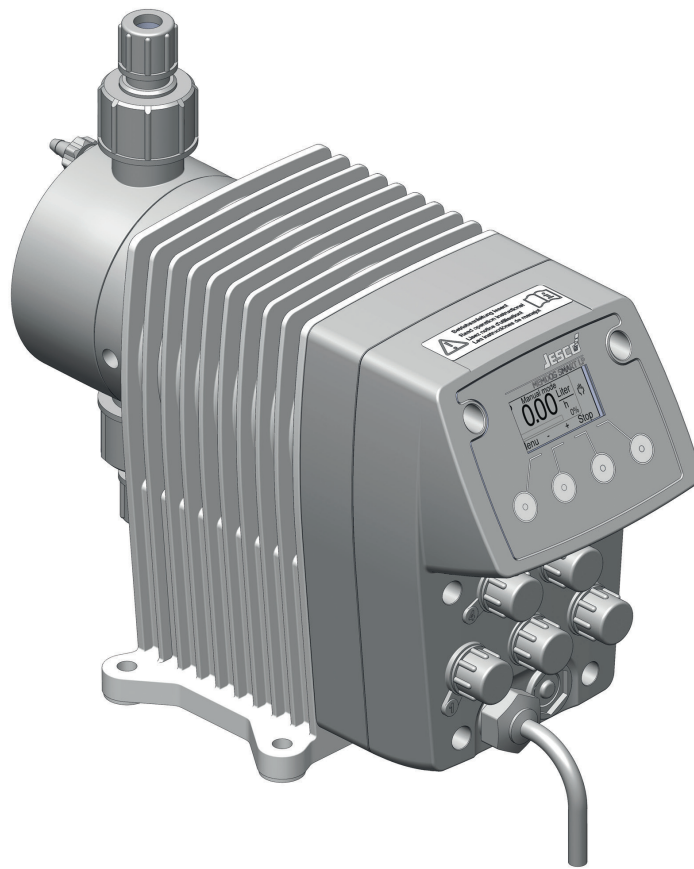


Stepper Motor-driven Diaphragm Dosing Pump
MEMDOS SMART LP
Operating Instructions



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 SMART LP and MEMDOS SMART 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 the 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.

Tab. 1: Explanations of signal words

1.3 Explanations of the warning signs

Warning signs represent the type and source of a danger:


Warning sign	Type of danger
	General danger zone
	Danger of electric shock
	Danger of caustic or other burns.
	Danger of explosions
	Danger of automatic start up
	Danger of damage to machine or compromised function

Tab. 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
	<p>Description of danger.</p> <p>Consequences if ignored.</p> <p>⇒ The arrow signals a precautionary measure to be taken to eliminate the danger.</p>

1.5 Instruction for action identification

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 SMART 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 to 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

Tab. 3: 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 SMART 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 SMART LP	03/2015 onwards	1.51 onwards
MEMDOS SMART LP-Net	03/2015 onwards	1.51 onwards

Tab. 4: 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 41). For details on the approximate values and the capacity of the dosing pump, refer to the chapter entitled "Delivery characteristic curves" (see page 56).
- Information on the usage and environment (see „Technical specifications" on page 12) 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 SMART LP is a stepper motor-driven diaphragm dosing pump that is used when precise dosing results are required.

They are characterized by the following properties:

- Capacity range 2 – 20 l/h, up to 15 bar,
- Power supply 110 – 240 V, 50/60 Hz, IP65, 25 W,
- Microprocessor controlled drive,
- Integrated dosing head venting facility (only MEMDOS SMART LP 2, LP 5 and LP 10 with dosing head made of plastic),
- Suitable for wall and floor mounting,
- Material finishes PVC, PP, PVDF and stainless steel,
- Stroke frequency can be precisely adjusted via the keyboard,
- Graphic display with multi-language menu,
- Analogue input and pulse input (increase and reduction),
- Level input with early warning and main alarm,
- Supply amount displayed in various units,
- Diaphragm replacement programme,
- 2 Slow Motion modes for dosing viscous media,
- Stroke feedback output,
- Alarm relay output,
- Batch dosing with interval and timer functions,
- Dosing control input,
- Diaphragm rupture input for leak monitoring,
- Ethernet interface (optional)

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 SMART LP,
- One set each of hose clamping connections for the suction and discharge sides for hoses with diameters of 4/6 mm, 6/9 mm and 6/12 mm (made of PVC, PP and PVDF)
- 5 (MEMDOS SMART LP) or 6 (MEMDOS SMART LP Net) 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

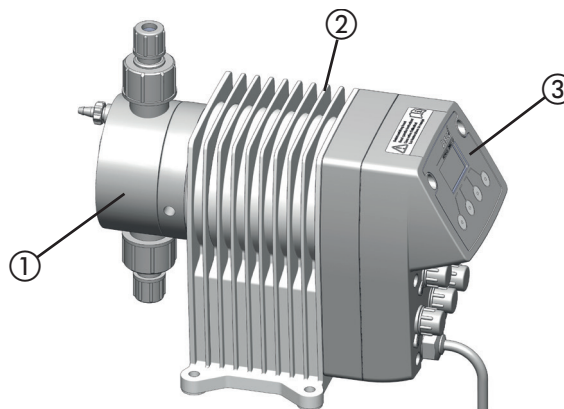


Fig. 1: Overview of MEMDOS SMART LP dosing pump

No.	Description
①	Dosing head
②	Drive unit
③	Control unit

4.3.2 Dosing head

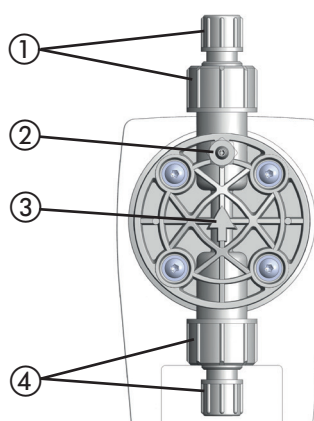


Fig. 2: Dosing head

No.	Description
①	Valve and connection on the discharge side
②	Integrated dosing head venting facility (only MEMDOS SMART LP 2, LP 5, LP 10 with dosing head made of plastic)
③	Arrow indicating the direction of throughflow of the dosing medium (only MEMDOS SMART LP 5, LP 10 with dosing head made of plastic)
④	Valve and connection on the suction side

4.3.3 Control elements



Fig. 3: Controller of MEMDOS SMART 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

Tab. 5: 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.

4.5 Rating plate (type label)

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.

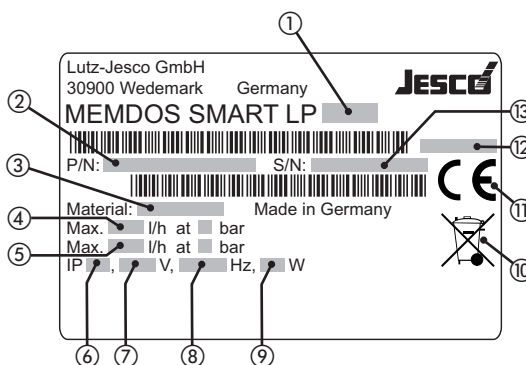


Fig. 4: MEMDOS SMART LP nameplate

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 at average pressure
⑤	Maximum delivery capacity at maximum pressure
⑥	Protection classification
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

Tab. 6: Ratings plate

4.6 Conveying characteristics

The MEMDOS SMART LP dosing pump is designed to run the pressure stroke and suction stroke at different speeds. For low supply rates, for example, the dosing pump performs the suction stroke at the maximum speed and adjusts the speed of the pressure stroke to match the desired supply rate. This produces a constant supply stream, which gives you a low-pulsation, smooth dosing.

The dosing pump in *Slow Motion* mode also has the option of reducing the suction speed in two steps. More viscous media can therefore be dosed easily and more accurately.

Settings

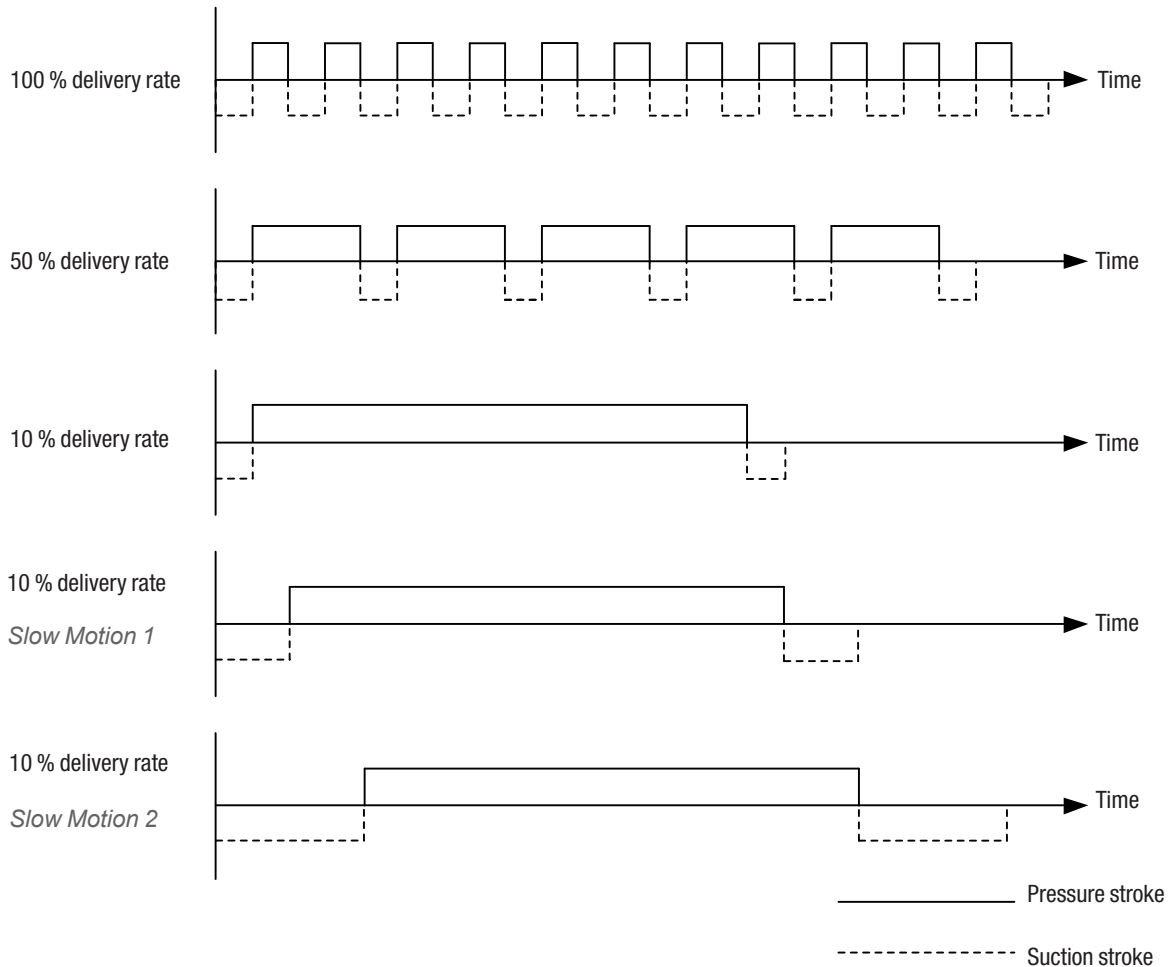


Fig. 5: Selecting available dosing programs

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 56).

Information	Value	MEMDOS SMART LP Size				
		2	5	10	15	20
Delivery capacity at max. back pressure	l/h	2,4	5.3	10.8	14.2	19.2
	ml/stroke	0,22****	0.59	1.20	1.58	2.13
Max. back pressure	bar	20	15	9	5	4
Delivery capacity at average back pressure	l/h	2,6	6	11.3	14.7	19.7
	ml/stroke	0,28	0.67	1.26	1.63	2.19
Average back pressure	bar	10	8	5	3	2
Max. stroke frequency	RPM	150				
Suction height for non-gassing media	mWS	3				

Tab. 7: Output data

5.2 Operating conditions and limits

Information	Value	MEMDOS SMART LP Size	
		2 – 20	
Permitted ambient temperature	°C	0 – 45 (0 – 40 with PVC parts)*	
Relative humidity	%	Max. 90	
Max. sound pressure level	dB(A)	51 – 56	
Max. supply pressure	mbar	800	
Viscosity limits	mPa s	300** / 1000***	
Adjustable dosing range	%	0 – 100	

Tab. 8: 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.

**** Only for LK 2 with PVDF or stainless steel dosing head, otherwise max. 16 bar counterpressure.

5.2.1 Permitted media temperatures

Information	Value	MEMDOS SMART 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

Tab. 9: Permitted media temperatures

5.3 Electrical data

Information	Value	MEMDOS SMART LP (all sizes)
Voltage supply		110 – 240 V AC, -10% / +5%, 50/60 Hz
Power consumption	W	25

Tab. 10: Electrical specifications

5.4 Other data

Information	Value	MEMDOS SMART LP Size				
		2	5	10	15	20
Weight (with dosing head made of PVC, PP or PVDF)	kg	~ 2.2				
Weight (with dosing head made of stainless steel (1.4571))	kg	~ 3.3				
Diameter of diaphragm	mm	33	39		54	
Electrical cable	m	1.8 m (with mains plug)				
Protection class		IP65 (with covering caps on the connections)				
Insulation class		F				
Valve connection		G 5/8 male				
Valve size		DN3	DN4			

Tab. 11: Other data

6 Dimensions

6.1 MEMDOS SMART LP 2, 5, 10

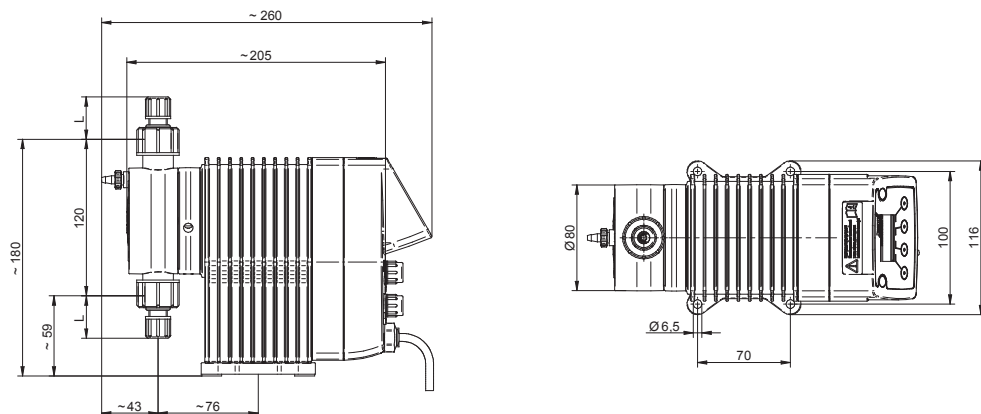


Fig. 6: Dimensioned drawing of MEMDOS SMART LP 2, 5, 10 with dosing head made of PVC, PP or PVDF (all dimensions in mm)

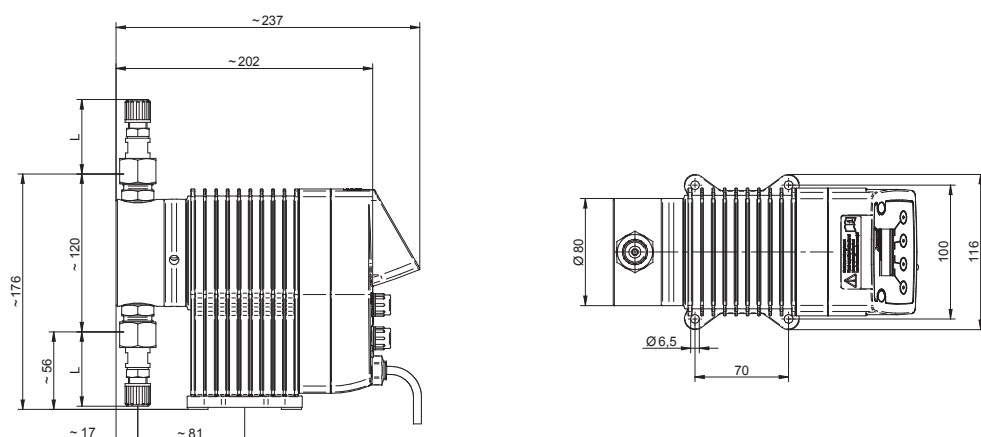


Fig. 7: Dimensioned drawing of MEMDOS SMART LP 2, 5, 10 with dosing head made of stainless steel (1.4571) (all dimensions in mm)

Hose clip	Material	Size	Nominal diameter	L
LP 2	PVC / PP / PVDF	4/6 mm	DN3	31
	Stainless steel	4/6 mm	DN3	54
LP 5, 10, 15, 20	PVC / PP / PVDF	4/6 mm	DN4	31
		1/4x3/8"	1/4"	34
		6/9 mm	DN6	34
		6/12 mm	DN6	15
	Stainless steel (1.4571) / PVDF	4/6 mm	DN4	50
		6/9 mm	DN6	54

6.2 MEMDOS SMART LP 15, 20

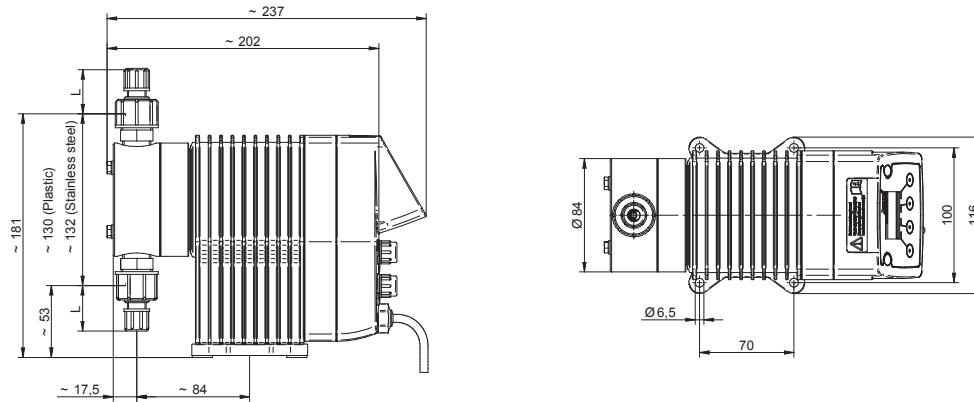


Fig. 8: Dimensioned drawing of MEMDOS SMART LP 15, 20 with dosing head made of PVC, PP, PVDF or stainless steel (1.4571) (all dimensions in mm)

Connection	Material	Size	Nominal diameter	L
Hose clip	PVC / PP / PVDF	4/6 mm	DN4	31
		1/4x3/8"	1/4"	34
		6/9 mm	DN6	34
		6/12 mm	DN6	15
	Stainless steel (1.4571) / PVDF	4/6 mm	DN4	50
		6/9 mm	DN6	54

7 Installing the Dosing Pump

	DANGER
Danger to life due to electric shock!	
Electrically conductive liquid can enter pump housings, cable screw connections and mains connectors.	
⇒ Make sure that all protective measures comply at least with the requirements of protection class IP65.	
⇒ Always set up the dosing pump such that water cannot enter the housing.	

	CAUTION
Danger of personal injury and material damage!	
A dosing pump that is difficult to access represents a danger due to incorrect operation and faulty maintenance.	
⇒ Install the dosing pump such that it is accessible at all times.	

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. In this connection, pay attention to the arrow on the dosing head. The dosing head must be aligned such that the arrow points vertically upwards.
- You should install the dosing pump at a convenient height for operation.
- 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).
- The tightening torque for the fastening bolts is 1.5 - 2 Nm.

7.2 Installation examples

7.2.1 Installation on a wall console

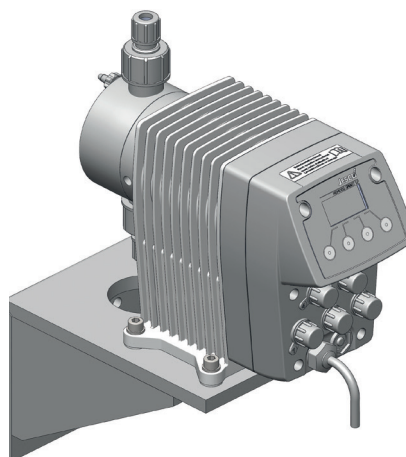


Fig. 9: Installation on a wall console

To reduce the structure-borne noise, the dosing pump is bolted to the wall bracket using rubber elements. The materials necessary for this are included with the wall bracket.

7.2.2 Installation on the wall

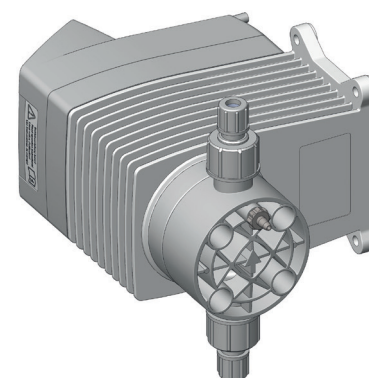




Fig. 10: Installation on the wall


The dosing pump can be mounted to the floor or directly to the wall without the need for additional elements. Turn the dosing head appropriately to ensure the flow direction of the medium through the dosing head.


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


	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. Depending on the type and hazardousness of the dosing medium, this can result in injury.</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. 	

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

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

	CAUTION
<p>Danger of personal injury and material damage!</p> <p>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.</p> <ul style="list-style-type: none"> ⇒ Install pulsation dampeners. 	

	NOTICE
<p>Damage to drives due to overloading</p> <p>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.</p> <ul style="list-style-type: none"> ⇒ Ensure that the pressure on the discharge side is at least 1 bar greater than on the suction side. 	

	NOTICE
<p>Locking of threads</p> <p>Stainless steel and plastic parts (particularly those made of PVC) that are bolted together in a detachable connection (e.g. the dosing head and the valves) can lock. This makes them difficult to release.</p> <ul style="list-style-type: none"> ⇒ Before bolting, grease the corresponding parts with a lubricant, e.g. PTFE spray). ⇒ Ensure that the lubricant is compatible with the dosing medium. 	

8.1 Design of the system

- The dosing pump's technical data (see „Technical specifications“ on page 12) must be taken into account and the plant's layout must be set up appropriately (e.g. pressure loss when rating the lines with regard to their nominal diameter and length).
- 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 designed such that no disproportionately high consequential damages arise due to dosing media escaping.
- To avoid dosing errors after the end of the process, the dosing pump must be locked 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 by means of 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 Aligning the dosing head

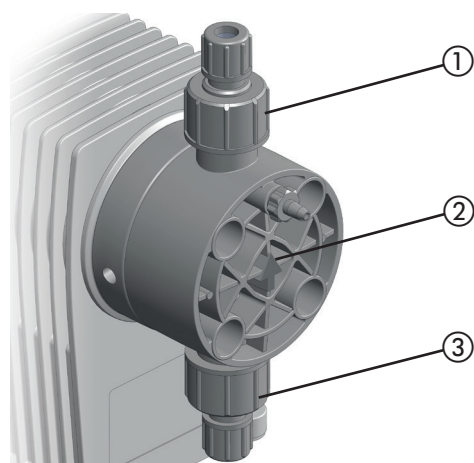


Fig. 11: Aligning the dosing head

When connecting the dosing lines to the dosing pump, you must observe the direction of through-flow (see arrow ②). The dosing head must be aligned vertically.

The suction valve ③ must always point downwards. Accordingly, arrow ② and pressure valve ④ always point upwards. This is irrespective of the positioning of the dosing head to the drive.

8.4 Hydraulic connections

8.4.1 Connecting hose clips

Choose the hose connection according to the condition of the hose (material, inner diameter, wall thickness) in order to ensure maximum pressure resistance.

8.4.1.1 Sizes 4/6 and 6/9

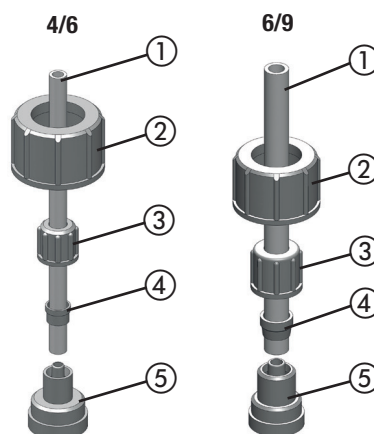


Fig. 12: Hose clips 4/6 and 6/9 (internal and external diameters in mm)

Perform the following working steps:

1. Cut the hose ① to length neatly and at an exact right angle.
2. Place a gasket that is suitable for the dosing medium between the connection ⑤ and the valve.
3. Screw the connecting piece ⑤ to the dosing pump's valve using the union nut ②.
4. Thread the union nut ③ and the clamping ring ④ onto the hose.
5. Plug the hose ① all the way in to the grommet of connection piece ⑤.
6. Push the clamping ring ④ onto the grommet of connection piece ⑤ and screw it to the union nut ③.
7. Carry out the same procedure with the connection to the dosing pump's other valve.

✓ **Hose clip connected.**

8.4.1.2 Size 6/12

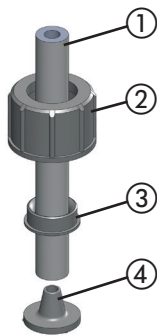


Fig. 13: Hose clip 6/12 (internal and external diameter in mm)

Size 6/12 hose clips only have a union nut. It clamps the hose onto the grommet of the connection piece and at the same time fastens on the dosing pump's valve.

Perform the following working steps:

1. Cut the hose ① to length neatly and at an exact right angle.
2. Place a gasket that is suitable for the dosing medium between the connection ④ and the valve.
3. Push the union nut ② and the cutting ring ③ over the hose ①.
4. Press the end of the hose ① onto the grommet of connection piece ④. You can do this more easily by moistening the end of the hose on the inside or applying some lubricant to the grommet in the cone area. You should push at least two thirds of the hose onto the grommet of the connection piece.
5. Push the cutting ring ③ over the hose ① into the cone area on the grommet of connection piece ④.
6. Screw the union nut ② onto the valve of the dosing pump.

✓ **Hose clip connected.**

8.4.2 Making the bonded connection

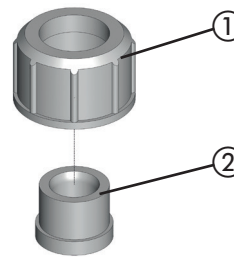


Fig. 14: Glue-in connection

Perform the following working steps:

1. Cut the PVC tube to length.
2. Push the union nut ① onto the tube.
3. Stick the bonded coupling sleeve ② to the tube (follow the instructions of the adhesive manufacturer).
4. Screw the union nut ① onto the valve of the dosing pump. Use a gasket that is suitable for the dosing medium.

✓ **Bonded connection made.**

8.4.3 Making the cemented connection

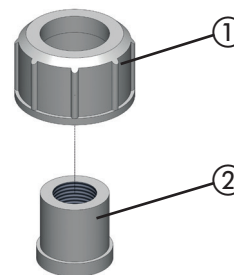


Fig. 15: Cemented connection

Perform the following working steps:

1. Cut the tube to length.
2. Cut the thread ② onto the end of the tube.
3. Push the union nut ① onto the tube.
4. Seal the thread ②. When choosing your sealing material, take into account its resistance to material, temperature and pressure.
5. Screw the union nut ① onto the valve of the dosing pump. Use a gasket that is suitable for the dosing medium.

✓ **Cemented connection made.**

Under normal conditions, you only need to screw the hydraulic connections finger-tight. However, due to the material settling, the pre-tension of the screw connection can slacken. This means that you must re-tighten the screw connection before carrying out commissioning.

8.5 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. On the flange of the dosing head, there are three openings for this purpose. Depending on the alignment of the dosing pump, the leakage is drained via the downward opening.

It is advisable to use a diaphragm rupture sensor (see „Diaphragm rupture sensor leak sensor“ on page 21).

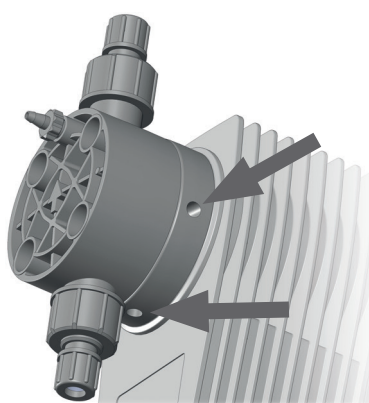


Fig. 16: Openings of the leakage drain

8.6 Connecting the dosing head venting facility

The dosing heads of the MEMDOS SMART LP 5 and LP 10 have an integrated dosing head venting unit (except for dosing heads made of stainless steel).

For the procedure when venting, refer to “Venting the dosing pump” on page 40.

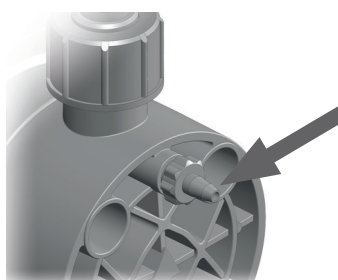


Fig. 17: Dosing head venting facility with hose connection

Perform the following working steps:

1. Connect a 4/6 hose to the dosing head venting facility.
2. Route the other end of the hose into the dosing tank or a collecting tank.

✓ **Dosing head venting facility connected.**



NOTICE

Damage to drives due to effervescent media

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

⇒ Collect the leakage in a collecting pan.

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

8.7 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.

8.7.1 Flow meter FLOWCON LP2

The FLOWCON LP 2 flow meter was especially developed for monitoring oscillating volume flows. The function is based on the evaluation of the pulsating dosing behaviour typical to dosing pumps. With stepper motor-driven dosing pumps, only the signal on the suction side can be evaluated; the flow on the discharge side remains relatively constant.

During the suction stroke, a float is lifted from the flowing fluid, thus activating a reed switch. Setting the switch point adapts the function to the size of the dosing pump and the viscosity of the medium.

This makes it possible not only to sense whether the dosing pump is delivering fluid, but also whether the set dosing capacity is achieved. With constant operating conditions, the reproducibility remains at 10...20%.

For the electrical connection of the FLOWCON, see section 9.2.5.1 page 30.

To activate and set the “Dosing control” function, see section 10.6.9 menu item Setting the dosing control.

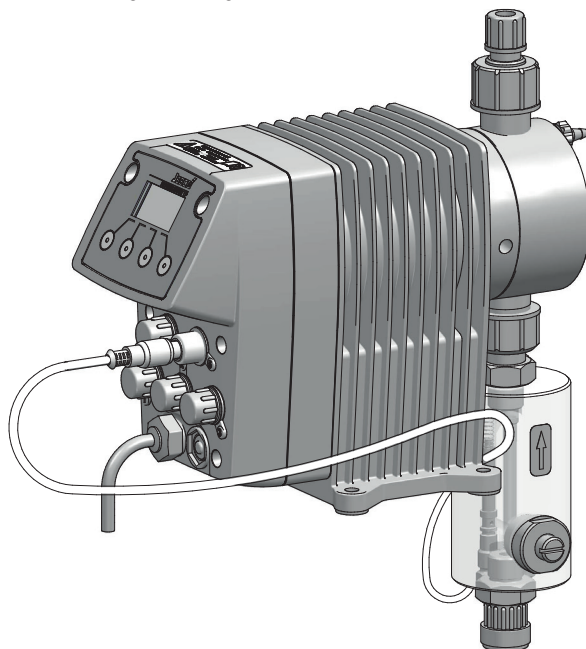


Fig. 18: MEMDOS SMART LP mit FLOWCON LP 2

Notes on assembly:



Follow the operating manual for the FLOWCON LP 2 flow meter. It contains instructions regarding operation using the MEMDOS LP dosing pump.

8.7.2 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.

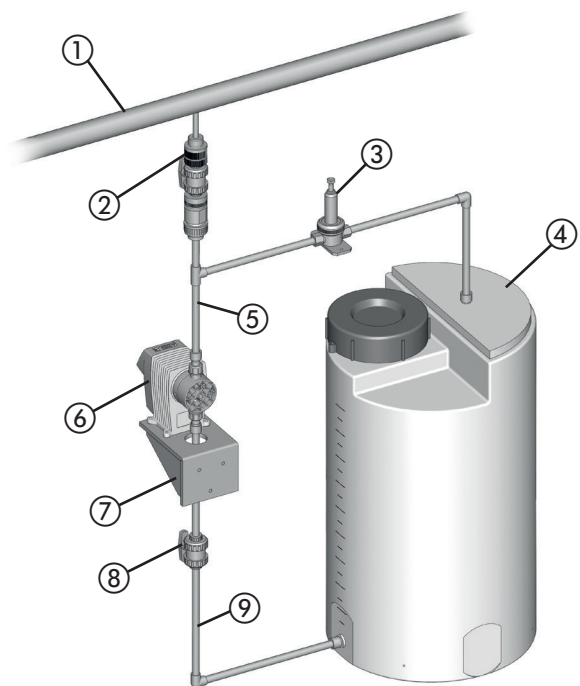


Fig. 19: Installation with an injection nozzle

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

Tab. 12: Designation of components

8.7.3 Diaphragm rupture sensor leak sensor

If a diaphragm ruptures, the dosing medium starts to leak. The leakage is drained via the leakage opening.

As an option, the MEMDOS SMART 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. The system shows a „Diaphragm rupture“ message on the display and reports a disturbance. The dosing pump cannot restart until you press **Start**.

You must first replace the diaphragm and clean dosing medium residue from the diaphragm flange. There must be no conducting connection between the two rings of the leak sensor.

The connecting cable of the leak sensor has an M12x1 male connector that you connect to connection socket 5 (see „Connection socket 5“ on page 30).

For an explanation of the icons, see “Set „Diaphragm rupture“ menu item” on page 35.

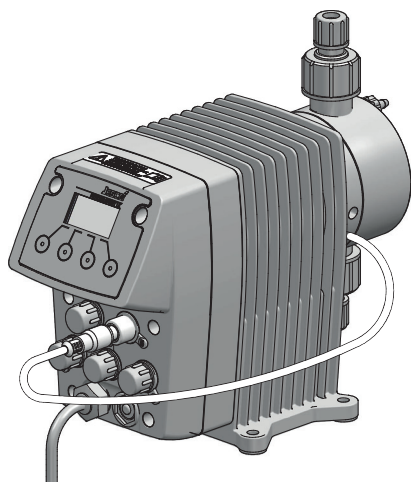


Fig. 20: MEMDOS SMART LP with leak sensor in the diaphragm flange

8.7.4 Contact-type water meter

The Contact Water Meter measures the throughflow in a pipe and sends a pulse to the dosing pump, which then starts dosing. This means that ideal proportional dosing is also possible with large throughflow fluctuations.

The Contact Water Meter connects to connection socket 2 (see „Connection socket 2“ on page 29).

You determine the ratio of throughflow and executed strokes of the dosing pump in *Pulse input* mode, (see „Water meter“ on page 44).

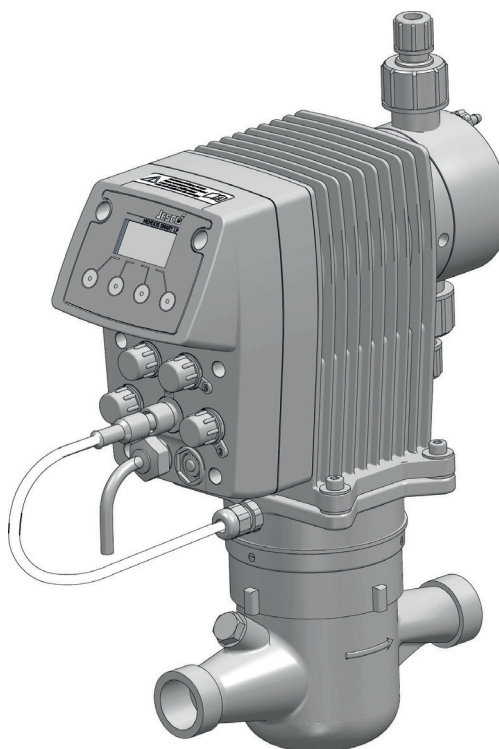


Fig. 21: MEMDOS SMART LP installation on contact-type water meter

8.7.5 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.

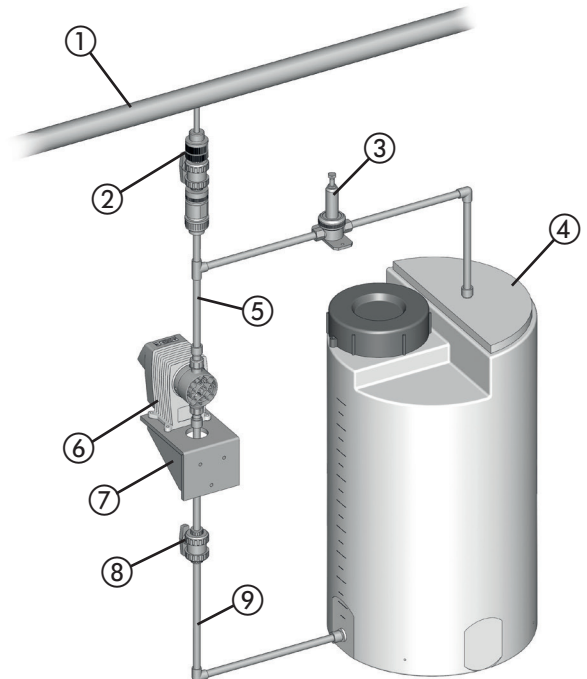


Fig. 23: Installation with pressure relief valve – returning to the dosing tank

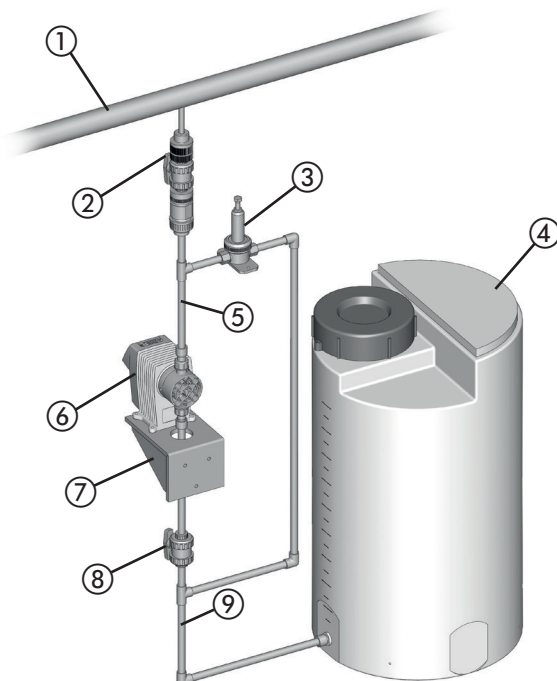


Fig. 22: Installation with pressure relief valve – returning to the suction line

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

Tab. 13: Designation of components

8.7.6 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 back pressure that it generates is adequate.

No.	Description
⑥	Pressure line
⑦	MEMDOS SMART LP dosing pump
⑧	Wall bracket
⑨	Shutoff valve
⑩	Suction line

Tab. 14: Designation of components

8.7.7 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.

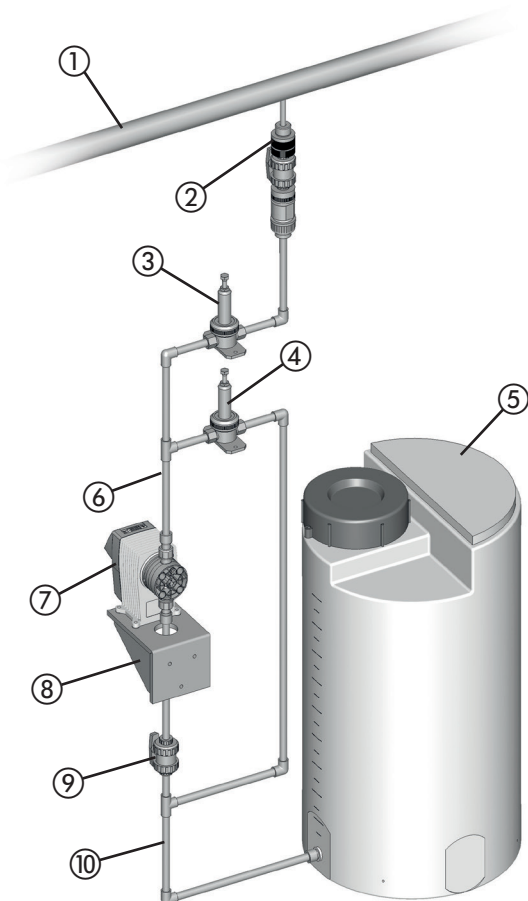


Fig. 24: Installation with a back-pressure valve

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Back-pressure valve
④	Pressure relief valve
⑤	Dosing tank

Tab. 14: Designation of components

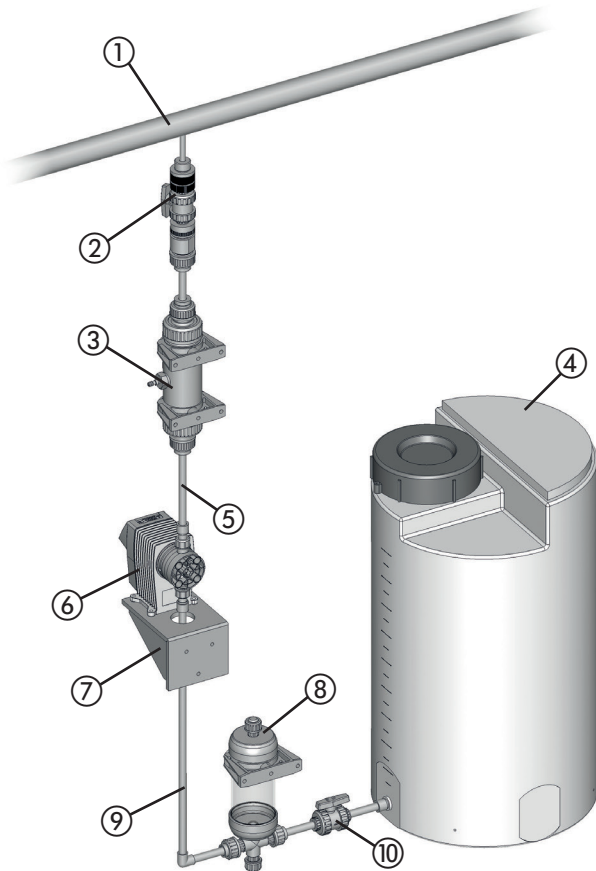


Fig. 25: Installation with a pulsation dampener

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

Tab. 15: Designation of components

8.7.8 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.

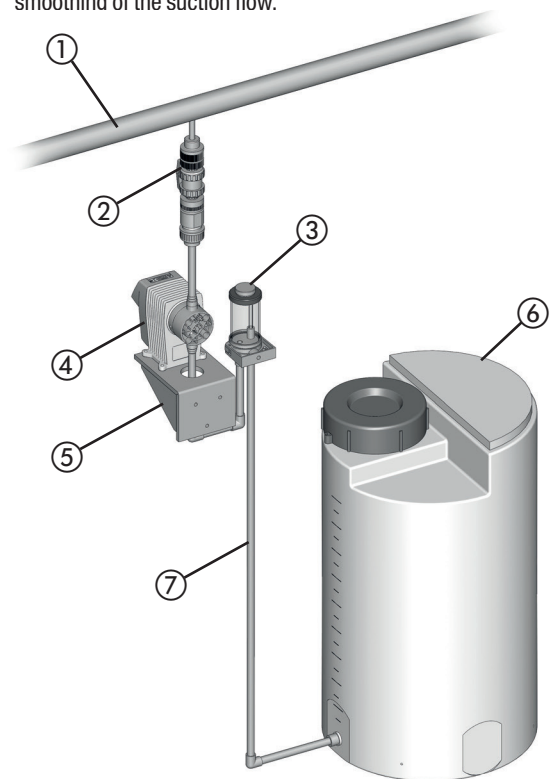


Fig. 26: Installation with a priming aid

No.	Description
①	Main line
②	Injection nozzle with shut-off valve
③	Priming aid
④	MEMDOS SMART LP dosing pump
⑤	Wall bracket
⑥	Dosing tank
⑦	Suction line

Tab. 16: Designation of components

8.7.9 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.

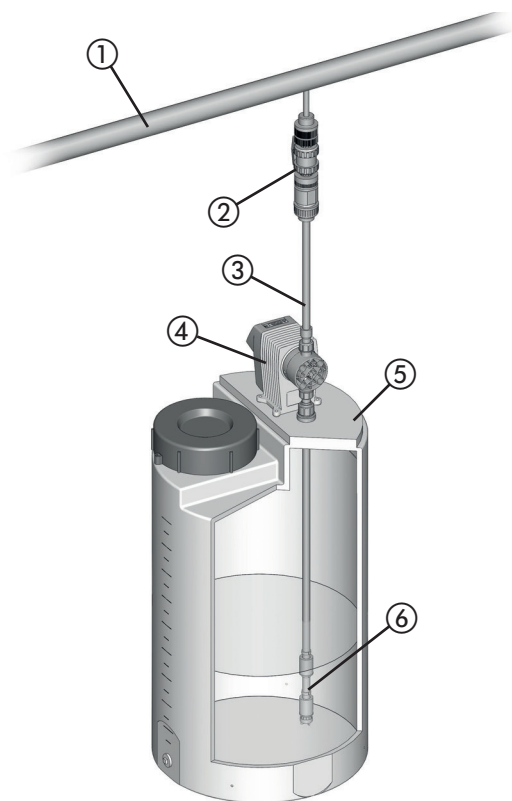


Fig. 27: Installation with a level monitoring system

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

Tab. 17: Designation of components

8.7.10 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.

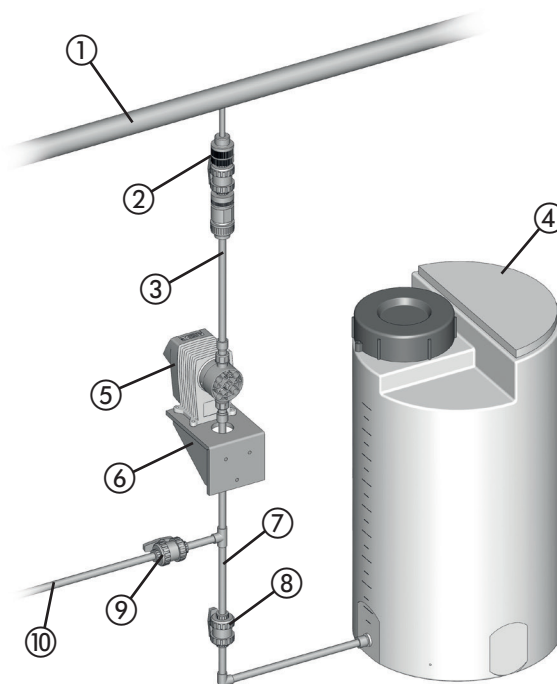


Fig. 28: Dosing of suspensions

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

Tab. 18: Designation of components

8.7.11 Suction pressure regulator

A suction pressure regulator may be necessary if the suction-side installation of the system demonstrates 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.

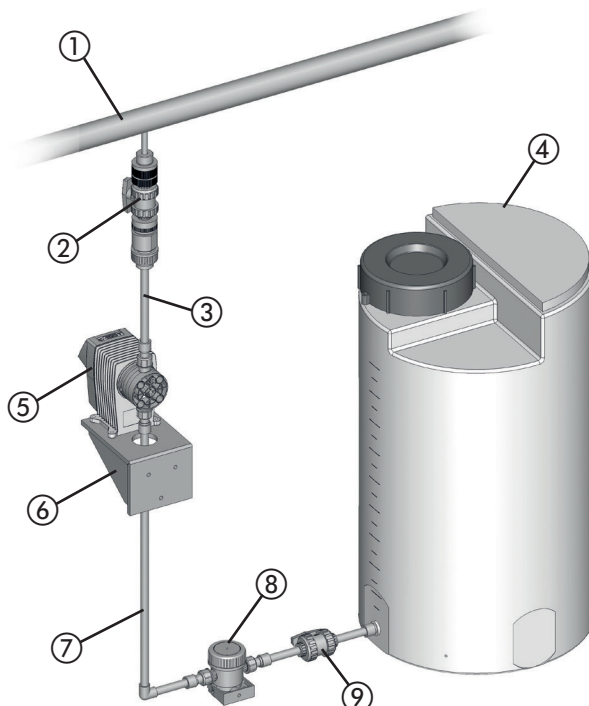


Fig. 29: Installation with a suction pressure regulator

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

Tab. 19: 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.

- 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. 30: Connection sockets 1 - 5

Inputs	Connection socket
Release input	1
Pulse input	2
Level input	3

Tab. 20: Inputs of the control unit

Outputs	Connection socket
Stroke feedback output alternative: Alarm optocoupler output	1
Alarm relay output	4

Tab. 21: Outputs of the control unit

9.1 Principles

- The dosing pump has a 110 - 240 V AC 50/60 Hz wide-range power supply unit
- 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.

9.2.1 Connection socket 1

Connection socket 1 is equipped with an optocoupler output and a switching input. The optocoupler can be configured for stroke feedback or a fault message. The connections and switch data are listed in the following tables.

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

Tab. 22: Connection socket 1

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

Pin	Function
Optocoupler (Pin 1&2)	max. 30V DC, max. 5mA
Release input (Pin 3&4)	Potential-free contact Opener NC or closer NO, Freely programmable

Tab. 23: Technical data 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.

The stroke feedback output can continue to be used e.g. to evaluate the signal in a PLC (stroke counting for batch mode).



Fig. 31: Synchronization of several dosing pumps by means of stroke feedback and pulse control

9.2.1.2 Fault reporting optocoupler

The optocoupler will notify dosing pump faults upon activation of this function. The message can be evaluated e.g. with a PLC.

For information on how to set the function of the release input, see section 10.6.5.

9.2.1.3 Release input

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

For information on how to set the function of the release input, see section 10.6.8.

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 the electronic fuse), not potential-free

For information on setting the *Analog input* operating mode, see Page 42.

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 43.

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	Analog input: 	Black	BK

Tab. 24: 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 25.

For information on setting the *Level input* function, see Page 35.

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

Tab. 25: 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 34.

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

Tab. 26: Connection socket 4

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

9.2.5 Connection socket 5

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

Tab. 27: Connection socket 5

9.2.5.1 Dosing control input

The optionally-available FLOWCON LP2 can be connected to connection port 5. It allows you to monitor the dosing medium flow motion after a dosing pump stroke.

- For more details on the hydraulic installation, see section 8.7.1 page 21.
- To set the “Dosing control” function, see section 10.6.9 page 36.
- Current supply (5V DC) is performed on connection 5 of the dosing pump. The maximum permissible current of all connected devices is 50mA.

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 more details on installing the leak sensor, see Page 21.

For information on setting the *diaphragm rupture* function, see Page 35.

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

Tab. 28: 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 Ethernet connection socket (MEMDOS SMART LP-Net only)



Fig. 32: 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 mode* operating mode, see Page 48.

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

Tab. 29: Ethernet connection socket

9.2.6.1 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

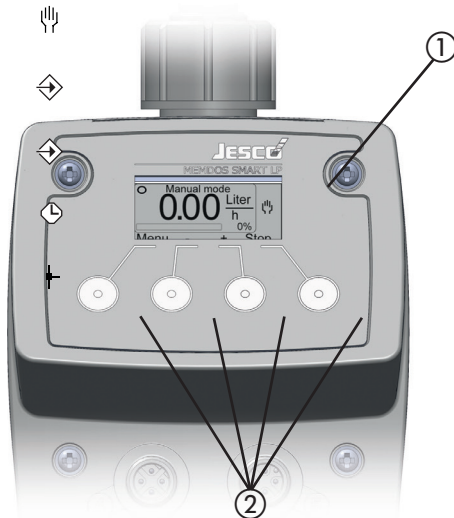


Fig. 33: Operator controls of the control unit

No.	Explanation
①	Graphic display
②	Four multifunction keys

Tab. 30: Operator controls of the control unit

You operate the MEMDOS SMART 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:

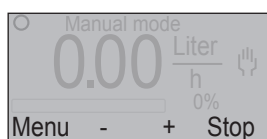


Fig. 34: Function assignments of the multifunction keys

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

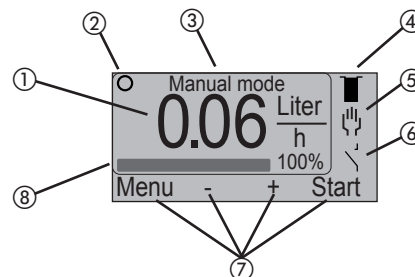


Fig. 35: Representation of the control unit on the display

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

Tab. 31: Explanation of menu navigation

10.3 Explanation of the menu icons

10.3.1 Dosing status display

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

Tab. 32: 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)

Tab. 33: 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 SMART LP-Net only)

Tab. 34: Explanation of the menu icons – Operating modes

10.3.4 Release input

Symbol	Meaning
	Active and open
	Active and closed

Tab. 35: Explanation of the menu icons – Release input

10.3.5 Release code

Symbol	Meaning
	Password protection active

Tab. 36: Explanation of the menu icons – Release code

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.

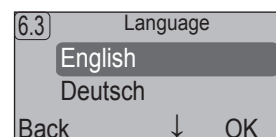


Fig. 36: Menu 6.3 Language

- 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).

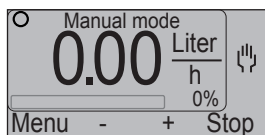


Fig. 37: Start screen of the dosing pump after initial commissioning

10.5 Main menu

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

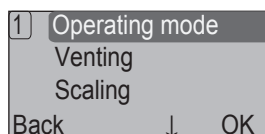


Fig. 38: Main menu

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

- *Operating mode* (see “Operating modes” on page 41),
- *Venting* (see “Venting the dosing pump” on page 40),
- *Scaling* (see “Scaling the delivery capacity” on page 40),
- *Calibration* (see “Calibrating the dosing pump” on page 41),
- *System setup* (see “System setup” on page 33),
- *Info* (see “Information about the dosing pump” on page 37),
- *Messages* (see “Messages of the control unit” on page 38).



For a complete overview of the control unit’s menu structure, see Page 57.

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.

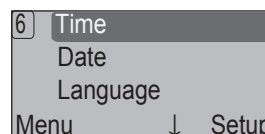


Fig. 39: System setup menu

10.6.1 Set "Time" menu item

- Use the **↑** or **↓** key to choose the *Time* menu item and press **Set up**.
- 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.

4. 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.



If you want to use the MEMDOS SMART 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*,
- *French*,
- *Spanish*,
- *Portuguese*,
- *Dutch*.

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

✓ **The language is set.**

10.6.4 Set "Units" menu item

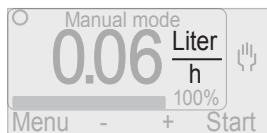


Fig. 40: Display of the unit of delivery capacity

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 output" menu item

Faults to the dosing pump can be notified externally using the fault reporting function. This can be performed using the fault reporting relays or the fault reporting optocoupler. When activating the fault reporting optocoupler in the menu, the relays will also be activated and can be used in parallel.

See section 9.2.4.1 "Alarm relay output" page 30 for connection and section 9.2.1.2 "Fault reporting optocoupler" on page 29.

1. Use the **↑** or **↓** key to choose the *Alarm output* 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),
- *NO Optocoupler* (closer),
- *NC Optocoupler* (opener).

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

✓ **The „Alarm output“ is set.**

10.6.5.1 "Alarm relay" configuration

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

Tab. 37: Configuration of NO relay

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

Tab. 38: Configuration of NC relay

10.6.5.2 Configuring the alarm output optocoupler

The optocoupler only switches with the supply voltage on.

Situation		Output
Optocoupler function	Alarm	Pins 1/2(socket 1)
N.O	no	open
	yes	closed
N.C.	no	closed
	yes	open

Tab. 39: Configuration of alarm optocoupler

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 25.

For information on the connection, see "Level input" on page 30.

1. Use the or 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 or 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 32.

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

Tab. 40: Level input configuration

10.6.7 Set „Diaphragm rupture“ menu item

As an option, the MEMDOS SMART 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 more information, refer to “Diaphragm rupture sensor leak sensor” on page 21.

For information on the connection, see “Diaphragm rupture input” on page 30.

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 29.

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 33.

10.6.9 Menu item “Setting the dosing control”


With FLOWCON LP2 as optional accessories, the flow of the dosing medium is monitored after the stroke of the dosing pump.

- For more details on the hydraulic installation, see section 8.7.1 page 21.
- For the electrical connection of the FLOWCON, see section 9.2.5.1 page 30.

Follow the operating manual for the FLOWCON LP 2 flow meter. It contains instructions regarding operation using the MEMDOS LP dosing pump.

10.6.10 Activating the Release code

If the *Release code* is activated, the dosing pump is protected against unauthorized access. You can only create settings after you enter the correct *Release code*.

	WARNING
Caustic burns or other burns through dosing media!	
If the Release code is activated, operation of the dosing pump is blocked. If a dosing pump has been started without the Release code being entered, it can only be stopped by means of the power supply. In unfavourable cases, if the user has inadvertently activated or forgotten the release code, the dosing pump cannot be quickly stopped and injuries may result.	
⇒ Install an emergency stop switch or integrate the dosing pump into the plant safety concept.	

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

1. Use the \uparrow or \downarrow key to choose the *Release code* menu item and press **Setup**.
 - ▶ The dosing pump displays menu 6.10 *Release code*.

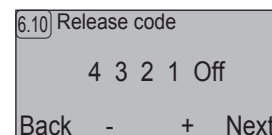


Fig. 41: Release code

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 *Release code* is activated. The dosing pump displays the corresponding symbol:

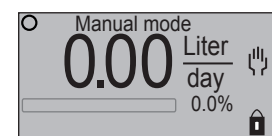


Fig. 42: Start screen with activated Release code

10.6.10.1 Entering the Release code

Once you press any key, you must enter the *Release code*. If you enter the code correctly, you have 120 seconds in which to operate the dosing pump. When the 120 seconds have elapsed, you must re-enter the *Release code*, even if you are in the middle of making another entry (this does not include settings in the menus).

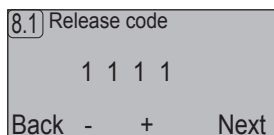



Fig. 43: Entering the Release code

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 start screen.

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

10.6.10.2 Deactivating the Release code

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

✓ **Release code deactivated.**

10.6.11 Deactivating the safety code

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.

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

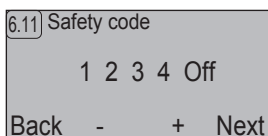


Fig. 44: Safety code

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. You must enter it when accessing the *System setup* menu.

10.6.11.1 Entering the safety code

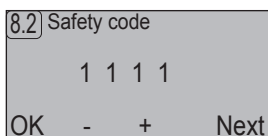



Fig. 45: Entering the safety code

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.

 If 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 33.

✓ **The dosing pump is reset to the factory setup setting.**

10.6.13 Set "Slow motion" menu item

Set slow mode to dose viscous media. The suction speed can be reduced in two steps.

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

You can choose from the following options:

- *Off* (factory default setting),
- *Slow Motion 1* (50 % of the standard suction speed),
- *Slow Motion 2* (25 % of the standard suction speed).

2. Use the **↑** or **↓** key to choose the desired function and press **OK**.
 - ▶ The system displays the selected *Slow Motion* mode on the start screen after the respective operating mode.

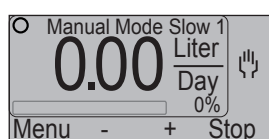


Fig. 46: „Slow Motion 1“ mode display in manual mode

10.6.14 Set „User setup“ menu item

This menu item allows you to save the settings you made in the dosing pump.

10.6.14.1 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.**

10.6.14.2 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.**

10.6.15 Set „IP address“ menu item (MEMDOS SMART 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. 47: Display of menu Info 1

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

The *Info* menus display the following information:

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

Tab. 41: 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 54) for a list of all the disturbance messages and their meanings.



Fig. 48: 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

Tab. 42: 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


5. Press **Menu**.
6. Use the **↑** or **↓** key to choose the *Messages* menu item and press **OK**.
7. Press **Back**.
8. 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 to 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. 	

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 28).
- ✓ 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 33) and, if necessary, the other settings in menu "System setup" (see page 33) have been carried out.
- ✓ Personnel have read all the operating instructions and understood them completely.

	<p>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.</p>
---	---

Perform the following working steps:

1. Open the shut-off valves on the suction and discharge sides if present.
2. Plug in the dosing pump's mains plug to the power supply.
3. Vent the dosing pump, (see „Venting the dosing pump“ on page 40).
4. Scale the delivery capacity of the dosing pump, if necessary (see „Scaling the delivery capacity“ on page 40).
5. Calibrate the dosing pump (see „Calibrating the dosing pump“ on page 41).
6. Select an operating mode and start the dosing pump in accordance with the instructions in the chapter entitled "Operating modes" (see page 41).
 - ▶ The dosing pump primes. if it does not prime enough, use a priming aid, (see „Priming aid“ on page 25).

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

✓ **The dosing pump is commissioned.**

11.1.1 Venting the dosing pump

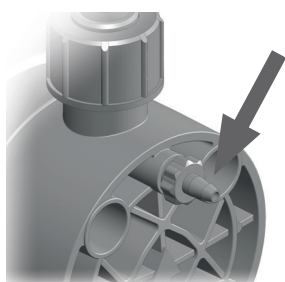


Fig. 49: Dosing head venting facility with vent screw

Precondition for action:

- ✓ The dosing head venting facility connected has been connected in accordance with the chapter entitled "Connecting the dosing head venting facility" (see page 20).

Perform the following working steps:

1. Open the vent screw (only MEMDOS SMART LP 5 and LB 10 with dosing head made of plastic) by one full turn (anti-clockwise facing the dosing head).
2. Press **Menu**.
3. Use the **↑** or **↓** key to choose the *Venting* menu item and press **OK**.
4. Press the **Start** key and keep it pressed.
 - ▶ The dosing pump starts delivery at the highest stroke frequency.
5. Release **Start** key as soon as there is a continuous throughflow from the dosing head venting facility with no air bubbles.
 - ▶ The dosing pump stops delivery.
6. Close the vent screw.

✓ **The dosing pump is vented.**

i If you are using effervescent media, allow them to flow out continuously. Open the vent screw such that about one drop per 1- 3 strokes escapes.

11.1.2 Scaling the delivery capacity

You can use the *Scaling* function to adjust the MEMDOS SMART LP flexibly to the local conditions during the start-up. Sometimes, a dosing pump model selected during the planning phase turns out to be too big. To minimise the risk of overdosing, the delivery capacity can be limited or scaled.

The reduced delivery capacity applies to all operating modes of the dosing pump. The setting is retained even after an interruption to the power supply.

Perform the following working steps:

1. Press **Menu**.
2. Use the **↑** or **↓** key to choose the *Scaling* menu item and press **OK**.
3. Use the **+** and **-** keys to set the desired delivery capacity in l/h and press **OK**.
 - ▶ The bar that indicates delivery capacity is now displayed in two parts.

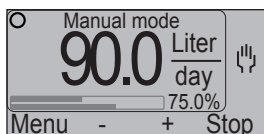


Fig. 50: Display with scaled delivery capacity

The meaning of the bars is as follows:

Bar	Meaning
top	The scaled delivery capacity value (part of the delivery capacity in the factory setting)
bottom	The current delivery capacity expressed as a percentage of the scaled delivery capacity

✓ **Delivery capacity scaled.**

i To reverse scaling, set the delivery capacity in the *Scaling* menu to the value 0 or to the maximum possible value.

11.1.3 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 40).
4. Press **Menu**.
5. Use the **↑** or **↓** key to choose the *Calibration* menu item and press **OK**.
 - ▶ The dosing pump displays menu 5 *Calibration*.

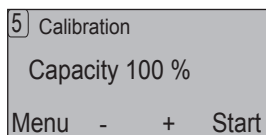


Fig. 51: Menu 5 Calibration

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.

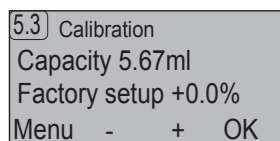


Fig. 52: Menu 5.3 Calibration

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 SMART LP dosing pump has 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* (only MEMDOS SMART LP-Net) - Controlling the stroke frequency and number of strokes across a network.

11.2.1 Manual mode

CAUTION

Danger of automatic start up!

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.

- ⇒ 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.

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*.

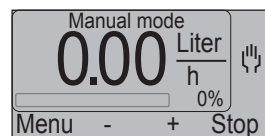


Fig. 53: Start screen of Manual mode

11.2.1.2 Starting the dosing pump

1. Press the **+** key to increase the stroke frequency by 0.1 %.
 - ▶ The dosing pumps starts dosing. The system automatically calculates the resulting delivery capacity and displays it.

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.

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 29) 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).

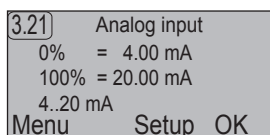


Fig. 54: Parameters of the operating mode

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

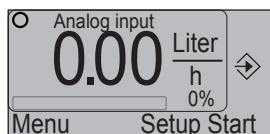


Fig. 55: Start screen of Analog input

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 for *100 % delivery capacity*. 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 29).

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 29).

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).

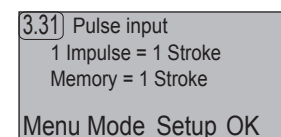


Fig. 56: Parameters of the operating mode

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

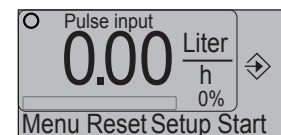


Fig. 57: Start screen of Pulse input

11.2.3.2 Choosing the pulse input mode

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

Mode	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

Tab. 43: 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 **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 3.31).
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.

Tab. 44: Strokes configuration type

Parameter	Explanation
<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.

Tab. 44: 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.

Tab. 45: 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 41.

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.

Tab. 46: 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.

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

- Press **Setup**.
 - The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.31).
- Press **Setup**.
- Use the **↑** or **↓** key to choose a parameter of the mode and press **OK**.
- 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 3.31).
- 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 29).
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 29).

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).

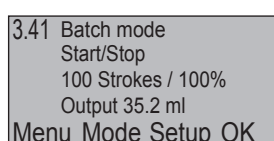


Fig. 58: Parameters of the operating mode

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

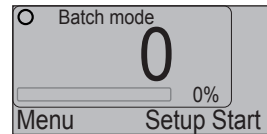


Fig. 59: Start screen of Batch mode

11.2.4.2 Choosing the batch 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

Tab. 47: Explanation of batch mode modes

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 *Batch 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.

Tab. 48: Start/Stop and Ext. Start configuration

Parameter	Explanation
No. of strokes	Specifies the number of required strokes. The value that is displayed in brackets indicates the calculated output.
Capacity	Specifies the required stroke frequency stated as a percentage of the maximum stroke frequency (see „Delivery capacity data“ on page 12).

Tab. 48: Start/Stop and Ext. Start configuration

Interval

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

Parameter	Explanation
Runtime	Specifies the required runtime of the dosing pump; input in minutes. The value that is displayed in brackets indicates the calculated output.
No. of strokes	Specifies the number of required strokes. The value that is displayed in brackets indicates the calculated output.
Capacity	Specifies the required stroke frequency stated as a percentage of the maximum stroke frequency (see „Delivery capacity data“ on page 12).
Interval	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.

Tab. 49: Interval configuration mode

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

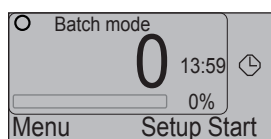


Fig. 60: Start screen of Interval batch mode mode

Timer

Using the MEMDOS SMART 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 33.

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

Parameter	Explanation
Start time 1	Specifies the required time for dosing procedure 1.
Start time 2	Specifies the required time for dosing procedure 2.
Runtime 1	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).
Runtime 2	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).
Preset strokes 1	Specifies the required number of strokes of dosing procedure 1. The value that is displayed in brackets indicates the calculated output.
Preset strokes 2	Specifies the required number of strokes of dosing procedure 2. The value that is displayed in brackets indicates the calculated output.
Capacity	Specifies the required stroke frequency for both dosing procedures stated as a percentage of the maximum stroke frequency (see „Delivery capacity data“ on page 12).
Mo-Su	Specifies the day of the week on which a specific dosing procedure is to be started.

Tab. 50: Timer configuration mode

11.2.4.4 Programming the dosing procedures

1. Press **Setup**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).
2. Press **Setup**.
3. Use the **↑** or **↓** key to choose the *Start time 1* menu item and press **Setup**.
4. Press the **+** key to increment the parameter's value or the **-** key to decrement it.
5. Press **OK**.
6. Using **↑** or **↓** select *Runtime 1* or *Preset strokes 1* and then press **Setup**.
7. Press the **+** key to increment the parameter's value or the **-** key to decrement it.
8. Press **OK**.
9. Use the **↑** or **↓** key to choose the *Capacity* menu item and press **Setup**.
10. Press the **+** key to increment the parameter's value or the **-** key to decrement it.
11. Press **OK**.
 - ▶ The dosing pump displays the current configuration of this operating mode's parameters (Menu 3.41).
12. If required, also program the dosing procedure 2 with the parameters *Start time 2*, *Runtime 2* or *Preset strokes 2*.
13. Use the **↑** or **↓** key to choose the *Mo-Su* menu item and press **Setup**.
14. Press **Next** to select a weekday.
15. 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.

i 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. 61: 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*.

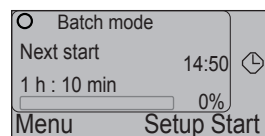


Fig. 62: Start-up display of the batch mode mode Timer

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 (only MEMDOS SMART LP-Net)

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*.

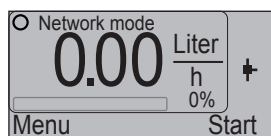


Fig. 63: Start screen of Network mode

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 31). 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 SMART LP Net)“ on page 65).

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 SMART LP-Net only)“ on page 37).

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 SMART LP Net)" (see page 65).

11.3 External On/Off via Release input

Regardless of the selected operating mode, you can start or stop the MEMDOS SMART LP dosing pump by opening or closing a switching contact on the Release input.

If you set the function (see „Set „Release input“ menu item“ on page 35), 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 32).

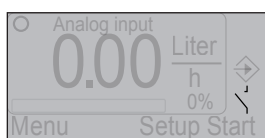


Fig. 64: Start screen of Analog input with icon for open contact

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

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, for transportation.


Should the unit be sent back to the manufacturer, please follow chapters "Declaration of harmlessness" (see page 70) and "Warranty application" (see page 72).


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
Danger to life due to electric shock!	
Live parts can inflict fatal injuries.	
⇒ Before carrying out any maintenance work, always disconnect the dosing pump from the power supply.	
⇒ Secure the dosing pump from accidental power-up.	

	WARNING
Caustic burns or other burns through dosing media!	
While working on the dosing head, valves and connections, you may come into contact with dosing media.	
⇒ Use sufficient personal protective equipment.	
⇒ Rinse the dosing pump with a 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
Caustic burns or other burns through dosing media!	
After connecting the mains supply, residual dosing media in the dosing head can spray out.	
⇒ Before connecting the mains supply, connect the dosing lines.	
⇒ Check that all the screw connections have been tightened correctly and are leak-proof.	

	CAUTION
Danger of personal injury and material damage!	
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.	
⇒ Carry out maintenance work at the recommended intervals.	

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

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 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	<ul style="list-style-type: none"> ■ 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 that the installed accessories are functioning correctly	Regularly
Check the dosing pump for unusual noises during operation, unusual temperatures or smells	Regularly
Replace parts that are subject to wear (diaphragms, valves, seals, etc.)	When unacceptable levels of wear are detected
Rinse out and clean the dosing pump	<ul style="list-style-type: none"> ■ Before changing diaphragms ■ Before taking out of service for a long period of time ■ After feeding aggressive, sticky, crystallising or contaminated liquids

Tab. 51: Maintenance information and maintenance intervals

12.2 Tighten up dosing head bolts

→ Tighten the dosing head bolts in diagonally opposite sequence with a torque wrench.

The necessary torque is 180 Ncm.

12.3 Change the diaphragm

The MEMDOS SMART LP dosing pump has an automatic diaphragm change program which simplifies replacing diaphragms.

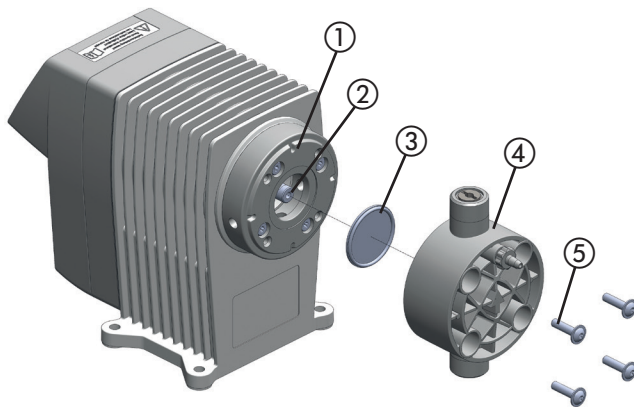


Fig. 65: Exploded view of the diaphragm and dosing head

12.3.1 Remove the old diaphragm

Precondition for action:

- ✓ The hydraulic parts of the system are depressurised.
- ✓ The dosing pump has been rinsed out with a non-hazardous medium (e.g. water).

Perform the following working steps:

1. Screw out the four screws e on the dosing head using ① suitable tool (SW 3 Allen key) and take off the dosing head ④.
2. Press **Menu**.
3. Use the **↑** or **↓** key to choose the *Diaphragm change* menu item and press **OK**.
 - ▶ The dosing pump displays menu 9 *Diaphragm change*.

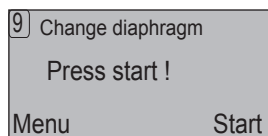
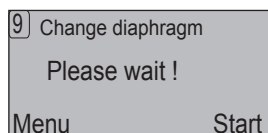
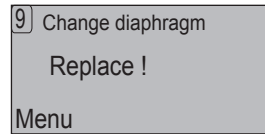


Fig. 66: Menu 9 Diaphragm replacement

4. Press **Start**.
 - ▶ The diaphragm travels to the front end position. The message "Please wait!" is displayed.



- ▶ Wait until the message „Replace!“ is displayed.



5. Use pliers to bend the edge of the diaphragm ③ slightly upwards and screw it out counter-clockwise.

12.3.2 Install a new diaphragm

Precondition for action:

- ✓ You have thoroughly cleaned the diaphragm rod ② and the diaphragm flange ① so that the new diaphragm is not affected by dosing medium residues.
- ✓ You have slightly greased the diaphragm thread ③ (e.g. using Molykote Longterm W2).

1. Screw the diaphragm manually ③ in the clockwise direction until it safely contacts into the diaphragm rod.
2. Press **Menu**.
 - ▶ The diaphragm travels to the rear end position.
3. Bring the dosing head into position and insert the screws. 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.



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 the screws to a torque of 180 Ncm.

- ✓ **Diaphragm change finished.**



It may be necessary to recalibrate the dosing pump after replacing the diaphragm or other spare parts on it. For more information, refer to Page 41.

12.4 Clean suction and discharge valves

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

With dosing heads made of plastic, when replacing a valve you must replace the complete dosing head (see „Spare parts“ on page 55).

13 Troubleshooting

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

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	→ Set Slow Motion 1 or 2. → 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.

Tab. 52: Type of fault: Dosing pump not delivering or output too low

Possible cause	Remedy
System back pressure too high (measured at discharge connection of dosing pump)	→ Clean blocked injection nozzle. → Install pulsation dampeners to reduce pressure peaks if pipes are too long. → Check function of safety valves.

Tab. 52: 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	→ Set Slow Motion 1 or 2. → 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.

Tab. 53: 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)	<ul style="list-style-type: none"> → Remove the damaged parts or install a new valve.
Suction line is leaking	<ul style="list-style-type: none"> → Seal the leak locations or replace the parts.
Suction line is blocked (e.g. screen in foot valve)	<ul style="list-style-type: none"> → Clean the suction line
Viscosity too high	<ul style="list-style-type: none"> → Set Slow Motion 1 or 2. → 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	<ul style="list-style-type: none"> → Check the electrical installation.
Suction side pressure too high (pump siphoning)	<ul style="list-style-type: none"> → Install a back-pressure valve in the pressure line.
Pressure peaks due to acceleration with long suction lines	<ul style="list-style-type: none"> → Install a suction pressure regulator.
Imprecise dosing due to changeable positive and negative suction heads	<ul style="list-style-type: none"> → Install a suction pressure regulator.
System back pressure 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.

Tab. 54: Type of fault: Delivery rate varies

13.1.4 No stroke movement observed

Possible cause	Remedy
Diaphragm return spring broken	<ul style="list-style-type: none"> → Contact the manufacturer.
Current supply interrupted	<ul style="list-style-type: none"> → Reconnect the current supply
The dosing pump's electrical data does not match that of the mains supply	<ul style="list-style-type: none"> → Check the electrical installation.

Tab. 55: Type of fault: No stroke movement observed

Possible cause	Remedy
Pressure peaks due to acceleration with long suction lines	<ul style="list-style-type: none"> → Install a suction pressure regulator.
System back pressure 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.

Tab. 55: 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)	<ul style="list-style-type: none"> → Install a back-pressure valve in the pressure line.
Pressure peaks due to acceleration with long suction lines	<ul style="list-style-type: none"> → Install a suction pressure regulator.

Tab. 56: 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	<ul style="list-style-type: none"> → Open the shut-off valves Inspect the dosing pump for possible damage.
Pressure peaks due to acceleration with long suction lines	<ul style="list-style-type: none"> → Install a suction pressure regulator.
The materials are not suitable for the dosing medium being used	<ul style="list-style-type: none"> → Check the resistance of the materials.
Diaphragm not screwed up to the end stop on the diaphragm rod	<ul style="list-style-type: none"> → Screw a new diaphragm up to the end stop.
System back pressure 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	<ul style="list-style-type: none"> → Clean the dosing head.

Tab. 57: Type of fault: Diaphragm is torn or tears too often

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	The motor is running too slowly. A very large number of strokes have accumulated.	#16	No	Yes
Motor accumulator Stop	Motor memory Stop	The motor is running extremely slowly. Too many strokes have accumulated. For safety reasons, the motor will be switched off.	#17	Yes	Yes
-	Alarm list deleted	Delete list of messages	#18	No	No
Motor not stopping Stop	Motor does not stop Stop	The motor is not responding to the command to stop. Switch off the motor voltage.	#19	Yes	Yes

Tab. 58: List of control unit messages

14 Spare parts

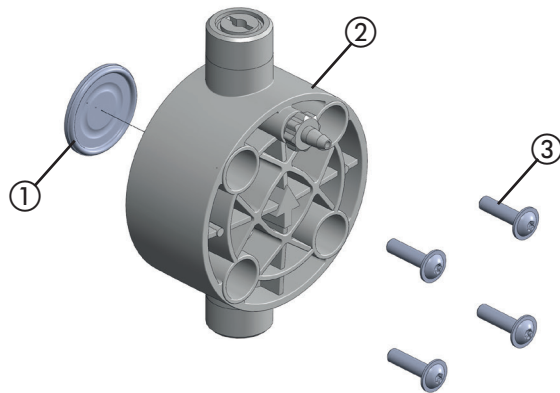


Fig. 67: Spare parts kits for MEMDOS SMART LP 2, 5, 10 (dosing head made of plastic)

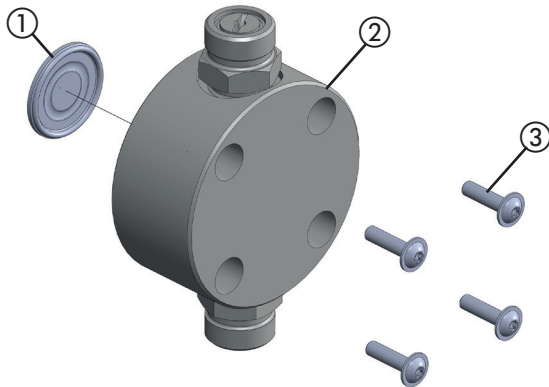


Fig. 68: Spare parts kits for MEMDOS SMART LP 2, 5, 10 (dosing head made of stainless steel (1.4571))

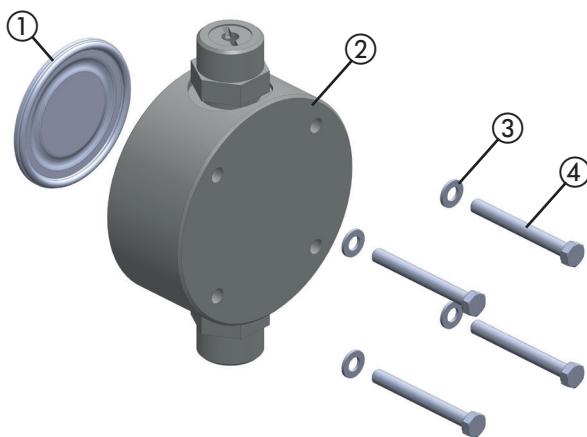


Fig. 69: Spare parts kits for MEMDOS SMART LP 15, 20 (dosing head made of plastic or stainless steel (1.4571))

Required kits for a complete service:

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

14.1 Diaphragm spare parts kits

Diaphragm spare parts kit containing:

- 1 diaphragm ①,
- 1 set of dosing head screws ③,
- 1 set of washers ④ (only MEMDOS SMART LP 15, 20).

Diaphragm kit	Tips	Part No.
	LP 2	39122
	LP 5, LP 10	39123
	LP 15, LP 20	40607

14.2 Dosing head spare parts kits including valves

Spare parts set: dosing head including screws consisting of:

- Dosing head ②,
- Valves,
- 1 set of dosing head screws ③,
- 1 set of washers ④ (only MEMDOS SMART LP 15, 20).

PVC	Type	Part No.
Glass/PVDF/FPM (ball/seat/seals)	LP 2	41192
	LP 5, LP 10	38983
	LP 15, LP 20	40571

PP	Type	Part No.
Glass/PVDF/FPM (ball/seat/seals)	LP 2	41193
	LP 5, LP 10	38980
	LP 15, LP 20	40572

PVDF	Type	Part No.
PTFE/PVDF/FPM (ball/seat/seals)	LP 2	41194
	LP 5, LP 10	38986
	LP 15, LP 20	40573

Stainless steel (1.4571)	Type	Part No.
Stainless steel (1.4571) / stainless steel (1.4571) / FPM (ball/seat/seals)	LP 2	41195
	LP 5, LP 10	39944
	LP 15, LP 20	40574

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.

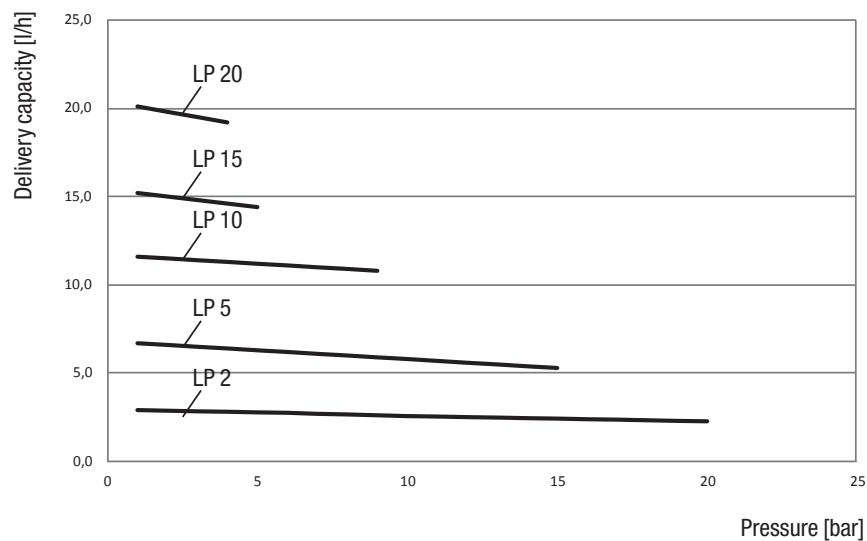
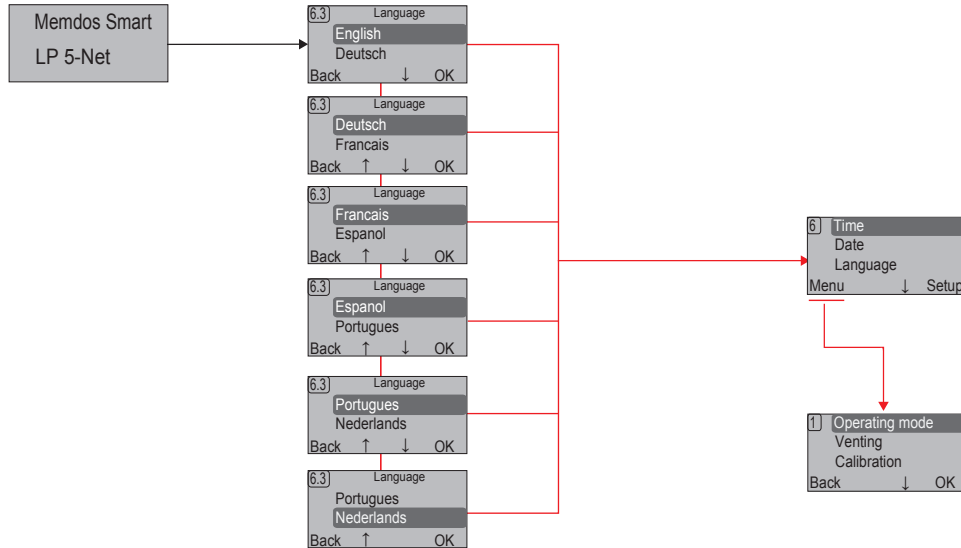


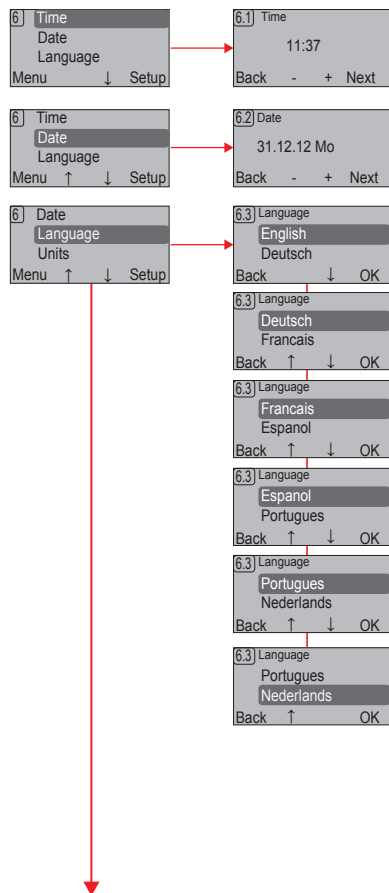
Fig. 70: Delivery characteristic curves MEMDOS SMART LP 2 – 20

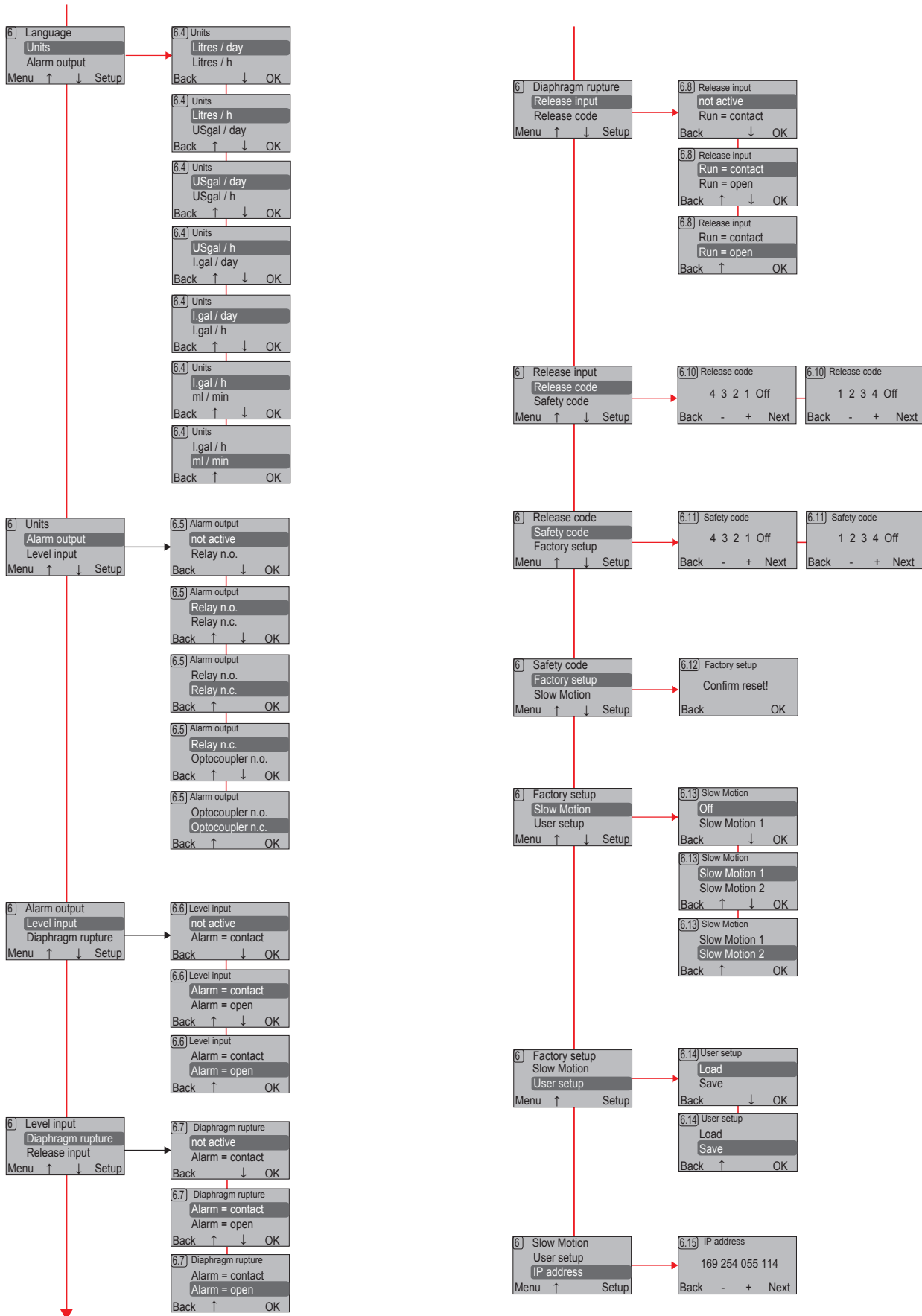
16 Menu structure of the Control Unit

16.1 Program start

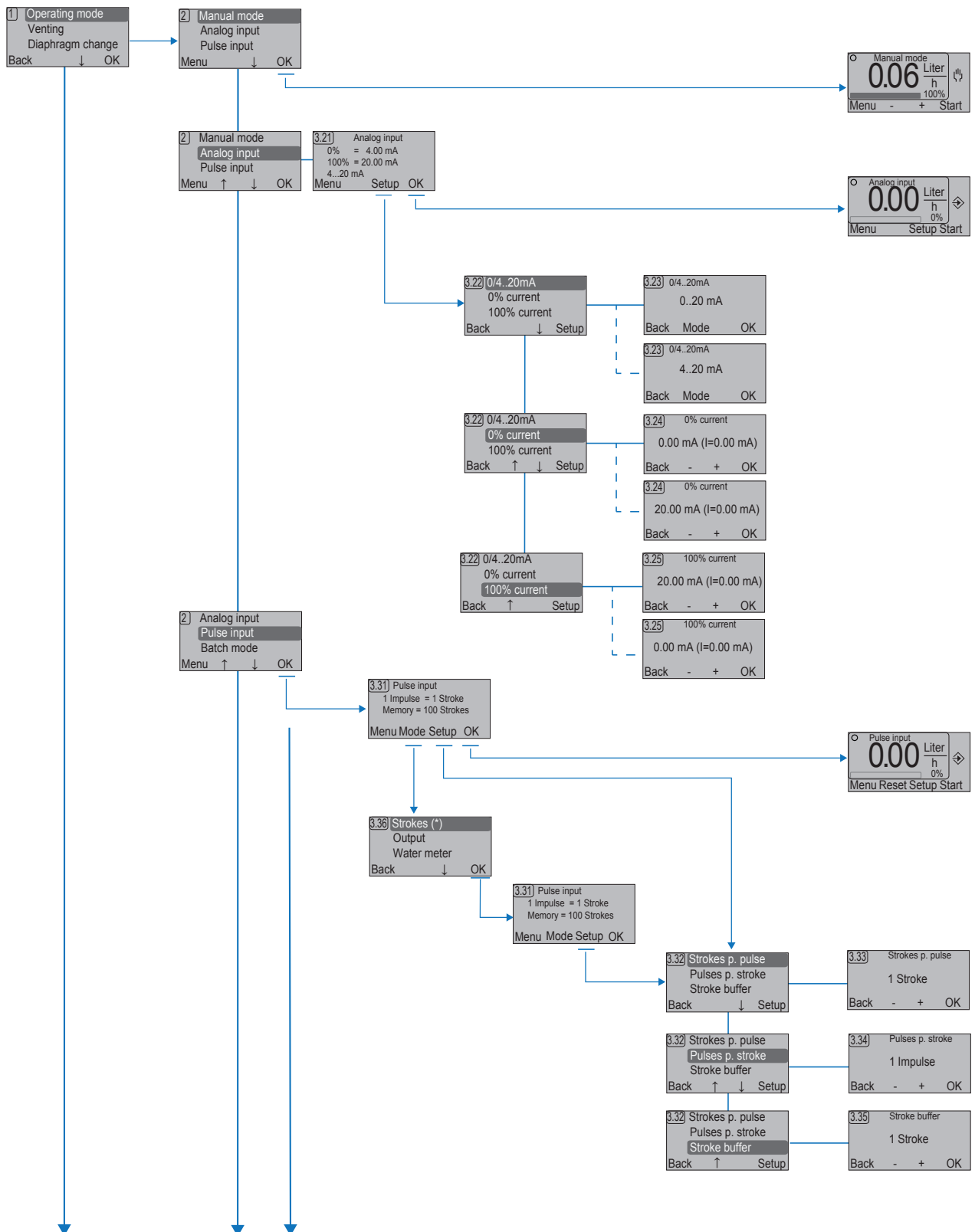


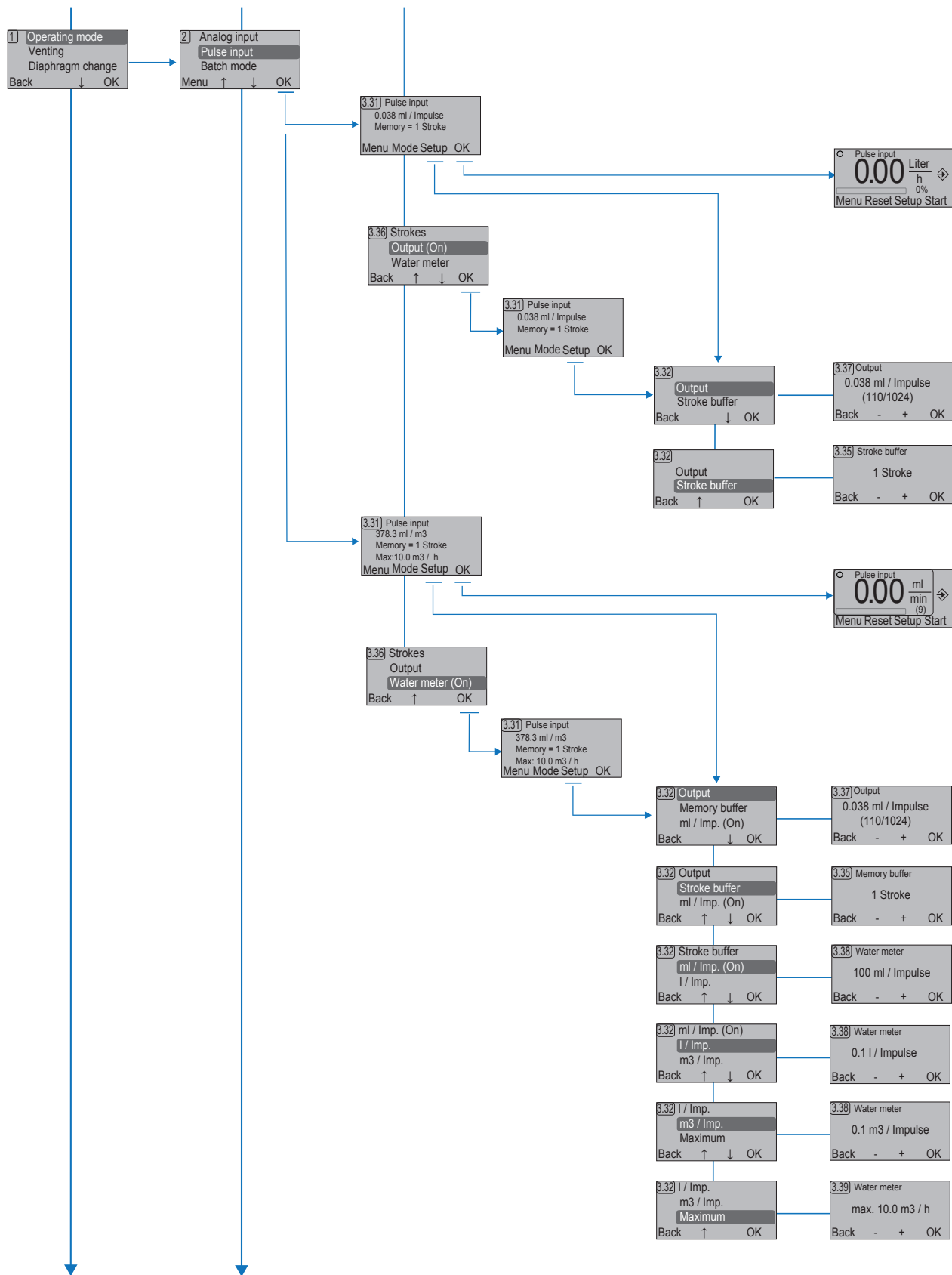
16.2 System setup

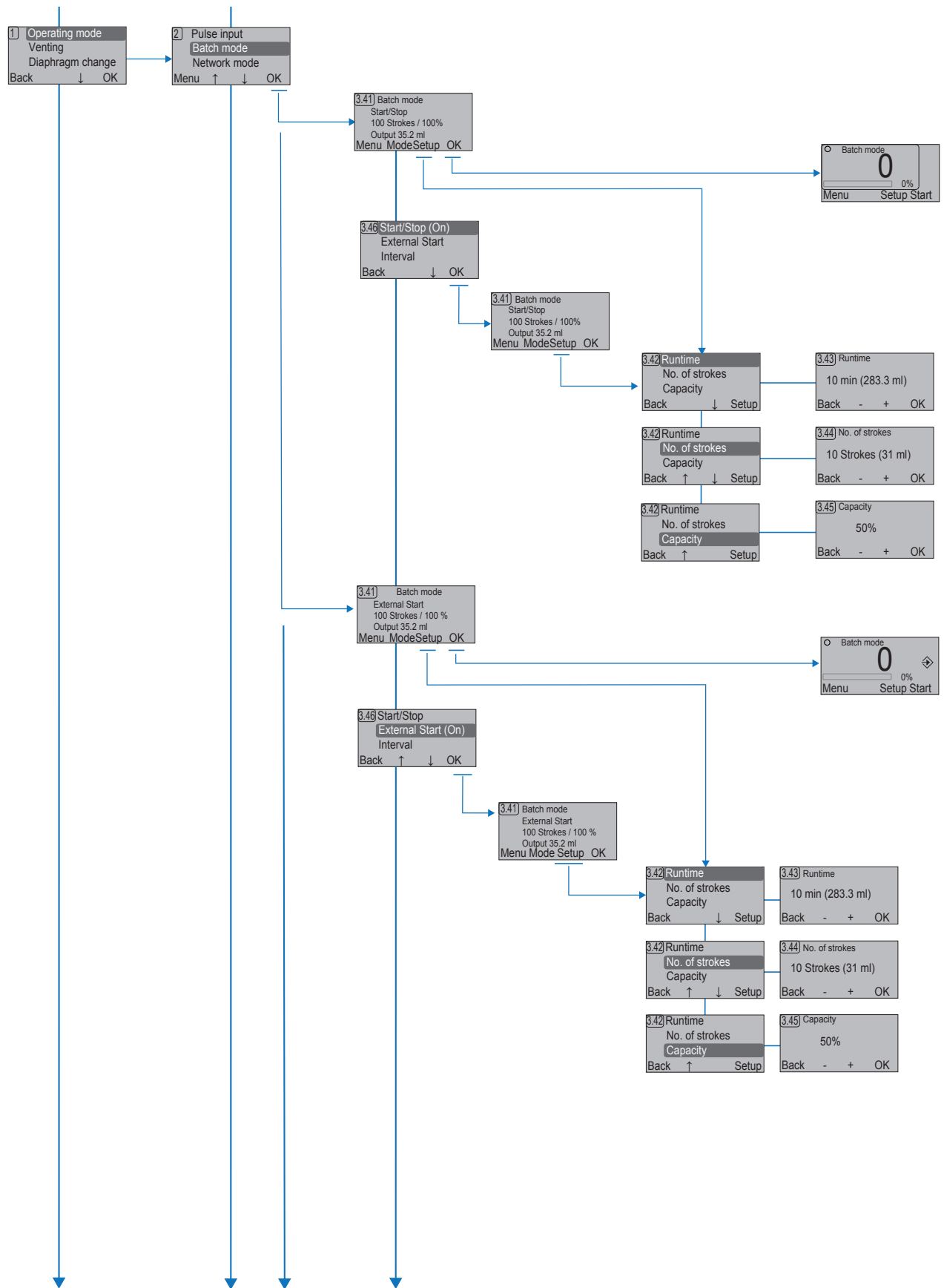


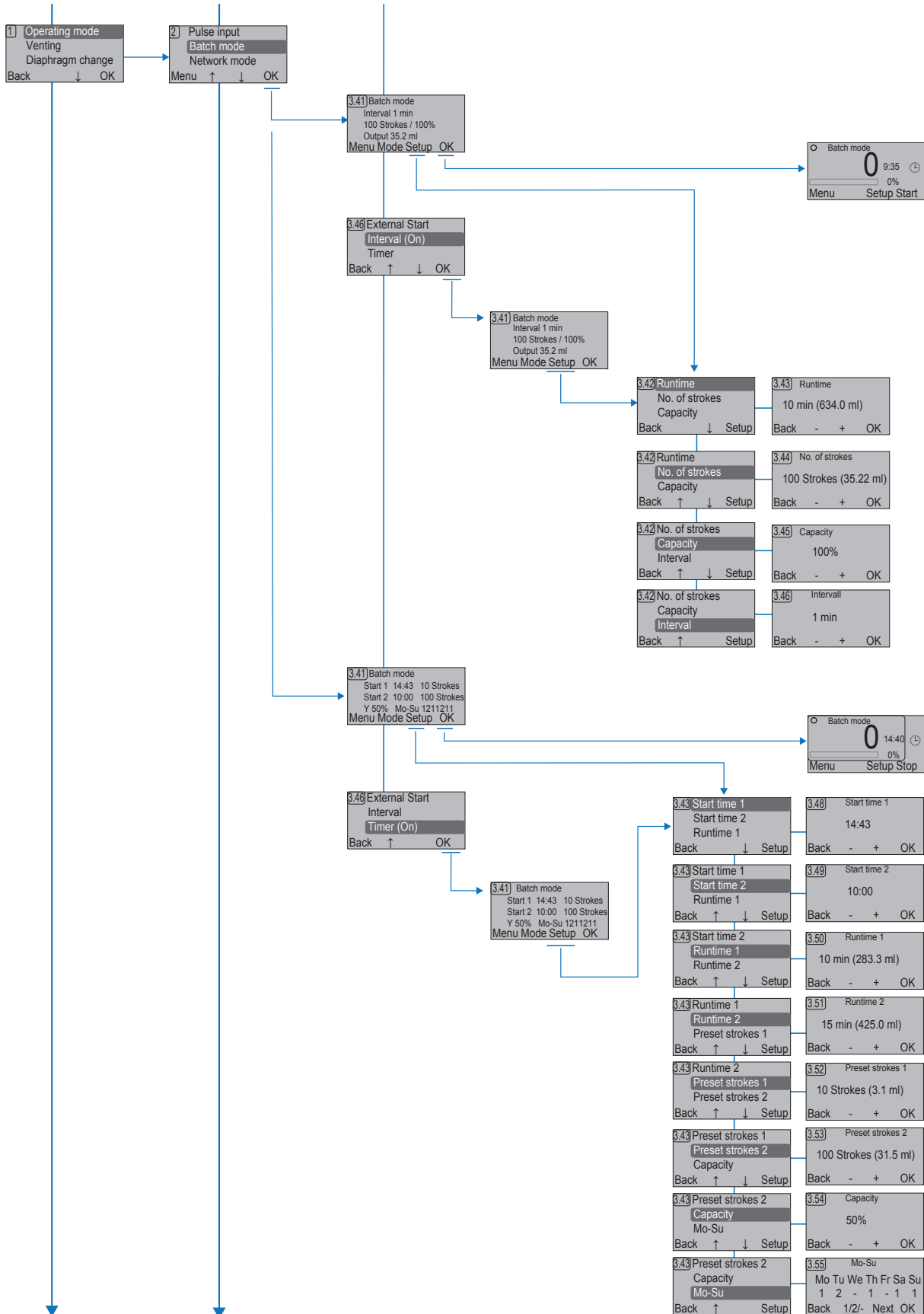


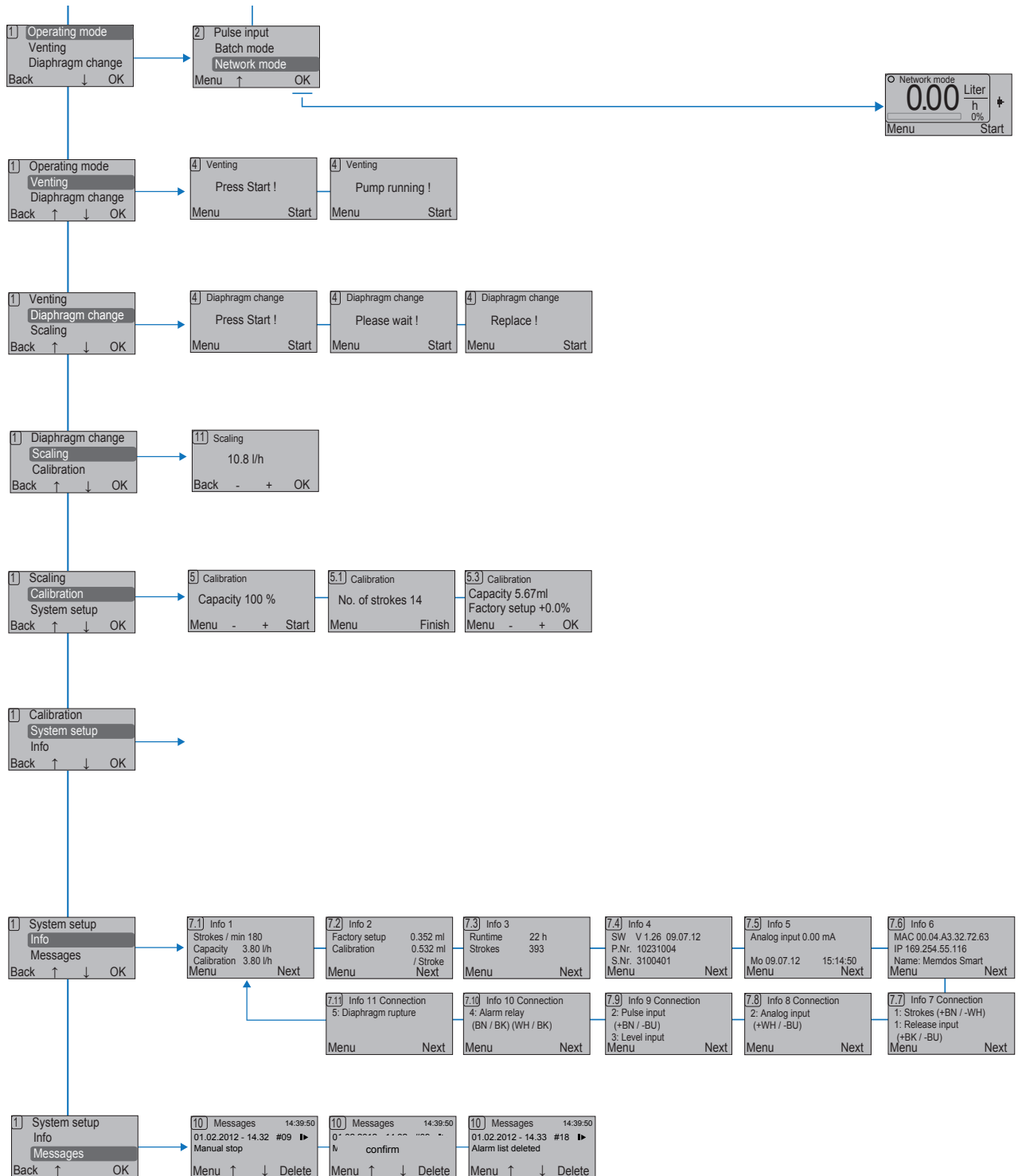
16.3 Main menu











17 Appendix

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

Address	Word	r/w	Type	Field	Description
0 - 3	-				
4	1	r	Number	Model	0340 _{hex} : LP 5 0341 _{hex} : LP 10 0342 _{hex} : LP 15 0343 _{hex} : LP 20 0345 _{hex} : LP 2
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"

Tab. 59: Addresses of MODBUS TCP/IP protocol (MEMDOS SMART LP-Net)

Address	Word	r/w	Type	Field	Description
53	1	r	Number	Reporting of last event	0340 _{hex} + 0000 _{hex} : Not an error 0001 _{hex} : Container at minimum level 0002 _{hex} : Container at empty level 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%" (applies to the manual mode and batch mode operating modes)
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
65*	1	r/w	Number	Specify the running time	Running time of the batch dosing in min
66*	1	r/w	Number	Start the batch	Number "1" starts the batch dosing

Tab. 59: Addresses of MODBUS TCP/IP protocol (MEMDOS SMART LP-Net)

* From firmware version 1.43 onwards

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) 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} 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)

Tab. 59: Addresses of MODBUS TCP/IP protocol (MEMDOS SMART LP-Net)

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

Type	Description
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	
Release code	Off	
Safety code	Off	
Slow Motion	Off	
IP address (MEMDOS SMART LP Net)	169.254.055.116	
Analog input	0/4..20 mA	4..20 mA
	0%	4.0 mA
	100%	20.00 mA

Tab. 60: Default settings

Parameter		Factory setting	Own setting
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 %	

Tab. 60: Default settings

18 EC Declaration of Conformity



(DE) EG-Konformitätserklärung

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

(EN) EC Declaration of Conformity

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

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

(FR) Déclaration de conformité CE

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

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

(ES) Declaración de conformidad CE

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

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

(NL) EU-overeenstemmingsverklaring

Ondergetekende Lutz-Jesco GmbH, 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.

(PT) Declaração de conformidade CE

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

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

Bezeichnung des Gerätes:

Schrittmotor-Membrandosierpumpe

Description of the unit:

Stepper Motor-driven Diaphragm Dosing Pump

Désignation du matériel:

Pompe doseuse à membrane entraînée par moteur pas à pas

Descripción de la mercancía:

Bomba dosificadora de membrana con motor paso a paso

Omschrijving van het apparaat:

Designação do aparelho:

Typ:

MEMDOS SMART LP 2 – 20, MEMDOS SMART LP-Net 2 – 20

Type:

EG-Richtlinien:

2006/42/EG, 2004/108/EG

EC directives:

Die Schutzziele der Niederspannungsrichtlinie 2006/95/EG wurden gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie 2006/42/EG eingehalten.

The protective aims of the Low Voltage Directive 2006/95/EC were adhered to in accordance with Annex I, No. 1.5.1 of the Machinery Directive 2006/42/EC.

Harmonisierte Normen:

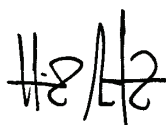
EN ISO 12100, EN 809, EN 61000-6-2, EN 61000-6-3

Harmonized standards:

Dokumentationsbevollmächtigter:

Lutz-Jesco GmbH

Authorized person for documentation:



Heinz Lutz
Geschäftsführer / Chief Executive Officer
Lutz-Jesco GmbH
Wedemark, 01.03.2014

Lutz-Jesco GmbH
Am Bostelberge 19
30900 Wedemark
Germany

19 Declaration of no objection

Declaration of no objection

Please fill out a separate form for each appliance!

We forward the following device for repairs:

Device and device type: Part-no.:

Order No.: Date of delivery:

Reason for repair:

.....

.....

Dosing medium

Description: Irritating: Yes No

Properties: Corrosive: Yes No

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

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

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

Company / address: Phone:

..... Fax:

..... Email:

Customer No.: Contact person:

Date, Signature:

20 Warranty claim

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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Product Range

Lutz Pumpen GmbH
 P.O. Box 1462 • D-97864 Wertheim
www.lutz-pumpen.de

Product Range

Lutz-Jesco GmbH
 P.O. Box 100164 • D-30891 Wedemark
www.lutz-jesco.com



Barrel and Container Pumps



Dosing Pumps



Measuring and Control Equipment



Flow Meters



Chlorinators



Disinfection



Double Diaphragm Pumps



Chemical Centrifugal Pumps



Standard Plus



Centrifugal Pumps



TECHNOPOL®

Products for the disinfection of swimming pool water based on salt water electrolysis and domestic water technology



The Lutz-Jesco App for iPads is available from the iTunes App Store.
 Additional information can be found at www.lutz-jesco.com



Headquarters
Lutz-Jesco GmbH
 Am Bostelberge 19
 30900 Wedemark
 Germany

Tel.: +49 5130 5802-0
 Fax: +49 5130 580268

E-mail: info@lutz-jesco.com
 Website: www.lutz-jesco.de

Hungary
Lutz-Jesco Üzletég
 Vasvári P. u. 9.
 9024 Győr
 Hungary

Tel.: +36 96 523046
 Fax: +36 96 523047

E-mail: info@lutz-jesco.hu
 Website: www.lutz-jesco.hu

Austria
Lutz-Jesco GmbH
 Aredstraße 7/2
 2544 Leobersdorf
 Austria

Tel.: +43 2256 62180
 Fax: +43 2256 6218062

E-mail: info@lutz-jesco.at
 Website: www.lutz-jesco.at

Netherlands
Lutz-Jesco Nederland B.V.
 Nijverheidstraat 14 C
 2984 AH Ridderkerk
 Netherlands

Tel.: +31 180 499460
 Fax: +31 180 497516

E-mail: info@lutz-jesco.nl
 Website: www.lutz-jesco.nl



Great Britain
Lutz-Jesco (GB) Ltd.
 Gateway Estate
 West Midlands Freeport
 Birmingham B26 3QD
 Great Britain

Tel.: +44 121 782 2662
 Fax: +44 121 782 2680

E-mail: info@lutz-jesco.co.uk
 Website: www.lutz-jesco.co.uk

USA
Lutz-JESCO America Corp.
 55 Bermar Park
 Rochester, N.Y. 14624
 USA

Tel.: +1 585 426-0990
 Fax: +1 585 426-4025

E-mail: mail@jescoamerica.com
 Website: www.lutzjescoamerica.com

East Asia
Lutz-Jesco East Asia Sdn Bhd
 6 Jalan Saudagar U1/16
 Hicom Glenmarie Industrial Park
 40150 Shah Alam/ Selangor
 Malaysia

Tel.: +603 55692322
 Fax: +603 55691322

E-mail: info@lutz-jescoasia.com
 Website: www.lutz-jescoasia.com

Middle East
Lutz-Jesco Middle East FZE
 P.O. Box 9614
 SAIF-Free Zone Center
 Sharjah
 UAE

Tel.: +971 6 5572205
 Fax: +971 6 5572230

E-mail: info@jescome.com
 Website: www.jescome.com

