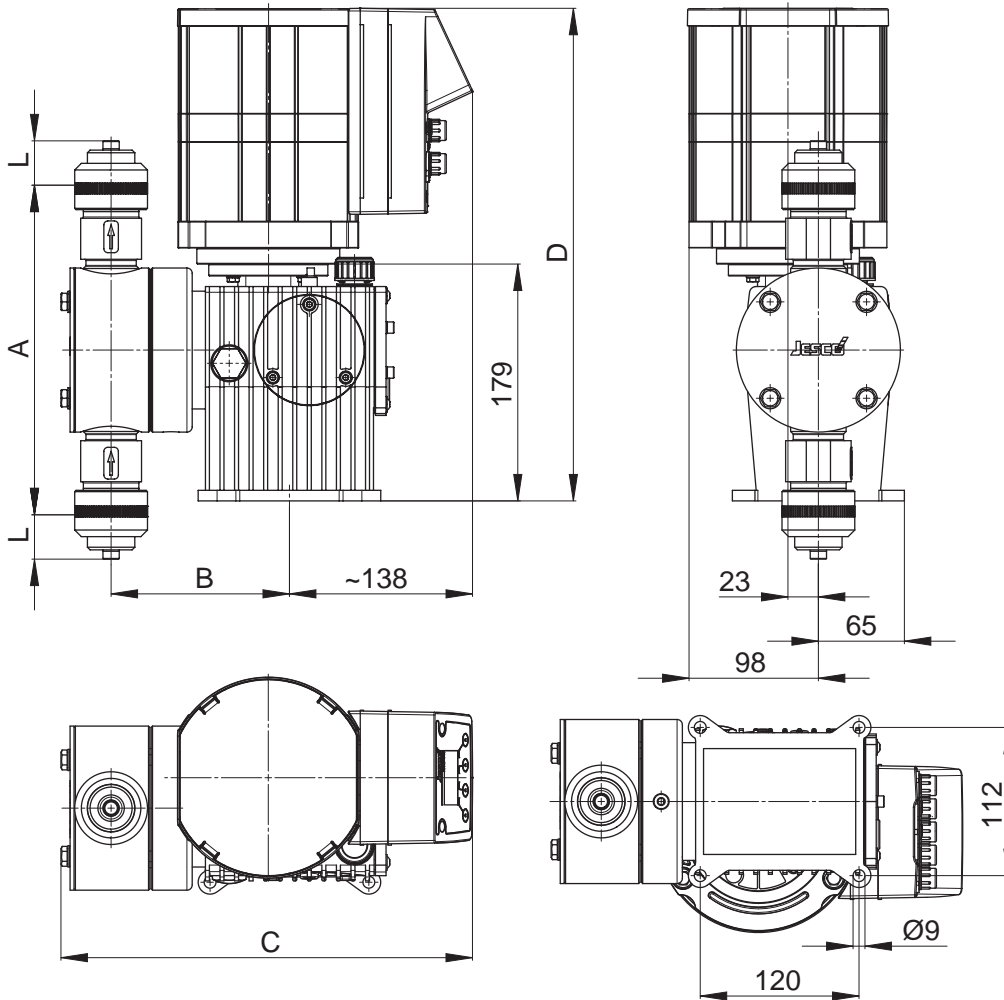


Fig. 6-1: Dimensioned drawings MEMDOS LP 4 – 80, 150

Size	MEMDOS LP size		
	4 – 20	35 – 60	80, 150
A	126	149	249
B	116	121.5	133
C	276	283	307
D	372	372	372
L	Depends on the connection type and size		

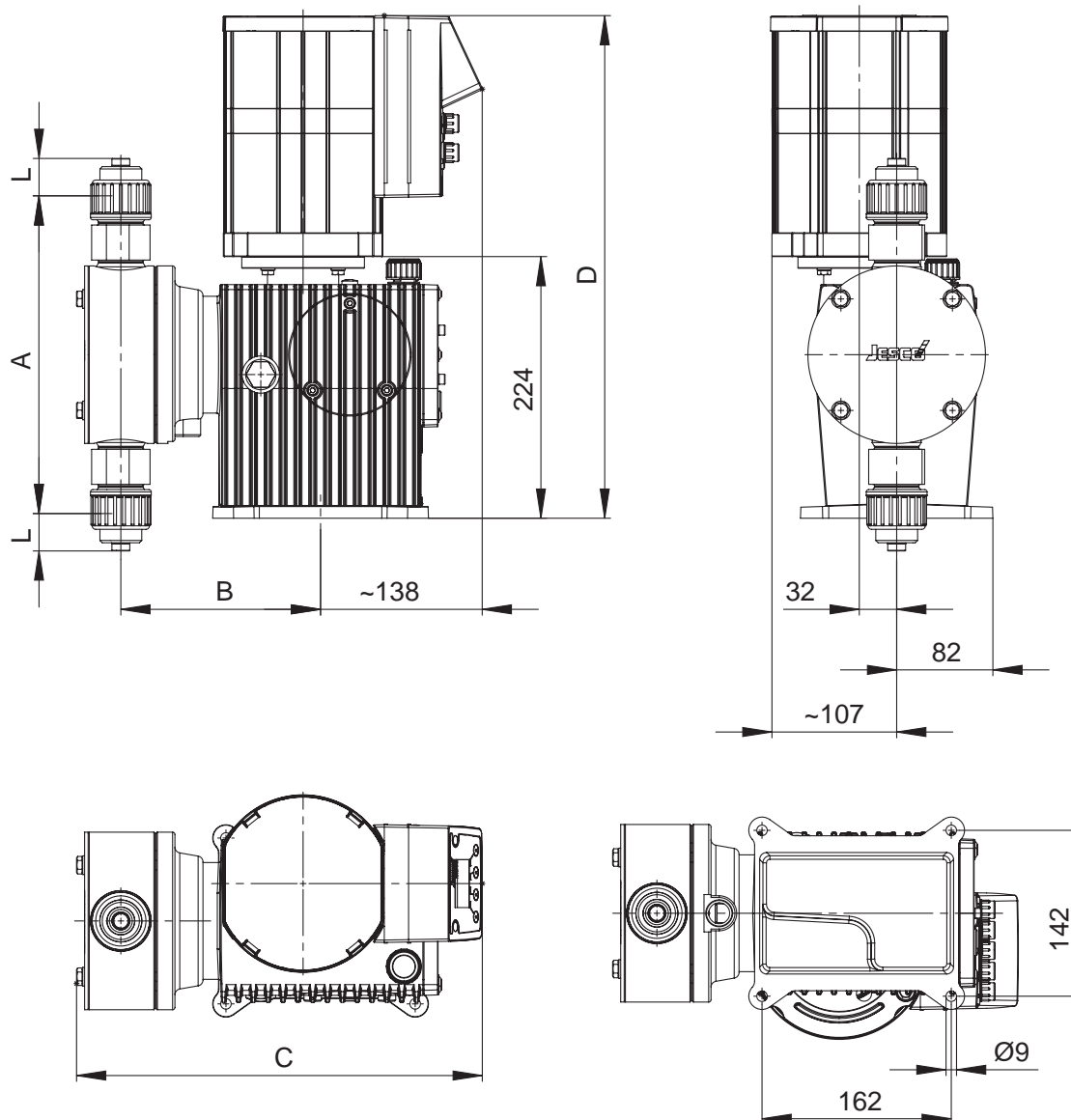

6.2 MEMDOS LP 110, 160 – 1010



Fig. 6-2: Dimensioned drawings MEMDOS LP 110, 160 – 1010

Size	MEMDOS LP size			
	110, 160	210 – 260	310 – 400	510 – 1010
A	249	268	312.5	352
B	160	170	175	208 (194,3*)
C	325	335	340	402 (375,5*)
D	430	430	430	466
L	Depends on the connection type and size			

* with dosing head made of stainless steel

7 Installing the dosing pump

	DANGER
<p>Danger to life due to electric shock</p> <p>Electrically conductive liquid can enter pump housings, cable screw connections and mains connectors.</p> <p>⇒ Make sure that all protective measures comply at least with the requirements of protection class IP 55.</p> <p>⇒ Always set up the dosing pump such that water cannot enter the housing.</p>	

	CAUTION
<p>Danger of personal injury and material damage!</p> <p>A dosing pump that is difficult to access represents a danger due to incorrect operation and faulty maintenance.</p> <p>⇒ Install the dosing pump so that it is accessible at any time, in particular the stroke length adjustment, the oil level glass as well as the oil filler and drain.</p>	

7.2 Installation on a wall console

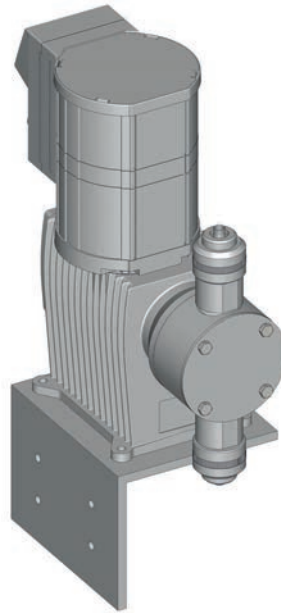


Fig. 7-1: Installation on a wall console


7.1 Set up information


When installing, follow the basic principles below:


- The valves must be vertical: Discharge valve at top, suction valve at bottom. Observe the arrows which are found on the valves. The dosing head and the valves must be oriented so that the arrows point vertically upwards.
- You should install the dosing pump at a convenient height for operation.
- It must not be fitted to a wall without a wall console.
- It must not be installed under the ceiling.
- The frame of foundation for fixing the dosing pump must not be subjected to jolts. The pump must be vibration-free and stable.
- There must be enough free space in the area of the dosing head and the suction and discharge valves for these parts to be easily dismantled if required. The entire space requirement for installation and maintenance is approximately 1 m².
- The distance from the sides of the dosing pump to the wall or other dosing pumps or equipment must be at least 3 cm. There must be a guaranteed flow of circulating air.
- The maximum ambient temperature must be complied with, see "Operating conditions and limits" on page 12. If necessary, radiated heat from surrounding equipment must be screened.
- Avoid exposure to direct sunlight.
- The dosing pump is not intended for use out of doors unless appropriate protective measures have been taken to prevent dust and water from entering the housing.
- For the dimensions of the fastening holes, refer to Chapter "Dimensions" (see page 14).
- Install the dosing pump with the feet on a level surface.
- The tightening torque for the fastening bolts is 15 Nm.


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 MEMDOS LP dosing pump offers, to guarantee functional safety or to achieve a high level of dosing precision.


	WARNING
Caustic burns or other burns through dosing media!	
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. Depending on the type and hazardousness of the dosing medium, this can result in injury.	
⇒ 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
Caustic burns or other burns through dosing media!	
If there is a diaphragm rupture, the dosing medium can escape in an uncontrolled way. Depending on the type and hazardousness of the dosing medium, this can result in injury.	
⇒ Install a leakage drain.	

	WARNING
Caustic burns or other burns through dosing media!	
The dosing pump can generate a pressure that is many times the rated one. A blocked pressure line can lead to dosing medium escaping. Depending on the type and hazardousness of the dosing medium, this can result in injury.	
⇒ 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 due to uncontrollable piping or escaping dosing media.	
⇒ Install pulsation dampeners.	

	NOTICE
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 plant pipework and to the dosing pump.	
⇒ Ensure that the pressure on the discharge side is at least 1 bar than on the suction side.	

	NOTICE
Locking of threads (seized threads)	
Stainless steel and plastic parts (particularly those made of PVC) which are screwed together forming a detachable connection can seize (e.g. the dosing head and the valves).	
⇒ Before screwing together, 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 pump's technical data (see "Technical specifications" on page 11) 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).
- You must design the entire plant and its integrated dosing pump such that escaping dosing medium due to the failure of wearing parts such as the diaphragm, or to burst hoses does not lead to permanent damage to parts of the system 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 laid out that, even if the dosing pump fails, no disproportionately high consequential damage can occur.
- 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 discharge 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 discharge 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

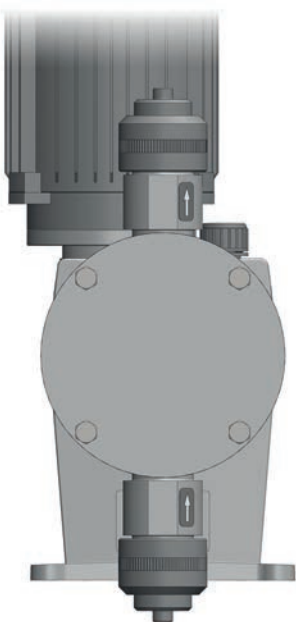


Fig. 8-1: Dosing head with suction and pressure valves

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.

All valves have arrows on them, these indicate the flow direction. These arrows must always point upwards.

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

Lutz-Jesco GmbH dosing pumps 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.

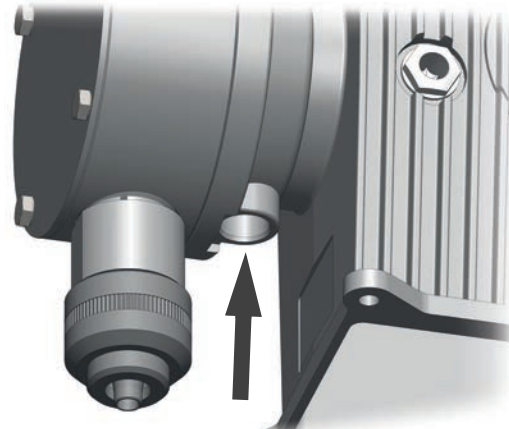



Fig. 8-2: Leakage drain opening

The use of a diaphragm rupture sensor is recommended.

	NOTICE
<p>Damage to drives due to effervescent media</p> <p>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.</p> <ul style="list-style-type: none"> ⇒ Collect the leakage in a collecting pan. ⇒ As an alternative, you can route the leakage back to 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 instructions are no substitute for the instructions supplied with the accessories in each case. The corresponding documentation supplied with the product applies to safety information and provides exact instructions on assembly.

8.5.1 Injection nozzle

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

Injection nozzles have three main 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.
- Many dosing media tend to contaminate the injection nozzles, which can lead to blockages. In cases like this, it is advisable to install an injection nozzle that is easy to dismantle and block off.

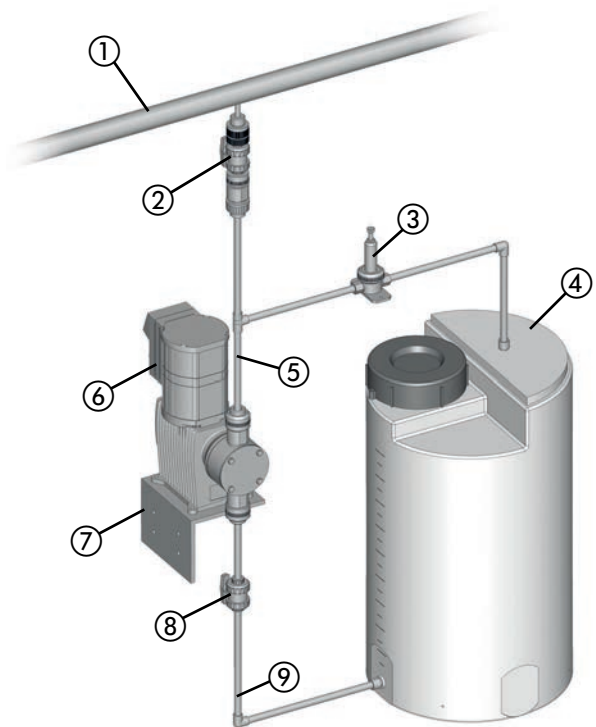


Fig. 8-3: Installation with an injection nozzle

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Pressure relief valve
④	Dosing tank
⑤	Pressure line
⑥	MEMDOS LP dosing pump
⑦	Wall bracket
⑧	Shutoff valve
⑨	Suction line

Table 8-1: Designation of components

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 pressures that are too high.

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.

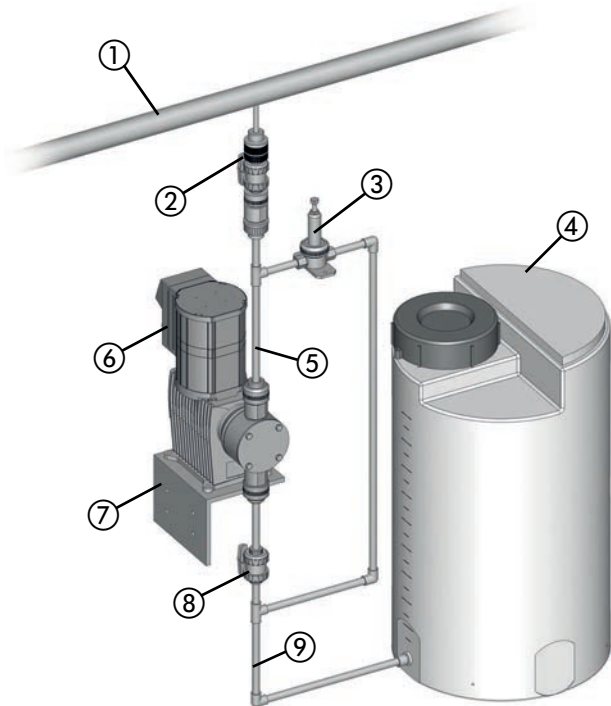


Fig. 8-4: Installation with pressure relief valve – returning to the suction line

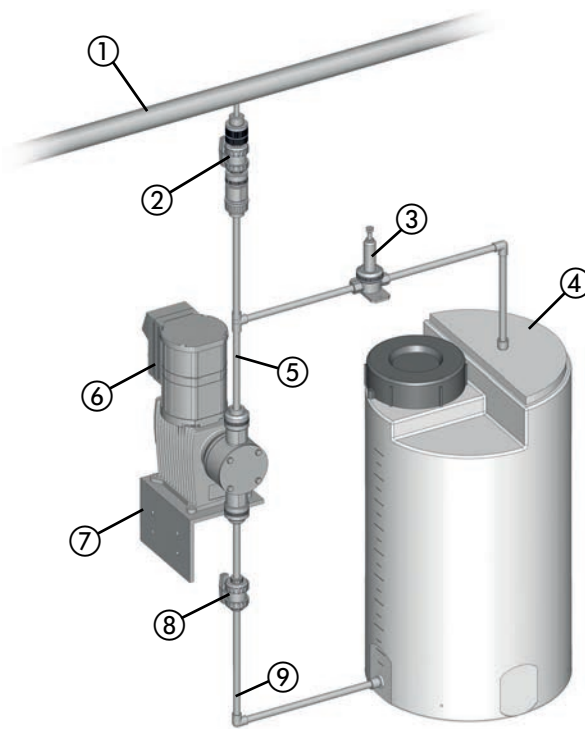


Fig. 8-5: Installation with pressure relief valve – returning to the dosing tank

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Pressure relief valve
④	Dosing tank
⑤	Pressure line
⑥	MEMDOS LP dosing pump
⑦	Wall bracket
⑧	Shutoff valve
⑨	Suction line

Table 8-2: Designation of components

8.5.3 Back-pressure valve

Back-pressure 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 back-pressure.

In some circumstances, a back-pressure valve is unnecessary if you use a hose injection nozzle and if the backpressure that it generates is adequate.

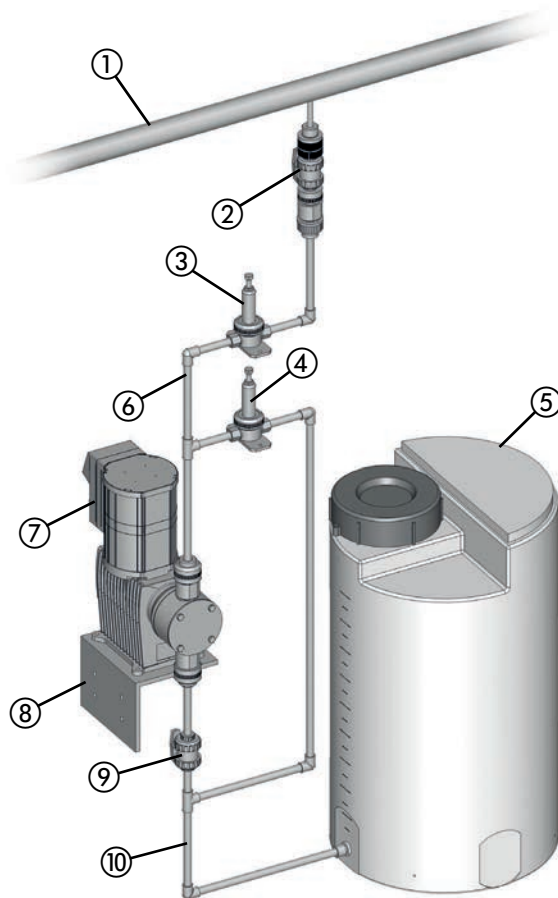


Fig. 8-6: Installation with a back-pressure valve

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Back-pressure valve
④	Pressure relief valve
⑤	Dosing tank
⑥	Pressure line
⑦	MEMDOS LP dosing pump
⑧	Wall bracket
⑨	Shutoff valve
⑩	Suction line

Table 8-3: Designation of components

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.

However, pulsation dampeners also have important safety functions, since they prevent pressure peaks from arising that lead to piping vibrating and cause them to snap.

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 discharge 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.

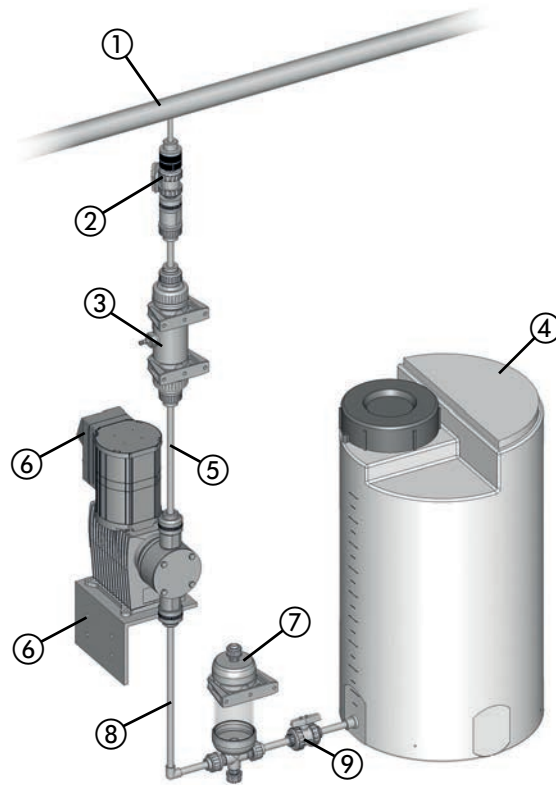


Fig. 8-7: Installation with a pulsation dampener

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Pulsation dampener
④	Dosing tank
⑤	Pressure line
⑥	MEMDOS LP dosing pump with wall console
⑦	Suction pulsation dampener
⑧	Suction line
⑨	Shutoff valve

Table 8-4: Designation of components

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.

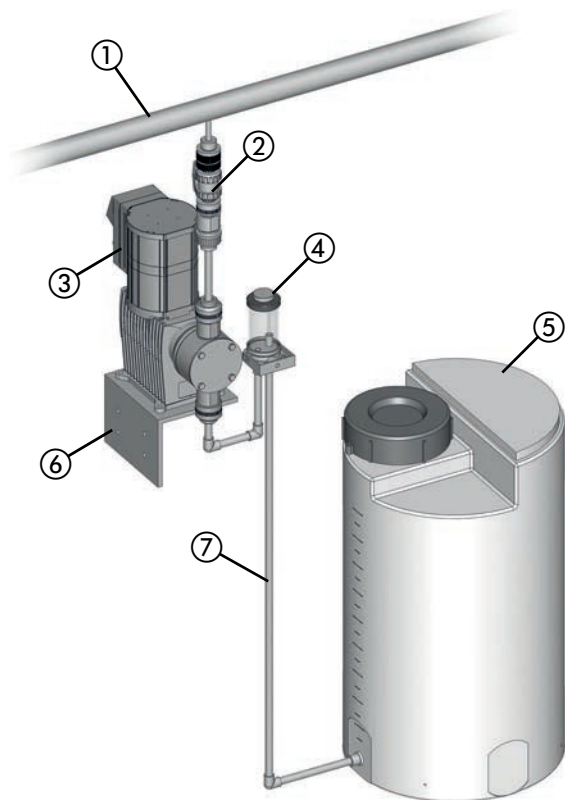


Fig. 8-8: Installation with a priming aid

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	MEMDOS LP dosing pump
④	Priming aid
⑤	Dosing tank

Table 8-5: Designation of components

No.	Description
⑥	Wall bracket
⑦	Suction line

Table 8-5: Designation of components

8.5.6 Level monitoring

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.

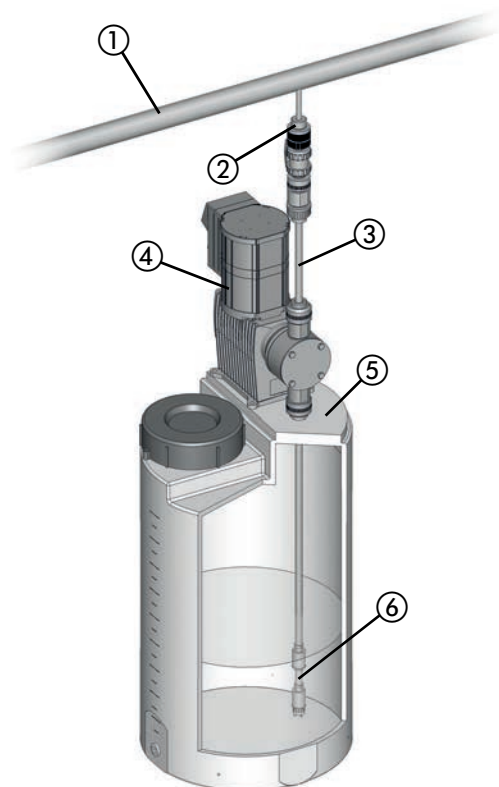


Fig. 8-9: Installation with a level monitoring system

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Pressure line
④	MEMDOS LP dosing pump
⑤	Dosing tank
⑥	Suction line with level monitoring

Table 8-6: Designation of components

8.5.7 Dosing of 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.

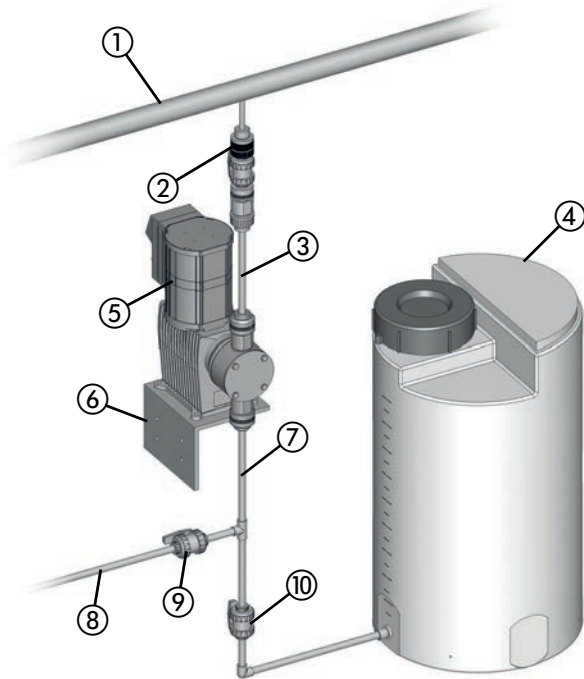


Fig. 8-10: Dosing of suspensions

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Pressure line
④	Dosing tank
⑤	MEMDOS LP dosing pump
⑥	Wall bracket
⑦	Suction line
⑧	Line for rinsing the dosing head
⑨	Shutoff valve
⑩	Shutoff valve

Table 8-7: Designation of components

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.

Installing a suction pressure regulator is a remedy for the problems above. 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.

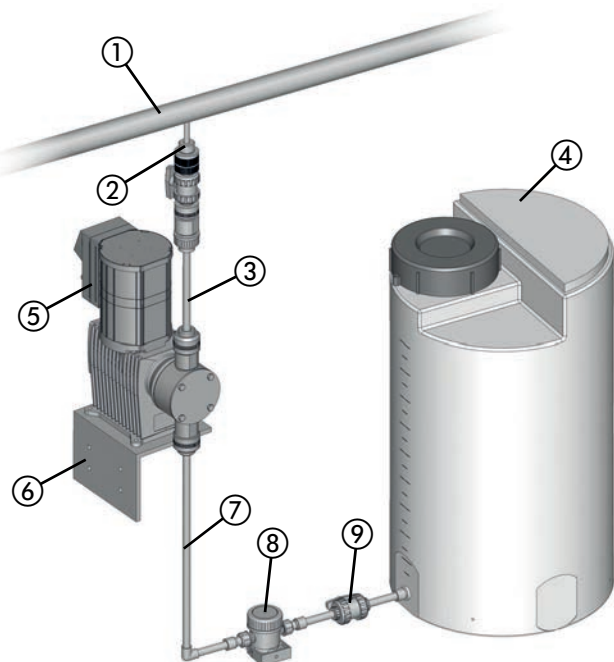


Fig. 8-11: Installation with a suction pressure regulator

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Pressure line
④	Dosing tank
⑤	MEMDOS LP dosing pump
⑥	Wall bracket
⑦	Suction line
⑧	Suction pressure regulator
⑨	Shutoff valve

Table 8-8: Designation of components

9 Electrical installation

DANGER

Danger to life due to 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.

NOTICE

Damage due to wrong 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 nameplate.

NOTICE

Insufficient electromagnetic compatibility

When you connect the dosing pump to a socket without an attached protective earth, it is not possible to guarantee the interference radiation and interference immunity according to EMC regulations.

⇒ Only connect the dosing pump to sockets with an attached protective earth.

9.1 Principles

- The electrical connection comply with local regulations.
- The dosing pump must be plugged into a grounded power outlet.
- To avoid dosing errors at the end of the process, the dosing pump must be locked electrically.
- The dosing pump must not be operated by switching the mains voltage on or off.
- Signal cables must not be laid parallel to high-voltage current lines or mains cables. You must route supply and signal lines in separate channels. An angle of 90° is required at line crossings.

9.2 Description of connection sockets

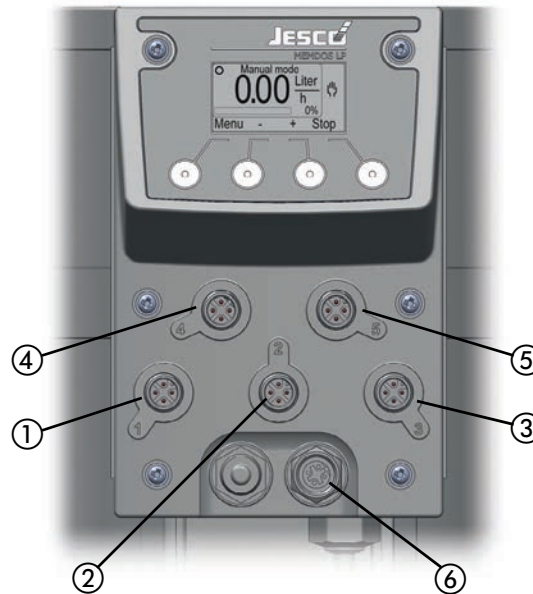


Fig. 9-1: Connection sockets 1 - 5

Inputs	Connection socket	No.
Release input	1	①
Pulse input	2	②
Analog input	2	②
Level input	3	③
Dosing control input	5	⑤
Diaphragm rupture input	5	⑤

Table 9-1: Inputs of the control unit

Outputs	Connection socket	No.
Stroke feedback output	1	①
Alarm relay output	4	④
Current output	-	⑥

Table 9-2: Outputs of the control unit

9.2.1 Connection socket 1

9.2.1.1 Stroke feedback output

At the stroke feedback output, the dosing pump reports back each executed stroke to the pulse input of another dosing pump. In this way, it is possible to network several dosing pumps and to trigger synchronized dosing strokes.

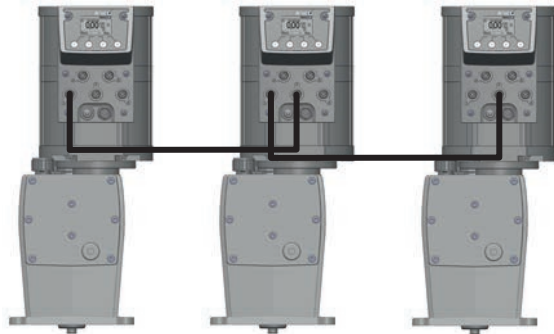


Fig. 9-2: Synchronization of several dosing pumps by means of stroke feedback and pulse control

- Optocoupler, max. 30 V DC, 5 mA
- Assignment of pin 1, 2

9.2.1.2 Release input

Using the Release input, it is possible to start or stop the dosing pump externally.

- Potential-free contact
- Programmable NC or NO contact
- Assignment of pin 3, 4

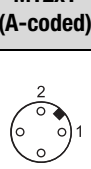

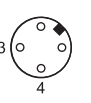

Pin	M12x1 (A-coded)	Assignments	Connection	Cable colour*	
1		Optocoupler collector (+)		Brown	BN
2		Optocoupler emitter (-)		White	WH
3		Ground (GND)		Blue	BU
4		External On/Off		Black	BK

Table 9-3: Connection socket 1

* Applies to cable colours of cables from Lutz-Jesco GmbH. No liability is accepted for cables from other manufacturers.

9.2.2 Connection socket 2

9.2.2.1 Analog input

The analog input makes it possible to control the delivery capacity by means of a 0/4 - 20 mA signal. The delivery capacity is regulated via the stroke frequency.

- 0/4 - 20 mA Signal
- Invertible
- Current range variable
- Working resistance: 200 Ohm (because of electronic fuse)
- potential-free

For information on setting the *Analog input* operating mode, see page 41.

9.2.2.2 Pulse input

The pulse input makes it possible to control the delivery capacity by means of pulses. The system regulates the delivery capacity by means of the dosing pump's stroke frequency and number of strokes in dependence on the number of pulses and the pulse spacing.

- Provided potential-free contact
- For potential-free NO contact, e.g. a contact-type water meter
- 5 V DC supply voltage (current across all connections limited to a total maximum of 50 mA)
- Pulse length min. 4 ms

For information on setting the *Pulse input* operating mode, see page 42.

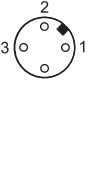
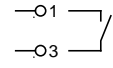
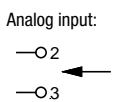
Pin	M12x1 (A-coded)	Assignments	Connection	Cable colour*	
1		Pulses		Brown	BN
2		(+) 0/4 - 20 mA		White	WH
3		Ground (GND)		Blue	BU
4	-	+ 5 V DC	-	Black	BK

Table 9-4: Connection socket 2

* Applies to cable colours of cables from Lutz-Jesco GmbH. No liability is accepted for cables from other manufacturers.

9.2.3 Connection socket 3

9.2.3.1 Level input

Connection for level monitoring of a dosing tank (e.g. a suction line with a float switch).

- 5 V DC supply voltage (current across all connections limited to a total maximum of 50 mA)
- Alert and main alarm
- Potential-free contact
- Programmable NC or NO contact

For more details on installing the level monitoring system, see page 23.

For information on setting the *Level input* function, see page 33.

Pin	M12x1 (A-coded)	Assignments	Connection	Cable colour*	
1		pre-alarm		Brown	BN
2		Main alarm		White	WH
3		Ground (GND)		Blue	BU
4	-	+ 5 V DC	-	Black	BK

Table 9-5: Connection socket 3

* Applies to cable colours of cables from Lutz-Jesco GmbH. No liability is accepted for cables from other manufacturers.

9.2.4 Connection socket 4

9.2.4.1 Alarm relay output

Using the alarm relay, it is possible to forward outwards disturbances on the dosing pump.

- Voltage-free changeover contact
- Max. 250 V AC, 2.5 A or max. 30 V DC, 2.5 A,

For information on setting the *Alarm relay*, see page 32.

Pin	M12x1 (B-coded)	Assignments	Connection	Cable colour*	
1		Break (NC) contact		Brown	BN
2		Make (NO) contact		White	WH
3		-		Blue	BU
4		Changeover contact		Black	BK

Table 9-6: Connection socket 4

* Applies to cable colours of cables from of Lutz-Jesco GmbH. No liability is accepted for cables from other manufacturers.

9.2.5 Connection socket 5

9.2.5.1 Dosing control input

You can connect the FLOWCON flow-through sensor to this socket. The FLOWCON, which is available as an optional extra, allows you to monitor the dosing medium's flow motion after a dosing pump stroke.

- 5 V DC supply voltage (current across all connections limited to a total maximum of 50 mA)

For information on setting the *dosing control* function, see page 33.

9.2.5.2 Diaphragm rupture input

A connection to a leak sensor in the flange of the dosing head to monitor for a possible diaphragm rupture.

- 5 V DC supply voltage (current across all connections limited to a total maximum of 50 mA)

For information on setting the *diaphragm rupture* function, see page 33.

Pin	M12x1 (A-coded)	Assignments	Connection	Cable colour*	
1		Flowcon	Flowcon: 	Brown	BN
2		Leak sensor		White	WH
3		Ground (GND)	Leak sensor: 	Blue	BU
4	-	+ 5 V DC	-	Black	BK

Table 9-7: Connection socket 5

* Applies to cable colours of cables from Lutz-Jesco GmbH. No liability is accepted for cables from other manufacturers.

9.2.6 Current output connection socket

The dosing pump forwards an analogue output signal via the current output connection socket. The current value of this signal is proportional to the stroke frequency. If the stroke frequency increases, the flow of current increases. If the stroke frequency decreases, the flow of current decreases.

This socket is not available in MEMDOS LP-Net.

- 0/4 - 20 mA Signal
- Provided potential-free contact
- Working resistance: 500 Ohm
- Energy saving if the function is switched off

For information on setting the *Current output* function, see page 35.

Pin	M12x1 (A-coded)	Assignments	Connection	Cable colour*	
1		(+) 0/4 - 20 mA		Brown	BN
2		-		White	WH
3		-		Blue	BU
4		Analogue (GND)		Black	BK

Table 9-8: Connection socket 2

* Applies to cable colours of cables from Lutz-Jesco GmbH. No liability is accepted for cables from other manufacturers.

9.2.7 Ethernet connection socket (MEMDOS LP-Net only)



Fig. 9-3: Ethernet connection socket

The network connection socket makes it possible to control the stroke frequency and the number of strokes. In addition, it is possible to transmit in the opposite direction all the disturbance and status messages.

The dosing pump has a network input in the form of a 4-pole, D-coded M12x1 female connector. To make the typical Ethernet RJ-45 male connection, Lutz-Jesco GmbH offers different lengths of special twisted-pair network cables. If you use third-party cables, choose a Category 3 cable with an impedance of 100 Ohm or above.

- Modbus TCP/IP protocol
- 10 Mbps

For information on setting the *Network* operating mode, see page 47.

Pin	M12x1 (D-coded)	Assignments	Connection
1		TX+	Pair 1
2		RX+	Pair 2
3		TX-	Pair 1
4		RX-	Pair 2
-		Screen	-

Table 9-9: Ethernet connection socket

9.2.7.1 Installing a wired network

During installation, observe the following points:

- The Ethernet is cabled in a star topology. The maximum cable length is 100 m.
- You must route separately as a bundle the different categories of cables (e.g. power supply, data lines and sensitive lines for measuring purposes). In this connection, cables should cross at an angle of 90°.
- There must either be a minimum distance between the power cable and data lines of 10 cm or you must install a partition or route the data line in a metal pipe. If this is not possible, use separate cable support systems.
- Only use screened cables and plug-in connectors.
- Route copper wires outside cable support systems through plastic pipes.
- Temperatures that are too high or too low result in lower mechanical and electrical loading or lead to damage.
- Data lines must only be subjected to a defined tensile load; otherwise, the electrical or attenuation values can no longer be guaranteed.
- When pulling cables out of the cable drum, avoid looping or pulling over sharp edges.
- With copper wires, implement potential equalization; when doing this, differentiate between hazardous and non-hazardous areas.
- Electrical, magnetic and electromagnetic fields affect signal transmission and under some circumstances can destroy electronic components.

10 Control

10.1 Operator controls of the control unit

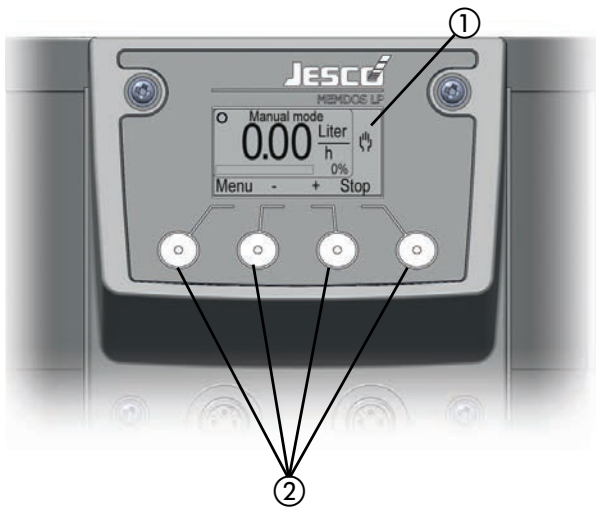


Fig. 10-1: Operator controls of the control unit

No.	Explanation
①	Graphic display
②	Four multifunction keys

Table 10-1: Operator controls of the control unit

You operate the MEMDOS LP dosing pump using the four multifunction keys below the display. The keys have different assignments depending on where you are located at any one time in the menu structure. The system shows the respective functions of the keys at the bottom of the display:



Fig. 10-2: Function assignments of the multifunction keys

In this example, the first key from the left has the **Menu** function; the second one has the **-** function; the third one has the **+** function and the fourth one has the **Stop** function.

The **+** and **-** selection keys as well as the **↑** and **↓** keys have a repeat function, i.e. if you keep them pressed down, the system automatically repeats the key function.

The display brightness reduces 45 seconds after your last input.

Two minutes after your last input, the control unit goes back to the start screen of the selected operating mode in each case.

i The dosing pump does not have an ON/OFF switch. After being disconnected from the power supply, the dosing pump starts in the operating mode and configuration that you selected last.

10.2 Explanation of menu navigation

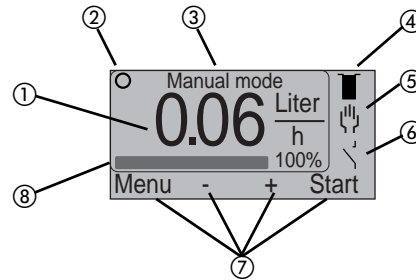


Fig. 10-3: Representation of the control unit on the display

No.	Explanation
①	Calculated delivery capacity (units per day or hour)
②	Symbol for the dosing status display
③	Designation of active operating mode
④	Symbol for level monitoring
⑤	Symbol for the active operating mode
⑥	Symbol for external ON/OFF
⑦	Variable assignment of the four menu keys on the dosing pump
⑧	Bar for representing the stroke frequency or delivery capacity

Table 10-2: Explanation of menu navigation

10.3 Explanation of the menu icons

10.3.1 Dosing status display

Symbol	Meaning
○	Diaphragm stationary (no dosing stroke)
●	Diaphragm in stroke phase (dosing stroke)

Table 10-3: Explanation of the menu icons – Dosing status display

10.3.2 Level monitoring

Symbol	Meaning
■	Dosing tank full
⌊	Dosing tank at minimum (alert)
⌋	Dosing tank empty (main alarm)

Table 10-4: Explanation of the menu icons – Level monitoring

10.3.3 Operating modes






Symbol	Meaning
	Manual mode
	Analog input
	Pulse input
	Batch mode (interval/timer mode)
	Network mode (MEMDOS LP-Net only)

Table 10-5: Explanation of the menu icons – Operating modes

10.3.4 Release input



Symbol	Meaning
	Active and open
	Active and closed

Table 10-6: Explanation of the menu icons – Release input

10.4 Menu settings at initial commissioning

On first connecting the dosing pump to the mains or resetting it to the factory default setting, it is automatically in the *Language* menu (menu 6.3). The system prompts you to specify the menu language.

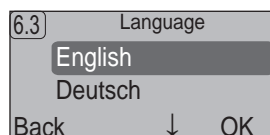


Fig. 10-4: Menu 6.3 Language

- Use the **↑** or **↓** key to choose a language.
- Press **OK**.
 - The dosing pump displays menu 6, *System setup*.
- Press **Menu**.
 - The dosing pump displays menu 1 *Main menu*.
- Press **Back**.
 - The dosing pump displays the start screen. In the factory default setting, the *Manual mode* operating mode is preset and saved with a stroke frequency of 0 % (no dosing).

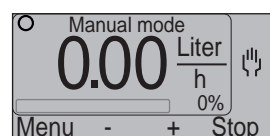


Fig. 10-5: Start screen of the dosing pump after initial commissioning

10.5 Main menu

- Press **Menu**.
 - The dosing pump displays menu 1 *Main menu*.

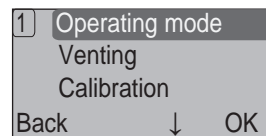



Fig. 10-6: Main menu

The main menu lists the main functions of the MEMDOS LP dosing pump:

- *Operating mode* (see “Operating modes” on page 40),
- *Venting* (see “Venting the dosing pump” on page 39),
- *Calibration* (see “Calibrating the dosing pump” on page 39),
- *System setup* (see “System setup” on page 31),
- *Info* (see “Information about the dosing pump” on page 36),
- *Messages* (see “Messages of the control unit” on page 37).

 For a complete overview of the control unit's menu structure, see page 62.

10.6 System setup

In the *System setup* menu item, you configure all the dosing parameter's general parameters that do not depend on an operating mode.

- Press **Menu**.
- Use the **↑** or **↓** key to choose the *System setup* menu item and press **OK**.
 - The dosing pump displays the *System setup* menu.

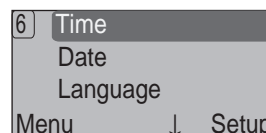



Fig. 10-7: System setup menu

10.6.1 Set "Time" menu item

- Use the **↑** or **↓** key to choose the *Time* menu item and press **Setup**.
- Use the **+** and **-** keys to set the desired hour and press **Next**.
- Use the **+** and **-** keys to set the desired minute.

 If you keep the key pressed down, the dosing pump keeps incrementing the value by two hours or two minutes.

- Press **Back**.
 - ✓ **The time is set.**

10.6.2 Set "Date" menu item

1. Use the **↑** or **↓** key to choose the *Date* menu item and press **Setup**.
2. Use the **+** and **-** keys to set the desired day and press **Next**.
3. Use the **+** and **-** keys to set the desired month and press **Next**.
4. Use the **+** and **-** keys to set the desired year and press **Next**.
5. Use the **+** and **-** keys to set the desired day of the week.

i If you want to use the *MEMDOS LP dosing pump's* Batch mode function, you must set the correct day of the week.

6. Press **Back**.

✓ **The date is set.**

10.6.3 Set "Language" menu item

1. Use the **↑** or **↓** key to choose the *Language* menu item and press **Setup**.

You can choose from the following options:

- *English* (factory default setting),
- *German*,
- *Francais*,
- *Espanol*,
- *Portuguese*,
- *Nederlands*.

2. Use the **↑** or **↓** key to choose a **Language** and press **OK**.

✓ **The language is set.**

10.6.4 Set "Units" menu item

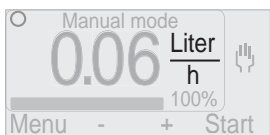


Fig. 10-8: Display of the unit of delivery capacity

1. Use the **↑** or **↓** key to choose the *Units* menu item and press **Setup**.

You can choose from the following units:

- Litres/Day,
- Litres/Hr.
- USgal/Day (American gallons),
- USgal/Hr. (American gallons),
- l.gal/Day (Imperial gallons),
- l. gal / Hr. (Imperial gallons),
- ml/Min.

2. Use the **↑** or **↓** key to choose the desired unit and press **OK**.

✓ **The unit is set.**

10.6.5 Set "Alarm relay" menu item

Using the alarm relay, it is possible to forward outwards disturbances on the dosing pump.

For information on the connection, see "Alarm relay output" on page 28.

1. Use the **↑** or **↓** key to choose the *Alarm relay* menu item and press **Setup**.

You can choose from the following options:

- *Not active* (factory default setting),
- *NO relay* (Normally open),
- *NC relay* (Normally closed).

2. Use the **↑** or **↓** key to choose the desired function and press **OK**.

✓ **The "alarm relay" is set.**

10.6.5.1 "Alarm relay" configuration

NC relay

Situation		Alarm relay output		Relay
Voltage supply	Fault	Pins 1/4	Pins 2/4	
No	No	closed	Open	inactive
	Yes	closed	Open	inactive
Yes	No	Open	closed	active
	Yes	closed	Open	inactive

Table 10-7: Configuration of NC relay

NO relay

Situation		Alarm relay output		Relay
Voltage supply	Fault	Pins 1/4	Pins 2/4	
No	No	closed	Open	inactive
	Yes	closed	Open	inactive
Yes	No	closed	Open	inactive
	Yes	Open	closed	active

Table 10-8: Configuration of NO relay

10.6.6 Set "Level input" menu item

Level monitoring of the dosing medium feed on the suction side with two alarm stages: Alert and main alarm

For more details on installing the level monitoring system, see "Level monitoring" on page 23.

For information on the connection, see "Level input" on page 28.

1. Use the \uparrow or \downarrow key to choose the *Level input* menu item and press **Setup**.

You can choose from the following options:

- *Not active* (factory default setting),
- *Alarm = contact* (issues an alarm when the float contact is closed),
- *Alarm = open* (issues an alarm when the float contact is open; setting for standard Lutz-Jesco GmbH level monitoring systems).

2. Use the \uparrow or \downarrow key to choose the desired function and press **OK**.

✓ "Level input" is set.



The system displays the selected setting of the level input as an icon on the start screen of each operating mode. For an explanation of the icons, see page 30.

10.6.6.1 "Level input" configuration


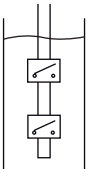
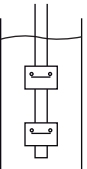

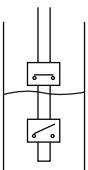
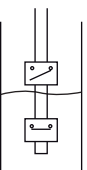

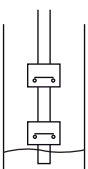
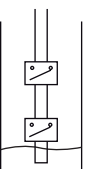
Status	Display	Level input		Dosing pump
		Alarm = contact	Alarm = open	
Tank full				Running
Tank at minimum (alert)				Running
Tank empty (main alarm)				Stopped

Table 10-9: Level input configuration

10.6.7 Set "Diaphragm rupture" menu item

As an option, the MEMDOS LP dosing pump is supplied with a leak sensor in the diaphragm flange; in the case of a diaphragm rupture, the sensor passes on a signal to the dosing pump and stops it.

For information on the connection, see "Diaphragm rupture input" on page 28.

1. Use the \uparrow or \downarrow key to choose the *Diaphragm rupture* menu item and press **Setup**.

You can choose from the following options:

- *Not active* (factory default setting),
- *Alarm = contact* (issues an alarm if the sensor output is closed for 10 seconds; setting for standard Lutz-Jesco GmbH leak sensor),
- *Alarm = open* (issues an alarm if the sensor output is open for 10 seconds).

2. Use the \uparrow or \downarrow key to choose the desired function and press **OK**.

✓ "Diaphragm rupture" is set.

10.6.8 Set "Release input" menu item

Option of starting or stopping the dosing pump externally.

For information on the connection, see "Release input" on page 27.

For information on starting and stopping the dosing pump, see "External On/Off via Release input" on page 48.

1. Use the \uparrow or \downarrow key to choose the *Release input* menu item and press **Setup**.

You can choose from the following options:

- *Not active* (factory default setting),
- *Run = contact* (enables the dosing pump if both contacts are closed),
- *Run = open* (enables the dosing pump if both contacts are open).

2. Use the \uparrow or \downarrow key to choose the desired function and press **OK**.

✓ "Release input" is set.



The system displays the selected setting of the Release input as an icon on the start screen of each operating mode. For an explanation of the icons, see page 31.

10.6.9 Set "Dosing control" menu item

The FLOWCON, which is available as an optional extra, allows you to monitor the dosing medium's flow motion after a dosing pump stroke.

For information on the connection, see "Dosing control input" on page 28.

1. Use the \uparrow or \downarrow key to choose the *Dosing control* menu item and press **Setup**.

- ▶ The dosing pump displays menu 6.9 *Dosing control*. *Not active* is preselected as the mode.

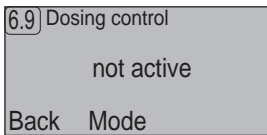


Fig. 10-9: Dosing control "not active"

- Use **Mode** to activate the FLOWCON contact.
 - The dosing pump is set to *Pump On* but continues to run in the case of FLOWCON error messages.

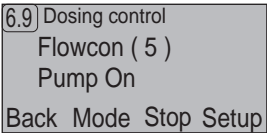


Fig. 10-10: Dosing control "Pump On"

- Press **Stop**.
 - The dosing pump is set to *Pump Stop* and stops when an error message arrives.

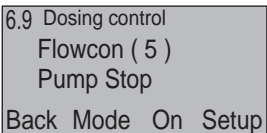


Fig. 10-11: Dosing control "Pump Stop"

- Press **Setup** to set the *faulty strokes*. The dosing pump's factory default setting is five strokes; this means that the system issues an error message after five faulty strokes.
 - Use the **+** and **-** keys to set the desired value. Adjustment range: 0 - 100 faulty strokes.
 - Press **OK**.
 - Press **Back**.
- ✓ **"Dosing control" is set.**

10.6.10 Set "Release code" menu item

Protects menu 1 *Main menu* from unauthorized access. In the factory default setting, the code is not activated.

You can set any *Release code* you like from 0000 to 9999.

- Use the **↑** or **↓** key to choose the *Release code* menu item and press **Setup**.
 - The dosing pump displays menu 6.10 *Release code*.

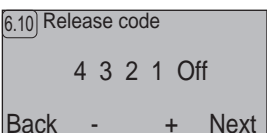


Fig. 10-12: Release code

- Use the **+** and **-** keys to set a value of 0 to 9 for the first digit of the code and then press **Next**.
- Proceed as described under point 2 for the other digits.
- Choose the last item *Off* and press **+**.

- Press **Back**.
 - The *Release code* is activated after 120 seconds. You must enter it when accessing the *Main menu*.

i After entering the correct *Release code* and exiting the *Main menu*, you must enter the code again when 120 seconds have elapsed and you access the *Main menu*.

10.6.10.1 Entering the Release code

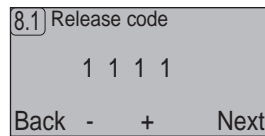


Fig. 10-13: Entering the Release code

- Use the **+** and **-** keys to set a value of 0 to 9 for the first digit of the code and then press **Next**.
- Proceed as described under point 1 for the other digits.
- After entering all the digits, press **OK**.
 - If your input is correct, the dosing pump displays the *Main menu*.

i Should you have forgotten the code, please contact Lutz-Jesco GmbH.

10.6.10.2 Deactivating the Release code

- Press **Menu**.
- Enter the correct Release code and press **OK**.
- Use the **↑** or **↓** key to choose the *System setup* menu item and press **OK**.
- Use the **↑** or **↓** key to choose the *Release code* menu item and press **Setup**.
- Keep pressing **Next** until *On* is selected.
- Press **-**.
- Press **Back**.

✓ **Release code deactivated.**

10.6.11 Set "Safety code" menu item

Protects the *System setup* menu from unauthorized access. In the factory default setting, the code is not activated.

You can set any *Safety code* you like from 0000 to 9999.

- Use the **↑** or **↓** key to choose the *Safety code* menu item and press **Setup**.
 - The dosing pump displays menu 6.11 *Safety code*.

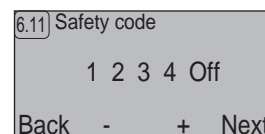


Fig. 10-14: Safety code

2. Use the **+** and **-** keys to set a value of 0 to 9 for the first digit of the code and then press **Next**.
3. Proceed as described under point 2 for the other digits.
4. Choose the last item *Off* and press **+**.
5. Press **Back**.
 - ▶ The *safety code* is activated after 120 seconds. You must enter it when accessing the *System setup* menu.



After entering the correct *safety code* and exiting the *System setup* menu, you must enter the code again when 120 seconds have elapsed and you access the *System setup* menu.

10.6.11.1 Entering the safety code

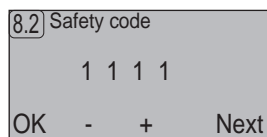


Fig. 10-15: Entering the safety code

1. Use the **+** and **-** keys to set a value of 0 to 9 for the first digit of the code and then press **Next**.
2. Proceed as described under point 1 for the other digits.
3. After entering all the digits, press **OK**.
 - ▶ If your input is correct, the dosing pump displays the *System setup* menu.



Should you have forgotten the code, please contact Lutz-Jesco GmbH.

10.6.11.2 Deactivating the safety code

1. Press **Menu**.
 2. Use the **↑** or **↓** key to choose the *System setup* menu item and press **OK**.
 3. Enter the correct safety code and press **OK**.
 4. Use the **↑** or **↓** key to choose the *Safety code* menu item and press **Setup**.
 5. Keep pressing **Next** until *On* is selected.
 6. Press **-**.
 7. Press **Back**.
- ✓ **The safety code is deactivated.**

10.6.12 Set "Factory setup" menu item

Resets the dosing pump's control unit settings to the factory default setting.

1. Use the **↑** or **↓** key to choose the *Factory setup* menu item and press **Setup**.
 2. Press **OK**.
 - ▶ The dosing pump displays the *Language* menu (menu 6.3); see also "Menu settings at initial commissioning" on page 31.
- ✓ **The dosing pump is reset to the factory setup setting.**

10.6.13 Set "User setup" menu item

This menu item allows you to save the settings you made in the *System setup* menu.

10.6.13.1 Saving own settings

1. Use the **↑** or **↓** key to choose the *User setup* menu item and press **Setup**.
 2. Use the **↑** or **↓** to choose *Save* and press **OK**.
- ✓ **Own settings saved.**

10.6.13.2 Loading own settings

1. Use the **↑** or **↓** key to choose the *User setup* menu item and press **Setup**.
 2. Use the **↑** or **↓** to choose *Load* and press **OK**.
- ✓ **Own settings loaded.**

10.6.14 Set "Current output" menu item

This menu item allows you to set the analogue output signal at the current output connection socket.

For information on the connection, see "Current output connection socket" on page 29.

1. Use the **↑** or **↓** key to choose the *Current output* menu item and press **Setup**.

You can choose from the following options:

 - *Off* (factory default setting),
 - *0..20mA*,
 - *4..20mA*.
 2. Use the **↑** or **↓** key to choose the desired function and press **OK**.
- ✓ **"Current output" is set.**



If the *Current output* function is not required, it should be set to *OFF* to save energy.

10.6.15 Set "IP address" menu item (MEMDOS LP-Net only)

This menu item allows you to set the network address. Your local network administrator specifies the address. It is not possible to set up a subnet, a proxy or a gateway.

1. Use the **↑** or **↓** key to choose the *IP address* menu item and press **Setup**.
2. Use the **+** and **-** keys to set a value of 001 to 255 for the first digit of the IP address and then press **Next**.
3. Proceed as described under point 2 for the other digits of the IP address.
4. Press **Back**.

✓ **IP address is set.**

10.7 Information about the dosing pump

In the *Info* menu item, you can find a wide range of information about your dosing pump.

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Info* menu item and press **OK**.
 - ▶ The dosing pump displays menu 7.1 *Info 1*.

7.1	Info 1	
	Strokes / min	180
	Capacity	3.80 l/Std
	Calibration	3.80 l/Std
	Menu	Next

Fig. 10-16: Display of menu Info 1

3. Keep pressing **Next** to get to subsequent *Info* menus.

The *Info* menus display the following information:

Menu	Information
<i>Info 1</i>	<ul style="list-style-type: none"> ■ Maximum strokes/minute ■ Maximum delivery capacity in l/hr ■ Calibrated delivery capacity in l/hr
<i>Info 2</i>	<ul style="list-style-type: none"> ■ Stroke volume at factory setting in ml ■ Stroke volume after calibration in ml
<i>Info 3</i>	<ul style="list-style-type: none"> ■ Running time of the dosing pump in hrs. ■ Total strokes of the dosing pump carried out
<i>Info 4</i>	<ul style="list-style-type: none"> ■ Software version and date of updating ■ Part number ■ Serial number
<i>Info 5</i>	<ul style="list-style-type: none"> ■ Current value in mA at analogue input ■ Date and time
<i>Info 6</i> (MEMDOS LP-Net only)	<ul style="list-style-type: none"> ■ MAC number ■ IP number
<i>Info 7</i>	Assignment of connection socket 1
<i>Info 8</i>	Assignment of connection socket 2
<i>Info 9</i>	Assignment of connection sockets 2 and 3
<i>Info 10</i>	Assignment of connection socket 4
<i>Info 11</i>	Assignment of connection socket 5

Table 10-10: Explanation of the *Info* menus

4. Press **Menu** to exit the *Info* menu.

10.8 Messages of the control unit

The system logs the disturbance messages of the dosing pump with the date, time and error code.

Refer to "Troubleshooting" > "List of control unit messages" (Page 56) for a list of all the disturbance messages and their meanings.



Fig. 10-17: Display of disturbance messages

The following symbols are used:

Symbol	Meaning
!	Symbol for an event
▶	Symbol for the start of a message
▶▶	Symbol for the end of a message

Table 10-11: Explanation of the menu icons – disturbance messages


1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Messages* menu item and press **OK**.
3. Keep pressing **↑** or **↓** to display the disturbance messages that are listed in chronological order.
4. Press **Menu** to exit the *Messages* menu.


10.8.1 Deleting the messages of the control unit


1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Messages* menu item and press **OK**.
3. Press **Back**.
4. Press **Back**.


✓ **The messages of the control unit are deleted**


11 Operation


	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>After connecting the mains supply, residual dosing media in the dosing head can spray out.</p> <ul style="list-style-type: none"> ⇒ Before connecting the mains supply, connect the dosing lines. ⇒ Check that all the screw connections have been tightened correctly and are leak-proof. 	


	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>While working on the dosing head, valves and connections, you may come into contact with dosing media.</p> <ul style="list-style-type: none"> ⇒ 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
<p>Danger of personal injury and material damage!</p> <p>Dosing medium can escape if you loosen connections on the dosing head, e.g. for venting, during operation.</p> <ul style="list-style-type: none"> ⇒ Follow the safety data sheet of the dosing medium. ⇒ Clean the dosing pump if dosing medium escapes. ⇒ Dispose of the dosing medium correctly. 	

	CAUTION
<p>Increased risk of accidents due to insufficient qualification of personnel!</p> <p>Dosing pumps and their accessories may only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will raise the risk of accidents.</p> <ul style="list-style-type: none"> ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications. ⇒ Prevent access to the system for unauthorised persons. 	

	CAUTION
<p>Danger of personal injury and material damage!</p> <p>Changing dosing media can lead to unpredictable reactions.</p> <ul style="list-style-type: none"> ⇒ Thoroughly clean the dosing pump and appropriate sections of the plant avoid chemical reactions. 	

	CAUTION
<p>Danger of automatic start up!</p> <p>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 hazardness of the dosing medium, this can result in injury.</p> <ul style="list-style-type: none"> ⇒ Stop the dosing pump before disconnecting it from the mains supply. ⇒ Ensure that the dosing pump has been installed correctly before connecting it to the mains supply. 	

	NOTICE
<p>Overheating of the motor</p> <p>If the fan cover is removed or is defective, insufficient motor cooling is provided.</p> <ul style="list-style-type: none"> ⇒ Before starting the dosing pump, ensure that the motor fan cover is fitted and fully functional. 	

11.1 Commissioning the dosing pump

Precondition for action:

- ✓ The dosing pump has been assembled and installed in accordance with Chapter "Installing the dosing pump" (see page 16), Chapter "Hydraulic installations" (see page 17) and Chapter "Electrical installation" (see page 26).
- ✓ All the mechanical fastenings have been inspected to ensure adequate load-bearing capacity.
- ✓ The dosing head screws have been tightened with the correct torque (see "Tighten dosing head bolts" on page 51).
- ✓ All the hydraulic sections have been inspected to ensure they are adequately leak-proof and that the through flow direction is correct.
- ✓ The dosing pump has been set in accordance with "Menu settings at initial commissioning" (see page 31) and, if necessary, the other settings in menu "System setup" (see page 31) have been carried out.
- ✓ Personnel have read all the operating instructions and understood them completely.
- ✗ You need gear oil of viscosity class ISO-VG460 according to DIN 51519 (corresponds to SAE 140 according to DIN 51512).

Perform the following working steps:

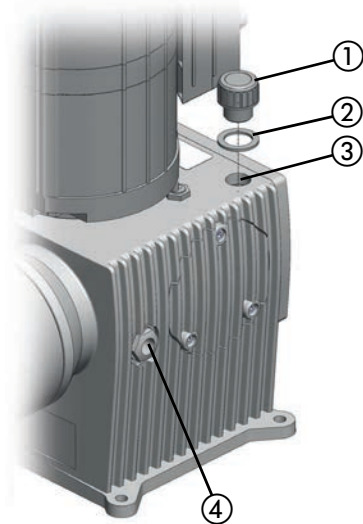


Fig. 11-1: Dosing pump oil inlet

1. Unscrew the closing screw ① from the oil inlet ③ and remove the washer seal ②.
2. Fill up with oil into the oil inlet ③. At the same time, check the oil level in the oil level glass ④. The oil level should reach approximately the middle of the oil level glass.

The following volumes are required:

MEMDOS LP	Filling volumes
4 – 80, 150	0.25 l
110, 160– 1010	0.75 l

3. Place the washer seal ② onto the oil inlet ③ and tighten up the closing screw ①.
4. Open the shut-off valves on the suction and discharge sides if present.



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.

At initial commissioning, it is advisable to prime the pump without backpressure. For this purpose, we recommend installing a relief valve on the discharge side of the dosing pump.

5. Plug in the dosing pump's mains plug to the power supply.
 - ▶ The dosing pump is ready for use.
6. Vent the dosing pump (see 11.1.1 "Venting the dosing pump").
7. Calibrate the dosing pump (see 11.1.2 "Calibrating the dosing pump").

8. Select an operating mode and start the dosing pump in accordance with the instructions in the chapter entitled "Operating modes" (see page 40).
 - ▶ The dosing pump primes. If it does not prime enough, use a priming aid, (see "Priming aid" on page 23).

✓ **The dosing pump is commissioned.**

11.1.1 Venting the dosing pump

On initial commissioning or on suspicion of entrapped air, the dosing pump must be vented. The MEMDOS LP is provided with the *Venting* function for this purpose, which sets the dosing pump to deliver at maximum stroke length to fill/vent the pipes and dosing head.

Perform the following working steps:

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Venting* menu item and press **OK**.
3. Press the **Start** key and keep it pressed.
 - ▶ The dosing pump starts delivery at the highest stroke frequency.
4. Release **Start** as soon as the dosing pump is sufficiently vented.
 - ▶ The dosing pump stops delivery.

✓ **The dosing pump is vented.**

11.1.2 Calibrating the dosing pump

In dependence on the dosing medium you are using and the existing delivery pressure, you must match the theoretical delivery capacity with that which is actually measured. You use the *Calibration* function to do this.

Precondition for action:

- ✓ The plant sections on the discharge side of the dosing pump have been installed correctly and are ready for operation.

Perform the following working steps:

1. Fill the metering container with the dosing medium.
2. Hold the end of the dosing pump's suction line in the metering container.
3. Vent the dosing pump, (see "Venting the dosing pump" on page 39).
4. Press **Menu**.
5. Use the **↑** or **↓** key to choose the *Calibration* menu item and press **OK**.
 - ▶ The dosing pump displays menu 5 *Calibration*.

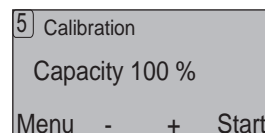


Fig. 11-2: Menu 5 Calibration

6. Use the **+** and **-** keys to set the percentage value of the delivery capacity with which you want to carry out calibration. Setting range 10 % - 100 %.
7. Press **Start**.
 - ▶ The dosing pump starts delivery and displays the number of executed strokes.

8. Press **Finish** as soon as you have achieved a measurable value in the metering container.
 - ▶ The dosing pump stops and displays the theoretical value of the delivery rate in ml.

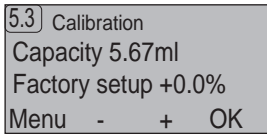


Fig. 11-3: Menu 5.3 Calibration

9. Read off the actual delivery rate from the metering container and use the **+** and **-** keys to correct the displayed delivery capacity. Adjustment range: -50 % - +50 %.
 10. Press **OK**.
- ✓ **The dosing pump is calibrated.**

11.2 Operating modes

The MEMDOS LP dosing pump offers the following operating modes:

- *Manual mode* - Manual setting of the delivery capacity,
- *Analog input* - Controlling the delivery capacity by means of a 0/4 - 20 mA signal,
- *Pulse input* - Controlling the stroke frequency and number of strokes in dependence on the number of pulses and the pulse spacing,
- *Batch mode* - Controlling the delivery capacity and the delivery rate by means of manual starting, an external pulse at intervals or specified times in different modes,
- *Network mode* (MEMDOS LP-Net only) - Controlling the stroke frequency and number of strokes across a network.

11.2.1 Manual mode

	CAUTION
<p>Danger of automatic start up!</p> <p>If the dosing pump is in manual mode with a specified stroke frequency, it retains the stroke frequency even after you disconnect it from the mains and then reconnect it. This means that dosing medium can escape. Depending on the type and hazardousness of the dosing medium, this can result in injury.</p> <p>⇒ Stop the dosing pump before disconnecting it from the mains supply.</p> <p>⇒ Ensure that the dosing pump has been installed correctly before connecting it to the mains supply.</p>	

11.2.1.1 Selecting the operating mode

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Operating mode* menu item and press **OK**.
3. Use the **↑** or **↓** key to choose the *Manual mode* menu item and press **OK**.
 - ▶ The dosing pump displays the start screen of *Manual mode* mode.

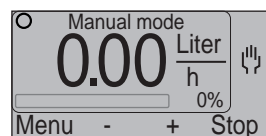


Fig. 11-4: Start screen of Manual mode

11.2.1.2 Starting the dosing pump

1. Press the **+** key to increase the stroke frequency by 1 %.
 - ▶ The dosing pumps starts dosing. The system automatically calculates the resulting delivery capacity and displays it.

	<p>At a small delivery capacity it might take a while after the dosing pump has started for it to carry out the first stroke. This is not an error.</p>
--	---

2. Use the **+** and **-** keys to set the desired stroke frequency.

✓ **Dosing pump has started.**

11.2.1.3 Stopping the dosing pump

➔ Press **Stop**.

- ▶ The system displays the "Stop" signal and **Stop** changes to **Start**. Press **Start** to restart the dosing pump.

✓ **Dosing pump has stopped.**



Pressing **Menu** does not interrupt dosing!
You do not stop the dosing pump until you change to a different operating mode using the menu.

11.2.2 Analog input

In *Analog input* operating mode, an external 0/4 - 20 mA signal, which is connected to the analogue input (see "Connection socket 2" on page 27) controls the stroke frequency.

11.2.2.1 Selecting the operating mode

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Operating mode* menu item and press **OK**.
3. Use the **↑** or **↓** key to choose the *Analog input* menu item and press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).

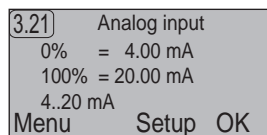


Fig. 11-5: Parameters of the operating mode

4. Press **OK**.
 - ▶ The dosing pump displays the start screen of *Analog input* mode.

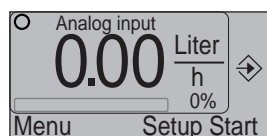


Fig. 11-6: Start screen of Analog input

11.2.2.2 Setting the signal mode

You have the option of setting a 0 - 20 mA signal or a 4 - 20 mA one.

1. Press **Setup**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).
2. Press **Setup**.
3. Use the **↑** or **↓** key to choose the *0/4..20mA* menu item and press **Setup**.
4. Press **Mode** to set 0 - 20 mA or 4 - 20 mA.

5. Press **OK**.

- ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).

6. Press **OK**.

- ▶ The dosing pump displays the start screen of *Analog input* mode.

✓ **The signal mode is set.**

11.2.2.3 Setting the current value for 0 % delivery capacity

1. Press **Setup**.

- ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).

2. Press **Setup**.

3. Use the **↑** or **↓** key to choose the *0% current* menu item and press **Setup**.

4. Use the **+** and **-** keys to set the desired current value. Admissible values are in the range 0.00 - 20.00 mA. The value that is displayed in brackets indicates the actual connected current value.

5. Press **OK**.

- ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).

6. Press **OK**.

- ▶ The dosing pump displays the start screen of *Analog input* mode.

✓ **The current value for 0 % delivery capacity is set.**

11.2.2.4 Setting the current value for 100 % delivery capacity

1. Press **Setup**.

- ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).

2. Press **Setup**.

3. Use the **↑** or **↓** key to choose the *100% current* menu item and press **Setup**.

4. Use the **+** and **-** keys to set the desired current value. Admissible values are in the range 0.00 - 20.00 mA. The value that is displayed in brackets indicates the actual connected current value.

5. Press **OK**.

- ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.21).

6. Press **OK**.

- ▶ The dosing pump displays the start screen of *Analog input* mode.



To process a 20 - 4 mA (inverted) analogue signal, you must configure parameter *0% current* to 20 mA and parameter *100% current* to 4 mA.

✓ **The current value for 100 % delivery capacity is set.**

11.2.2.5 Starting the dosing pump

Precondition for action:

- ✓ The dosing pump has been connected in accordance with the chapter entitled Chapter "Analog input" (see page 27).
1. Press **Start**.
 2. Apply a 0 - 20 mA or a 4 - 20 mA signal to the dosing pump's analog input.
 - ▶ The dosing pumps starts dosing immediately. The system automatically calculates the resulting delivery capacity and displays it.
- ✓ **Dosing pump has started.**

11.2.2.6 Stopping the dosing pump

➔ Press **Stop** or reduce the incoming signal to the value for 0% current or less.

If the signal value is below 4 mA with a 4 - 20 mA signal, the system issues an "Analog input error" message.

- ✓ **Dosing pump has stopped.**

11.2.3 Pulse input

In the *Pulse input* operating mode, the system regulates the stroke frequency and the number of strokes in dependence on the number of pulses and the pulse spacing of the pulse signal that is connected at the pulse input (see "Connection socket 2" on page 27).

11.2.3.1 Selecting the operating mode

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Operating mode* menu item and press **OK**.
3. Use the **↑** or **↓** key to choose the *Pulse input* menu item and press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.31).

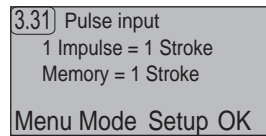


Fig. 11-7: Parameters of the operating mode

4. Press **OK**.
 - ▶ The dosing pump displays the start screen of *Pulse input* mode.

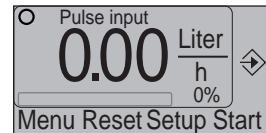


Fig. 11-8: Start screen of Pulse input

11.2.3.2 Choosing the pulse input mode

You can choose from the following modes in *Pulse input* operating mode:

Type	Explanation
<i>Strokes</i>	Transmission and reduction of the number of pulses compared to the number of strokes
<i>Output</i>	Delivery of a fixed output per pulse
<i>Water meter</i>	Operation on a contact-type water meter

Table 11-1: Explanation of pulse input modes

The system marks the currently active mode by displaying (*On*) after the menu item. In the factory default setting, the *Strokes* mode is preselected: *Strokes (On)*.

1. Press **Setup**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.31).
2. Press **Type**.
3. Use the **↑** or **↓** key to choose a mode and press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.31).

4. Press **OK**.

- ▶ The dosing pump displays the start screen of *Pulse input* mode.

11.2.3.3 Pulse input modes


The parameters that you can set are different depending on the mode.

Strokes

The *Strokes* pulse input mode offers the following configuration options:

Parameter	Explanation
<i>Strokes p. pulse</i>	Specifies the required number of strokes that the dosing pump carries out per pulse. In this connection, the system determines the stroke frequency on a dynamic basis based on the time between the last two pulses. Stroke frequency = number of strokes/pulse spacing Default settings: 1 stroke Adjustment range: 1 - 999 strokes.
<i>Pulses p. stroke</i>	Specifies the required number of pulses that must be connected to the input to trigger a stroke. Default setting: 1 pulse Adjustment range: 1 - 999 pulses.
<i>Stroke buffer</i>	The strokes that have still to be executed are saved in the stroke buffer. If stroke multiplication is set, the system writes all the strokes belonging to one pulse into the stroke buffer. With each pulse, the number of strokes in the accumulator increases; with each executed stroke, it decreases. The limit of the stroke buffer must be raised to save pulse requests that arrive during execution of the strokes from the previous pulse request. If the number of requested strokes exceeds the stroke buffer capacity, the system issues a "Stroke buffer maximum" message. Default setting: 1 stroke Adjustment range: 1 - 999 strokes.

Table 11-2: Strokes configuration type

 In the case of pulse multiplication, you must increment the stroke buffer manually. Otherwise, you can confirm the configuration by pressing **OK**.

You can configure parameters *Strokes per pulse* and *Pulses per stroke* at the same time to define an exact number of strokes for a number of pulses. In this connection, the system determines the stroke frequency on a dynamic basis based on the time between the last two pulses.

Example:

If you set "7 strokes per pulse" and "3 pulses per stroke", the dosing pump carries out 7 strokes per 3 input pulses.

Output

The *Output* pulse input mode offers the following configuration options:

Parameter	Explanation
<i>Output</i>	Specifies the required output per pulse in ml. The output is calculated from the dosing pump's stroke volume after calibration and the automatically calculated ratio of the number of strokes to the number of pulses. The value that is displayed in brackets indicates the number of strokes and pulses (number of strokes/number of pulses).
<i>Stroke buffer</i>	See "Stroke buffer" mode under "Strokes" on page 43.

Table 11-3: Output configuration mode



The delivery capacity depends on the dosing pump's delivery pressure. To display the delivery capacity correctly, you must calibrate the dosing pump, see page 39.

Water meter

The *Water meter* pulse input mode offers the following configuration options:

Parameter	Explanation
<i>Output</i>	Specifies the delivered output of the dosing pump per cubic metre (m ³) throughflow of the water meter in ml. The value corresponds to the throughflow amount per pulse. Since the dosing pump only controls the output via the stroke frequency, you must set the cycle between the water meter pulse and the dosing pump's stroke. The value that is displayed in brackets indicates the number of strokes that must be triggered per number of water meter pulses. (Number of strokes/number of pulses).
<i>Stroke buffer</i>	See "Stroke buffer" mode under "Strokes" on page 43.
<i>ml/pulse</i>	Specifies the water meter's throughflow amount per pulse in ml.
<i>l/Imp.</i>	Specifies the water meter's throughflow amount per pulse in l.
<i>m³/pulse</i>	Specifies the water meter's throughflow amount per pulse in m ³ .
<i>Maximum</i>	Specifies the water meter's maximum throughflow amount in m ³ /hr.

Table 11-4: Water meter configuration mode

On the basis of the water meter's values (*ml/pulse*, *l/pulse* or *m3/pulse*) and the delivered dosing capacity (output), the dosing pump automatically determines the stroke frequency. If the dosing pump's maximum output is exceeded during a fast sequence of pulses, the system issues a warning message.

i If you enter contradictory parameters, the system displays this when you try to save them (Menu 3.41). It is not possible to activate the operating mode without correcting the parameters.

11.2.3.4 Configuring the pulse input mode

1. Press **Setup**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.31).
2. Press **Setup**.
3. Use the **↑** or **↓** key to choose a parameter of the mode and press **OK**.
4. Press the **+** key to increment the parameter's value or the **-** key to decrement it.
5. Press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.31).
6. Press **OK**.
 - ▶ The dosing pump displays the start screen of *Pulse input* mode.

11.2.3.5 Starting the dosing pump

Precondition for action:

- ✓ The dosing pump has been connected in accordance with the chapter entitled Chapter "Pulse input" (see page 27).
1. Press **Start**.
 2. Apply a pulse to the dosing pump's pulse input.
 - ▶ The dosing pumps starts dosing immediately. The system automatically calculates the resulting delivery capacity and displays it.
- ✓ **Dosing pump has started.**

11.2.3.6 Stopping the dosing pump

- ➔ Press **Stop**.
- ✓ **Dosing pump has stopped.**

11.2.3.7 Clearing the stroke buffer

- ➔ Press **Reset**.
 - ▶ All the strokes in the accumulator that are still pending are deleted. The dosing pump stops; however, it is still active and waiting for the next pulse.
- ✓ **The stroke buffer has been cleared.**

11.2.4 Batch mode

In *Batch mode*, the system regulates the dosing pump's stroke frequency and the number of strokes in dependence on the delivered output. You can set the output on an individual basis for the dosing pump's run time, number of strokes and delivery capacity (stroke frequency),

It is started either manually or via a pulse signal applied at the pulse input (see "Connection socket 2" on page 27).

Dosing is possible at intervals or at specified times in the course of a week.

11.2.4.1 Selecting the operating mode

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Operating mode* menu item and press **OK**.
3. Use the **↑** or **↓** key to choose the *Batch mode* menu item and press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).

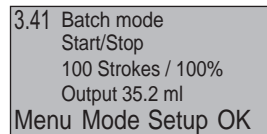


Fig. 11-9: Parameters of the operating mode

4. Press **OK**.
 - ▶ The dosing pump displays the start screen of *Batch mode*.

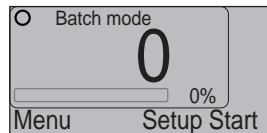


Fig. 11-10: Start screen of Batch mode

11.2.4.2 Choosing the batch mode mode

You can choose from the following modes in *Batch mode*:

Mode	Explanation
<i>Start/Stop</i>	Manual starting of dosing
<i>Ext. Start</i>	External starting of dosing
<i>Interval</i>	Automatic starting of dosing at regular intervals
<i>Timer</i>	Starting of dosing at a specific time

Table 11-5: Explanation of batch mode modes

i The system marks the currently active mode by displaying (*On*) after the menu item. In the factory default setting, the *Start/Stop* mode is preselected: *Start/Stop (On)*.

1. Press **Setup**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).
2. Press **Mode**.
3. Use the **↑** or **↓** key to choose a Mode and press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).
4. Press **OK**.
 - ▶ The dosing pump displays the start screen of *Pulse input* mode.

11.2.4.3 Batch mode modes

The parameters that you can set are different depending on the mode.

Start/Stop and Ext. Start

The *Start/Stop* and *Ext. Start* batch modes do not differ in terms of the configuration; the only difference is in the way in which the dosing pump is started (see "Starting the dosing pump" on page 47). They offer the following configuration options:

Parameter	Explanation
<i>Runtime</i>	Specifies the required runtime of the dosing pump; input in minutes. The value that is displayed in brackets indicates the calculated output.
<i>No. of strokes</i>	Specifies the number of required strokes. The value that is displayed in brackets indicates the calculated output.
<i>Capacity</i>	Specifies the required stroke frequency stated as a percentage of the maximum stroke frequency (see "Delivery capacity data" on page 11).

Table 11-6: Start/Stop and Ext. configuration Start

Interval

The *Interval* batch mode mode offers the following configuration options:

Parameter	Explanation
<i>Runtime</i>	Specifies the required runtime of the dosing pump; input in minutes. The value that is displayed in brackets indicates the calculated output.
<i>No. of strokes</i>	Specifies the number of required strokes. The value that is displayed in brackets indicates the calculated output.
<i>Capacity</i>	Specifies the required stroke frequency stated as a percentage of the maximum stroke frequency (see "Delivery capacity data" on page 11).
<i>Interval</i>	Specifies the interval at which dosing is to take place on a regular basis. The interval cannot be shorter than the specified or calculated runtime; if necessary, the system corrects it automatically to the minimum value.

Table 11-7: Interval configuration mode

The system displays the *Interval* with a clock icon and the time elapsing until the start of next dosing.



Fig. 11-11: Start screen of Interval batch mode mode

Timer

Using the MEMDOS LP dosing pump *Timer* batch mode mode, you can program two different dosing procedures for a period of one week.

You can provide one or two dosing procedure(s) for each day of the week which start at a specific time (this start time is repeated for each further dosing procedure of the same mode on other days of the week). You can therefore program up to 14 dosing procedures per week. You must specify for each day of the week if no dosing procedure, dosing procedure 1, dosing procedure 2, or both dosing procedures should be started after each other.


Apart from this, you must specify for each dosing procedure whether the dosing pump is to carry out dosing for a specific time or for a specific number of strokes.

You can configure the parameters below for dosing procedure 1:

- *Start time 1*,
- *Run time 1*,
- *Preset strokes 1*,
- *Delivery capacity* (applies to dosing procedures 1 and 2),
- *Mo-Su*.

You can configure the parameters below for dosing procedure 2:

- *Start time 2*,
- *Run time 2*,
- *Preset strokes 2*,
- *Delivery capacity* (applies to dosing procedures 1 and 2),
- *Mo-Su*.

 You must set the date, time and day of the week before configuring the parameters. For more information, refer to page 31.

The *Timer* batch mode mode offers the following configuration options:

Parameter	Explanation
<i>Start time 1</i>	Specifies the required time for dosing procedure 1.
<i>Start time 2</i>	Specifies the required time for dosing procedure 2.
<i>Runtime 1</i>	Specifies the required run time of dosing procedure 1, stated in minutes. The bracket value in the display shows the calculated delivery rate (based on the setting in the <i>Delivery capacity</i> parameter).

Table 11-8: Timer configuration mode

Parameter	Explanation
<i>Runtime 2</i>	Specifies the required run time of dosing procedure 2, stated in minutes. The bracket value in the display shows the calculated delivery rate (based on the setting in the <i>Delivery capacity</i> parameter).
<i>Preset strokes 1</i>	Specifies the required number of strokes of dosing procedure 1. The value that is displayed in brackets indicates the calculated output.
<i>Preset strokes 2</i>	Specifies the required number of strokes of dosing procedure 2. The value that is displayed in brackets indicates the calculated output.
<i>Capacity</i>	Specifies the required stroke frequency for both dosing procedures stated as a percentage of the maximum stroke frequency (see "Delivery capacity data" on page 11).
<i>Mo-Su</i>	Specifies the day of the week on which a specific dosing procedure is to be started.

Table 11-8: Timer configuration mode

11.2.4.4 Programming the dosing procedures

- Press **Setup**.
 - The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).
- Press **Setup**.
- Use the **↑** or **↓** key to choose the *Start time 1* menu item and press **Setup**.
- Press the **+** key to increment the parameter's value or the **-** key to decrement it.
- Press **OK**.
- Using **↑** or **↓** select *Runtime 1* or *Preset strokes 1* and then press **Setup**.
- Press the **+** key to increment the parameter's value or the **-** key to decrement it.
- Press **OK**.
- Use the **↑** or **↓** key to choose the *Capacity* menu item and press **Setup**.
- Press the **+** key to increment the parameter's value or the **-** key to decrement it.
- Press **OK**.
 - The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).
- If required, also program the dosing procedure 2 with the parameters *Start time 2*, *Runtime 2* or *Preset strokes 2*.
- Use the **↑** or **↓** key to choose the *Mo-Su* menu item and press **Setup**.
- Press **Next** to select a weekday.
- Press **1/2/-** to program the dosing procedures for the selected weekday. The following settings can be made:

Setting	Explanation
1	Dosing procedure 1 will be carried out on the selected weekday.
2	Dosing procedure 2 will be carried out on the selected weekday.
3	Dosing procedures 1 and 2 will be carried out on the selected weekday.
-	No dosing procedure will be carried out on the selected weekday.



Please note that, if setting 3 is chosen, dosing procedure 1 and dosing procedure 2 must be programmed with a sufficient time gap between them. If one dosing procedure has not finished before the start time of the other one, the first will be interrupted and the other dosing procedure started.

16. Press **OK**.

- The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).



Fig. 11-12: Configuring the batch mode mode Timer

In this example, the dosing procedure 1 starts on Monday and on Friday at 9 o'clock in the morning. Dosing procedure 1 runs for 10 minutes at 50% of the stroke frequency (Y 50%). Dosing procedure 2 starts on Thursday and on Friday at 4 o'clock in the afternoon. Dosing procedure 2 runs for 100 strokes at 50% stroke frequency.

17. Press **OK**.

- The dosing pump displays the start screen of *Batch mode*.

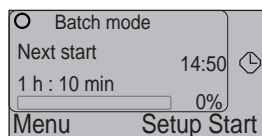


Fig. 11-13: Start-up display of the batch mode mode Timer

The start-up display of the batch mode mode *Timer* shows the remaining time until the next start as well as the current time.

- ✓ **Dosing procedures programmed.**

11.2.4.5 Starting the dosing pump

If batch mode mode *Start/Stop* is set:

1. Press **Start**.
2. Press **Start** again.
 - ▶ The dosing pumps starts dosing immediately. The system automatically calculates the resulting delivery capacity and displays it.

✓ **Dosing pump has started.**

If batch mode is set to *Ext. Start*:

1. Press **Start**.
2. Supply a pulse to the pulse input of the dosing pump.
 - ▶ The dosing pumps starts dosing immediately. The system automatically calculates the resulting delivery capacity and displays it.

✓ **Dosing pump has started.**

If batch mode mode *Interval* is set:

- Press **Start**.
 - ▶ The dosing pump displays the time remaining until the set interval is reached. After the time has expired, the pump starts dosing.

✓ **Dosing pump has started.**

If batch mode mode *Timer* is set:

- Press **Start**.
 - ▶ The dosing pump starts dosing when one of the set days of the week and one of the set start times are reached.

✓ **Dosing pump has started.**

11.2.4.6 Stopping the dosing pump

- Press **Stop**.

✓ **Dosing pump has stopped.**

11.2.5 Network mode (MEMDOS LP-Net only)

11.2.5.1 Selecting the operating mode

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Operating mode* menu item and press **OK**.
3. Use the **↑** or **↓** key to choose the *Network mode* menu item and press **OK**.
 - ▶ The dosing pump displays the start screen of *Network mode*.

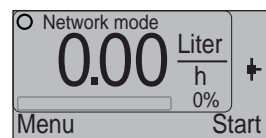


Fig. 11-14: Start screen of Network mode

In *Network mode*, the signal that is connected to the Ethernet connection controls the dosing pump's stroke frequency and number of strokes (see page 29). In addition, it is possible to transmit in the opposite direction all the disturbance and status messages (see "Addresses of MODBUS TCP/IP protocol (MEMDOS LP Net)" on page 70).

You do not need to make any further configurations in the operating mode.

You must, however, enter or check the IP address (see "Set "IP address" menu item (MEMDOS LP-Net only)" on page 36).

The dosing pump has a globally unique MAC number for unambiguous identification (for example: "00-C0-3D-00-27-8B"). To uniquely identify the dosing pump on a TCP/IP network, it must be given an IP number (for example: "169.254.55.114"). The local network administrator assigns the IP number. There is no DHCP function to automatically assign numbers.

If you operate several dosing pumps on one network, their IP addresses must be matched with each other to differentiate them and to make possible unique addressing.

TCP/IP packets must conform with the Modbus TCP/IP protocol; this means that they can be sent from and received by the TOPAX DX Net multi-channel controller, by an Ethernet-capable PLC or a PC control console.

You can only operate the dosing pump in a local TCP/IP network (not via a gateway).

The dosing pump monitors the network connection. If packets fail, the dosing pump automatically stops delivery. This means that the PLC or the PC control console must continuously trigger the dosing pump in an interval of less than one second.

A Web server is integrated in the dosing pump. To check the network connection, you can surf to the Web server from a PC with a Web browser and read out the current delivery capacity. Addressing is by means of the IP address.

For more information about parameterising the Modbus TCP/IP protocol, see Chapter "Addresses of MODBUS TCP/IP protocol (MEMDOS LP Net)" (see page 70).

11.3 External On/Off via Release input

Regardless of the selected operating mode, you can start or stop the MEMDOS LP dosing pump by means of the closed switching contact on the Release input.

If you set the function (see "Set "Release input" menu item" on page 33), the system displays in the selected operating mode the symbol for configuration of the Release input (see also "Explanation of the menu icons" on page 30).

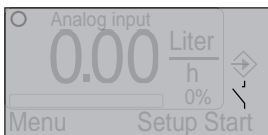


Fig. 11-15: Start screen of Analog input with icon for open contact

11.3.1 Starting the dosing pump

If *Run = contact* is set:

➔ Close the switching contact on the Release input.

✓ **Dosing pump has started.**

If *Run = open* is set:

➔ Open the switching contact on the Release input.

✓ **Dosing pump has started.**

11.3.2 Stopping the dosing pump

If *Run = contact* is set:

➔ Open the switching contact on the Release input.

✓ **Dosing pump has stopped.**

If *Run = open* is set:

➔ Close the switching contact on the Release input.

✓ **Dosing pump has stopped.**

11.4 Decommissioning the dosing pump

Perform the following working steps:

1. Stop the dosing pump in accordance with the selected operating mode.
2. Unplug the dosing pump's mains plug from the power supply.
3. Disconnect all electrical connections.
4. Depressurize all the hydraulic parts in the system.
5. Unplug all the hydraulic connections on the dosing pump.
6. Empty the dosing head.
7. Remove any residual dosing medium from the dosing head by flushing the system with a washing agent. Ensure that the washing agent is compatible with the dosing medium.

✓ **Dosing pump is decommissioned.**

11.5 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.

11.6 Storage

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

Ensure ideal storage conditions where possible:

- the storage place must be cold, dry, dust-free and generously ventilated,
- Temperatures between + 2 °C and + 40 °C (with PP and PVDF dosing heads, between + 2 °C and + 60 °C),
- Relative humidity must not exceed 90%.

11.7 Transportation



NOTICE

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 working 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, and transportation.

Should the unit be sent back to the manufacturer, please follow chapters "Declaration of harmlessness" (see page 75) and "Warranty application" (see page 76).

11.8 Disposal of old units

- The waste unit must be thoroughly cleaned. Any dangerous dosing media must be additionally neutralised and decontaminated.
- Any residual dosing media must be removed in a professional manner.
- The dosing pump must be disposed of in accordance with applicable local laws and regulations. The unit does not belong to household waste!
- As the disposal regulations may differ from country to country in the European Union, please consult your supplier if necessary.

12 Maintenance

Lutz-Jesco dosing pumps are produced 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). This means that regular visual inspections are necessary to ensure a long operating life. Regular maintenance will protect the dosing pump from operation interruptions.

	DANGER
<p>Danger to life due to electric shock</p> <p>Live parts can inflict fatal injuries.</p> <ul style="list-style-type: none"> ⇒ Before carrying out any maintenance work, always disconnect the dosing pump from the power supply. ⇒ Secure the dosing pump from accidental power-up. 	

	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>While working on the dosing head, valves and connections, you may come into contact with dosing media.</p> <ul style="list-style-type: none"> ⇒ Use sufficient personal protective equipment. ⇒ Rinse the dosing pump with a medium (e.g. water) which does not pose any risk. ⇒ Release pressure in hydraulic parts. ⇒ Never look into open ends of plugged pipelines and valves. 	

	WARNING
<p>Caustic burns or other burns through dosing media!</p> <p>After connecting the mains supply, residual dosing media in the dosing head can spray out.</p> <ul style="list-style-type: none"> ⇒ Before connecting the mains supply, connect the dosing lines. ⇒ Check that all the screw connections have been tightened correctly and are leak-proof. 	

	CAUTION
<p>Danger of personal injury and material damage!</p> <p>The dosing pump can generate a pressure that is many times the rated one. The dosing medium can escape in the case of material failure or wear on the dosing head, the connection pipe or the seals that are used.</p> <ul style="list-style-type: none"> ⇒ Carry out maintenance work at the recommended intervals. 	

	CAUTION
<p>Increased risk of accidents due to insufficient qualification of personnel!</p> <p>Dosing pumps and their accessories may only be installed, operated and maintained by personnel with sufficient qualifications. Insufficient qualification will raise the risk of accidents.</p> <ul style="list-style-type: none"> ⇒ Ensure that all action is taken only by personnel with sufficient and corresponding qualifications. ⇒ Prevent access to the system for unauthorised persons. 	

12.1 Maintenance intervals

This table gives you an overview of maintenance work and the intervals at which you must carry it out. The next few chapters contain instructions for carrying out this work.

Maintenance work to be carried out	Frequency
Check the oil level in the oil level glass	■ Regularly
Change the oil	■ Change the first filling after approximately 500 operating hours ■ Further oil changes should be done approximately every 5000 operating hours
Check that piping is seated firmly	■ Regularly
Check that suction and discharge valves are seated firmly	■ Regularly
Clean suction and discharge valves	■ Regularly
Check that electrical connections are not damaged	■ Regularly
Tighten up dosing head bolts	■ Regularly ■ Before initial commissioning ■ After each diaphragm change
Check diaphragm for leakage due to rupture	■ Regularly (as long as no leak monitoring system is installed)
Check the dosing pump for unusual noises during operation, unusual temperatures or smells	■ Regularly

Table 12-1: Maintenance information and maintenance intervals

Maintenance work to be carried out	Frequency
Replace wearing parts (diaphragms, bearings etc.)	<ul style="list-style-type: none"> When unacceptable levels of wear are detected
Rinse out and clean the dosing pump	<ul style="list-style-type: none"> Before taking out of service for a long period of time After feeding aggressive, sticky, crystallising or contaminated liquids

Table 12-1: Maintenance information and maintenance intervals

12.2 Change the oil

Precondition for action:

- ✓ A suitable oil collecting tank is held ready.
- ✘ You need gear oil of viscosity class ISO-VG460 according to DIN 51519 (corresponds to SAE 140 according to DIN 51512).

Perform the following working steps:

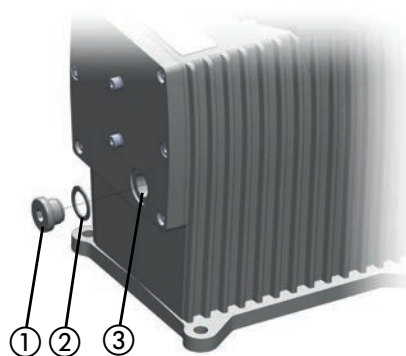


Fig. 12-1: Draining oil on the dosing pump

- Unscrew the closing screw ① from the oil drain ③ and remove the washer seal ②.
- Let all of the gear oil drain from the housing.
- Place the washer seal ② onto the oil drain ③ and tighten up the closing screw ①.

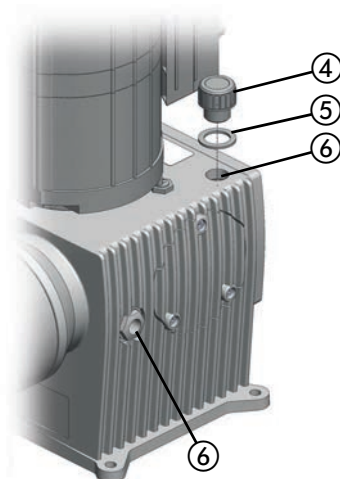


Fig. 12-2: Dosing pump oil inlet

- Unscrew the closing screw ④ from the oil inlet ⑥ and remove the washer seal ⑤.
- Fill up with oil into the oil inlet ⑥. At the same time, check the oil level in the oil level glass ⑦. The oil level should reach approximately the middle of the oil level glass.

The following volumes are required:

MEMDOS LP	Filling volumes
4 – 80, 150	0.25 l
110, 160 – 1010	0.75 l

- Place the washer seal ⑤ onto the oil inlet ⑥ and tighten up the closing screw ④.

✓ Oil change complete.

12.3 Tighten dosing head bolts



NOTICE

Damage to the dosing head/diaphragm leaks

If you tighten the screws too much, this can lead to the dosing head being damaged. However, not tightening the screws enough leads to the diaphragm being leaky and correct functioning being affected.

⇒ Tighten up the screws to a suitable torque, in accordance with the following table.

The torque needed for each MEMDOS LP type or the diaphragm size:

MEMDOS LP	Diaphragm diameter	Torque (+/- 10%)
4 – 20	52 mm	2 Nm
4-HP – 20-HP	52 mm	3 Nm
35 – 60	64 mm	3 Nm
80 – 160	90 mm	6 Nm
210 – 260	120 mm	6 Nm
310 – 400	150 mm	10 Nm
510 – 1010	185 mm	12 Nm

Table 12-2: Dosing head bolt torque

12.4 Diaphragm replacement

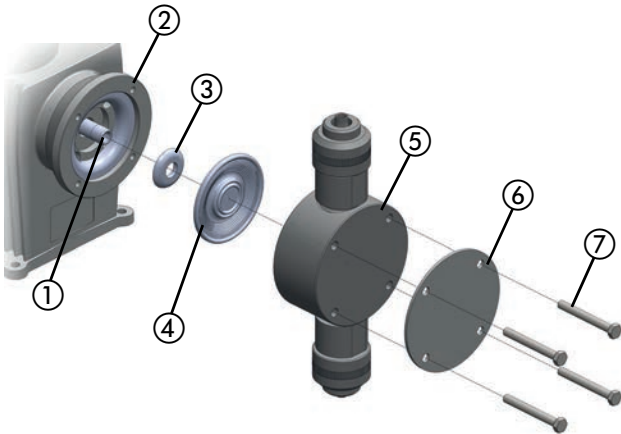


Fig. 12-3: Diaphragm replacement

12.4.1 Remove the old diaphragm

Precondition for action:

- ✓ You have disconnected the dosing pump from the mains supply.
- ✓ 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 working steps:

1. Unscrew the four bolts ⑦ on the dosing head with a suitable tool and remove the pressure plate ⑥ (only for MEMDOS LP 80 - 1010 with dosing heads made of PP, PVC and PVDF) and the dosing head ⑤.
2. Bend up the diaphragm ④ slightly on the edge, hold it with pliers and screw it out counter-clockwise.
3. Dosing pumps MEMDOS LP 4 - 60 contain an additional support plate ③, which sits behind the diaphragm. Remove the support plate.

12.4.2 Install a new diaphragm

Precondition for action:

- ✓ The diaphragm rod ①, diaphragm flange ② and, if present, the support plate ③ are thoroughly cleaned to prevent the new diaphragm being affected by any dosing media residue.
- ✓ The diaphragm thread ④ is lightly greased (e.g. Molykote Longterm W2).

1. The support plate ③ is pushed onto the threaded supports with the curved side facing the diaphragm.
2. Screw the diaphragm ④ together with the support plate ③ clockwise until it is securely fitted onto the membrane rod.
3. Place the dosing head ⑤ and the pressure plate ⑥ (only with the MEMDOS LP 80 - 1010 with PP, PVC, PVDF dosing heads) and insert the four bolts ⑦.
4. First tighten the screws finger-tight. After this, tighten the screws in diagonally opposite sequence, e.g. top left and bottom right and top tight and bottom left.

- ✓ **Diaphragm changed.**

12.5 Clean suction and pressure valves

Contaminated valves affect the dosing precision and this means that you should clean the valves on a regular basis.



Suction and pressure valves differ in the sequence of assembly of the individual parts. Disassemble them one at a time to prevent parts being mixed up.

Finally, screw the valves at first finger-tight into the dosing head. While doing this, ensure that the seals or O-rings are correctly seated inside the valves and the dosing head.



WARNING

Caustic burns or other burns through dosing media!

If valves are serviced without replacing the seals, it can lead to leakage and to an eventual escape of the dosing media.

⇒ Replace the seals when maintaining the valves.

Required torque for tightening plastic valves into the dosing head:

MEMDOS LP	Torque (+/- 10%)
4 – 20	3 Nm
4-HP – 20-HP	3 Nm
35 – 60	5 Nm
80 – 260	15 Nm
310 - 400	15 Nm
510 - 1010	20 Nm

Table 12-3: Valve torque

For stainless steel valves with fibre seals or seals made of PTFE, the given torque values are the minimum values. Due to their elastic deformation, these must be re-tightened several times.

13 Troubleshooting

See below the troubleshooting instructions to the unit/system. If you cannot eliminate the fault, please consult with the manufacturer on further measures or return the dosing pump for repair.

13.1 Type of fault

13.1.1 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	→ Reconnect the current supply
The dosing pump's electrical data does not match that of the mains supply	→ Check the electrical installation.

Table 13-1: Type of fault: Dosing pump not delivering or output too low

Possible cause	Remedy
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.

Table 13-1: Type of fault: Dosing pump not delivering or output too low

13.1.2 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 discharge valve	→ Vent the dosing head or the lines.

Table 13-2: Type of fault: Dosing pump does not prime

13.1.3 Delivery rate varies

Possible cause	Remedy
Valve leaking or blocked	<ul style="list-style-type: none"> ➔ 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	<ul style="list-style-type: none"> ➔ Possibly reduce the concentration of the dosing medium or increase the temperature. ➔ Install spring-loaded valves. ➔ Increase the pipe diameter.
The dosing pump'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)	<ul style="list-style-type: none"> ➔ Clean blocked injection nozzle. ➔ Install pulsation dampeners to reduce pressure peaks if pipes are too long. ➔ Check function of safety valves.

Table 13-3: Type of fault: Delivery rate varies

13.1.4 No stroke movement observed

Possible cause	Remedy
Diaphragm return spring broken	➔ Contact the manufacturer.
Current supply interrupted	➔ Reconnect the current supply
The dosing pump's electrical data does not match that of the mains supply	➔ Check the electrical installation.

Table 13-4: Type of fault: No stroke movement observed

Possible cause	Remedy
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)	<ul style="list-style-type: none"> ➔ Clean blocked injection nozzle. ➔ Install pulsation dampeners to reduce pressure peaks if pipes are too long. ➔ Check function of safety valves.

Table 13-4: Type of fault: No stroke movement observed

13.1.5 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.

Table 13-5: Type of fault: Dosing pump delivery rate too high

13.1.6 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)	<ul style="list-style-type: none"> ➔ 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.

Table 13-6: Type of fault: Diaphragm is torn or tears too often

13.1.7 Loud noises on the dosing pump

Possible cause	Remedy
The drive magnet's stop damper is worn-out	→ Contact the manufacturer.

Table 13-7: Type of fault: Loud noises on the dosing pump

13.1.8 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.

Table 13-8: Type of fault: The drive is overloaded

13.1.9 Motor does not start

Possible cause	Remedy
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.
No or insufficient oil in the gearbox	→ Fill up the gearbox oil.

Table 13-9: Type of fault: Motor does not start

13.2 List of control unit messages

Display	Description in "Messages" menu	Explanation	Error code Messages Menu	Stop the dosing pump	Fault signalling relay
-	Restart pump	Reset to factory settings	#00	Yes	Yes
Tank at minimum level	Minimum level	Level monitoring messages	#01	No	Yes
Tank empty	Empty level		#02	Yes	Yes
Flowcon Error	Dosing control	Flowcon reports faulty strokes Dosing pump continues to run	#05	No	Yes
Flowcon Stop	Dosing control	Flowcon reports faulty strokes Dosing pump stopped	#05	Yes	Yes
Release input Stop	No external release	Dosing pump waiting for external On/Off	#06	Yes	Yes
Diaphragm rupture Stop	Diaphragm rupture	Leakage sensor reports diaphragm rupture	#07	Yes	Yes
Analogue input Error	20mA input Error	No signal or faulty signal at the analogue input	#08	Yes	Yes
Stop	Manual Stop	Dosing pump stopped by user	#09	Yes	Yes
Setup Error	General unit Error	Internal hardware fault	#10	Yes	Yes
Stroke Error	General unit Error	Internal hardware fault	#10	No	Yes
-	Excess temperature	Temperature monitoring	#11	Yes	Yes
Offline	Offline	No signal in network operation or faulty data transfer	#12	Yes	Yes
Battery Error	Clock	Time error stops dosing pump in batch operation, timer type	#13	Yes	Yes
Stroke buffer Maximum	Stroke buffer full	Stroke buffer is too small	#14	No	No
Mains Error	Voltage Error	Overvoltage	#15	Yes	Yes
Motor accumulator Error	Motor memory Error	Specified stroke exceeds motor power output (dosing pump overloaded for a short period)	#16	No	Yes
Motor accumulator Stop	Motor memory Stop	Specified stroke exceeds motor power output (dosing pump overloaded continuously)	#17	Yes	Yes
-	Alarm list deleted	Delete list of messages	#18	No	No
Motor not stopping Stop	Motor does not stop Stop	Motor error	#19	Yes	Yes

Table 13-10: List of control unit messages

14 Spare parts

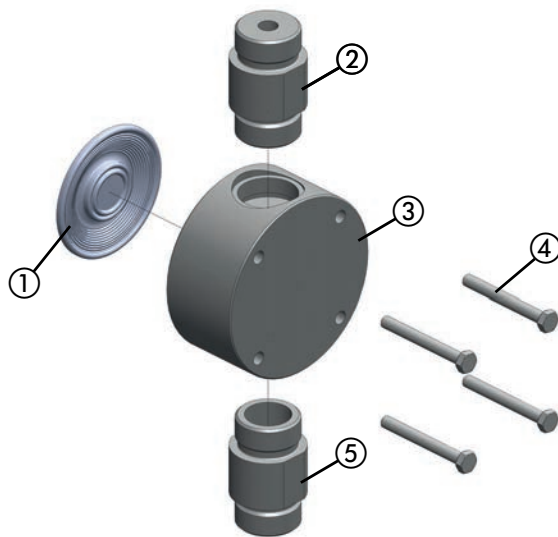


Fig. 14-1: Spare parts

Required kits for a complete service:

- 1 diaphragm spare parts kit,
- 1 dosing head spare parts kit.

14.1 Diaphragm spare parts kits

Diaphragm spare parts kit containing:

- 1 diaphragm ①,
- 1 set of dosing head screws ④.

Diaphragm kit	Type	Part No.
	LP 4, LP 10, LP 20	40356
	LP 35, LP 60	40357
	LP 80, LP 110, LP 150, LP 160	40358
	LP 210, LP 260	40359
	LP 310, LP 400	40360
	LP 510, LP 760, LP 1010	40361

Table 14-1: Diaphragm spare parts kits

14.2 Dosing head spare parts kits including valves

Dosing head spare parts kit containing:

- Dosing head ③,
- 1 set of dosing head screws ④.
- Pressure valve ②,
- Suction valve ⑤.

14.2.1 Dosing head sets with double ball valves

Dosing head made of PVC	Type	Part No.
Glass/PVDF/FPM (ball/seat/seals)	LP 4, LP 10, LP 20	40385
	LP 4-HP, LP 10-HP, LP 20-HP	40547
Glass/PVDF/EPDM (ball/seat/seals)	LP 4, LP 10, LP 20	40399
	LP 4-HP, LP 10-HP, LP 20-HP	40551
Stainless steel / stainless steel / FPM (ball/seat/seals)	LP 4, LP 10, LP 20	40473
	LP 4-HP, LP 10-HP, LP 20-HP	40567
	LP 35, LP 60	40474
	LP 80, LP 110, LP 150, LP 160	40475
Stainless steel/Stainless steel/EPDM (ball/seat/seals)	LP 4, LP 10, LP 20	40476
	LP 4-HP, LP 10-HP, LP 20-HP	40568
	LP 35, LP 60	40477
	LP 80, LP 110, LP 150, LP 160	40478
Glass/PVC/FPM (ball/seat/seals)	LP 35, LP 60	40386
	LP 80, LP 110, LP 150, LP 160	40387
Glass/PVC/EPDM (ball/seat/seals)	LP 35, LP 60	40400
	LP 80, LP 110, LP 150, LP 160	40401

Table 14-2: Spare parts kits dosing head made of PVC

Dosing head made of PP	Type	Part No.
Glass/PVDF/FPM (ball/seat/seals)	LP 4, LP 10, LP 20	40388
	LP 4-HP, LP 10-HP, LP 20-HP	40548
Glass/PVDF/EPDM (ball/seat/seals)	LP 4, LP 10, LP 20	40402
	LP 4-HP, LP 10-HP, LP 20-HP	40552
Glass/PP/FPM (ball/seat/seals)	LP 35, LP 60	40389
	LP 80, LP 110, LP 150, LP 160	40390
Glass/PP/EPDM (ball/seat/seals)	LP 35, LP 60	40403
	LP 80, LP 110, LP 150, LP 160	40404

Table 14-3: Spare parts kits dosing head made of PP

Dosing head made of PVDF	Type	Part No.
PTFE/PVDF/FPM (ball/seat/seals)	LP 4, LP 10, LP 20	40391
	LP 4-HP, LP 10-HP, LP 20-HP	40549
	LP 35, LP 60	40392
	LP 80, LP 110, LP 150, LP 160	40393
PTFE/PVDF/EPDM (ball/seat/seals)	LP 4, LP 10, LP 20	40405
	LP 4-HP, LP 10-HP, LP 20-HP	40553
	LP 35, LP 60	40406
	LP 80, LP 110, LP 150, LP 160	40407
PTFE/PVDF/PTFE (ball/seat/seals)	LP 4, LP 10, LP 20	40457
	LP 4-HP, LP 10-HP, LP 20-HP	40563
	LP 35, LP 60	40458
	LP 80, LP 110, LP 150, LP 160	40459

Table 14-4: Spare parts kits dosing head made of PVDF

Dosing head made of 1.4571	Type	Part No.
Stainless steel / stainless steel / FPM (ball/seat/seals)	LP 4, LP 10, LP 20	40394
	LP 4-HP, LP 10-HP, LP 20-HP	40550
	LP 35, LP 60	40395
Stainless steel/Stainless steel/EPDM (ball/seat/seals)	LP 4, LP 10, LP 20	40408
	LP 4-HP, LP 10-HP, LP 20-HP	40554
	LP 35, LP 60	40409
Stainless steel/stainless steel/PTFE (ball/seat/seals)	LP 4, LP 10, LP 20	40465
	LP 4-HP, LP 10-HP, LP 20-HP	40565
	LP 35, LP 60	40466
Stainless steel/stainless steel/PTFE (ball/seat/seals)	LP 80, LP 110, LP 150, LP 160	40396
	LP 80, LP 110, LP 150, LP 160	40410
	LP 80, LP 110, LP 150, LP 160	40467

Table 14-5: Spare parts kits dosing head made of 1.4571



Further sets in numerous material combinations can be found in Lutz-Jesco GmbH's actual price list.

14.2.2 Dosing head sets with spring-loaded valves

Dosing head made of PVC	Type	Part No.
Glass/PVDF/FPM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40417
	LP 4-HP, LP 10-HP, LP 20-HP	40555
Glass/PVDF/EPDM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40437
	LP 4-HP, LP 10-HP, LP 20-HP	40559
Stainless steel/Stainless steel/FPM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40479
	LP 4-HP, LP 10-HP, LP 20-HP	40569
	LP 35, LP 60	40480
	LP 80, LP 110, LP 150, LP 160	40481
	LP 210, LP 260	40482
	LP 310, LP 400	40545
	LP 510, LP 760, LP 1010	40483
Stainless steel/Stainless steel/EPDM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40484
	LP 4-HP, LP 10-HP, LP 20-HP	40570
	LP 35, LP 60	40485
	LP 80, LP 110, LP 150, LP 160	40486
	LP 210, LP 260	40487
	LP 310, LP 400	40546
	LP 510, LP 760, LP 1010	40488
Glass/PVC/FPM/Hastelloy (ball/seat/seals/spring)	LP 35, LP 60	40418
	LP 80, LP 110, LP 150, LP 160	40419
Glass/PVC/EPDM/Hastelloy (ball/seat/seals/spring)	LP 35, LP 60	40438
	LP 80, LP 110, LP 150, LP 160	40439
PVDF/PVC/FPM/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40420
	LP 310, LP 400	40535
	LP 510, LP 760, LP 1010	40421

Table 14-6: Spare parts kits dosing head made of PVC

Dosing head made of PVC	Type	Part No.
PVDF/PVC/EPDM/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40440
	LP 310, LP 400	40539
	LP 510, LP 760, LP 1010	40441

Table 14-6: Spare parts kits dosing head made of PVC

Dosing head made of PP	Type	Part No.
Glass/PVDF/FPM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40422
	LP 4-HP, LP 10-HP, LP 20-HP	40556
Glass/PVDF/EPDM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40442
	LP 4-HP, LP 10-HP, LP 20-HP	40560
Glass/PP/FPM/Hastelloy (ball/seat/seals/spring)	LP 35, LP 60	40423
	LP 80, LP 110, LP 150, LP 160	40424
Glass/PP/EPDM/Hastelloy (ball/seat/seals/spring)	LP 35, LP 60	40443
	LP 80, LP 110, LP 150, LP 160	40444
PVDF/PP/FPM/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40425
	LP 310, LP 400	40536
	LP 510, LP 760, LP 1010	40426
PVDF/PP/EPDM/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40445
	LP 310, LP 400	40540
	LP 510, LP 760, LP 1010	40446

Table 14-7: Spare parts kits dosing head made of PP

Dosing head made of PVDF	Type	Part No.
PTFE/PVDF/FPM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40427
	LP 4-HP, LP 10-HP, LP 20-HP	40557
	LP 35, LP 60	40428
	LP 80, LP 110, LP 150, LP 160	40429
PTFE/PVDF/EPDM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40447
	LP 4-HP, LP 10-HP, LP 20-HP	40561
	LP 35, LP 60	40448
	LP 80, LP 110, LP 150, LP 160	40449
PTFE/PVDF/PTFE/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40460
	LP 4-HP, LP 10-HP, LP 20-HP	40564
	LP 35, LP 60	40461
	LP 80, LP 110, LP 150, LP 160	40462
PVDF/PVDF/FPM/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40430
	LP 310, LP 400	40537
	LP 510, LP 760, LP 1010	40431
PVDF/PVDF/EPDM/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40450
	LP 310, LP 400	40541
	LP 510, LP 760, LP 1010	40451
PVDF/PVDF/PTFE/Hastelloy (ball/seat/seals/spring)	LP 210, LP 260	40463
	LP 310, LP 400	40543
	LP 510, LP 760, LP 1010	40464

Table 14-8: Spare parts kits dosing head made of PVDF

Dosing head made of 1.4571	Type	Part No.
Stainless steel/Stainless steel/FPM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40432
	LP 4-HP, LP 10-HP, LP 20-HP	40558
	LP 35, LP 60	40433
	LP 80, LP 110, LP 150, LP 160	40434
	LP 210, LP 260	40435
	LP 310, LP 400	40538
Stainless steel/Stainless steel/EPDM/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40452
	LP 4-HP, LP 10-HP, LP 20-HP	40562
	LP 35, LP 60	40453
	LP 80, LP 110, LP 150, LP 160	40454
	LP 210, LP 260	40455
	LP 310, LP 400	40542
Stainless steel/Stainless steel/PTFE/Hastelloy (ball/seat/seals/spring)	LP 4, LP 10, LP 20	40468
	LP 4-HP, LP 10-HP, LP 20-HP	40566
	LP 35, LP 60	40469
	LP 80, LP 110, LP 150, LP 160	40470
	LP 210, LP 260	40471
	LP 310, LP 400	40544
Stainless steel/Stainless steel/PTFE/Hastelloy (ball/seat/seals/spring)	LP 510, LP 760, LP 1010	40456
	LP 510, LP 760, LP 1010	40472

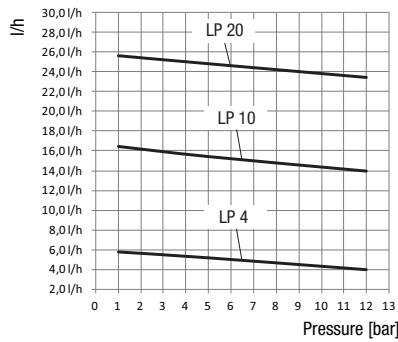
Table 14-9: Spare parts kits dosing head made of 1.4571



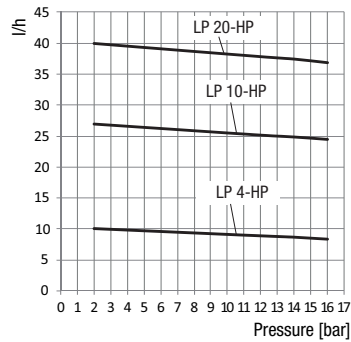
Further sets in numerous material combinations can be found in Lutz-Jesco GmbH's actual price list.

15 Delivery characteristic curves

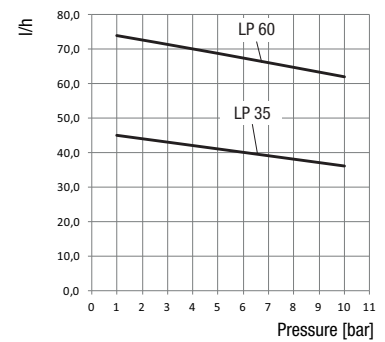
This Chapter is intended to give you an idea of the delivery capacity that the dosing pump can achieve at specific back pressures. These delivery capacities were determined on the manufacturer's test stands. They apply at 20 °C (68 °F) for water, at 100 % stroke frequency. The delivery capacity depends on the medium (density and viscosity) and temperature. Since these conditions vary at every installation location, you should calibrate the dosing pump.



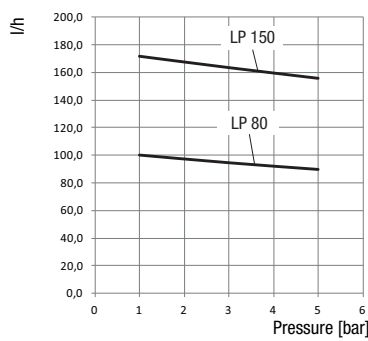
MEMDOS LP 4, 10, 20



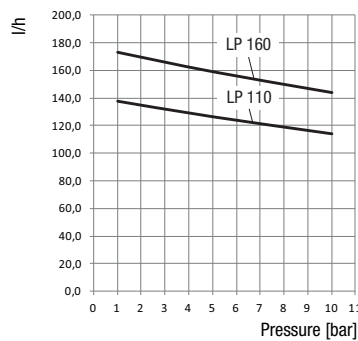
MEMDOS LP 4-HP, 10-HP, 20-HP



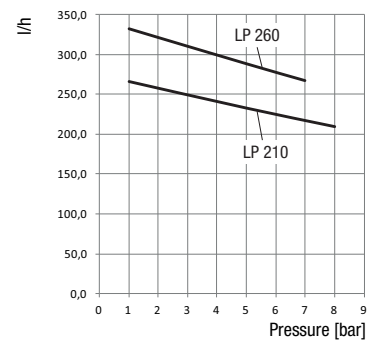
MEMDOS LP 35, 60



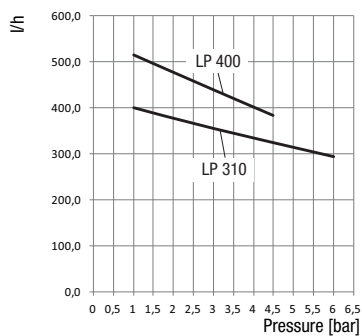
MEMDOS LP 80, 150



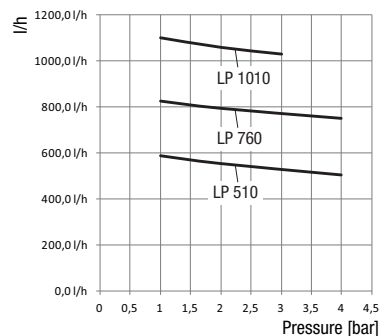
MEMDOS LP 110, 160



MEMDOS LP 210, 260



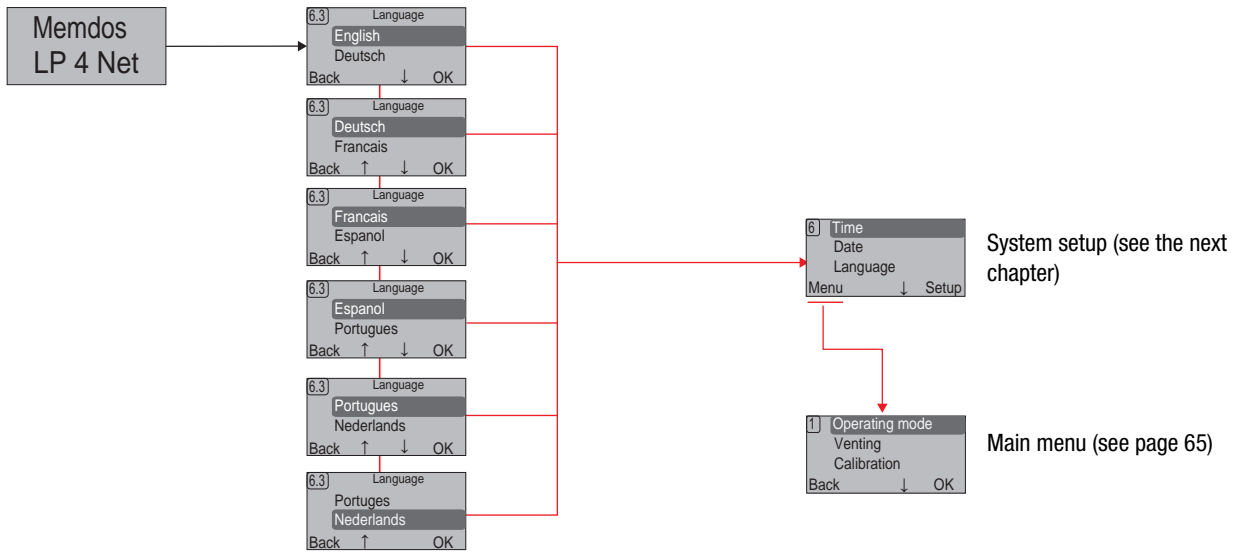
MEMDOS LP 310, 400



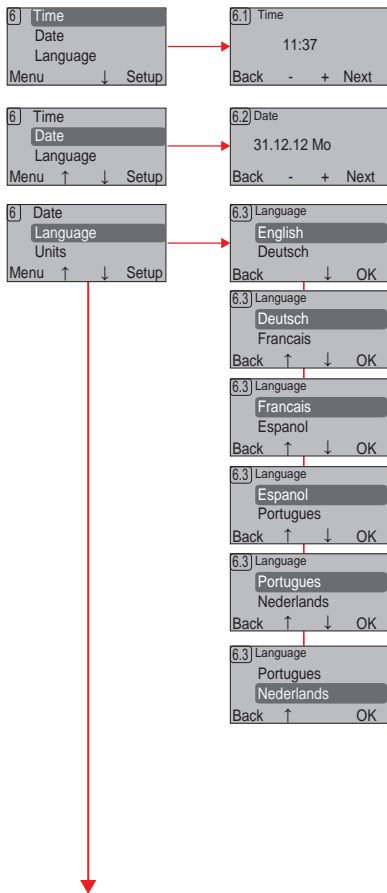
MEMDOS LP 510, 760, 1010

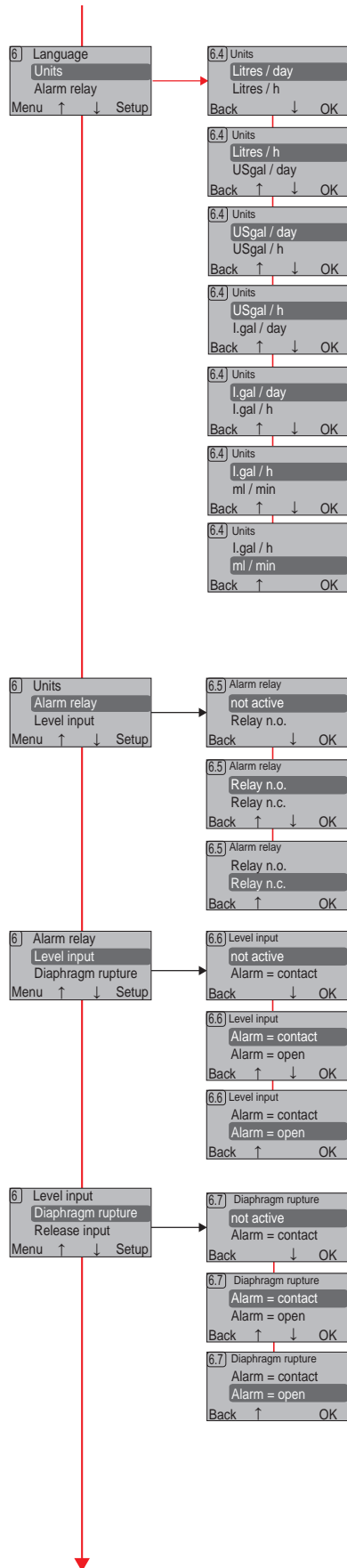
16 Menu structure of the Control Unit

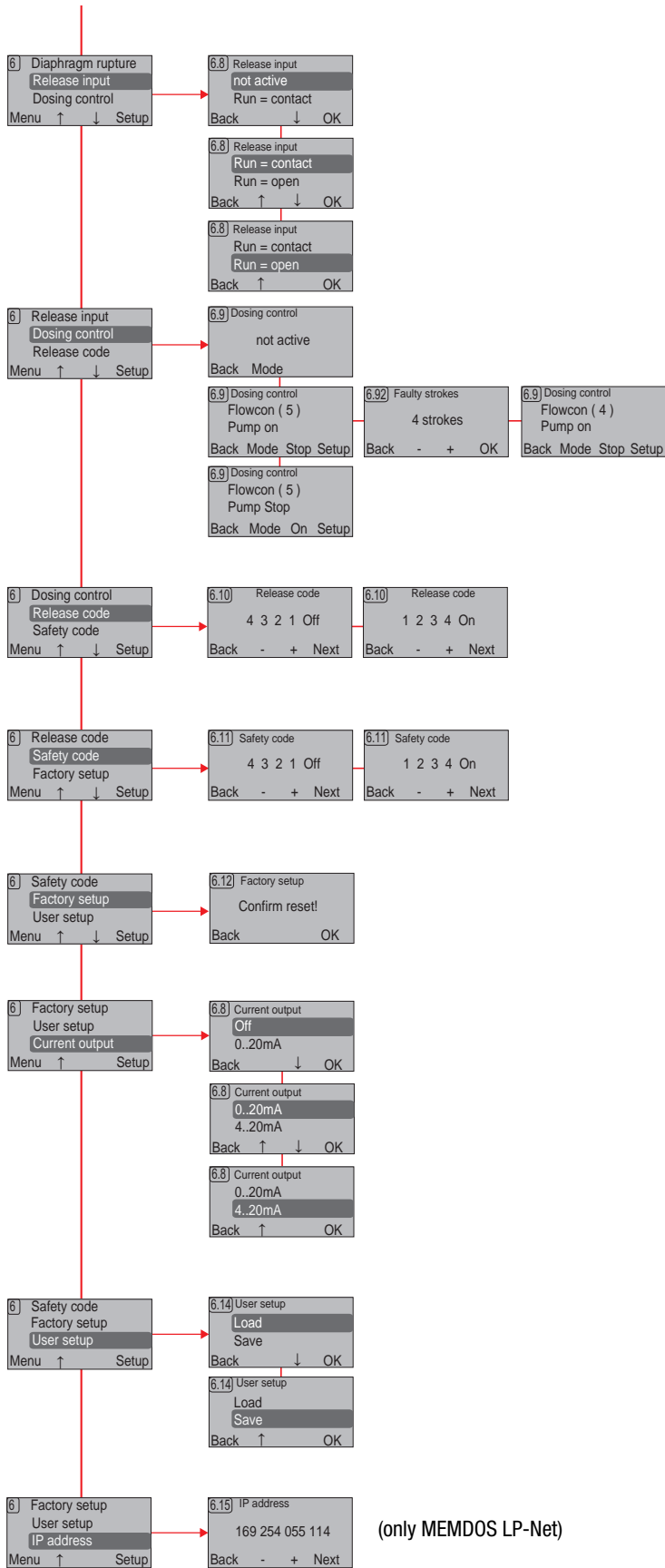
16.1 Program start



16.2 System setup

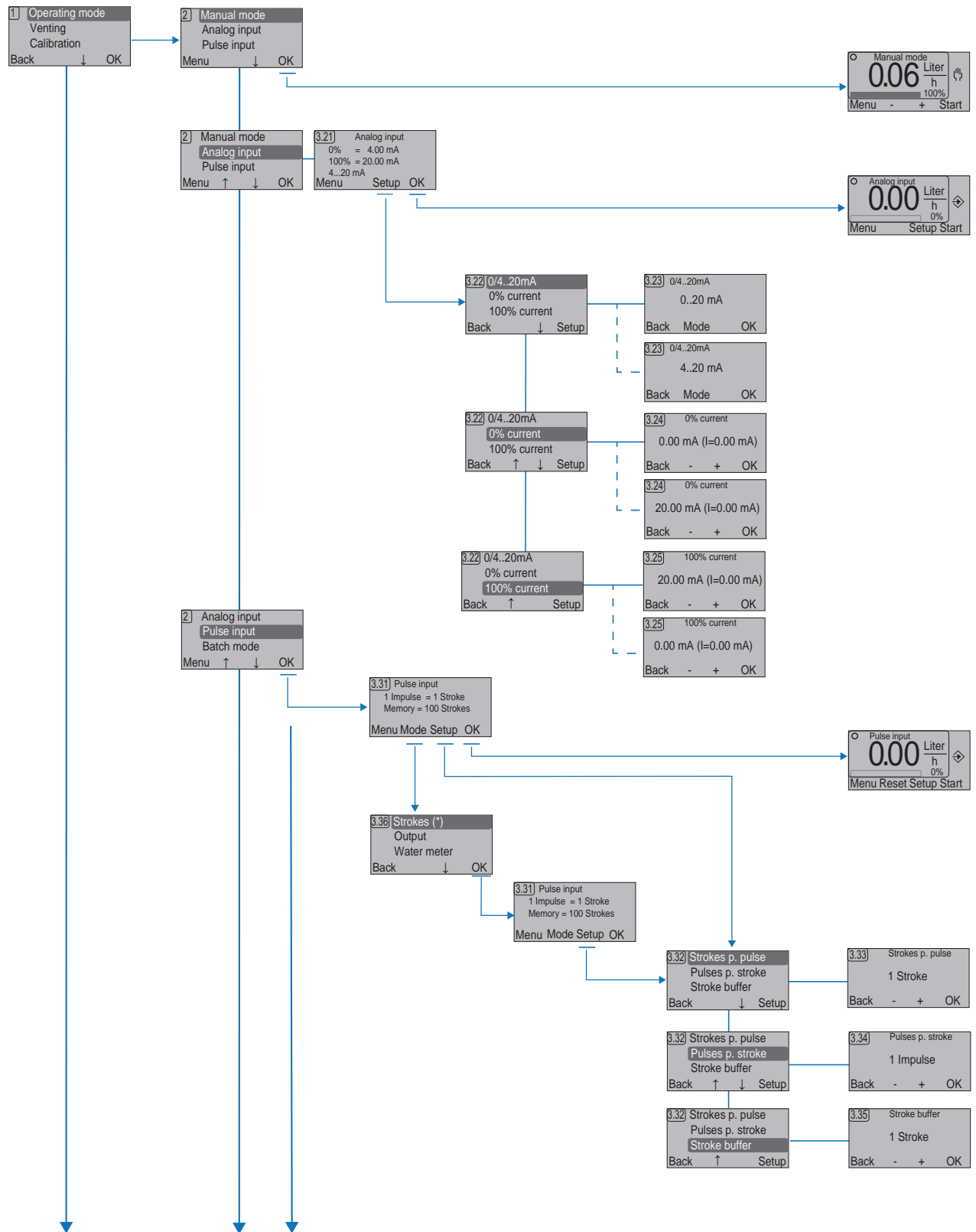


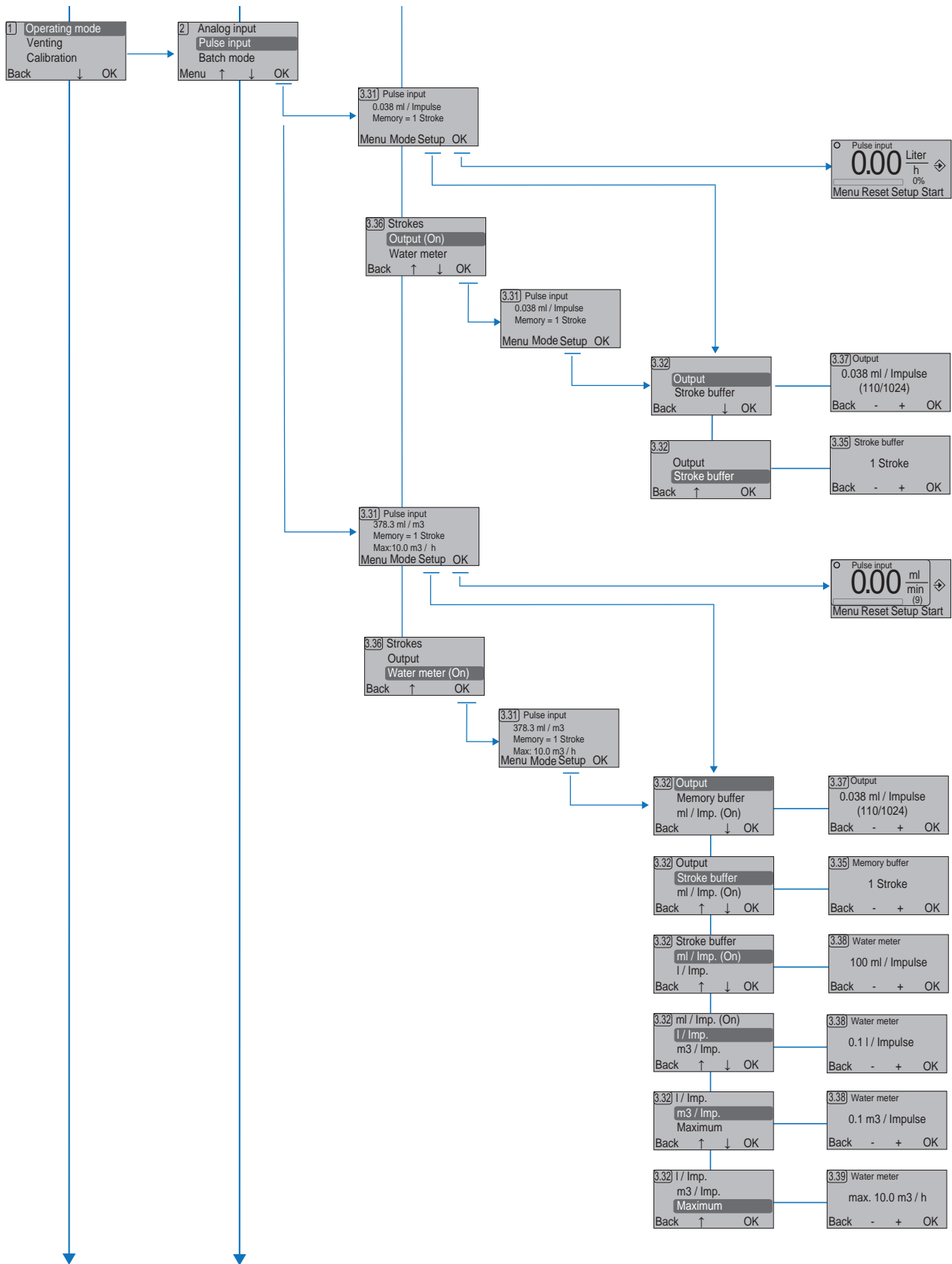


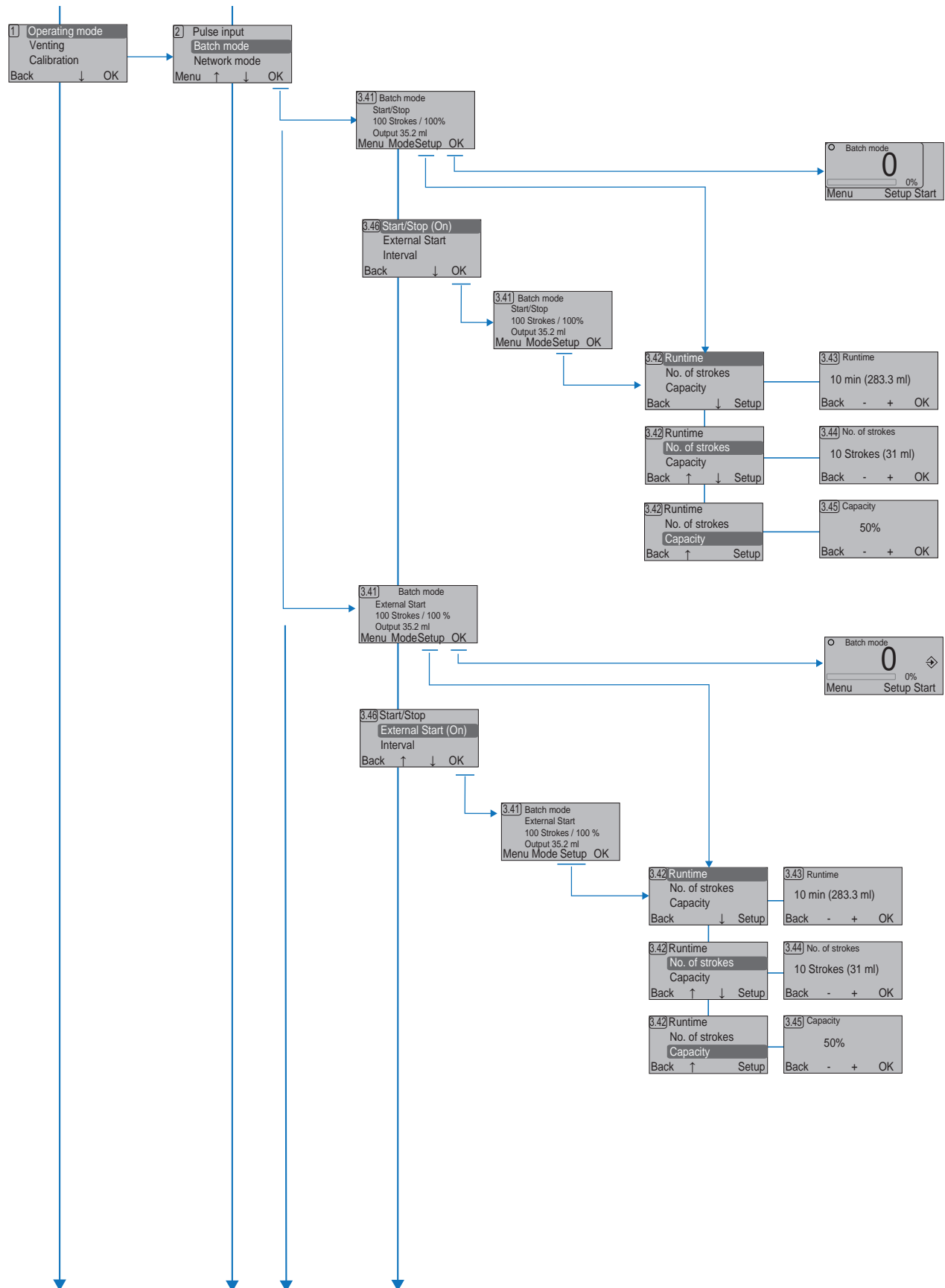


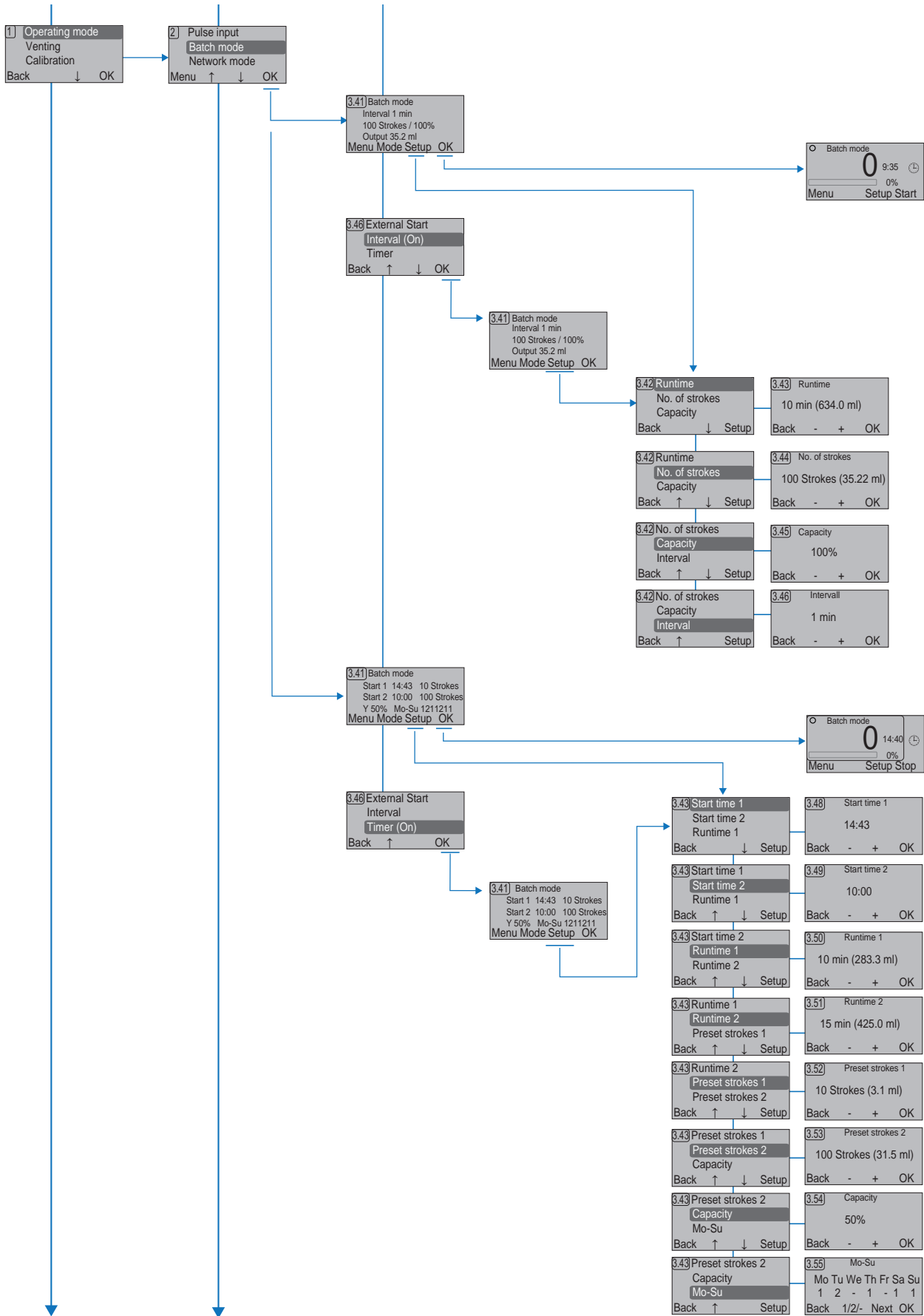
(only MEMDOS LP-Net)

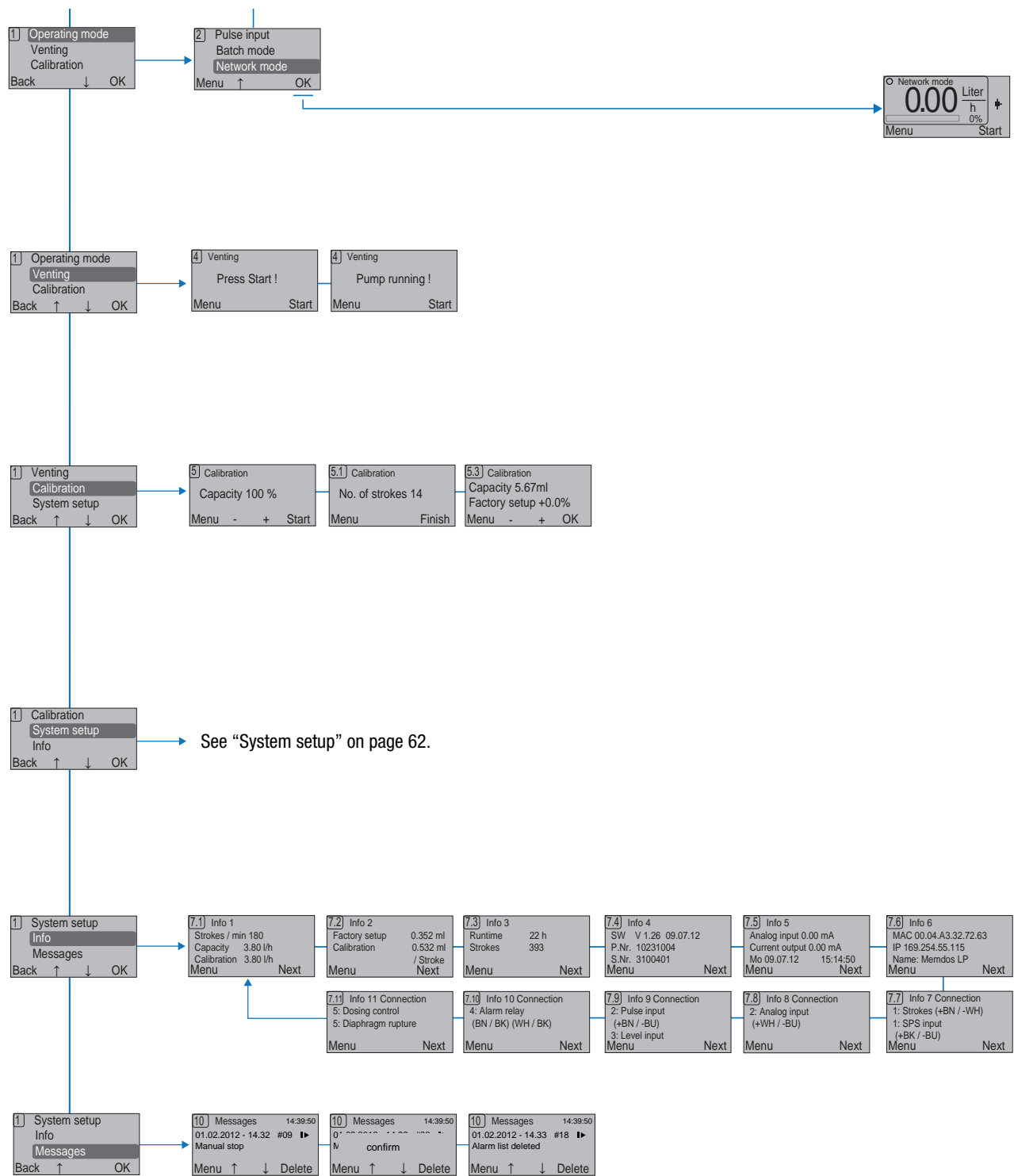
16.3 Main menu











17 Appendix

17.1 Addresses of MODBUS TCP/IP protocol (MEMDOS LP Net)

Address	Word	r/w	Type	Field	Description
0 - 3	-				
4	1	r	Number	Model	0300 _{hex} : LP 05 0301 _{hex} : LP 1 0302 _{hex} : LP 2 0303 _{hex} : LP 4 0304 _{hex} : LP 6 0305 _{hex} : LP 10 0306 _{hex} : LP 15
5	1	r	Number	Nominal delivery capacity	Example: 380 = "3,8 l/h"
6 - 7	2	r	Text	Software Version:	Example: "1.20"
8 - 9	-				
10	1	r	Number	Operating hours	
11	1	r	Number	Operating seconds	
12	1	r	Number	Modbus address	= 1
13 - 14	2	r	Number	MAC address	
15	-				
16 - 17	2	r	Number	IP address	
18	1	r	Number	Watchdog	Example: 12300 = "12,3 s", max. 15000
19 - 29	-				
30 - 35	6	r/w	Text	Device names	Max. of 12 characters
36 - 39	-				
40 - 45	6	r	Text	Serial number	Max. of 11 characters
46 - 49	-				
50	1	r	Number	Operating mode	0000 _{hex} : Manual mode 0001 _{hex} : Analog input 0002 _{hex} : Pulse input 0003 _{hex} : Batch mode 0004 _{hex} : Network mode
51	1	r/w	Number	Stroke frequency control variable	0 ... 1000 The watchdog is reset to 0 by writing the control variable.
52	1	r	Number	Actual delivery rate	Example: 240 = "2,4 l/h"

Table 17-1: Addresses of MODBUS TCP/IP protocol (MAGDOS LP Net)

Address	Word	r/w	Type	Field	Description
53	1	r	Number	Reporting of last event	0380 _{hex} + 0000 _{hex} : Not an error 0001 _{hex} : Container at minimum level 0002 _{hex} : Container at empty level 0005 _{hex} : Flowcon/dosing control error 0006 _{hex} : Release input stop 0007 _{hex} : Diaphragm rupture 0008 _{hex} : 0/4 ... 20mA input error 0009 _{hex} : Manual stop 000A _{hex} : General unit error 000B _{hex} : Over temperature/overload 000C _{hex} : Offline/transfer error 000D _{hex} : RTC error/battery error 000E _{hex} : Stroke buffer maximum 000E _{hex} : Voltage error 0010 _{hex} : Too many strokes (warning) 0011 _{hex} : Too many Strokes (alarm) 0012 _{hex} : List of messages deleted 0013 _{hex} : Motor does not stop
54	-				
55	1	r	Number	Current on 0/4 ... 20 mA input	Example: 1814 = "18.14 mA"
56	1	r/w	Number	Specified delivery capacity %	Example: 830 = "83.0%"
57	1	r/w	Number	Countdown specification	With batch mode, start amount specified under No. of strokes
58	1	r/w	Number	Current countdown	In batch mode (start/stop or external start), the strokes that have still to be performed. Example: 1200 = "20 strokes" With batch mode (interval or timer type) the strokes that have still to be carried out at 100 % delivery capacity. You must multiply the value by the delivery capacity (address 56).
59-60	2	r	Number	Stroke counter	Number of strokes that have been carried out up to now
61 - 62	-				
63	1	r	Number	Strokes/min. max.	Maximum output after factory calibration
64	1	r/w	Number	Strokes/min. calibrated	Output after calibration by customer

Table 17-1: Addresses of MODBUS TCP/IP protocol (MAGDOS LP Net)

Address	Word	r/w	Type	Field	Description
90 - 91	High	r	Number	Status bit message	0000 0000 _{bin} 0000 0001 _{bin} : Too many Strokes (Alarm)00000000 _{bin} 0000 0000 _{bin} 0000 0010 _{bin} : List of messages deleted 0000 0000 _{bin} 0000 0100 _{bin} : Motor does not stop
	Low	r	Number		0000 0000 _{bin} 0000 0001 _{bin} : Container at minimum level 0000 0000 _{bin} 0000 0010 _{bin} : Container at empty level 0000 0000 _{bin} 0001 0000 _{bin} : Flowcon/dosing control error 0000 0000 _{bin} 0010 0000 _{bin} : Release input stop 0000 0000 _{bin} 0100 0000 _{bin} : Diaphragm rupture 0000 0000 _{bin} 1000 0000 _{bin} : 0/4 - 20mA input error 0000 0001 _{bin} 0000 0000 _{bin} : Manual stop 0000 0010 _{bin} 0000 0000 _{bin} : General unit error 0000 0100 _{bin} 0000 0000 _{bin} : Over temperature/overload 0000 1000 _{bin} 0000 0000 _{bin} : Offline/transfer error 0001 0000 _{bin} 0000 0000 _{bin} : RTC error/battery error 0010 0000 _{bin} 0000 0000 _{bin} : Stroke buffer maximum 0100 0000 _{bin} 0000 0000 _{bin} : Voltage error 1000 0000 _{bin} 0000 0000 _{bin} : Too many strokes (warning)

Table 17-1: Addresses of MODBUS TCP/IP protocol (MAGDOS LP Net)

r/w = read/write, 1 address space = 1 word = 2 Bytes = 16 Bits

Type	Apraksts
Number	2 Bytes = 0000 _{hex} ... FFFF _{hex} = 0 _{dec} ... 65536 _{dec} = 00000000 _{bin} ... 11111111 _{bin}
Text	2 Bytes = "aa" _{ASCII} ... "ZZ" _{ASCII}

17.2 Default settings

Preset operating mode *Manual mode* (delivery capacity 0 %)

Parameter	Factory setting	Own setting
Language	English	
Units	Litres/hr.	
Alarm relay	Not active	
Level input	Not active	
Diaphragm rupture	Not active	
Release input	Not active	
Dosing control	Not active	
Release code	Off	
Safety code	Off	
IP address (MEMDOS LP Net)	169.254.055.115	

Table 17-2: Default settings

	Parameter	Factory setting	Own setting
Analog input	0/4..20 mA	4..20 mA	
	0%	4.0 mA	
	100%	20.00 mA	
Pulse input	Type	Strokes	
	Strokes p. pulse	1 stroke	
	Pulses p. stroke	1 pulse	
	Stroke buffer	1 stroke	
	Output	64/64	
	Unit	ml/pulse	
	Maximum	10 m ³ /hr.	
Batch mode	Type	Start/Stop	
	Runtime	10 min.	
	No. of strokes	100 strokes	
	Capacity	100 %	
	Interval	10 min.	
	Start time 1	08:00	
	Start time 2	10:00	
	Runtime 1	10 min.	
	Runtime 2	10 min.	
	Preset strokes 1	100 strokes	
	Preset strokes 2	100 strokes	
	Capacity	100 %	

Table 17-2: Default settings

18 EC Declaration of Conformity



(DE) EG-Konformitätserklärung

Der Unterzeichnete Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark, bestätigt, dass die nachfolgend bezeichneten Geräte in der von uns in Verkehr gebrachten Ausführung die Anforderungen der harmonisierten EG-Richtlinien, EG-Sicherheitsstandards und produktspezifischen Standards erfüllen. Bei einer nicht mit uns abgestimmten Änderung der Geräte verliert diese Erklärung ihre Gültigkeit.

(EN) EC Declaration of Conformity

The undersigned Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark, hereby certifies that, when leaving our factory, the units indicated below are in accordance with the harmonised EC guidelines, EC standards of safety and product specific standards. This certificate becomes void if the units are modified without our approval.

(FR) Certificat de conformité aux directives européennes

Le constructeur, soussigné: Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark, déclare qu'à la sortie de ses usines le matériel neuf désigné ci-dessous était conforme aux prescriptions des directives européennes énoncées ci-après et conforme aux règles de sécurité et autres règles qui lui sont applicables dans le cadre de l'Union européenne. Toute modification portée sur ce produit sans l'accord express de Jesco supprime la validité de ce certificat.

(ES) Declaración de conformidad de la UE

El que suscribe Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark, declara que la presente mercancía, objeto de la presente declaración, cumple con todas las normas de la UE, en lo que a normas técnicas, de homologación y de seguridad se refiere. En caso de realizar cualquier modificación en la presente mercancía sin nuestra previa autorización, esta declaración pierde su validez.

(NL) EU-overeenstemmingsverklaring

Ondergetekende Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark, bevestigt, dat het volgende genoemde apparaat in de door ons in de handel gebrachte uitvoering voldoet aan de eis van, en in overeenstemming is met de EU-richtlijnen, de EU-veiligheidsstandaard en de voor het product specifieke standaard. Bij een niet met ons afgestemde verandering aan het apparaat verliest deze verklaring haar geldigheid.

(HU) EG (EK)– Egyezőségi nyilatkozat

A Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark ezúton kijelenti, hogy a szóban forgó termék annak tervezése és szerkezeti módja, valamint forgalomba hozott kivitele alapján a vonatkozó alapvető biztonságtechnikai és egészségügyi követelményeknek és az alábbi felsorolt EG-irányelveknek minden szempontból megfelel. A terméken engedélyünk nélkül végrehajtott módosítások következtében jelen nyilatkozat érvényét veszíti.

(PT) Certificado de conformidade da UE

Os abaixo mencionados Lutz-Jesco GmbH, Am Bostelberge 19, 30900 Wedemark, por este meio certificam que ao sair da fábrica o aparelho abaixo mencionado está de acordo com as directrizes harmonizadas da UE, padrões de segurança e de produtos específicos. Este certificado ficará nulo se a unidade for modificada sem a nossa aprovação.

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
Omschrijving van het apparaat:	Motor-Membraandoseerpompen
A termék megnevezése:	Motoros- membrán adagolószivattyú
Designação do aparelho:	Bomba doseadora de membrana a motor

Typ / Type	EU-Richtlinie / EU directives	Harmonisierte Normen / harmonized standards
Memdos LP 4 – 1010	2006/42/EG 2006/95/EG	DIN EN 809:2011-01 DIN EN ISO 12100:2011-03



Lucjan Gogolin	Dokumentationsbevollmächtigter:	
Leiter Dosiertechnik	Authorized person for documentation:	
Head of Dosing Department	Lucjan Gogolin	Lutz-Jesco GmbH
Lutz-Jesco, Wedemark, 01.06.2012	Adresse: siehe Adresse des Herstellers	Am Bostelberge 19
	Address: see manufacturer's address	30900 Wedemark
		Germany

19 Declaration of harmlessness

Please copy the declaration, stick it to the outside of the packaging and return it with the device.

Declaration of Harmlessness

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:

20 Warranty application

Warranty Application

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 application, filled out.

Sender

Company: Phone: Date:

Address:

Contact person:

Manufacturer order no.: Date of delivery:

Device type: Serial number:

Nominal capacity / nominal pressure:

Description of fault:.....

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

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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