



A Grundfos company

# Piston Diaphragm Dosing Pump KM 254

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## Operation Manual

Please read the Operating and Servicing Manual completely and retain for future reference!

## **Imprint**

**Piston Diaphragm Dosing Pump KM 254  
Operation Manual**

**Version 1.0**

**Issued by**

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**Subject to change.**

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# 1 General

## 1.1 Introduction

This operation manual contains all the information required for starting up and handling the described KM 254 pump.

If you require further information or if any problems arise, which are not discussed in detail in this operation manual, contact ALLDOS directly for the information needed.

ALLDOS Eichler GmbH  
Reetzstr. 85  
D-76327 Pfinztal (Söllingen), Germany

The ALLDOS service centre can be reached via our fax service or hotline:

Fax: ++49 (0) 61-211 - Reference "Quality Service"  
Hotline: ++49 (0) 61-230

## 1.2 Information About the Product

### 1.2.1 Pump Types

The KM 254 piston diaphragm dosing pump is available for a variety of power ranges in various sizes:

Pump types and designation see type plate

**The following is indicated on the type plate of the pump:**

- The pump type specifies the stroke volume, connection size, performance data (see below).
- The serial number of the pump which is used to store and access the pump configuration at ALLDOS.
- The most important characteristics of the pump configuration e.g. for dosing head and valve materials, they are described in the "Product Description and Accessories" section.
- Maximum flow rate, maximum counterpressure
- Mains frequency

**The following is indicated on the type plate of the pump drive:**

- required energy
- mains frequency
- power consumption
- degree of protection

### 1.2.2 Pump Performance

Performance data at maximum pump counterpressure

Type		50 Hz			60 Hz			100 Hz		
Singlepump	Doublepump	Q* [l/h]	p max [bar]	stroke value [n/min]	Q* [l/h]	p max [bar]	stroke value [n/min]	Q* [l/h]	p max [bar]	stroke value [n/min]
254-50	254-50/2	50	10	26	60	10	31	101	10	52
254-102	254-102/2	102	10	54	122	10	65	203	10	108
254-143	254-143/2	143	10	75	172	10	90	286	10	150
254-175	254-175/2	175	10	92	210	10	110	—	—	—
254-213	254-213/2	213	10	112	255	10	134	—	—	—
254-291	254-291/2	291	10	153	—	—	—	—	—	—
254-46	254-46/2	46	16	26	55	16	31	92	16	52
254-97	254-97/2	97	16	54	116	16	65	193	16	108
254-136	254-136/2	136	16	75	163	16	90	271	16	150
254-166	254-166/2	166	16	92	200	16	110	—	—	—
254-202	254-202/2	202	16	112	242	16	134	—	—	—
254-276	254-276/2	276	16	153	—	—	—	—	—	—

\* l/hr per dosing head; double the capacity for double pumps.



Note

**The pump can be operated in the range between 10% and 100% of the maximum dosing capacity.**

### 1.2.3 Accuracy

Dosing flow fluctuation smaller  $\pm 1\%$   
 Linearity deviation  $\pm 1\%$  of the full-scale value (for water with a fully deaerated dosing head)

### 1.2.4 Admission Pressure and Counterpressure / Suction Height

Maximum admission pressure at the suction side [bar]

Type	[bar]
KM 254	5

Minimum counterpressure at the pressure valve of the pump [bar]

Type	[bar]
KM 254	2



Note

**A positive pressure difference of 2 bar min. is required between the suction valve and the pressure valve in order for the dosing pump to operate correctly. If the total counterpressure (at the dosing point) and geodetic height difference between the suction valve and the dosing point is less than 2 bar (20 m WS), a pressure retention valve must be installed directly in front of the dosing point.**

Maximum counterpressure\* [bar]

Type		p max [bar]
Singlepump	Doublepump	
254-50	254-50/2	10
254-102	254-102/2	
254-143	254-143/2	
254-175	254-175/2	
254-213	254-213/2	
254-291	254-291/2	
254-46	254-46/2	16
254-97	254-97/2	
254-136	254-136/2	
254-166	254-166/2	
254-202	254-202/2	
254-276	254-276/2	

\*Observe the maximum permissible temperatures

**Maximum suction height \* [m] for media with a viscosity similar to water**

Type		Suction height max. [m WS]
Singlepump	Doublepump	
254-50	254-50/2	1
254-102	254-102/2	
254-143	254-143/2	
254-175	254-175/2	
254-213	254-213/2	
254-291	254-291/2	flooded suction
254-46	254-46/2	1
254-97	254-97/2	
254-136	254-136/2	
254-166	254-166/2	
254-202	254-202/2	
254-276	254-276/2	flooded suction

\*applies to a filled dosing head

**Maximum suction height [m] for media with maximum permissible viscosity**

Type	[m]
KM 254	flooded suction

**1.2.5 Sound Pressure Level**

Type	
KM 254	65 ± 5 dB (A), testing according to DIN 45635-01-KL3

**1.2.6 Degree of Protection**

Depending on the motor variant that is selected, see type plate of the motor.  
The specified degree of protection can only be ensured, if the mains cable is connected with the same degree of protection.

**1.2.7 Mains Voltage****Power supply for AC voltage**

Nominal voltage	Deviation from the nominal value
230 / 400 V	± 10 %
240 / 415 V	± 10 %
115 V	± 10 %

**max. permissible mains impedance**

(0.084 + j 0.084) Ohm (testing according to DIN EN 61000-3-11)  
these details refer to 50 Hz

**1.2.8 Ambient and Operating Conditions**

Permissible ambient temperature	0 °C to + 40 °C (for an installation height up to 1000 m over NN)
Permissible storage temperature	- 20 °C to + 70 °C
Permissible humidity	relative humidity: 70% at 40 °C, 90% at 35 °C



**Caution**

***Risk of malfunction or damage to the device!  
The installation site must be under cover!  
Pumps with electronics are only suitable for indoor use!  
Do not install outdoors!***

## 1.2.9 Dosing Medium



### Note

**In the event of questions regarding the material resistance and suitability of the KM 254 for specific dosing media, please contact the manufacturer.**

**The dosing medium must fulfil the following characteristics for standard version pumps:**

- Liquid
- Non-abrasive \*
- non-combustible \*\*

\* The dosing of abrasive media is possible with certain versions, on request,

\*\* the dosing of combustible media is possible with certain versions of explosion protected pumps, in accordance with ATEX.

**Maximum permissible viscosity at operating temperature\***

Type	up to stroke value 63 [n / min]	stroke value 64 - 120 [n / min]	from stroke value 121 [n / min]
	Viscosity (max.) * mPas		
KM 254	300	100	5

\* The specified values are approximate values and refer to the standard version of pumps.

Dosing Medium:  
Newtonian liquid  
non-degassing  
without suspended matter  
density similar to water

Please note the increasing viscosity at lower temperatures!

**Permissible media temperature**

Dosing head material	Min. media temperature	Max. media temperature < 10 bar	Max. media temperature < 16 bar
PVC	0 °C	40 °C	20 °C
1.4571 *	-10 °C	100 °C	100 °C
2.4610 *	-10 °C	100 °C	100 °C
PP	0 °C	40 °C	20 °C
PVDF	-10 °C	60 °C 70° C at 9 bar	20 °C

\* At 70°C maximum counterpressure of 3 ba

\* For SIP/CIP applications, 145 °C is permissible for a short period of time (approx. 15 min) at < 2 bar.



### Caution

**Risk of malfunction or damage to the device!  
The dosing medium must be in liquid phase!  
Observe the freezing and boiling point of the dosing medium!**



### Caution

**Risk of malfunction or damage to the device!  
The resistance of the parts that come into contact with the media depends on the media, media temperature and operating pressure. Ensure the parts that come into contact with the media are chemically resistant to the dosing medium in operating conditions!  
Observe the manufacturer's safety instructions when handling chemicals!  
Observe limitations of dosing media depending on type of pump!**

## 1.3 Application of the Device

### 1.3.1 Appropriate, Acceptable and Correct Usage

The KM 254 pump, described here is suitable for dosing liquid media strictly in accordance with the instructions in this manual.

**Note**

***Pumps in explosion protected version are identified accordingly on the pump type plate and motor type plate, and an EC Declaration of conformity is provided in accordance with guidelines 94/9/EC, which replaces the EC Declaration of conformity which is printed in this instruction manual.***

**Warning**

***To operate a pump which has been identified as an explosion protected pump for the dosing of combustible liquids or for operation in potentially explosive operating sites in accordance with guideline 94/9/EC, refer to the enclosed instruction manual "Operating an explosion protected pump" in addition to this operation manual.***

**Warning**

***Other applications or the operation of pumps in ambient and operating conditions, which are not approved, are considered improper and are not permitted. ALLDOS Eichler GmbH accepts no liability for any damage resulting from incorrect use.***

## 1.4 Warranty

Warranty in accordance with our general terms of sales and delivery shall only be valid if:

- The KM 254 pump is used in accordance with the information within this operation manual
- The KM 254 pump is not opened or incorrectly handled
- Repairs are only carried out by authorised and qualified personnel
- Only original spare parts are used for repairs

## 2 Safety

This operation manual contains general instructions that must be observed during installation, operation and maintenance of the pump. This operation manual must therefore be read by the installation engineer and the relevant qualified personnel/operators prior to installation and start-up, and must be available at the installation location of the pump at all times.

It is not only the general safety instructions described in this "Safety" section that must be observed, but all special safety instructions that are provided in the other sections.

### 2.1 Identification of Safety Instructions in the Operation Manual

Safety instructions or other advice included in this operation manual, which, if not followed could result in personal injury or damage to the pump and its functions, are identified with the following symbols:



**Warning**

***Risk of accidents and injury!***



**Warning**

***Risk accidents and injury caused by electrical voltage!***



**Caution**

***Risk of malfunction or damage to the device!***



**Note**

***There is an exceptional feature.***

Information provided directly on the pump, e.g.

- Labelling of fluid connections
- Arrow indicating the direction of rotation

must be observed and must be legible at all times.

### 2.2 Qualification and Training of Personnel

Operating, maintenance, inspection and installation personnel must have the relevant qualifications. The responsibility and supervision of personnel must be strictly controlled by the operator. Personnel must be trained and instructed if they do not have the required level of knowledge. If necessary, this can be done by the manufacturer/supplier at the request of the operator of the pump. It is the responsibility of the operator to make sure that the contents of the operation manual are understood by the personnel.

### 2.3 Risks When Safety Instructions Are Not Observed

If safety instructions are not observed, this may have dangerous consequences for humans, the environment and the pump. If safety instructions are not observed, this may lead to the loss of any claims for damages.

If individual safety instructions are not observed, this may cause the following damage, for example:

- Failure of important functions of the pump/system
- Failure of specified methods for maintenance
- Harm to humans from exposure to electrical, mechanical and chemical influences
- Damage to the environment from leakage of harmful substances

### 2.4 Safety-Conscious Working

The safety instructions described in this operation manual, applicable national regulations for accident prevention and any internal working, operating and safety regulations of the operator must be observed.

## 2.5 Safety Instructions for the Operator / User

Hazardous hot or cold parts on the pump must be protected to prevent accidental contact.

Leakages of dangerous substances (e.g. hot, toxic) must be disposed of in a way that is not harmful to humans or the environment. Legal regulations must be observed.

Damage caused by electrical energy must be prevented (for more details see, e.g. the regulations of the VDE and the local power supply company).

## 2.6 Safety Instructions for Maintenance, Inspection and Installation Work

The operator is responsible for ensuring that all maintenance, inspection and installation work is carried out by authorised and qualified personnel, who have been adequately trained by reading the operation manual.

All work on the pump should only be carried out when it is stopped. The procedure described in the operation manual for stopping the pump must be observed.

Pumps or pump units which produce media that are harmful to health must be decontaminated.

All safety and protective equipment must be immediately restarted or put into operation once work is complete.

Observe the points described in the initial start-up section prior to subsequent start-up.



**Warning**

***Electrical connections should only be connected by qualified personnel!  
The pump housing must only be opened by personnel authorised by ALLDOS!  
Observe the manufacturer's safety instructions when handling chemicals.  
When working on the dosing head, connections or lines:  
Wear the necessary protective clothing (goggles, gloves)!  
Before removing the dosing head, valves and media lines, empty any remaining medium in the dosing head into a drip tray by carefully unscrewing the suction valve.***



**Warning**

***Install pump so that it is easily accessible for operation and maintenance purposes.  
Observe the resistance of the parts that come into contact with the media depends on the media, media temperature and operating pressure! Observe the restrictions of the dosing media depending on the pump type.  
Only use the specified line types!  
Do not open pump, electronics and sensors!  
Repairs must only be carried out by authorised and qualified personnel!  
Observe flow direction (arrow) of valves!  
Do not operate pump next to closed slides. Risk of damage!***

## 2.7 Unauthorised Modification and Manufacture of Spare Parts

Modification or changes to the pump are only permitted following agreement with the manufacturer. Original spare parts and accessories authorised by the manufacturer are safe to use. Using other parts can result in liability for any resulting consequences.

## 2.8 Improper Operating Methods

The operational safety of the supplied pump is only ensured if it is used in accordance with the "General" section of the operation manual. The specified limit values should on no account be exceeded.



**Note**

***Pumps in explosion protected version are identified accordingly on the pump type plate and motor type plate, and an EC Declaration of conformity is provided in accordance with guidelines 94/9/EC, which replaces the EC Declaration of conformity which is printed in this instruction manual.***

**Warning**

***To operate a pump which has been identified as an explosion protected pump for the dosing of combustible liquids or for operation in potentially explosive operating sites in accordance with guideline 94/9/EC, refer to the enclosed instruction manual “Operating an explosion protected pump” in addition to this operation manual.***

**If the assumption is made that a safe operation is no longer possible, switch off the pump and protect it against unintentional operation.**

**This action should be taken**

- if the pump has been damaged,
- if the pump no longer seems to be operational,
- if the pump has been stored for an extended period of time in poor conditions.

## **2.9 Safety of the System in the Event of a Failure in the Dosing System**

KM 254 dosing pumps are designed according to the latest discoveries and are carefully manufactured and tested. However, a failure may occur in the dosing system. Systems in which dosing pumps are installed must be designed in such a way that the safety of the entire system is still ensured following a failure of the dosing pump. The relevant monitoring and control functions are designed for this.

## 3 Transport and Intermediate Storage

### 3.1 Transport



**Caution**

***Risk of malfunction or damage to the pump! Do not throw or drop the pump.***

#### 3.1.1 Delivery

The piston diaphragm dosing pump KM 254 is supplied in different packaging depending on the overall delivery. For transport and intermediate storage, use the correct packaging to protect the pump against damage.

#### 3.1.2 Return

Clean the pump thoroughly

- before it is returned or stored. It is essential that there are no traces of toxic or hazardous media remaining on the pump,
- Drain oil from the drive mechanism,
- package pump correctly.



**Caution**

***Risk of malfunction or damage to the pump! ALLDOS accepts no liability for damage caused by incorrect transportation, missing or unsuitable packaging of the pump, residual media or leaking oil!***

### 3.2 Unpacking

Retain the packaging for future storage or return, or dispose of the packaging in accordance with local regulations.

### 3.3 Intermediate Storage

Permissible storage temperature	-20°C to +70°C
Permissible humidity	max. 70 % rel. at 40 °C max. 90 % rel. at 35 °C

## 4 Product Description and Accessories

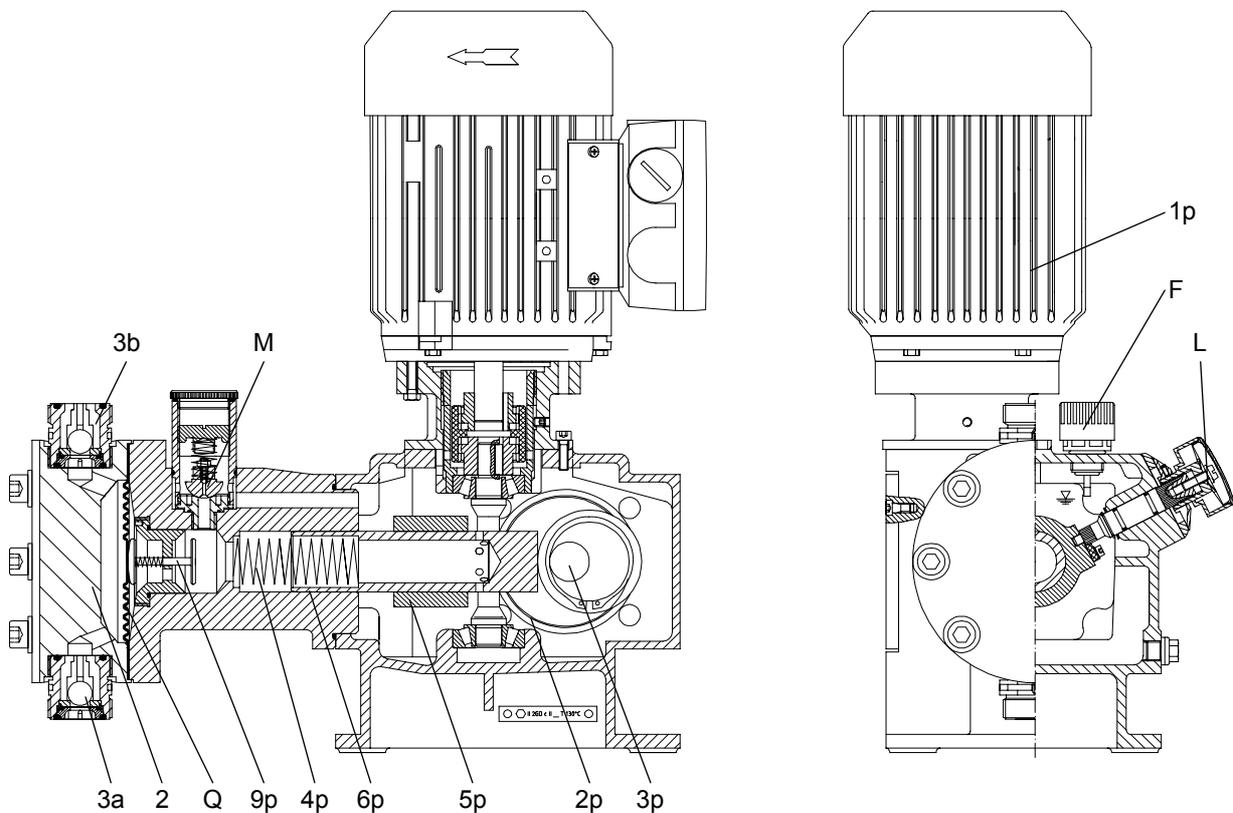
### 4.1 General Description

The KM 254 are oscillatory positive-displacement pumps with hydraulic diaphragm control. The operation procedure of the dosing pump is shown in the sectional drawing.

The rotational movement of the drive motor (1p) is converted via the worm gearing (2p) and eccentric (3p) into the oscillatory suction and stroke movement of the piston (6p). The piston has a hollow bore and a row of radial control holes, which provide a hydraulic connection between the drive area and the piston stroke area. The sliding plug (5p) envelops the holes during the stroke and seals the stroke area from the drive area.

The hydraulic excursion of the solid teflon diaphragm (Q) displaces an equivalent volume of dosing medium from the dosing head (2) into the dosing line. With the suction stroke, the piston creates a low pressure, which propagates in the dosing head, the ball valve (3b) on the dosing side closes and the dosing medium flows through the suction valve (3a) into the dosing head.

The stroke volume size is solely determined by the position of the sliding plug. The active stroke length and corresponding average dosing flow can therefore be changed continuously and linearly from 10-100 % using the stroke adjustment button and Nonius (L).



- 1p Motor
- 2p Worm gearing
- 3p Eccentric
- 4p Recuperating spring (not with drive size 3)
- 5p Sliding plug
- 6p Piston
- M combined overpressure and degassing valve
- 9p Diaphragm protection valve (AMS)
- Q Dosing diaphragm
- 2 Dosing head
- 3a Suction valve
- 3b Pressure valve
- L Stroke adjustment button
- F Aeration screw with oil-level gauge

#### 4.1.1 Combined overpressure and degassing valve

The combined overpressure and degassing valve (M) opens if there is an excessively high build-up of pressure in the dosing system and provokes the constant degassing of the hydraulic medium.

#### 4.1.2 Diaphragm protection system AMS

The diaphragm protection system AMS (9p) has a keypad, which is connected to the dosing diaphragm. The dosing diaphragm oscillates freely in the dosing head and cannot be overstretched due to a fault in the dosing system, since the diaphragm protection valve closes if a fault like this occurs.

#### 4.1.3 Double diaphragm system / Diaphragm breakage signal (optional)

##### General

The piston diaphragm and high-tech dosing pumps with drift-free diaphragm breakage signal are equipped with:

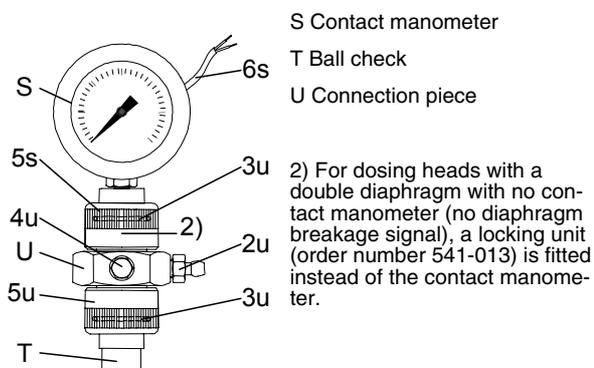
- Dosing head with PTFE double diaphragm system and
- ball check valve with built-in contact manometer

##### Double diaphragm system

Dosing pumps with a double diaphragm system with no diaphragm breakage signal have no manometer. In this case the ball check valve is fitted with a locking unit, order No. 541-013. The valve however can be retrofitted with a contact manometer.

##### Ball check

In order for the diaphragm breakage signal to work and to protect the diaphragms, the gap must be fully deaerated. Dosing heads with a double diaphragm are equipped with a ball check valve (T), to prevent air from flowing back during the filling and deaeration process (2u).



##### Functioning of the diaphragm breakage signal

The check valve and intermediate gap of the diaphragms are filled with a separating agent (paraffin oil) at the factory and are set in such a way during start-up on the test stand, that there is always a hydraulically separated equilibrium between the valve and

diaphragm gap (the manometer indicates “0” when the pump is running and when it is stopped).

If one of these diaphragms breaks, the dosing or hydraulic medium penetrates into the intermediate gap and, when the ball is removed, into the valve. The system pressure is therefore impinged on the valve and the contact manometer is activated. Depending on the design of the system, the electrically isolated reed contact can trigger an alarm device or the pump can be switched off.

The contact is triggered at the preset pressure as is shown in the table below:

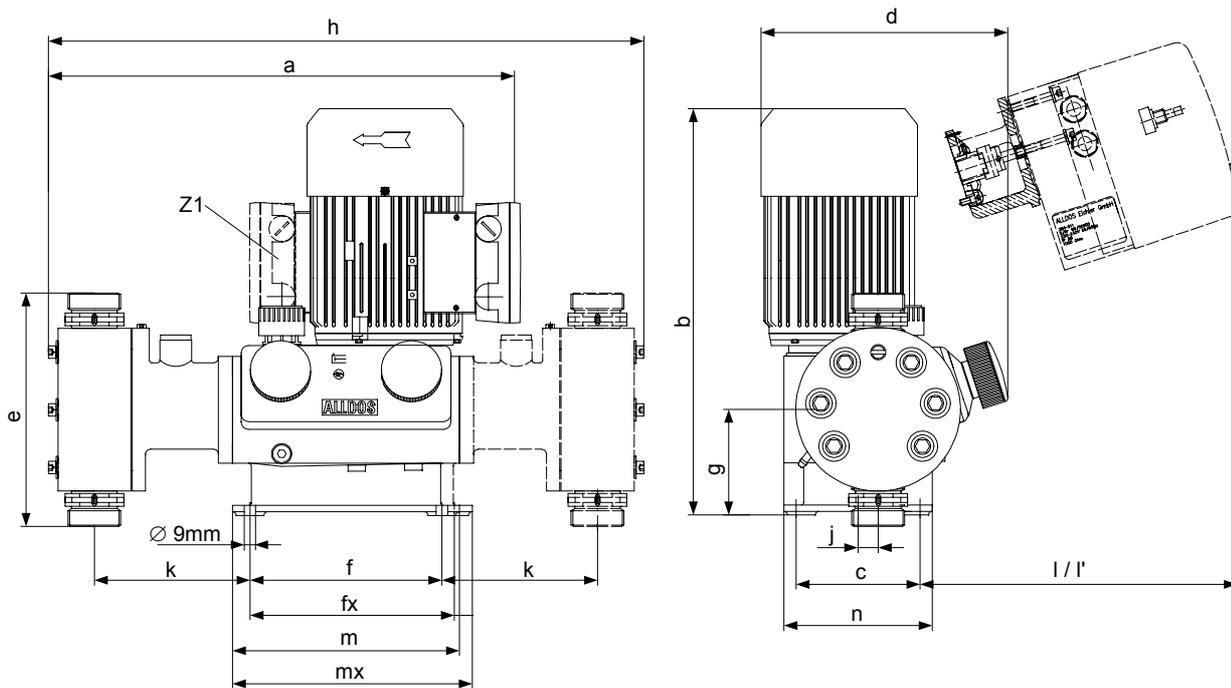
Part number of manometer	Description/Use	Set pressure
541-011	for pumps up to 10 bar manometer 0 - 10 bar	1,5 bar
541-011.1	for pumps up to 10 bar flameproof manometer 0 - 10 bar	1,5 bar
541-012	for pumps 16 to 100 bar manometer 0 - 100 bar	10 bar
541-012.1	for pumps 16 to 100 bar flameproof manometer 0 - 100 bar	10 bar



**Warning**

**The contact manometer (Ex) in explosion protected version with post switch should be used if the pump is fitted with a flameproof motor.**

### 4.2 Dimensional Drawing



Z1 for double pump, motor turned by 180°

fx, mx for double pumps

l for electrical stroke adjustment

l' or pneumatic stroke adjustment

#### Dimensions

Type	Dimensions in mm															
	a	b	c	d	e	f	fx	g	h	j	k	l	l'	n	m	mx
KM 254	436	492	156	252	207	185	260	126	718	10	185	235	413	180	225	300

### 4.3 Weight

Type	Dosing Head Material	Weight [kg] Single / Double pump	
		KM 254	PVC, PP, PVDF
1.4571, 2.4610	32		42

### 4.4 Stroke volume

Type	Stroke volume [cm <sup>3</sup> ]		
	10bar	16 bar	25 bar
KM 254	31,6	30	—

### 4.5 Versions

#### 4.5.1 Dosing heads: Materials and Additional Features

For all dosing heads:

- Diaphragm material: PTFE
- with no manual deaeration

Index No.	Dosing Head	MBS	Heating flange
D000	PVC	—	—
D001	V4A	—	—
D002	PP	—	—
D003	PVDF	—	—
D004	Hastelloy C	—	—
D050	V4A	—	liquid heating
D060	PVC	with double diaphragm system for diaphragm breakage signal	—
D061	V4A		—
D062	PP		—
D063	PVDF		—
D064	Hastelloy C	with double diaphragm system for diaphragm breakage signal Contact manometer in flameproof version	—
D360	PVC		—
D361	V4A		—
D362	PP		—
D363	PVDF	Contact manometer in flameproof version	—
D364	Hastelloy C		—

#### 4.5.2 Valves: Materials and Additional Features

For KM 254, p<sub>n</sub> 10 bar:

- Nominal width DN 20
- Screwed connection 1 1/4"

Index No.	Valve Body	Gasket	Valve Ball	Seat	Description
R000	PVC	Viton	Glass	PTFE	
R001	V4A	Viton	Stainless steel	Stainless steel	
R002	PP	Viton	Glass	PTFE	
R003	PVDF	Viton	PTFE	PTFE	
R006	PTFE	PTFE	Ceramics	PTFE	
R009	PVDF	PTFE	PTFE	PTFE	
R014	PVC	EPDM	PTFE	PTFE	
R020	PVC	Viton	Glass	PTFE	spring-loaded
R021	V4A	Viton	Stainless steel	Stainless steel	spring-loaded
R022	PP	Viton	Glass	PTFE	spring-loaded
R024	PVC	EPDM	Stainless steel	Stainless steel	spring-loaded

Index No.	Valve Body	Gasket	Valve Ball	Seat	Description
R028	PVDF	Viton	PTFE	PTFE	spring-loaded
R029	PVDF	PTFE	PTFE	PTFE	spring-loaded
R033	V4A	Viton	Hastelloy	2.4607	spring-loaded
R046	PVC	EPDM	Stainless steel	Stainless steel	
R301	V4A	Viton	Stainless steel	Stainless steel	for abrasive media
R401	V4A	Viton	Stainless steel	Stainless steel	up to 16 bar
R401	V4A	Viton	Hastelloy C	Hastelloy C	up to 16 bar



### Warning

**Risk of malfunction or damage to the device!**  
**The resistance of the parts that come into contact with the media depends on the media, media temperature and operating pressure. Ensure the parts that come into contact with the media are chemically resistant to the dosing medium in operating conditions!**  
**Observe the manufacturer's safety instructions when handling chemicals!**



### Note

**Further information on resistance with regard to the medium, medium temperature and operating pressure is available on request.**

## 4.6 Materials

### Pump Housing Material

Pump	
Pump housing	Al 226

## 4.7 Data of contact manometer for MBS (optional)

The contact manometer have a reed switch with electrically isolated contact output, maximum switching power 10 W for DC current or 10 VA for AC current. The maximum switching voltage is 100 V, maximum switching current 0.5 A.

The switching function is set up as an NC contact, i.e. if the diaphragm breaks, the current circuit is interrupted.

The manometer has a 2 m long cable.

## 4.8 Installation Location

### 4.8.1 Space Required for Operation and Maintenance

**The pump must be placed where it is freely accessible for operation and maintenance work.**

Maintenance work must be carried out regularly on the dosing head and the valves.

- Provide sufficient space for removing the dosing head and the valves.

### 4.8.2 Permissible Ambient Influences

Permissible ambient temperature 0 °C to + 40 °C (for an installation height up to 1000 m over NN)

Permissible humidity relative humidity: 70% at 40 °C, 90% at 35 °C



### Caution

**Risk of malfunction or damage to the device!**  
**Pumps with electronics are only suitable for indoor use!**  
**Do not install outdoors!**

### **4.8.3 Underground**

The pump must be mounted on a flat surface.

## 5 Installation

### 5.1 Mounting

Mount the pump on a console or pump foundation using 4 screws.



**Note**

***Make sure that the flow runs in the opposite direction to gravity.***

### 5.2 General Information on Installation



**Warning**

***Observe the specifications for the installation location and range of application described in the “General” section.***



**Warning**

***Errors, incorrect operation or faults on the pump or system can lead, for example, to excessive or insufficient dosing, or the permissible pressure may be exceeded. Possible errors, faults or damage which may result from this must be evaluated by the operator and appropriate precautions must be taken to avoid them!***



**Note**

***A positive pressure difference of 2 bar min. is required between the suction valve and the pressure valve in order for the dosing pump to operate correctly. If the total counterpressure (at the dosing point) and geodetic height difference between the suction valve and the dosing point is less than 2 bar (20 m WS), a pressure retention valve must be installed directly in front of the dosing point.***

#### 5.2.1 Approximate values when using pulsation dampers



**Caution**

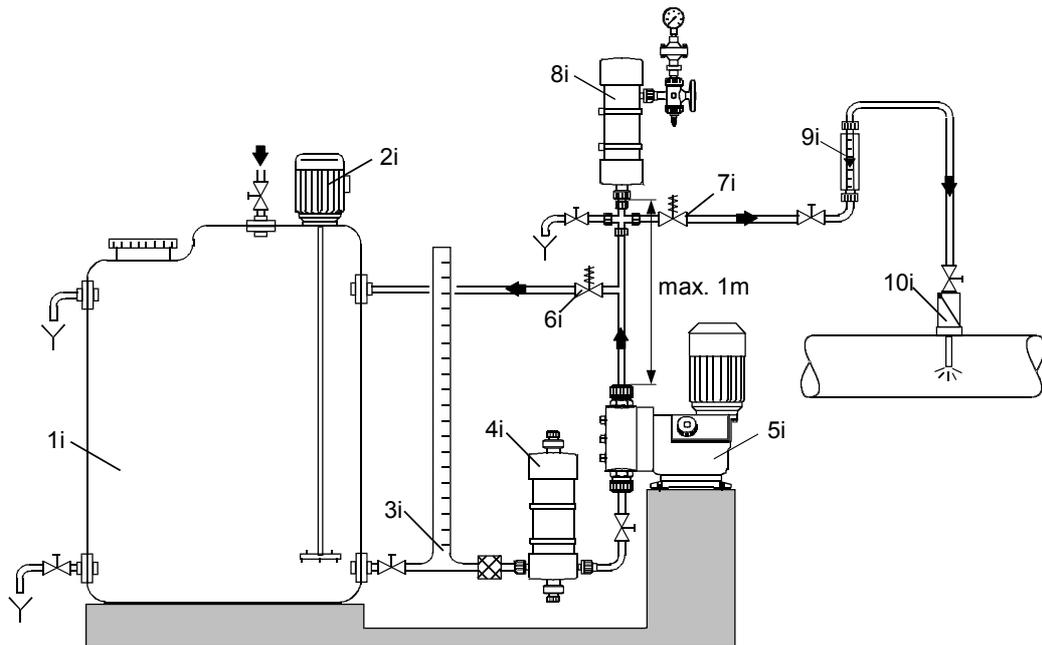
***Risk of damage to the system! We always recommend using pulsation dampers for large high-speed pumps! Since the pulsation is influenced by many factors, a system-specific calculation is essential, e.g. on request with our calculation program.***

The following table indicates the approximate values, and for which suction line length suction pulsation dampers are required. The values relate to 50 Hz operation where water or similar liquids are used as the dosing medium.

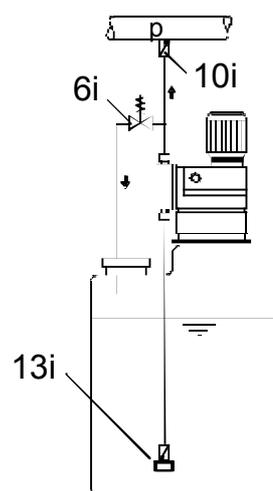
Type	Stroke value	Nominal width of suction line	Maximum suction line length [m]
254-50	26	DN 20	8
254-102	54	DN 20	8
254-143	75	DN 20	5
254-175	92	DN 20	3
254-213	112	DN 20	1,5
254-291	153	DN 20	1
254-46	26	DN 20	8
254-97	54	DN 20	8
254-136	75	DN 20	5
254-166	92	DN 20	3
254-202	112	DN 20	1,5
254-276	153	DN 20	1

## 5.2.2 Installation Examples and Tips

### Picture of optimal installation



- 1i Dosing tank
- 2i Electric agitator
- 3i Extraction device
- 4i Suction pulsation damper
- 5i Dosing pump
- 6i Overflow valve
- 7i Pressure retention valve
- 8i Pulsation damper
- 9i Measuring glass
- 10i Injection unit



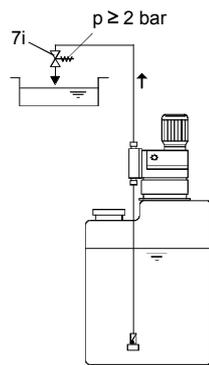
#### Tank installation:

- For non-degassing media with viscosity similar to water, the pump can be mounted onto the tank (observe the admissible suction height).

#### *Preferable for flooded suction.*

#### For dosing media which tend to sedimentation:

- Install a suction line with filter (13i) in a way ensuring that the suction valve remains several centimetres above the bottom of the tank.



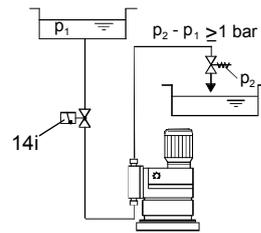
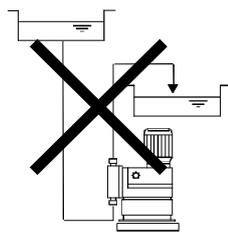
**Pressure retention valve**

**With open outflow of the dosing medium or low counter-pressure:**

A positive pressure difference of at least 2 bar has to exist between the counterpressure at the injection point and the pressure of the dosing medium at the suction valve of the dosing pump.

If this cannot be guaranteed:

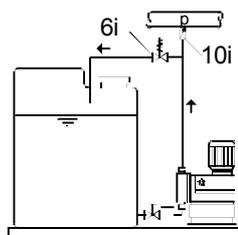
- Install a pressure retention valve (7i) directly in front of the outlet or the injection unit.



**Pressure retention valve**

**To avoid the siphon effect:**

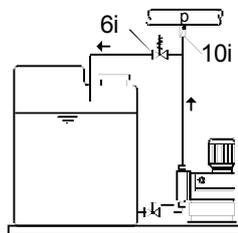
- Install a pressure retention valve in the dosing line and, if necessary, a solenoid valve (14i) in the suction line.



**Overflow valve**

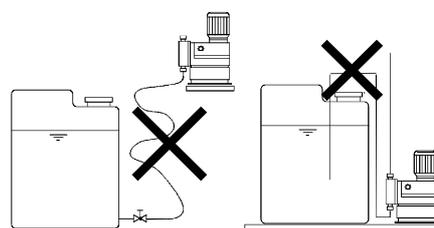
**To protect the dosing pump and the pressure line against:**

- Install an overflow valve (6i) in the pressure line.



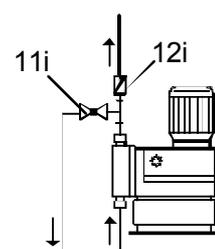
**For volatile media:**

- flooded suction
- Install a filter in the suction line to prevent the valves being contaminated.



**To install the suction line:**

- Keep the suction line as short as possible, avoid a tangled suction line
- If necessary, use swept bends instead of elbows.
- Always lay the suction line rising to the suction valve of the dosing pump.
- Avoid loops which cause air bubbles.

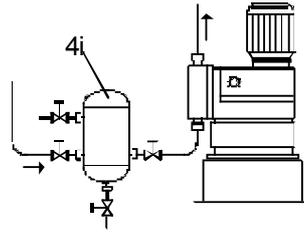


**For easy deaeration of the dosing head:**

Install a ball valve (11i) with bypass line (back to the dosing tank) immediately behind the pressure valve.

**In case of long pressure lines:**

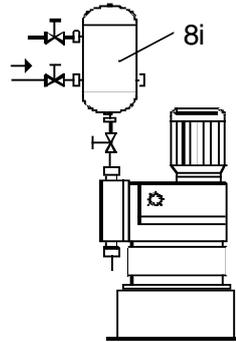
- Install a check-back valve (12i) into the dosing line.



#### For suction-side installation

- Depending on the pump type and line length, it may be necessary to use a suction pulsation damper (4i).

**Observe the “Approximate values when using pulsation dampers” auf Seite 21 and if necessary request a system-specific calculation from our calculation program.**



#### For pressure-side installation

- Depending on the pump type and line length, it may be necessary to use a pulsation damper (4i) on the pressure side.

**For rigid pipework and line length > 2m, for flexible pipework and line length > 3m, depending on the pump type and size, use pulsation dampers (8) to protect the system.**



**Caution**

**Risk of damage to the system! We always recommend using pulsation dampers for large high-speed pumps!**

**Since the pulsation is influenced by many factors, a system-specific calculation is essential, e.g. on request with our calculation program.**

## 5.3 Tube/Pipe Lines

### 5.3.1 General



#### Warning

**The resistance of the parts that come into contact with the media depends on the media, media temperature and operating pressure. Ensure the parts that come into contact with the media are chemically resistant to the dosing medium in operating conditions!**

**Only use the specified line types! All lines must be free from strain! If necessary, use swept bends instead of elbows, avoid loops and buckles in the tubes! Ensure the suction line is as short as possible to avoid cavitation!**

**To protect the system against excessive build-up of pressure: Install an overflow valve in the pressure line.**

**Flow must run in the opposite direction to gravity!**



#### Warning

**Observe the manufacturer's safety instructions when handling chemicals!**

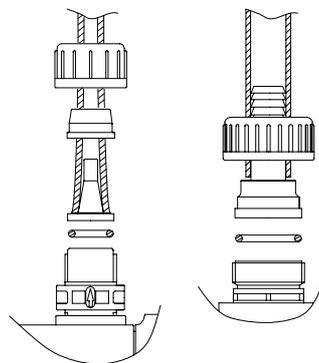
### 5.3.2 Connecting the Suction and Pressure Lines

- Connect the suction line to the suction valve.
- Connect the pressure line to the pressure valve.



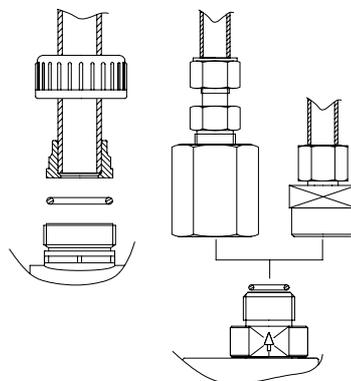
#### Note

**Install suction line in the tank so that the foot valve remains approximately 5 to 10 cm above the bottom of the tank.**



#### When connecting hose lines

- Push the hose firmly onto the connection nipple and depending on the connection, secure using a connection counterpart or hose support clip.
- Fit gasket.
- Screw onto the valve using the union nut.

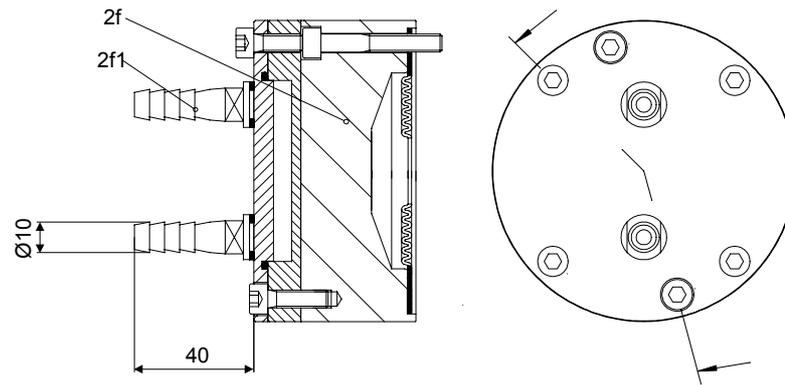


#### When connecting pipe lines to DN 20

- Depending on the pipe material and connection, glue it (PVC), weld it (PP, PVDF or stainless steel) or press it in (stainless steel).
- Fit gasket.
- Screw onto the valve using the union nut.

### 5.3.3 Connecting a liquid-heated dosing head (optional)

As an option, liquid-heated dosing heads are available in stainless steel version.



2f Dosing head, liquid heated

2f1 Hose nipple, DN10 connection

**Demands placed on heating liquid:**

- The heating liquid must not attack stainless steel.
- maximum permissible pressure:  $p_{\max} = 3 \text{ bar}$
- maximum permissible temperature:  $T_{\max} = 100 \text{ °C}$

## 6 Electrical Connections



### Warning

**Electrical connections should only be connected by qualified personnel!**  
**Before connecting the power supply cable and the relay contacts: Disconnect the mains voltage!**  
**Observe the local safety regulations!**  
**The pump housing must only be opened by personnel authorised by ALLDOS!**  
**Protect the cable connections and plugs against corrosion and humidity.**  
**Only remove the protective caps from the sockets that are being used.**

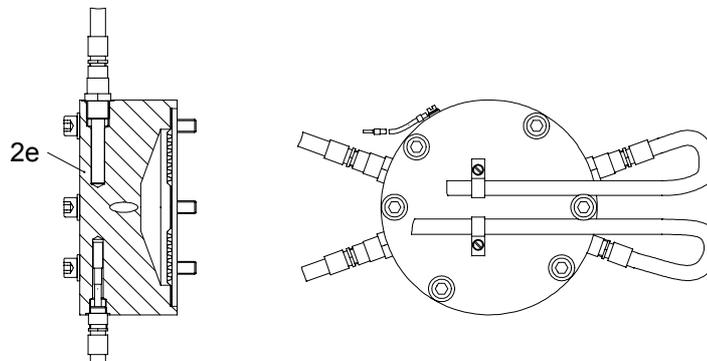
### 6.1 Electrical servomotor (optional)

To connect the servomotor to the mains supply, please refer to the instructions for the servomotor.

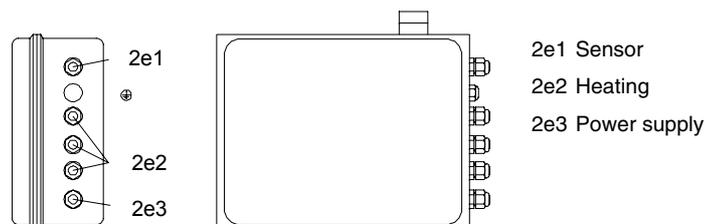
### 6.2 Electronic stroke preset counter (optional)

To connect the stroke preset counter to the mains supply, please refer to the instructions for the stroke preset counter.

### 6.3 Electrically heated dosing head (optional)



2e Dosing head, electrically heated



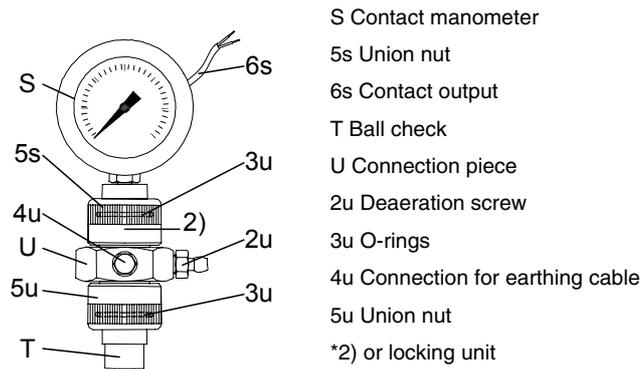
To connect the temperature controller to the mains supply, please refer to the instructions for the electric temperature controller.

### 6.4 Diaphragm control (optional)



### Warning

**Pumps in explosion protected version with diaphragm breakage signal are fitted with a contact manometer in explosion protected version. It must be grounded.**  
**Connecting the earthing cable (4u) see diagram.**



## 6.5 Connecting the Power Supply Cable



**Warning**

***Disconnect the mains voltage before connecting the power supply cable!  
 Before connecting the power supply cable, check that the mains voltage specified on the type plate corresponds to the local conditions!  
 Do not make any changes to the mains cable or plug!***



**Caution**

***The pump can be automatically started by connecting the mains voltage!***



**Warning**

***The assignment between the plug-and-socket connection and the pump must be labelled clearly (e.g. by labelling the socket outlet).***

- Do not switch on the mains voltage until you are ready to start the pump.



**Warning**

***A clearly labelled all-pole isolating switch with a contact opening width of at least 3 mm should be installed between the pump and the mains.***

Connect the motor to the mains in accordance with local electrical installation regulations as is shown on the terminal connection plan (on the lid of the connection box).



**Warning**

***The specified degree of protection can only be ensured, if the mains cable is connected to the same degree of protection.***



**Caution**

***Observe direction of rotation!  
 To protect the motor, install a motor protecting switch or motor contactor, and set the bimetal relay to the nominal current of the motor for the present voltage and frequency.  
 This is also necessary for versions with Etron Profi Electronics!***

## 7 Start-up/Shutdown

### 7.1 Safety Information



#### Warning

**When dosing dangerous media, observe the corresponding safety precautions!  
When working on the dosing head, connections or lines:  
wear the necessary protective clothing (goggles, gloves)!  
Before removing the dosing head, valves and media lines, empty any remaining  
medium in the dosing head into a drip tray by carefully unscrewing the suction  
valve.**

**Do not open the pump!  
Repairs must only be carried out by authorised specialists!**



#### Caution

**Observe flow direction (arrow) of valves!  
Tighten plastic valves by hand only. Risk of damage!**

### 7.2 Initial Start-Up/Subsequent Start-Up

#### 7.2.1 Checks Before Start-Up

- Check all electrical connections are correct.
- Check that the mains voltage specified on the type plate corresponds to the local conditions!
- Check all connections are secure and tighten, if necessary.
- Check fixing screws on the dosing head are tightened with the specified torque and tighten, if necessary.

**Tighten the dosing head screws crosswise using a torque wrench:**

**Torque:  
50 - 54 Nm for KM 254**

#### 7.2.2 Oil filling



#### Note

**The pump is checked at the factory, and the oil is drained for shipping purposes.  
Before start-up, add the special oil which is provided.  
The piston flange is filled with oil for easy start-up. The stroke adjustment button  
must only be adjusted if the gear oil has been added, otherwise the oil will leak  
from the piston flange.**

1. Unscrew and remove the aeration screw and oil-level gauge (F).
2. Slowly add the hydraulic oil that is provided through the opening of the filling screw (F), until the oil reaches the mark on the oil-level gauge.
3. Set the stroke adjustment button (L) to "0".

#### 7.2.3 Filling the dosing head for the initial start-up for systems without dosing medium flooded suction

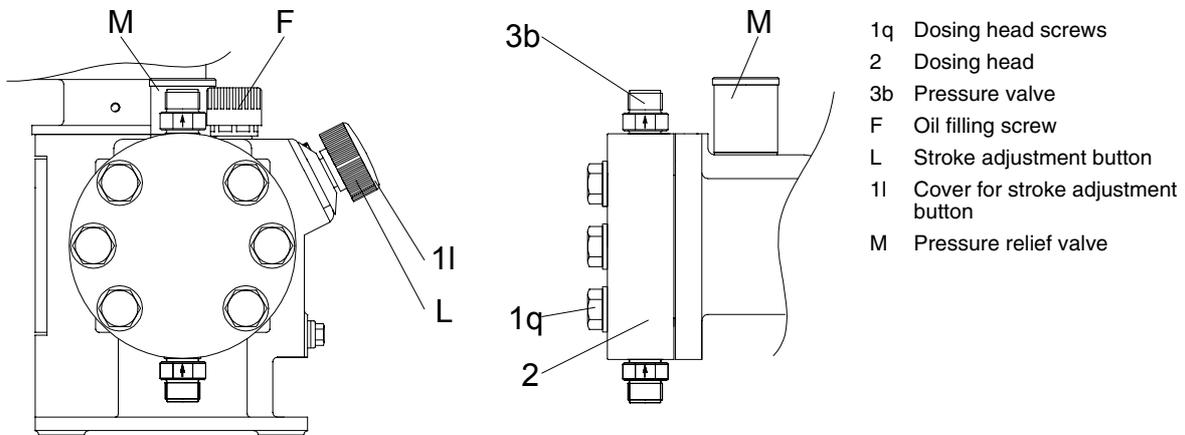


#### Warning

**When dosing dangerous media, observe the corresponding safety precautions!  
When working on the dosing head, connections or lines:  
wear the necessary protective clothing (goggles, gloves)!**

As assisting suction for systems without dosing medium flooded suction, you can fill the dosing head with dosing medium before the initial start-up:

1. Unscrew the pressure valve (3b).
2. Add the dosing medium to the dosing head (2).
3. Screw the pressure valve (3b) back in.

**Caution****Observe arrow for the pressure valve (for flow direction)!****7.2.4 Start-Up/Subsequent Start-Up**

- 1q Dosing head screws
- 2 Dosing head
- 3b Pressure valve
- F Oil filling screw
- L Stroke adjustment button
- 1l Cover for stroke adjustment button
- M Pressure relief valve

1. Connect the electrical power supply.
2. Depending on the installation, start the pump where possible without counterpressure. See installation example for easy deaeration of the dosing head in the section on 'Installation'.
3. Set the stroke adjustment button (L) to 0 %.
4. Run the pump for approx. 5 minutes.
5. Checking the oil level.
  - 5.1 Set the stroke adjustment button (L) to 40 %.
  - 5.2 Run the pump for approx. 10 minutes with a stroke adjustment of 40%.
  - 5.3 Switch off pump, check the oil level and add oil if necessary.
  - 5.4 Fit the oil filling screw (F) and the oil-level gauge back on.
    - The pump is now ready to operate.

**Note****The rod length of the oil level gauge is****for KM 254 35 mm; immersion depth to marking approx. 5 mm.****Caution****Check the oil level at least every 2 weeks and add oil if necessary. Only use original ALLDOS gear oil!**

Pump Type		Order No.	Description
KM 254	single	555-302	3,5 l DHG 68
KM 254	double	555-303	4,5 l DHG 68

**7.2.5 After start-up****Caution****Following initial start-up and after each time the diaphragm is changed, tighten the fixing screws on the dosing head:****After approximately 6 - 10 working hours or two days, tighten the dosing head screws crosswise using a torque wrench.****Torque:****50 - 54 Nm for KM 254**

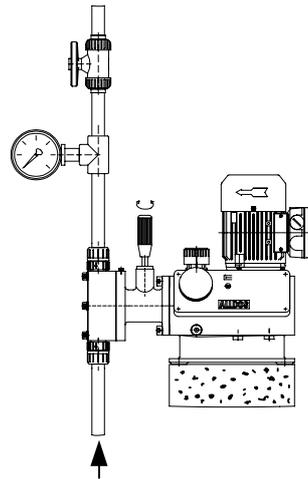
## 7.3 Setting the pressure relief valve

If the written agreement does not specify a system-specific opening pressure, then the pressure relief valve is set to a slightly greater opening pressure than the bleed pressure for the pump. It can however be set by the customer to a smaller opening pressure.

### Opening pressure of the pressure relief valve

Bleed pressure of the pump [bar]	Opening pressure of the pressure relief valve [bar]
10	13
16	18

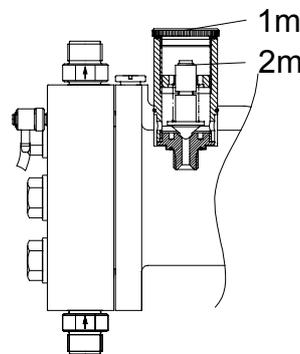
### Setting the opening pressure



To do so, a manometer must be installed in the pressure line and behind the manometer, a shut-off valve.

To set the pressure relief valve, use a screwdriver.

### Set the pressure relief valve as follows:



1. Close the shut-off valve after the manometer.
2. Remove the cover (1m) of the pressure relief valve.
3. Start up pump.
4. Using the screwdriver, slowly turn the adjusting screw (2m) of the pressure relief valve anticlockwise, until the desired opening pressure is obtained.



### Caution

***Risk of damage to the pump or system! The pressure relief valve loses its function through blocking, and can produce pressures of several hundred bar in the pump or system. Do not block the pressure relief valve during adjustments!***

5. Close the cover of the pressure relief valve again.
6. Open the shut-off valve after the manometer.

## 7.4 Zero Point Adjustments

### 7.4.1 Adjusting the zero point for system pressures up to 100 bar

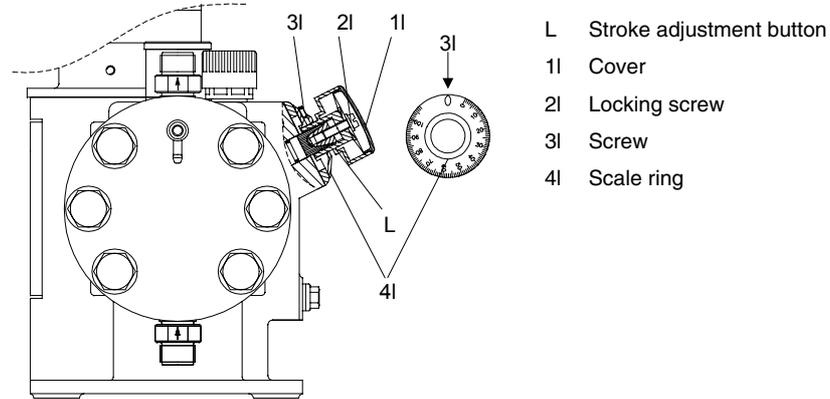
The zero point of the dosing pump is factory-set to a slightly smaller counterpressure than the bleed pressure of the pump. If the operating counterpressure deviates considerably

from this value, adjusting the zero point will ensure that the values are more precise.

#### Counterpressure for zero point setting of the pump at the factory

Bleed pressure of the pump [bar]	Counterpressure for zero point setting of the pump at the factory [bar]
10	3
16	3

### 7.4.2 Adjusting the Zero Point



#### Warning

**When dosing dangerous media, observe the corresponding safety precautions! When working on the dosing head, connections or lines: wear the necessary protective clothing (goggles, gloves)! Always adjust the value with the pressure line connected and with operating counterpressure.**

1. Fit a measuring device on the suction side, e.g. place the suction line in a graduated measuring beaker.
2. Set dosing flow to 15%.
3. Remove cover (1) from stroke adjustment button (L).
4. Use a screwdriver to loosen the locking screw (2) by approximately 2 rotations.
5. Switch on the pump.
6. Turn the stroke adjustment button slowly towards the zero point, until the dosing (the liquid level falls) stops in the measuring device.
7. Switch off the pump.
8. Set the scale ring (4) to zero
  - 8.1 Loosen the screw (3) in the scale ring (4) slightly using an Allan wrench M3,
  - 8.2 Turn the scale ring (4) until both "0" are the same on the scale and scale ring.
  - 8.3 Tighten screw (3).
9. Depending on the application, tighten the locking screw (2) so that the stroke adjustment button can still be turned/cannot be turned any more.
10. Replace cover (1).

### 7.5 Operating the pump

#### Note

**When operating the pump, refer to the section "Operating the pump", "Operating the pump electronics" (only for Etron Profi Electronics), as well as "Maintenance" and if necessary for troubleshooting, the section "Possible faults".**

## 7.6 Shutdown



### Warning

***When working on the dosing head, connections or lines:  
Risk of injuries! Wear the necessary protective clothing (goggles, gloves)!  
Do not allow any chemicals to leak from the pump. Collect and dispose of all chemicals correctly!***



### Note

***If possible, rinse the dosing head before shutting down the pump, e.g. by supplying it with water.***

#### 7.6.1 Switching Off/Uninstalling

- Switch off the pump and disconnect it from the mains.
- Depressurise the system.
- Take suitable steps to ensure that the returning dosing medium is safely collected.
- Carefully remove all lines.
- Uninstall the pump.

#### 7.6.2 Cleaning

- Rinse all parts that have come into contact with the medium very carefully:
  - Lines
  - Valves
  - Dosing Head
  - Diaphragm
- Remove any trace of chemicals from the pump housing.

#### 7.6.3 Storage

When you store the pump:

After cleaning (see above)

- Carefully dry all parts and reinstall the dosing head and valves

or

- Change the valves and diaphragm.

See "Maintenance" section.

#### 7.6.4 Disposal

When you dispose of the pump:

After cleaning (see above)

- Dispose of the pump in accordance with the relevant regulations.

## 8 Operating the Pump

### 8.1 Switching On/Off



**Caution**

**Before switching on the pump, check that it is installed correctly. See the “Installation” and “Start-Up” sections.**

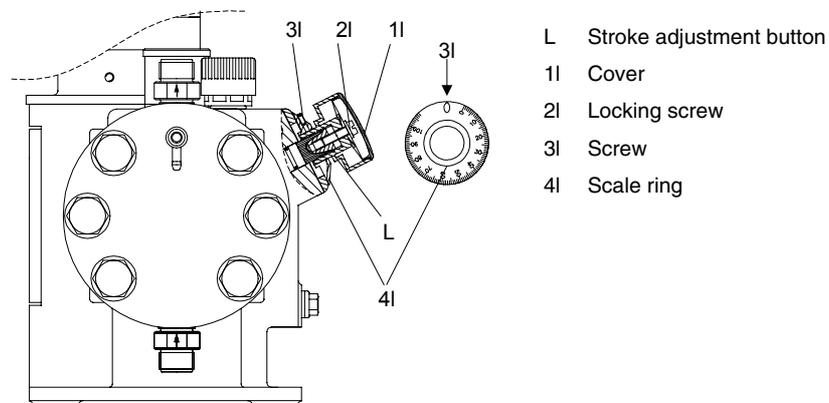
#### 8.1.1 Switching On the Pump

- Switch on the mains voltage

#### 8.1.2 Switching Off the Pump

- Switch off the mains voltage.

### 8.2 Setting the dosing capacity



#### 8.2.1 Setting the dosing flow and locking the stroke adjustment button

1. Remove cover (1) from stroke adjustment button (L).
2. Use a screwdriver to loosen the locking screw (2) by approximately 2 rotations.
3. Increase/reduce the dosing flow while the pump is running.
  - 3.1 Slowly turn the stroke adjustment button to the left / right to set the desired dosing volume.
4. Depending on the application, tighten the locking screw (2) so that the stroke adjustment button can still be turned/cannot be turned any more.
5. Replace cover (1).



**Caution**

**Pump cannot be operated if the stroke adjustment button is fully open! Depending on the pump adjustment, this value may already be < 100 % on the scale display for system pressures of > 100 bar. Open the stroke adjustment button completely and then close by approx. 10% in order to set the dosing flow to 100 %.**

### 8.3 Electrical servomotor (optional)

To operate the servomotor, please refer to the instructions for the servomotor.

### 8.4 Electronic stroke preset counter (optional)

To operate the stroke preset counter, please refer to the instructions for the stroke preset counter.

### 8.5 Electrically heated dosing head (optional)

To operate the temperature controller, please refer to the instructions for the temperature

controller.

## 9 Maintenance

### 9.1 General Notes



#### Warning

**When dosing dangerous media, observe the corresponding safety precautions!**

**When working on the dosing head, connections or lines: Wear the necessary protective clothing (goggles, gloves)!**

**Do not open the pump!**

**Repairs must only be carried out by authorised and qualified personnel!**

**Switch off the pump and disconnect it from the mains before carrying out maintenance work and repairs!**

**Before removing the dosing head, valves and media lines, empty any remaining medium in the dosing head into a drip tray by carefully unscrewing the suction valve.**



#### Caution

**Observe flow direction (arrow) of valves!**

**Tighten plastic valves by hand only. Risk of damage!**

### 9.2 Diaphragm breakage control for diaphragm breakage signal

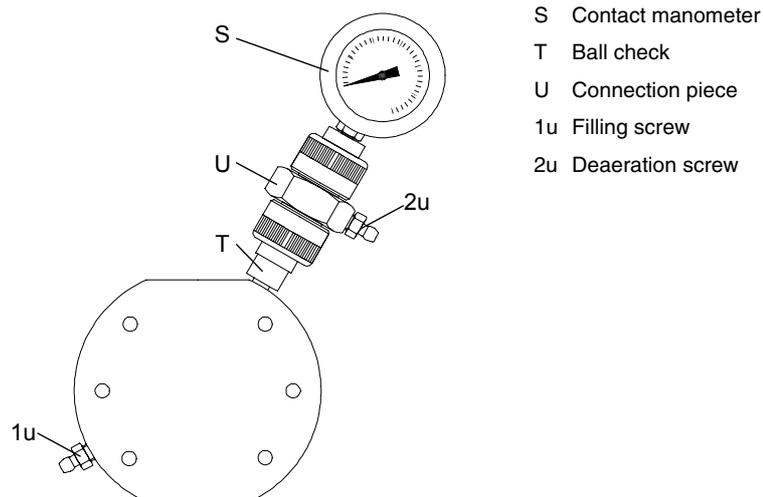
If a diaphragm breakage signal (MBS) occurs, you should first of all check whether an error has been displayed, as different external factors such as for instance, the heating of hydraulic or dosing medium can cause the cracked medium to be displaced into the valve, thereby causing an error to occur. Checks after an MBS:

1. Briefly open the MBS deaeration screw (2u) and then close it again.
2. Switch on the pump
3. If an MBS reoccurs after a short period of time, then a diaphragm has broken.



#### Caution

**After a diaphragm breakage, replace the diaphragms and clean the check-back valve, see section on "Replacing the diaphragm for dosing head with double diaphragm".**



### 9.3 Intervals for cleaning and maintenance

**Check the oil level and add oil if necessary.**

- Check the oil level every 2 weeks and add oil if necessary.

**Clean the valves.**

- At least every 12 months or after 4000 operating hours, or
- if the pump isn't performing, or
- in the event of an error.

Clean the valves and replace if necessary (for stainless steel valves: inner parts of valve)

**Change diaphragms and gear oil.**

- At least every 12 months or after 8000 operating hours, change the dosing medium and gear oil,
- in dusty installation site, change gear oil every 3000 operating hours.

**Clean ball check of the double diaphragm**

- after a diaphragm breakage, remove the ball check immediately and clean it.

**Note**

*Only clean the ball check after a diaphragm breakage!*

**9.4 Checking the oil level****Caution**

*Check the oil level at least every 2 weeks and add oil if necessary.*

**Note**

*The rod length of the oil level gauge is*

*for KM 254 35 mm; immersion depth to marking approx. 5 mm.*

**9.5 Cleaning the suction and pressure valves****Warning**

*When working on the dosing head, connections or lines: Wear the necessary protective clothing (goggles, gloves)!*

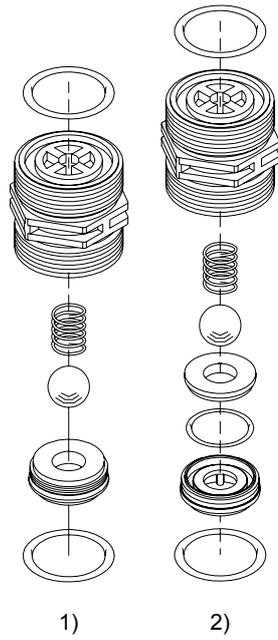
*Before removing the dosing head, valves and media lines, empty any remaining medium in the dosing head into a drip tray by carefully unscrewing the suction valve.*

**Nominal width DN 20**

- Screwed connection 1 1/4"
- Stainless steel/plastic
- optional spring-loaded

**Clean suction and pressure valves as follows:**

1. Unscrew valves.
2. Unscrew screw parts and valve set using round pliers.
3. Dismantle inner part (seat, O-ring, balls, ball cages, if necessary spring).
4. Clean all parts, replace any faulty parts.
5. Reassemble valve.
6. Replace O-rings with new ones and screw valve back in.



DN 20 valve <sup>1)</sup> stainless steel/ <sup>2)</sup> plastic,  
optional spring-loaded



**Caution**

***The O-rings must be correctly placed in the specified groove.  
Observe flow direction (arrow)!  
Tighten plastic valves by hand only. Risk of damage!***

## 9.6 Changing the diaphragm and gear oil for dosing head with single diaphragm (no MBS)



### Warning

**When working on the dosing head, connections or lines:  
Wear the necessary protective clothing (goggles, gloves)!  
The dosing diaphragm should be replaced with each gear oil change.**

**Before removing the dosing head, valves and media lines, empty any remaining medium in the dosing head into a drip tray by carefully unscrewing the suction valve.**



### Caution

**Only use original ALLDOS gear oil!**

ALLDOS gear oil

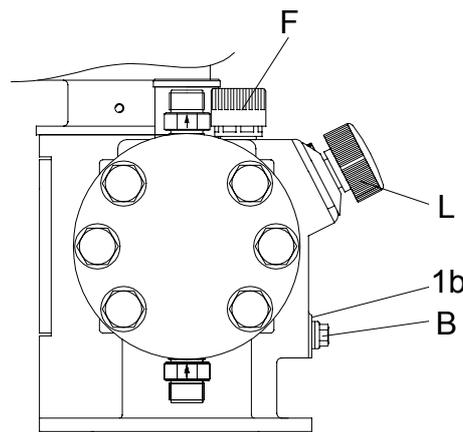
Pump Type		Order No.	Description
KM 254	single	555-302	3,5 l DHG 68
KM 254	double	555-303	4,5 l DHG 68



### Note

**Collect gear oil in a container and dispose of correctly.**

### 9.6.1 Drain gear oil



- B Lock screw
- 1b Gasket
- F Oil filling screw
- L Stroke adjustment button

1. Unscrew the stroke adjustment screw (B) and collect gear oil in a container.
2. Screw the lock screw (B) and the new gasket (1b) back in and tighten well.



### Caution

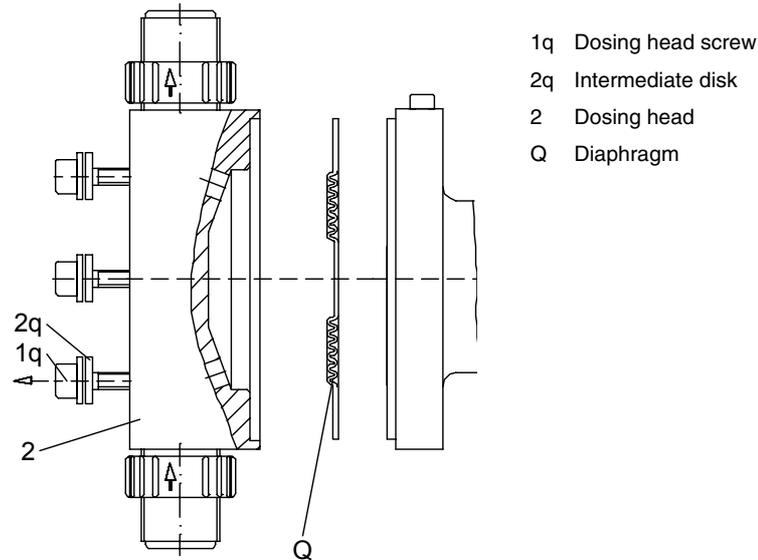
**Risk of leaking and damage caused by oil loss! For each oil change, a new flat gasket (1b) must be used!**

### 9.6.2 Removing the dosing head

1. Close dosing lines on suction and pressure side and loosen suction and pressure valve connections.
2. Loosen the 6 dosing head screws (1q with 2q) and remove the dosing head (2).

### 9.6.3 Replacing a single diaphragm (no MBS)

- Remove the diaphragm, fit new diaphragm (Q) on suction side (see diagram below).



#### 9.6.4 Fitting the dosing head

- Fit the dosing head and tighten the dosing head screws (1q with 2q) crosswise using a torque wrench.



#### Note

*Refer to the “Start-up” section for subsequent start-up!*

#### 9.6.5 Filling gear oil



#### Caution

***Risk of leaking and damage caused by oil loss! For each oil change, a new flat gasket (1b) must be used!***

Check that the lock screw (B) is tightened.

1. Unscrew and remove the aeration screw and oil-level gauge (F).
2. Set the stroke adjustment button (L) to “0”.
3. Slowly add the hydraulic oil through the aeration screw opening (F), until the oil reaches the mark on the oil-level gauge.
4. Wait 30 minutes.
5. Run the pump for approx. 5 minutes with a stroke adjustment of 0%.
6. Run the pump for approx. 10 minutes with a stroke adjustment of 40%.

#### 9.6.6 Checking the oil level.

1. Switch off pump, check the oil level and add oil if necessary.
2. Fit the aeration screw and oil-level gauge (F) back on.



#### Caution

***Following initial start-up and after each time the diaphragm is changed, tighten the fixing screws on the dosing head:***

***After approximately 6 - 10 working hours or two days, tighten the dosing head screws crosswise using a torque wrench.***

***Torque:***

***50 - 54 Nm for KM 254***

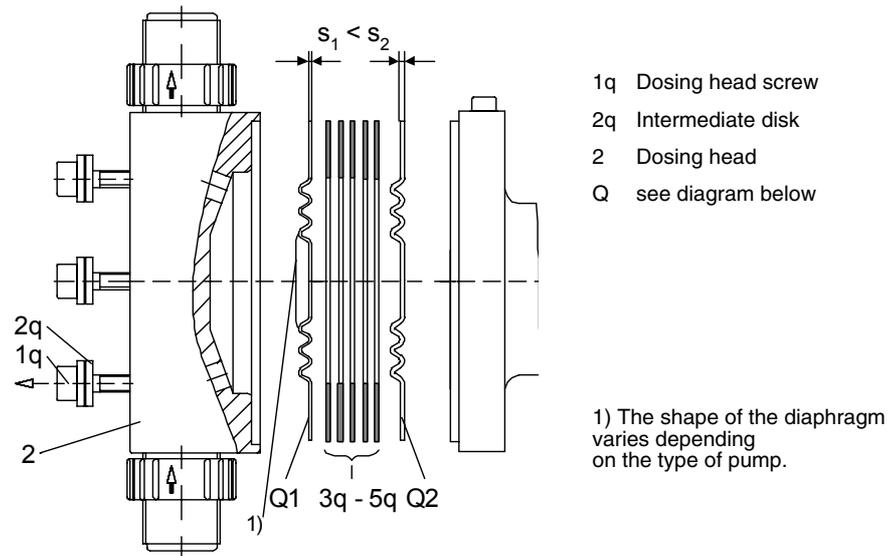
## 9.7 Replacing the diaphragm for dosing head with double diaphragm

### 9.7.1 Removing the dosing head

1. Close dosing lines on suction and pressure side and loosen suction and pressure valve connections.
2. Loosen the 6 dosing head screws (1q with 2q) and remove the dosing head (2).

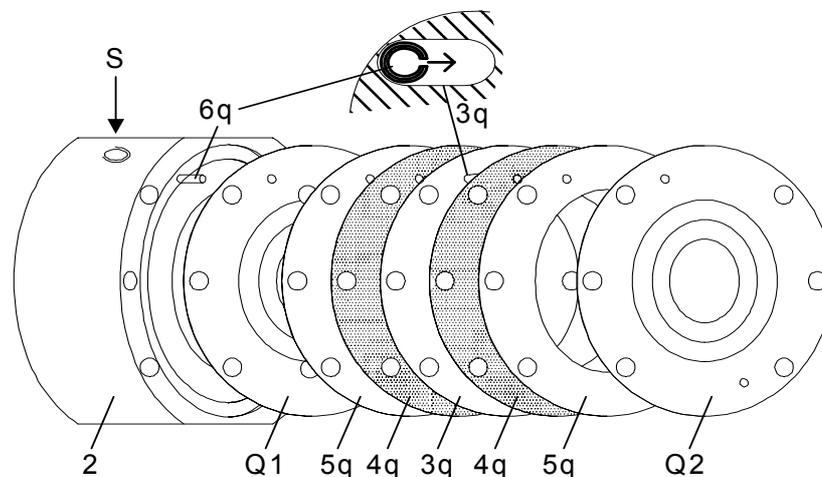
### 9.7.2 Replace the double diaphragm.

1. Clean the intermediate disk (3q), sealing rings (4q) and covering rings (5q) - replace with new ones after a diaphragm has broken.
2. Remove both clamping sleeves (6q) slightly using pliers - replace with new ones after a diaphragm has broken.
3. Measure the outer wall thickness of both new diaphragms (Q1 and Q2):  
 $s_1 (Q1) < s_2 (Q2)$ .



**Observe correct installation of diaphragms Q1 and Q2 (see diagram)!**  
**Fit the thinner diaphragm (Q1) on the dosing side and the thicker diaphragm (Q2) on the oil side/pump side!**

4. Fit both new diaphragms (Q1 and Q2) and the parts (3q - 5q) in the correct order, as is shown in the diagrams (the clamping sleeves (6q) are used for centring purposes).



- S Contact manometer (installation position)
- Q1 Diaphragm on dosing head side
- Q2 Diaphragm on oil side/pump side
- 3q Intermediate disk
- 4q Sealing rings
- 5q Covering rings
- 6q Clamping sleeves

**Caution**

**The paraffin oil between the diaphragms (Q) is connected via the clamping sleeves (6q) to the contact manometer (S) in order to fill and activate the diaphragm breakage signal. It is able to pass between the diaphragms through the slits in the clamping sleeves and the slits in the intermediate disk.**

**The clamping sleeves (6q) must therefore be installed in such a way that the slits in the clamping sleeve face the slits in the intermediate disk (3q) (see above).**

### 9.7.3 Fitting the dosing head

- Fit the dosing head and tighten the dosing head screws crosswise using a torque wrench.

**Note**

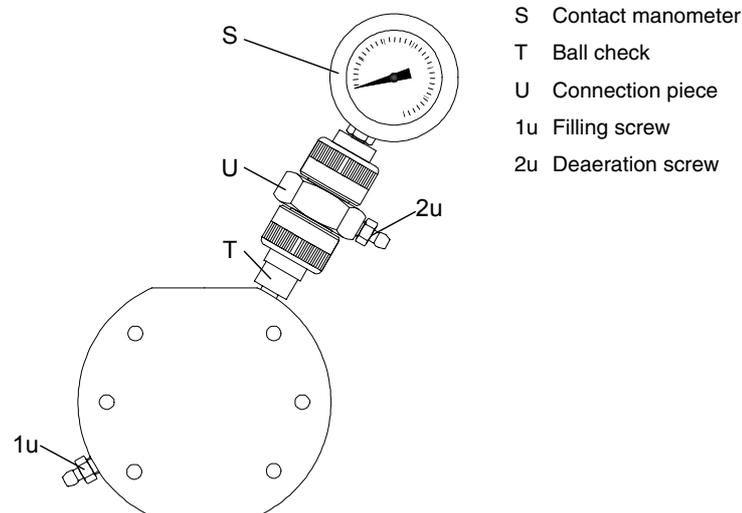
**Refer to the “Start-up” section for subsequent start-up.**

### 9.7.4 Filling the double diaphragm with separating agent

**Note**

**After a diaphragm has broken, the ball check must be cleaned before forming filled with separating agent. Only clean the ball check after a diaphragm breakage!**

After the diaphragm has been replaced for a pump with a double diaphragm, refill the separating agent between the diaphragm:



- S Contact manometer
- T Ball check
- U Connection piece
- 1u Filling screw
- 2u Deaeration screw

1. Set the stroke adjustment button of the pump to 0 %.
2. Open the filling screw (1u) and deaeration screw (2u) by one rotation.
3. Connect the filling hose to the nipple of the filling screw (1u) and, using the dosing syringe inject the correct amount of paraffin oil that is specified in the table below.
4. Close filling screw (1u), but leave the deaeration screw (2u) open.
5. Start up the pump with a system counterpressure and 40 % stroke adjustment.

6. Only close the deaeration screw (2u) when the separating agent stops flowing. (after approx. 5 - 10 min)

**Note**

**Once filled with separating agent and after a few operating hours, especially if the pressure of the manometer is increasing, deaerate again.**

Filling quantity of paraffin oil for dosing pumps with a double diaphragm (per dosing head)

Pump Type	Filling quantity in ml
KM 254	6

**Ordering data for double diaphragm filling components**

Order No.	Description
555-410	Filling components, set with paraffin oil, throw-away syringe and hose parts

**9.7.5 Filling gear oil****Caution**

**Risk of leaking and damage caused by oil loss! For each oil change, a new flat gasket (1b) must be used!**

Check that the lock screw (B) is tightened.

1. Unscrew and remove the aeration screw and oil-level gauge (F).
2. Set the stroke adjustment button (L) to "0".
3. Slowly add the hydraulic oil through the aeration screw opening (F), until the oil reaches the mark on the oil-level gauge.
4. Wait 30 minutes.
5. Run the pump for approx. 5 minutes with a stroke adjustment of 0%.
6. Run the pump for approx. 10 minutes with a stroke adjustment of 40%.

**9.7.6 Checking the oil level.**

7. Switch off pump, check the oil level and add oil if necessary.
8. Fit the aeration screw and oil-level gauge (F) back on.

**Caution**

**Following initial start-up and after each time the diaphragm is changed, tighten the fixing screws on the dosing head:**

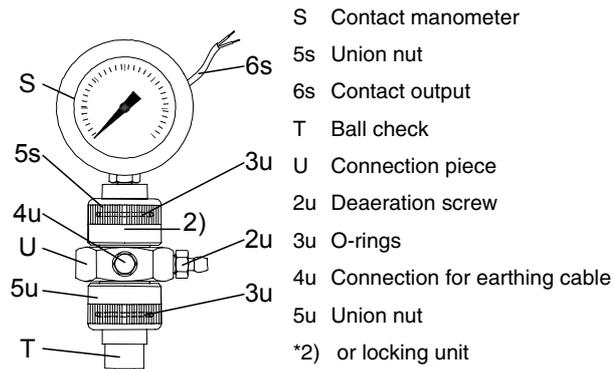
**After approximately 6 - 10 working hours or two days, tighten the dosing head screws crosswise using a torque wrench.**

**Torque:**

**50 - 54 Nm for KM 254**

**9.7.7 Cleaning the ball check valve****Note**

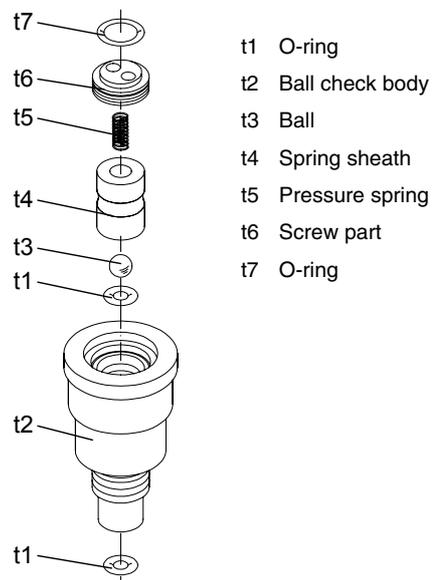
**Only clean the ball check after a diaphragm breakage!**



### Removing the ball check and contact manometer

1. For pumps and manometers in flameproof version, unscrew the earthing (4u).
2. Hold the connection piece (U) using a screwdriver and unscrew the union nut (3u).
3. Unscrew the ball check (T) from the dosing head.

### Clean the ball check



1. Unscrew screw part (t6) using round pliers.
2. Clean all parts, replace any faulty parts.
3. Reassemble ball check.
4. Refit ball check (T).
5. Screw contact manometer (S) and connection piece (U) back on.
6. For pumps and manometers in flameproof version, screw earthing (4u) back on.



**Caution**

***Tighten ball check and connection piece by hand only. Risk of damage!***

## 10 Possible Errors



**Caution**

***Actions that are taken to overcome faults on the pump and which are not described in the operation manual, must only be carried out by the service centre!***

Fault	Diagnosis	Cause	Remedy
No dosing flow even at a low backpressure. (Pump is running without any noise).	No motor sound or vibrations, Ventilator is not rotating.	Motor is not running.	Connect at power supply, exchange motor if blown.
	When the aeration screw is removed, use the oil-level gauge (F) to observe a calm oil surface, there is no "sloshing".	Motor runs, but the eccentric shaft is not rotating, no piston movement; spiral pin or motor shaft broken.	Dismantle the motor and eccentric shaft, replace damaged parts.
	Oil level too low - see oil-level gauge (F). No reaction of the overpressure valve, if the suction line is closed.	Not enough oil in the pump, air is penetrating the piston flange through the control holes.	Fill in oil, deaerate the pump, see "Start-up".
	No dosing flow at the pressure side	Dosing head is not filled, suction line empty, tank empty	Deaerate dosing head, fill/exchange (tank) at suction side
No dosing flow even at a low backpressure. (pump is running noisily, although the overpressure valve reacted).	Overpressure valve reacts independent from the dosing flow adjustment (10%-100%).	Valve at pressure side closed.	Open valve.
		Backpressure is higher than the adjusted pressure at the overpressure valve.	Adjust overpressure valve higher, but only if the pump is designed for this. Never block the overpressure valve.
		Pressure valve is installed in the opposite direction of the flow, observe the arrow at the valve.	Install pressure valve correctly.
	AMS responds, overpressure valve reacts independent from the dosing flow adjustment (10%-100%).	Valve at suction side closed.	Open valve.
		Suction filter obstructed.	Clean suction filter, replace.
		Suction valve jammed (does not open).	Dismantle and check suction valve.
		Suction valve has a too strong spring.	Use fitting spring, or use double ball valve for checking.
		Suction valve is installed in the opposite direction of the flow, observe the arrow at the valve.	Install suction valve correctly.
	AMS responds, overpressure valve reacts at 100% dosing flow, when reducing the flow ~10%-20% the overpressure valve does not react any more.	Dosing head is not completely deaerated.	Fill dosing head completely.
		Pump is running in cavitation (dosing liquid with too high viscosity; dosing liquid with too high steam pressure at Operating temperature = degassing of the liquid; suction height too high; wrong design of the system at suction side).	Use a gear with a low stroke number; use valves with bigger nominal width; realise admission pressure on suction side.
Diaphragm broken (not enough oil in the enclosure of the pump; piston flange).		Clean and grease well all parts using oil according to regulations, then install new diaphragm.	
Pump does not deliver or pressure relief valve opens.		Pressure valve of pump is clogged or ball guide in the valve is worn due to corrosive or abrasive media.	Uninstall pressure valve, dismantle and clean, or if the bars of the ball guide are worn, replace valve.

Fault	Diagnosis	Cause	Remedy
Dosing flow too small	Suction valve: during the pressure stroke the dosing liquid flows back into the suction line. Pressure valve: during the suction stroke, the dosing liquid flows back into the dosing head; the pump takes in less.	Suction/pressure valves dirty or leaky.	Clean or exchange valves.
	Dosing flow depends very much on the pressure; if the backpressure is low, the dosing flow increases considerably. If the stroke frequency rises, the dosing flow increases excessively.	Too much clearance between piston and slide valve, or the stroke frequency of the pump is too low (too much slip).	Replace piston and piston slide valves, use another hydraulic oil with a higher viscosity, (mainly for frequency controller operation and higher backpressures).
	Manometer pressure line.	Backpressure has seriously increased; overpressure valve is adjusted too low.	Readjust zeropoint. Correct setting of the pressure relief valve.
	Especially with stroke frequencies below 15H/min, e.g. with frequency converter operation.	Degassing valve (M) is not working properly.	Replace degassing valve (M), or if necessary replace with ø8 ball.
Pump doses too much	Manometer pressure line	Backpressure has seriously dropped.	Readjust zeropoint.
	Heavy overdose	Admission pressure of suction line > backpressure of pressure line.	Install a pressure retention valve.
	Overdosing at bigger dosing flow adjustments and flows.	Too big dynamic in the suction line.	Mount a suction pulsation damper.

# 11 Spare Parts

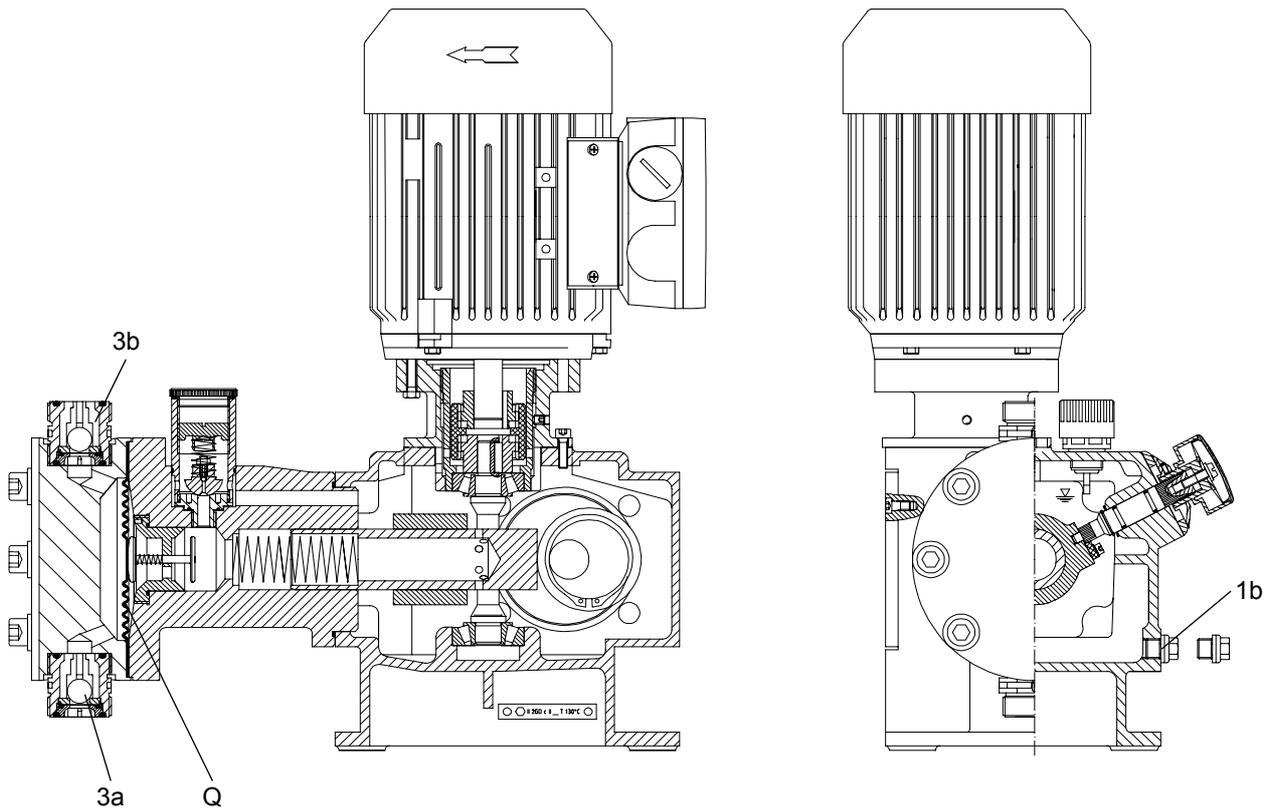
### Manufacturer recommendation

We recommend that you keep some spare parts in stock to ensure that worn parts can be replaced quickly when necessary.

Two spare parts are required for double pumps.

Permissible storage temperature -10 °C to +50 °C

Permissible humidity Relative: 80%, maximum



### A spare part includes the following parts:

- 1b 2 Flat gaskets
- 3a, 3b Inner parts for 2 valves
- Q 1 dosing diaphragm (for pumps without MBS), or  
1 diaphragm set (for pumps with MBS), consisting of diaphragms, intermediate disk, foils, covering rings and clamping sleeves

### Order numbers

Order numbers for spare parts can be found in the table below or can be obtained on request by indicating the device name of the pump. If you already have a spare part set, you can reorder it using the same number.

Order number	Pump type	Pres- sure	Nominal width/Valve material				Version
				Balls	Seat	Gasket	
553-268	254		DN 20	Glass	PTFE	Viton	
553-269	254			Stainless steel	Stainless steel		
553-280	254	10,00 bar	DN 20	Stainless steel	Stainless steel	Viton	
553-297	254	10,00 bar	DN 20	Glass	PTFE	Viton	
553-298	254	10,00 bar	DN 20	Glass	PTFE	Viton	
553-299	254	10,00 bar	DN 20	PTFE	PTFE	PTFE / Viton	
553-1080	254	10,00 bar	DN 20	Hastelloy	2.4607	Viton	

Order number	Pump type	Pressure	Nominal width/Valve material				Version
				Balls	Seat	Gasket	
553-1320	254	10,00 bar	DN 20	Stainless steel	PTFE	EPDM	
553-407	254	— 2)				Diaphragm breakage safety device	

2) Spare parts set only for replacing diaphragm (e.g. following diaphragm breakage) without valve parts.

#### ALLDOS gear oil

Pump type		Order No.	Description
<b>KM 254</b>	single	555-302	3,5 l DHG 68
<b>KM 254</b>	double	555-303	4,5 l DHG 68

#### Alternative Spezialöle für DHG 68

Manufacturer	Designation
ARAL	Degol BMB 68
BP	BP-Energol GR-XP 68
Chevron	Chevron NL gear compound 68
ESSO	Spartan BP 68
Fina	Fina Giran 68
Mobil Oil	Mobilgear 626
Texaco	Texaco Meropa 68
Shell	Tellus 68
elf	reductelf SP 68

#### Spare parts for double diaphragm system

Order No.	Bleed pressure of pump	Description
		Index No.
<b>541-011</b>	<b>up to 10 bar</b>	Contact manometer up to 10 bar
<b>541-011.1</b>	<b>up to 10 bar</b>	Contact manometer up to 10 bar in flameproof protection version
<b>553-410</b>		Filling components, consisting of: 0.004 kg paraffin oil in PE bottle, 2 x 250 mm PE filling hose 4/6 and a graduated throw-away syringe

## 12 Dosing Curves

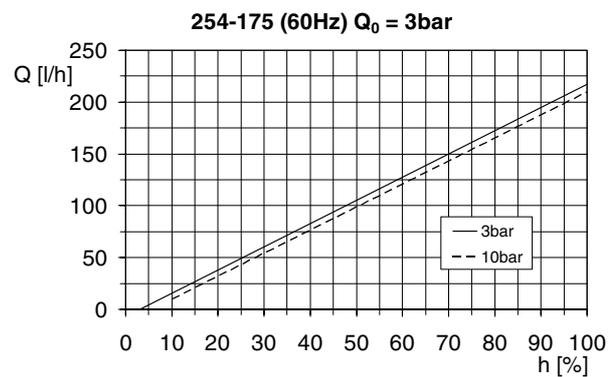
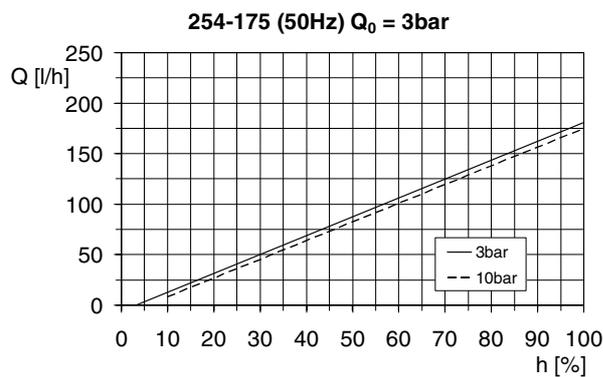
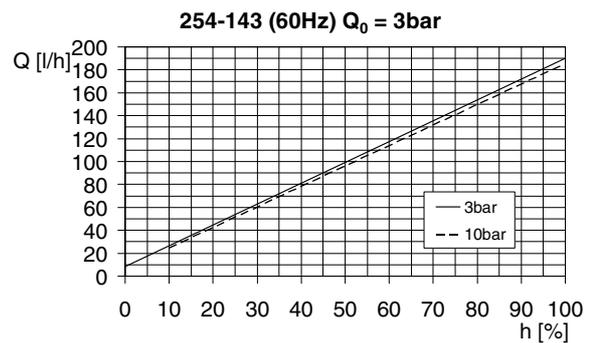
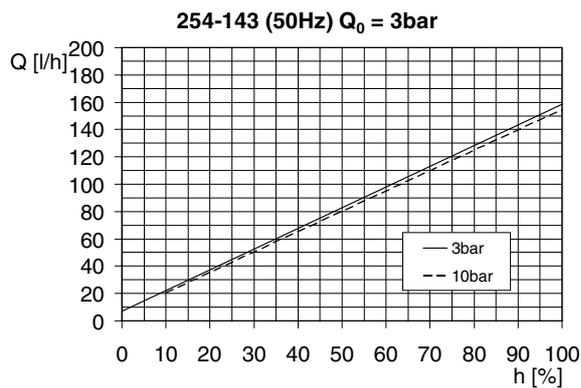
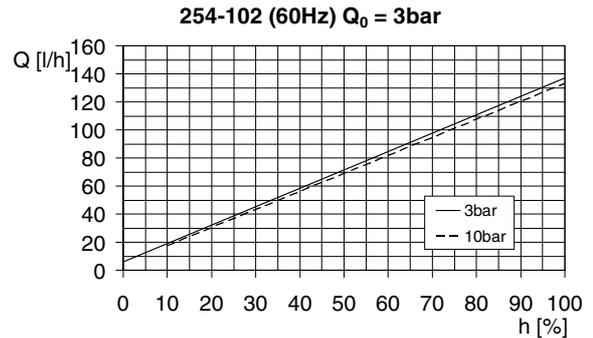
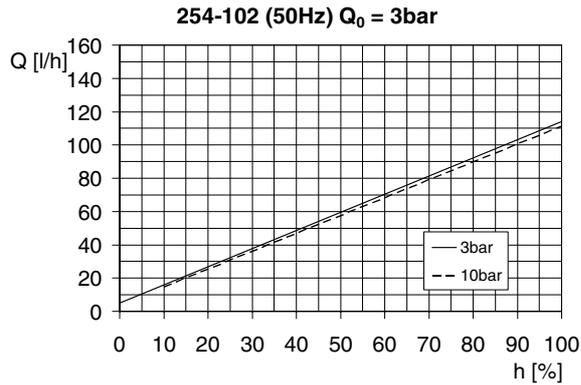
The dosing curves refer to:

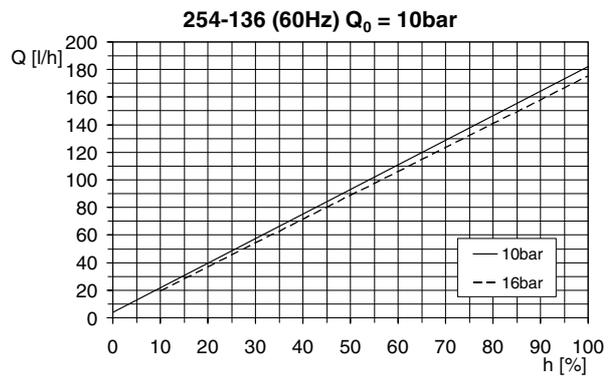
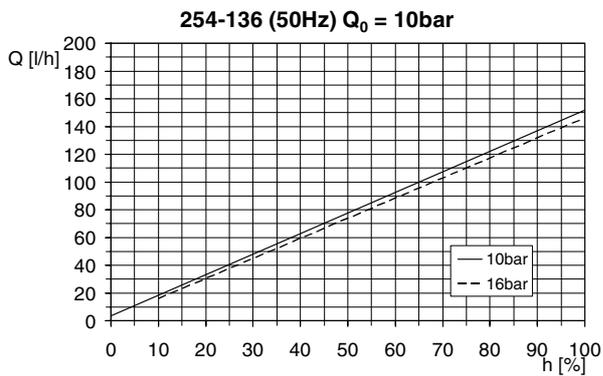
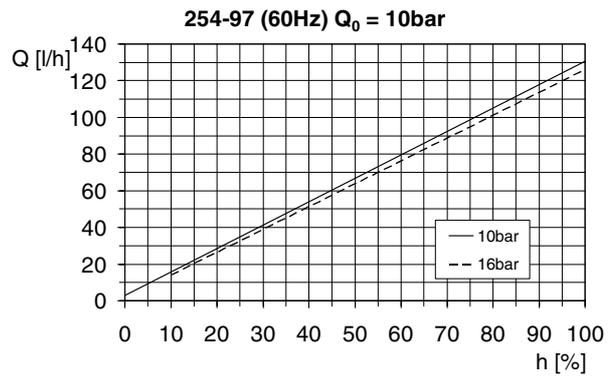
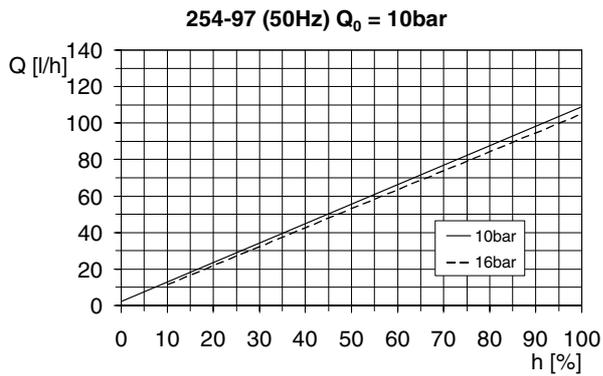
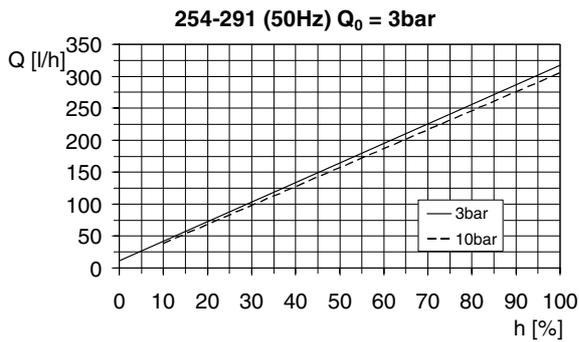
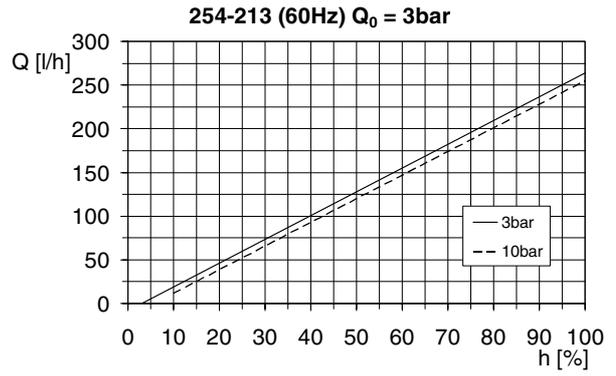
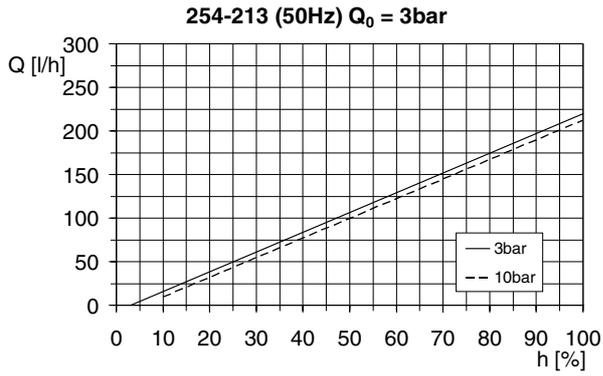
- The dosing medium water,
- Zero point of pump  $Q_0$  for specified pressure - see diagram.

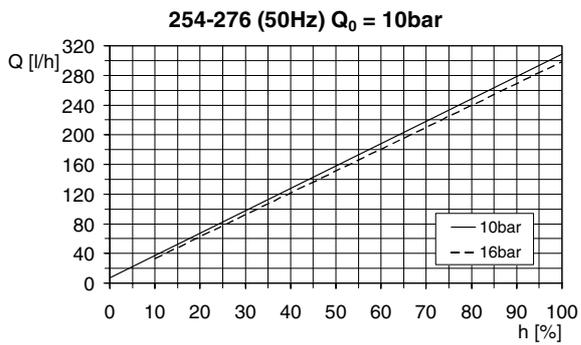
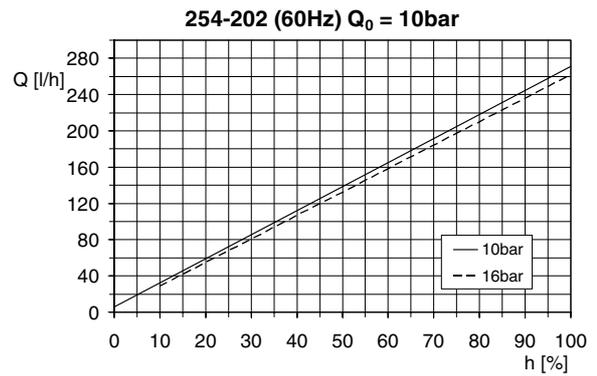
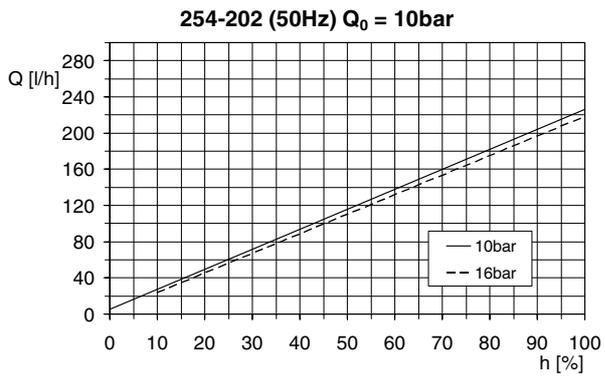
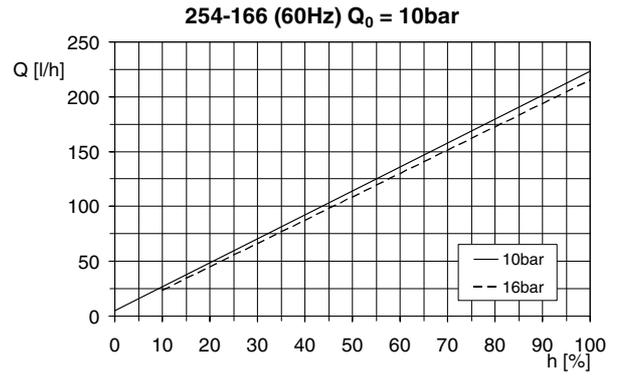
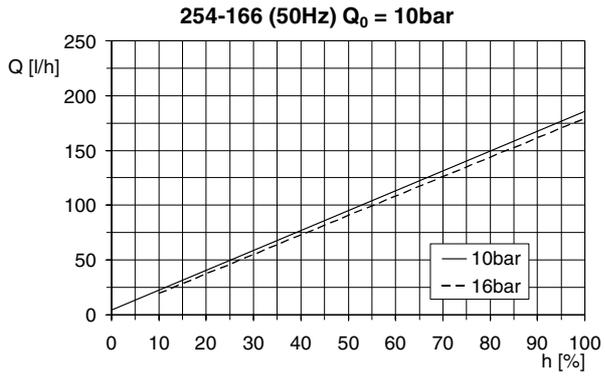
Q Dosing flow

$Q_0$  Zeropoint of the pump

h Stroke length







## EC Declaration of Conformity (Translation)

in the context of EC machinery directive 98/37/EC,  
EC directive for EMC 89/336/EEC

The design of the product range

**Piston Diaphragm Dosing Pumps KM 254**

has been developed, constructed and manufactured in compliance with  
EC directives 98/37/EC and 89/336/EEC at the sole responsibility of

**ALLDOS Eichler GmbH**  
**Reetzstr. 85**  
**D-76327 Pfinztal (Söllingen), Germany**

The following harmonized standards have been applied:

- EN 292-1:1991/ EN 292-2:1991 + A1:1995
- EN 809:1998
- EN 61000-3-11:2000 \*
- EN 61000-6-2:2001
- EN 61000-6-4:2001

\* with Etron Profi electronics

Pfinztal, 25/10/02



Ewald Diesslin  
Managing Director

pp Klaus Müller  
Construction and  
Development

Any modifications made to the pump without our approval will invalidate this declaration.  
When installing the pump in a machine or system ensure that the machine or system into  
which it is installed complies with the provisions of the directives. The pump must not be  
started until this has been established.