

## MINIDOS A

Motor-Driven Diaphragm Dosing Pump



**EN**

02

## Operating Manual

Read this operating manual before start-up!  
To be retained for future reference.

# Table of Contents

<b>1. General and Safety Instructions</b> .....	<b>3</b>
1.1 General.....	3
1.2 Identification of safety instructions in this operating manual .....	3
1.3 Personnel qualifications and training.....	3
1.4 Important safety instructions .....	3
1.5 Hazards due to failure to follow safety instructions.....	4
1.6 Safety-conscious working .....	4
1.7 Safety instructions for the operating company/operator .....	4
1.8 Safety instructions for inspection, maintenance and installation work.....	4
1.9 Unauthorised modification and production of spare parts .....	4
1.10 Inadmissible operating practices.....	5
1.11 Dosing of chemicals .....	5
1.12 Scope of delivery.....	6
<b>2. Use for intended purpose</b> .....	<b>7</b>
2.1 Structure of the dosing pump .....	7
<b>3. General information and function</b> .....	<b>8</b>
<b>4. Dimensioned drawings</b> .....	<b>9</b>
<b>5. Technical data</b> .....	<b>10</b>
5.1 Dimensioning of the lines .....	10
5.2 Electrical data, motor .....	11
5.3 Technical data, automatic reversible ATE servomotor (optional) .....	11
<b>6. Performance curves</b> .....	<b>12</b>
<b>7. Installation</b> .....	<b>13</b>
7.1 General information .....	13
7.2 Installation location .....	14
7.3 Drain .....	14
7.4 Electrical connection of the pump .....	14
7.5 Wiring diagrams for ATE servomotor for stroke length adjustment .....	16
7.6 Back-pressure and safety valves .....	17
7.7 Injection nozzle installation .....	17
7.8 Example installation .....	18
7.9 Stroke length adjustment .....	18
<b>8. Start-up</b> .....	<b>19</b>
8.1 Start-up of MINIDOS A with ATE servomotor .....	19
<b>9. Shutdown</b> .....	<b>20</b>
9.1 Disposal of old equipment.....	20
<b>10. Maintenance</b> .....	<b>21</b>
10.1 Lubrication.....	21
10.2 Maintenance of the bearings .....	21
10.3 Maintenance of the ATE servomotor (optional) .....	21
10.4 Manual adjustment of the ATE servomotor, Type AR30W .....	21
10.5 Replacing the diaphragm .....	22
10.6 Valves.....	23
<b>11. Spare parts</b> .....	<b>25</b>
<b>12. Troubleshooting</b> .....	<b>28</b>
<b>Device revision</b> .....	<b>29</b>
<b>Index</b> .....	<b>30</b>
<b>Declaration of No Objection</b> .....	<b>33</b>
<b>Warranty claim</b> .....	<b>34</b>
<b>CE declaration of conformity</b> .....	<b>35</b>

# 1. General and Safety Instructions

## 1.1 General

This operating manual contains basic instructions to be followed during installation, operation and maintenance. It is therefore essential for the assembler and the relevant technical personnel/operating company to read this operating manual. It must remain accessible at the dosing pump/system for reference at all times.

Besides the general safety instructions in this "Safety" section, the special safety instructions in the other sections are also to be followed.

## 1.2 Identification of safety instructions in this operating manual

Failure to follow the safety instructions in this operating manual may result in personal injury or damage to the environment and the dosing pump/system. Safety instructions are identified by the following symbols:

### **DANGER!**

*Indicates an immediate danger.*

*Failure to follow this instruction will lead to death or extremely serious injuries.*



### **WARNING!**

*Indicates a potentially hazardous situation. Failure to follow this instruction may lead to death or extremely serious injuries.*

### **CAUTION!**

*Indicates a potentially hazardous situation. Failure to follow this instruction may lead to minor injuries or damage to property.*

### **ATTENTION! or NOTICE!**

*Failure to follow these safety instructions may endanger the machine and its functions.*

### **IMPORTANT!**

*This indicates additional information that makes work easier and ensures trouble-free operation.*



Information attached directly to the dosing pump, such as

- cable markings
- markings for fluid connections

must be followed without fail and must remain fully legible at all times.

## 1.3 Personnel qualifications and training

The personnel employed for operation, maintenance, inspection, and installation must be suitably qualified for this work. The responsibilities, areas of competence and personnel supervision must be clearly defined by the operating company. Personnel who do not have the required know-how must be duly trained and instructed. If necessary, this can also be done by the manufacturer/supplier on behalf of the operating company. In addition, the operating company must ensure that the personnel are fully familiar with, and have understood the contents of this operating manual.

## 1.4 Important safety instructions

When installing and using this electrical device, basic safety precautions should always be followed, including the following:

### **ATTENTION!**

*Read and follow all instructions! Keep this operating manual for future reference!*

### **WARNING!**

*To reduce the risk of injury, do not permit children to use this product unless they are closely supervised at all times.*



**WARNING!**

*Risk of electric shock. Connect the device only to a socket outlet with earthing contact protected by a ground fault circuit interrupter (GFCI). Consult a qualified electrician if you are uncertain whether the socket is protected by a GFCI.*

*Do not bury the cable. Secure cable to avoid damage by lawn mowers, hedge trimmers and other equipment.*

**WARNING!**

*To reduce the risk of electric shock, replace the cable immediately if damaged.*

**WARNING!**

*To reduce the risk of electric shock, do not use extension lead to connect unit to electric supply; use an appropriately located socket outlet.*

**1.5 Hazards due to failure to follow safety instructions**

Failure to follow the safety instructions may endanger not only persons but also the environment and the device. Failure to follow the safety instructions may invalidate any damage claims.

The following hazards in particular may result:

- Failure of major equipment functions
- Failure of required maintenance and repair methods.
- Danger to persons due to electrical, mechanical and chemical effects.
- Danger to the environment due to leakage of hazardous substances.

**1.6 Safety-conscious working**

The safety instructions contained in this operating manual must be observed. The operating company is responsible for ensuring compliance with local safety regulations. Faults that may affect safety must be repaired immediately.

**1.7 Safety instructions for the operating company/operator**

Leakages of hazardous substances (e.g. aggressive, poisonous) must be disposed of in such a way that they do not pose a risk to persons and the environment. Statutory regulations must be observed.

Dangers due to electric current must be prevented (for further details, refer to the VDE<sup>1)</sup> regulations and regulations of the local power supply companies).

<sup>1)</sup> German Association for Electrical, Electronic & Information Technologies

**1.8 Safety instructions for inspection, maintenance and installation work**

The operating company must ensure that all maintenance, inspection and installation work is carried out by authorised and duly qualified personnel, who have read and understood this operating manual.

Any work on the machine must only be carried out after it has been brought to a complete stop. Always follow the procedure specified in the operating manual for shutting down the dosing pump/system.

Dosing pumps or systems which convey hazardous media must be decontaminated.

All safety and protective equipment must be reattached and activated immediately after the work has been completed.

**1.9 Unauthorised modification and production of spare parts**

The device may only be modified or converted in consultation with the manufacturer. Use only the manufacturer's spare parts and accessories. Otherwise the warranty is invalidated.

## 1.10 Inadmissible operating practices

Any methods of operation other than those described in section 2 "Proper use" are not permitted and will invalidate any manufacturer liability under the warranty.

## 1.11 Dosing of chemicals

### CAUTION!

*When working on dosing systems, the local accident prevention regulations must be observed and the specified personal protective equipment must be worn. The following standard protective clothing is recommended, depending on the hazardousness of the metered medium:*



Protective clothing



Protective gloves



Protective goggles

It is recommended that all persons responsible for the installation and maintenance of piping systems, hoses and accessories wear this protective clothing.

Before working on the dosing pump and system, disconnect it from the mains power supply and prevent it from being switched on.

### CAUTION!

*Any chemical still present in the dosing head may spray out when the power supply is reconnected. This may lead to chemical or other burns to the face and hands. Dosing lines must always be connected before switching on again.*



The chemical resistance of the construction materials in the pump must be verified before dosing aggressive media!

The pump dosing head and the system connections and lines may be under pressure. Working on the dosing system requires special safety precautions and is allowed only for suitably trained personnel:

### CAUTION!

*Chemical may spray out. This may lead to chemical or other burns. Always release the pressure before starting work on the dosing pump.*

Before working on the dosing head, valves and connections, flush the dosing pump with a harmless medium (water in most cases), to avoid unintentional contact with the metered medium.

### WARNING!

*Never look into the open end of a clogged line or valve. Chemicals may emerge unexpectedly and cause chemical or other burns to face and hands.*

Before start-up, all screw connections must be inspected for correct tightness and leak-tightness, and must be re-tightened using an appropriate tool if necessary.

### CAUTION!

*If connections at the dosing head are loosened during operation, for venting or other reasons, leaking chemicals must be removed properly. Only in this way is it possible to effectively avoid the risk of injuries caused by chemicals and corrosion at the dosing pump. Leaking chemicals may also damage the diaphragm at its mounting edge.*



**ATTENTION!**

*If changing the chemical, check the materials in the pump and other system parts for chemical resistance. If there is a danger of chemical reaction between the different media, clean thoroughly beforehand.*

**IMPORTANT!**

*The lock screw must be retightened after adjusting the stroke length. The setting of the adjusting knob may otherwise change, thus causing faulty flow rates.*

**ATTENTION!**

*The base of the dosing pump must remain clear to ensure adequate air circulation to cool the motor. The pump should be raised if there is a risk of liquid collecting beneath the base of the pump.*

**DANGER!**

*Fire hazard. Shock wave: parts may fly off and cause fatal injury. MINIDOS A must never be used in areas with a potentially explosive atmosphere.*

**WARNING!****Lethal voltage!**

*Take particular care when carrying out adjustment work on the inside of the ATE servomotor. Connections and internal limit switches might be live. Additional limit switches in the ATE servomotor may be under voltage (live) even when the auxiliary voltage is switched off.*

*After installing the ATE servomotor or before start-up, re-attach the cover.*

**1.12 Scope of delivery****IMPORTANT!**

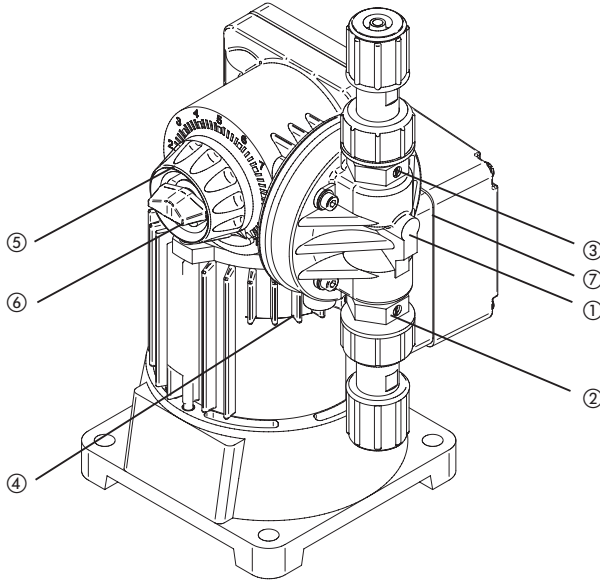
*Carefully unpack the dosing pump and any accompanying accessories ordered, so that small parts are not left inside the packaging. Compare the delivery content with the delivery note immediately. If there are any discrepancies, determine the cause.*

## 2. Use for intended purpose

The device is intended for the following purpose only: the conveying and dosing of chemicals.

Operating safety is guaranteed only if the device is used for its intended purpose. Use for any other purpose is not permitted and will invalidate any liability under the warranty. The operating conditions described in section 5 "Technical Data" must be observed!

### 2.1 Structure of the dosing pump



- ① Dosing head
- ② Suction side valve
- ③ Discharge side valve
- ④ Drain socket
- ⑤ Stroke length adjustment
- ⑥ Stroke length adjustment lock
- ⑦ Terminal box, motor (power supply)

### 3. General information and function

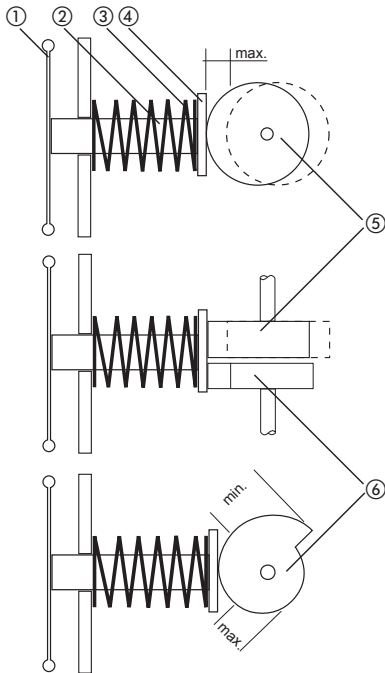
Dosing pumps are used to add chemicals in precisely metered quantities in various processes. Designed as a leak-free diaphragm dosing pump with a dosing range between 3 l/h and 39 l/h, the MINIDOS A is used in a wide range of applications.

The MINIDOS A is supplied as an uncomplicated dosing pump with the dosing head mounted on the left-hand side.

The motor is connected directly to the terminal box. A three-phase motor drives the unit. Operation with AC voltage is also possible when a corresponding capacitor is used. To adapt the dosing rate, the stroke length can be adjusted by hand from 0% to 100%.

The MINIDOS A is optionally available with electrical remote adjustment of the stroke length (ATE).

#### Principle of operation



- ① Diaphragm
- ② Diaphragm rod
- ③ Return spring for suction stroke
- ④ Tappet plate
- ⑤ Drive eccentric
- ⑥ Stroke limiting eccentric

The worm gear set of the single-stage gearbox and the roller bearings are lifetime lubricated. Dosing takes place when movement of the drive eccentric ⑤ causes movement of the diaphragm rod ②. The suction stroke is produced by the return movement due to spring force. Stroke length is adjusted by limiting the tappet return movement using a manually adjustable eccentric disc as the end stop (stroke limiting eccentric ⑥). The adjustment range is from 0 to 100%.

## 4. Dimensioned drawings

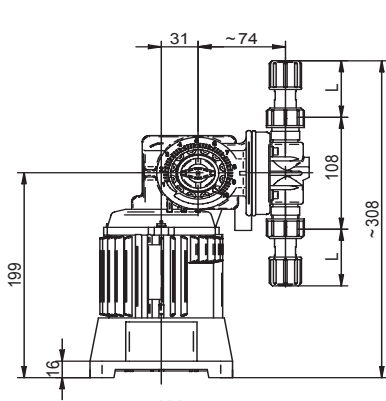


Fig. 4.1: MINIDOS A3...24

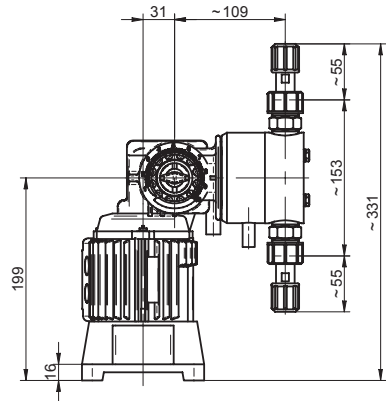


Fig. 4.2: MINIDOS A40

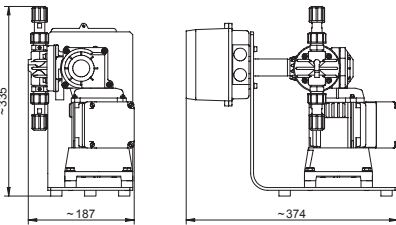
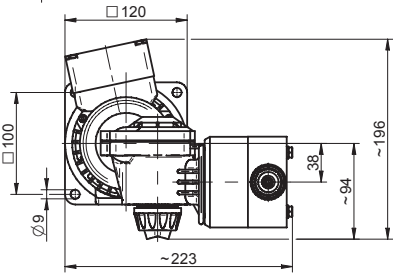
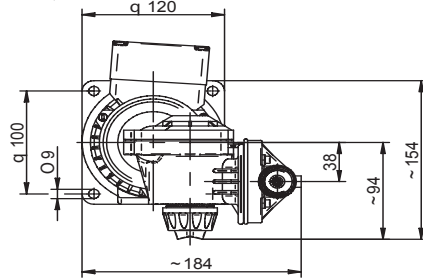


Fig. 4.3: MINIDOS A3...24 ATE

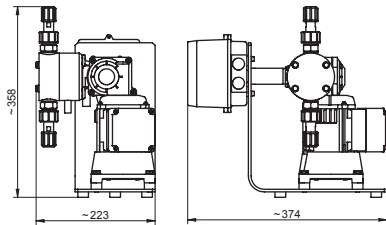


Fig. 4.4: MINIDOS A40 ATE

Connections	Valves	L
Hose clamp connection	4/6	28
	6/12	55
Hose clip connection	-	30
Pipe bonded connection	Ø 10	15
	Ø 12	15
Pipe thread connection	G 1/4 i	20

All dimensions in mm

## 5. Technical data

MINIDOS A		3	5	8	14	24	40
max. delivery pressure	bar	10					5
max. pressure in 1~ operation	bar	10				5	2,5
Delivery rate at max. pressure	l/h	3,2	6,4	8	14	24	39
Stroke volume	ml/ stroke	1,5			2,6		4,7
max. stroke frequency	rpm	36	72	90		138	
Diaphragm Ø	mm	38			52		64
max. suction head	mbar	500					250
Max. inlet pressure Σstatic and dynamic	mbar	500					
Valves, nominal diameter		DN 4					DN 6
max. ambient temperature	°C	40					
max. media temperature	°C	35					
Power output	kW	0,03	0,05	0,03		0,05	
Weight							
Plastic	kg	4,4					4,7
Stainless steel	kg	4,7					7,0

### 5.1 Dimensioning of the lines

The following approximate values are applicable for the dimensioning (maximum length) of suction and pressure lines:

- 2 m for maximum flow velocities of 0.5 ... 0.7 m/s
- 10 m for maximum flow velocities of 1.0 ... 1.5 m/s

(without pulsation damper or suction pressure regulator, and without overdimensioning of the line).

This is applicable to chemicals with a maximum viscosity of 20 mPAS (the highest viscosity is at lowest system temperature, for example in case of delivery in winter) and with a maximum density of 1100 kg/m<sup>3</sup>. The maximum flow velocity is calculated as follows:  $Q \times \pi / A$  ( $Q$  = flow rate,  $A$  = line diameter).

For all other chemicals and installation situations please refer to the seminar documents of the manufacturer "Kleine Einführung in die Dosiertechnik" (Short introduction into dosing technology) or to other applicable guidelines from specialist literature on fluid dynamics (i.e. Kalide ISBN 3-446-13092-6).

Avoid overloading of the pump, the piping or the instruments.

## 5.2 Electrical data, motor

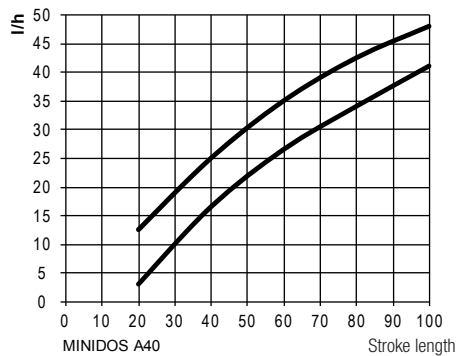
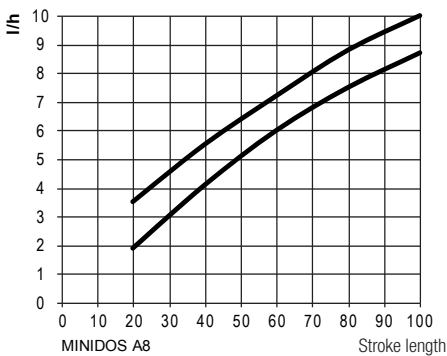
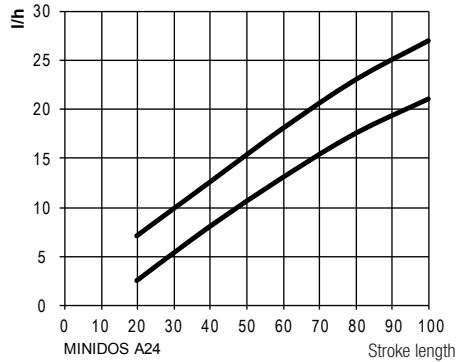
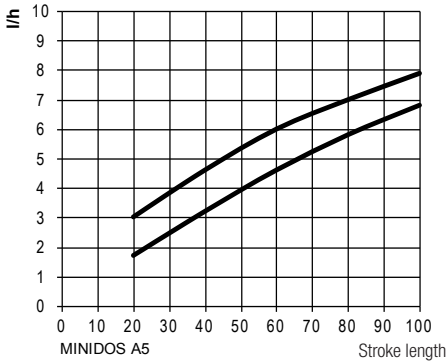
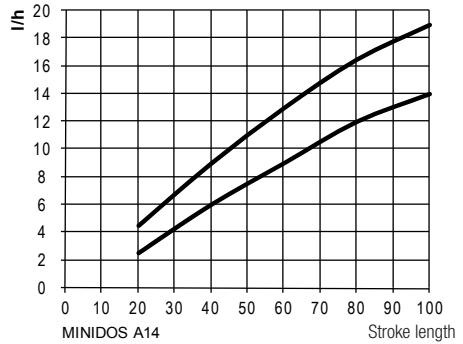
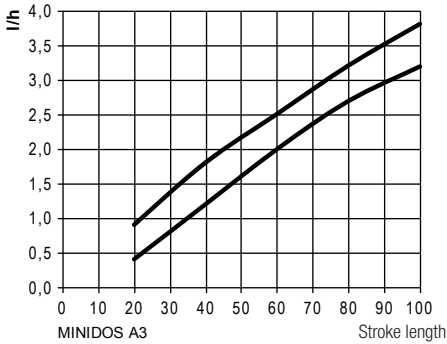
MINIDOS A		3	8	14	5	24	40
Standard motor, type		RFT 0.06/4-71R			RFT 0.06/2-71R		
Speed	rpm	1420			2880		
Voltage	V AC	230/240					
Nominal current	A	0,23/0,40			0,30/0,52		
Power output	kW	0,03			0,05		
Frequency	Hz	50					
Protection class		IP 55					
ISO class		F					

## 5.3 Technical data, automatic reversible ATE servomotor (optional)

Servomotor		AR 30 W23	AR 30 W23S
<b>Part No.</b>		<b>78747</b>	<b>78918</b>
Design		Reversible servomotor with self-locking step-down gear. Connections led out via cables (900 mm). Angle of rotation limited by two internal limit switches.	
Use		For controllers with switching output	For controllers with constant output
Voltage		230 V AC +/-15%, 50/60 Hz	24 V AC +/-20%, 50/60 Hz
Power consumption		3.7/4.2 VA	4.8/5.4 VA
Torque		15 Nm	
Actuating time	50 Hz	360 s	
	60 Hz	300 s	
Regulation bevel		270° ⇔ 0...100%	
Protection class		IP 55	
Ambient temperature		-20 ... +60 °C	
Weight		1.2 kg	
<b>Inputs</b>			
Control		3-point step control	0/4...20 mA
			0/2...10 V DC
Load limit at 0/2...10 V DC		max. 0.5 A	
<b>Outputs</b>			
Position feedback signal for remote display		Potentiometer 1 W 0 ... 1 kOhm = 0 ... 100 %	0 ... 10 V DC

## 6. Performance curves

The performance curves refer to water at 20 °C (68 °F). The delivery capacity depends on the medium (density and viscosity) and temperature. Dosing pumps must therefore be gauged in litres for the application. At 60 Hz operation, values are increased by a factor of 1.2.



MINIDOS A3...A24: Upper curve of field for no-pressure delivery, lower curve at 10 bar.  
 MINIDOS A40: Upper curve of field at 2 bar, lower curve of field at 5 bar.

## 7. Installation

### 7.1 General information

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

The technical data of the dosing pump (Section 5) must also be taken into consideration. The system must be designed accordingly (e.g. pressure loss in lines depending on nominal diameter and length).

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

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

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

Always use appropriate tools when installing plastic connecting parts. To avoid damage, never apply excessive force.

#### **IMPORTANT!**

*Plastic parts (especially PVC parts) can be tightened and loosened more easily by applying lubricant (e.g. silicone grease) to the thread beforehand. To prevent seizing, threaded stainless steel parts (e.g. dosing head and valves) must be lubricated before being assembled (e.g. with PTFE spray).*



#### **ATTENTION!**

*Check the lubricant for compatibility with the chemical.*



#### **7.1.1 Installation of MINIDOS with ATE servomotor**

The ATE servomotor is connected to the pump and adjusted at the factory. When installing, sufficient installation space of at least 150mm must be provided in order to allow later maintenance.

The electrical connection of the ATE drive must be made in accordance with locally applicable requirements and may only be carried out by technical personnel. The wiring diagrams (Section 7.5.1) show the two basic connection variants.

Cable type and cross-section must be chosen according to the motor data.

The cable passage through the housing must be made professionally. We recommend using gland connections with strain-relief clamp. The required protection class must be ensured by professional-standard installation of the electrical connections.

#### **ATTENTION!**

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



## 7.2 Installation location

The installation location of the dosing pump must be easily accessible for the operating and maintenance personnel.

When installing the dosing pump below the liquid level, care must be taken to ensure that chemical leakages due to a broken diaphragm cannot cause any damage (collecting pan, leakage sensor).

It is also possible to mount the pump directly on the chemical supply tank.

### ATTENTION!

*Ambient temperatures of the pump exceeding 40°C are not permitted. Radiant heat from apparatus and heat exchangers must be shielded so that heat from the dosing pump can be dissipated sufficiently. Avoid exposure to direct sunlight. If the dosing pump is installed outside, provide a roof to protect it from the effects of weather.*

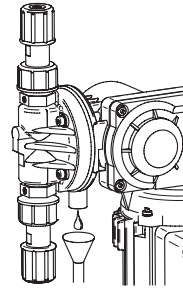
Install the pump so that the suction and discharge valves are in vertical position. To ensure stability, bolt the pump to a suitable foundation. The system piping must not exert any force on the connections and valves of the dosing pump. To avoid dosing errors at the end of the process, the dosing pump must be locked electrically and hydraulically.

## 7.3 Drain

### ATTENTION!

*Released gases can cause irreparable damage to the gearing in the dosing pump.*

Drainage or leakage from the separating chamber must be allowed to flow downward to the collecting pan. The drain pipe must never lead directly back to the medium through the tank cover, otherwise released gases may get into the pump gearbox. The drain pipe should only lead downward to a gas-free collecting tank or downward to a collecting funnel, leaving a sufficient gap from the end of the pipe. Leakage can then be returned through the funnel and through the tank cover. This makes it easier to detect any leakages at the gap to the collecting funnel.



## 7.4 Electrical connection of the pump

The electrical connection of the dosing pump must be made according to local rules and regulations and may only be carried out by qualified technical personnel.

Cable type and cross-section of the supply lines must be chosen according to the motor data.

The cable passage to the motor terminal box must be made professionally. We recommend using gland connections with strain-relief clamp. The required protection class must be ensured by professional-standard installation of the electrical connections. To avoid dosing errors at the end of the process, the dosing pump must be locked electrically and hydraulically.

## Electrical connection data

(other types available on request)

MINIDOS	Voltage	Frequency	Power output	Current
	V AC	Hz	W	A
A3, A8, A14	400 / 230	50	30	0,23 / 0,40
	400 / 254	60	40	0,24 / 0,42
	400 / 230	60	40	0,22 / 0,38
	230, 1~	50	25	0,35
A5, A24, A40	400 / 230	50	50	0,30 / 0,52
	400 / 254	60	60	0,35 / 0,52
	400 / 230	60	60	0,29 / 0,50
	230, 1~	50	50	0,45

## Wiring diagram for the drive motor

Three-phase current supply

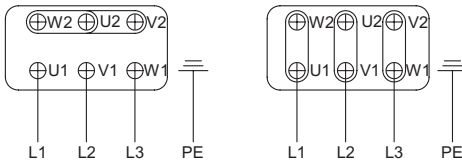


Fig. 7.2: Y-circuit (left) and delta circuit (right)

Alternating current supply with motor in Steinmetz circuit

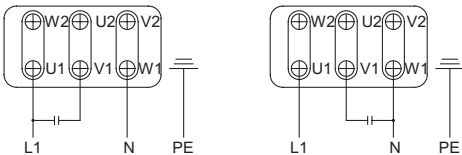


Fig. 7.2: Clockwise rotation (left) and anticlockwise rotation (right)

For other special versions please refer to the corresponding separate wiring diagrams.

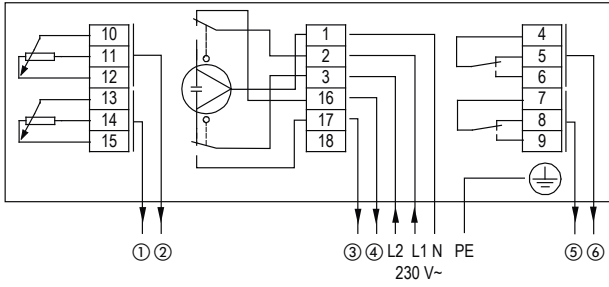
### NOTE!

*The dosing pump must be plugged into a grounded power outlet.*

*The 230 V AC version of the MINIDOS is connected by a shockproof earthing-pin plug.*



## 7.5 Wiring diagrams for ATE servomotor for stroke length adjustment



Terminal	Item	Function	Wire	Assignments
1		3-point control, Voltage 230 V~, 50/60 Hz	N	
2			L	Reduce
3			L	Increase
4, 5, 6	⑤	Isolated end position feedback, max. 250 V~, 1 A (optional)		
7, 8, 9	⑥			
10, 11, 12	①	Position feedback, 0 ... 1 k $\Omega$		
13, 14, 15	②	Position feedback, 0 ... 1 k $\Omega$ (optional)		
16	③	End position feedback		0 %
17	④			100 %
18	-			

Fig. 7.1 Wiring and terminal diagrams, ATE servomotor Sauter AR 30W23

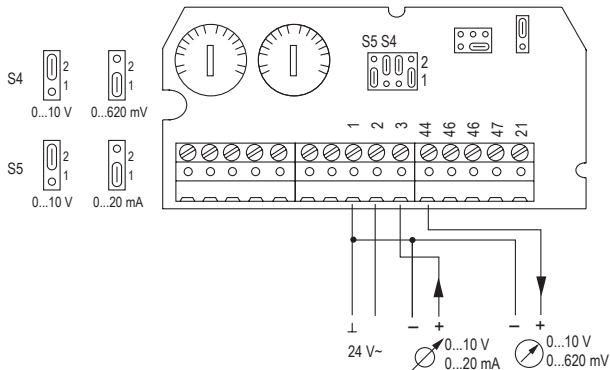


Fig. 7.2: Wiring diagram, ATE servomotor, Sauter, Type AR 30W23S F020 24 V~

## 7.6 Back-pressure and safety valves

Back-pressure valves are used to optimise the dosing process. They are used:

- to increase the dosing accuracy in the presence of fluctuating back pressures.
- when the dosing lines are long, in order to prevent excess delivery, since the accelerated medium continues moving due to its own inertia even after the delivery stroke has ended.
- to prevent siphoning, if the supply pressure is higher than system pressure.

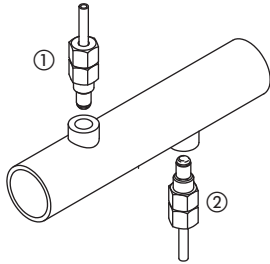
Pressure-relief and safety valves are used for overload protection of the dosing pump and the associated valves and lines. They prevent inadmissible pressure rises in the delivery side system of the dosing pump; for example, if shutoff valves close while the pump is running, or if the injection nozzle is clogged.

The PENTABLOC is a combination valve and acts both as a back-pressure valve as well as a safety valve. It also integrates functions such as anti-siphoning, pressure relief and dosing control.

## 7.7 Injection nozzle installation

Injection nozzles are used to inject the metered medium into the main flow, while at the same time acting as non-return valve. The injection nozzle is usually mounted from the top into the main line. Mounting from below is recommended only for media that have a tendency to crystallise, in order to prevent air bubbles from being trapped in.

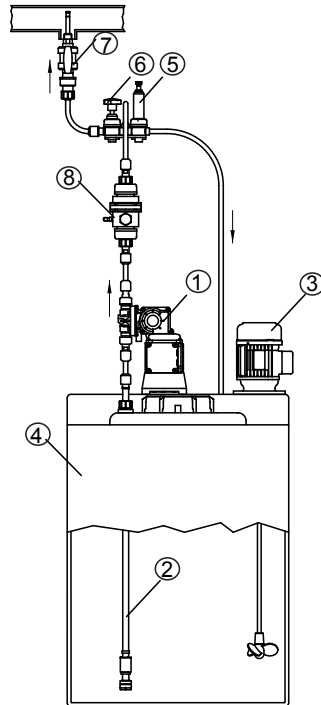
For media that tend to contaminate the injection nozzle, we recommend installing an injection nozzle that can be shut off and removed for maintenance purposes.



① Injection nozzle mounted from above, ② Injection nozzle mounted from below (for media that tend to crystallise)

## 7.8 Example installation

- ① Dosing pump
- ② Suction line
- ③ Electric agitator
- ④ Tank
- ⑤ Pressure-relief valve
- ⑥ Diaphragm shutoff valve
- ⑦ Injection nozzle
- ⑧ Pulsation damper



## 7.9 Stroke length adjustment

### ATTENTION!

*The stroke length must not be adjusted when the pump is at a standstill!*

Proceed as follows to adjust the stroke length:

1. Release the screw securing the adjusting knob by turning it counterclockwise (to the left).
2. Set the stroke length to the required value corresponding to the performance curves (Section 6).
3. Retighten the mounting screw without changing the stroke length setting.

## 8. Start-up

### CAUTION!

The personal protective equipment specified by the applicable accident prevention regulations must be worn whenever working on the dosing pump/system!



Protective clothing



Protective gloves



Protective goggles

1. All the work described under "Installation" (Section 7) must be carried out before starting the dosing pump. The safety instructions (Section 1) must also be observed.
2. The MINIDOS dosing pump is switched on by an externally installed control system.
3. The manual capacity adjustment should be set to maximum stroke for better priming. During the initial priming, there should be no back pressure. For this purpose, we recommend installing a relief valve on the discharge side of the dosing pump.
4. If a priming aid has been installed, this must be filled with chemical first. If the dosing pump does not prime, switch off the pump, unscrew the discharge valve and fill the dosing head with liquid. If non-hazardous, the medium itself can be used; otherwise use a neutral medium that will not disturb the process. (In many cases, water can be used.)

### WARNING!

Chemical may spray out. This may lead to chemical or other burns. Ensure that the discharge line is depressurised before disconnecting.



Mount the discharge valve, switch on the dosing pump and allow it to prime again. (A priming aid is recommended. See example installations.)

5. If there is a vent valve integrated in the dosing head or installed as a separate fitting, open it while the dosing pump is operating until fluid comes out. Then close it again. In the case of outgassing media, allow the fluid to flow off continuously (about 1 drop per 1 - 3 strokes).
6. When correct operation has been established, set the desired delivery rate using the adjusting knob (see section 9) or the remote control adjustment. For an initial approximation, refer to the performance curves (Section 5).

### NOTE!

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

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



### 8.1 Start-up of MINIDOS A with ATE servomotor

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

## 9. Shutdown

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



### CAUTION!

*Excess chemicals must be disposed of properly. Observe the applicable accident prevention regulations and wear personal protective equipment.*



Protective clothing



Protective gloves



Protective goggles



### CAUTION!

*The dosing pump must be disconnected from the power supply and secured to prevent it being restarted.*



### CAUTION!

*The pressure must be relieved before disconnecting the pressure line from the pump pressure control valve so that chemicals cannot spray out.*

To drain the dosing head, it is advisable to unscrew the discharge and suction valves.

### 9.1 Disposal of old equipment

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

## 10. Maintenance

These 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). Regular visual inspections are therefore necessary in order to ensure a long operating life. Regular maintenance will protect the dosing pump from operation interruptions.

### 10.1 Lubrication

The MINIDOS A diaphragm dosing pump requires little maintenance. The pump gearbox is lifetime lubricated with a molybdenum disulphite lubricant. Nevertheless, under harsh operating conditions such as high ambient temperatures and continuous operation, the grease should be replaced after every 5000 operating hours. The following lubricant can be used for this purpose: Molykote BR 2 plus or OKS400.

#### NOTE!

*The drive unit of this dosing pump is not designed for oil lubrication.*



### 10.2 Maintenance of the bearings

The bearings of the rotor shaft are sealed ball bearings with lifetime lubrication. The other rolling bearings in the gearing, and the plain bearings of the diaphragm rod, are lubricated by the gear oil.

### 10.3 Maintenance of the ATE servomotor (optional)

The ATE servomotor comes with lifetime lubrication ex factory. Nevertheless, regular inspections are recommended if the drive is operated in tough operating conditions, for example in high ambient temperatures or continuous operation. To re-lubricate the ATE gear, use molybdenum disulphite, for example "Molykote BR2plus" or "OKS400".

### 10.4 Manual adjustment of the ATE servomotor, Type AR30W

The ATE servomotor, Type AR30W, can be moved manually using a hand crank in the event of an electrical defect. The hand crank is available as an accessory under Part No. 32.587.

Manual adjustment is carried out as described in the following:

1. Disconnect the ATE servomotor from the power supply.
2. Remove the cover from the drive unit.
3. Switch on the main drive motor.
4. Insert the hand crank in the opening as shown below and turn in the required direction.  
Caution: Do not turn beyond the end positions.
5. Reattach the cover after manual adjustment.

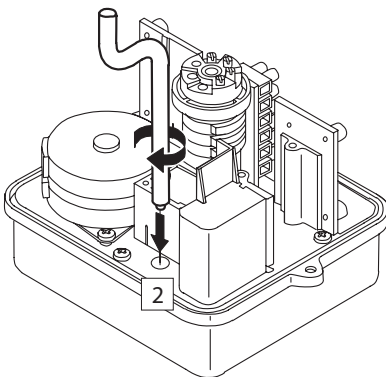


Fig. 10.1: Inserting the hand crank and turning

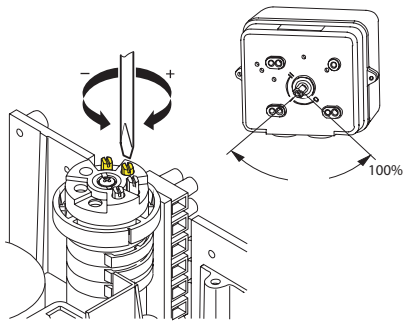


Fig. 10.2: Setting the angle of rotation

## 10.5 Replacing the diaphragm



### CAUTION!

Chemical may spray out. This may lead to chemical or other burns. The pump must be depressurized and flushed thoroughly with water or a suitable medium before starting any work on the dosing pump.

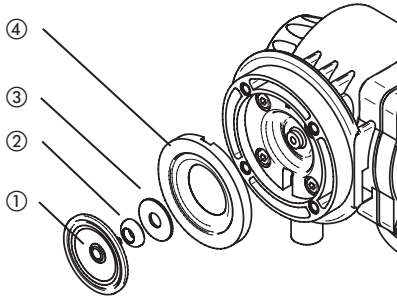


Fig. 10.3: Diaphragm ① with support plate ②, deflector plate ③ and support ring ④

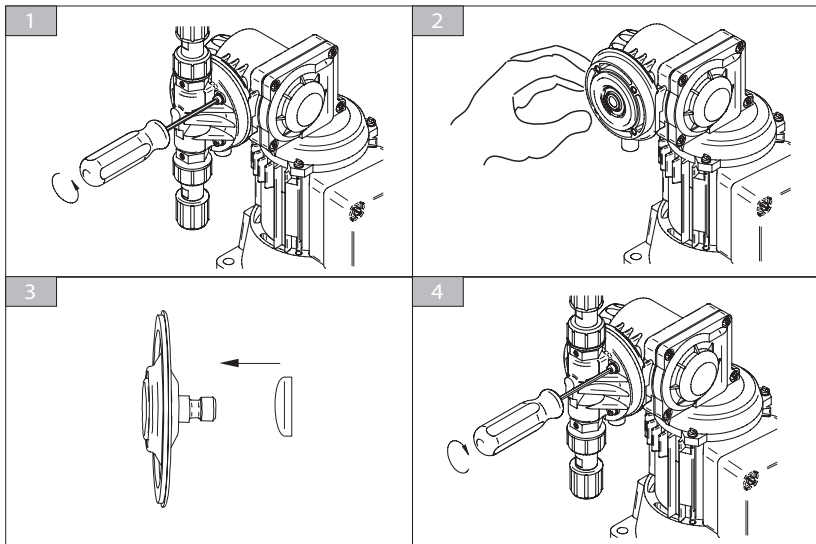
The diaphragm can be replaced as follows:

1. The delivery rate of the dosing pump is set to zero while the motor is running. This moves the diaphragm to the front end position. Switch off the pump.
2. The dosing head is removed using an appropriate tool (see Fig. 1).
3. Grasp the edge of the diaphragm and turn it to the left. The support plate fitted behind the diaphragm on the MINIDOS A3, A5, A8, A40 is also removed (see Fig. 2).

### IMPORTANT!

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

4. If fitted, the support plate is pushed onto the threaded sleeve with the curved side facing towards the diaphragm (see Fig. 3).
5. The new diaphragm is turned clockwise until it is screwed securely into the diaphragm rod (grease the thread). This causes the flat side of the support plate (if present) to be pressed against the end of the diaphragm rod.



6. The dosing pump stroke is now set to maximum while the motor is running. Switch off the motor. The diaphragm is now seated in the groove of the diaphragm flange.
7. Fit the dosing head at the front. Tighten the screws crosswise, e.g. top left – bottom right – top right – bottom left (see Fig. 4). The tightening torque required for the screws holding the dosing head is 125 Ncm on MINIDOS A3...A24 and 2 Nm on MINIDOS A40.

**IMPORTANT!**

*The diaphragm will not provide a tight seal if the tightening torque is too low. The dosing head may be damaged if the tightening torque is too high.*

8. After connecting the dosing lines, the dosing pump is started as described in "Start-up" (Section 8).
9. If the diaphragm wear is excessively high, establish the reason. For the possible causes, please refer to "Troubleshooting" (Section 12).



**10.6 Valves**

The dosing pump valves must be cleaned regularly.

**NOTE!**

*When screwing the valves into the dosing head, observe the tightening torque of 2 Nm  $\pm$ 20 %.*

**CAUTION!**

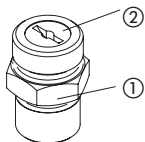
*Chemical may spray out. This may lead to chemical or other burns. The pump must be depressurized and flushed thoroughly with water or a suitable medium before starting any work on the dosing pump.*

**NOTE!**

*Dirty valves will affect the dosing accuracy.*

**DN4 valves**

DN4 valves are pre-assembled, and can be unscrewed from the dosing head as a single unit. To disassemble the valves, use a screwdriver with a 10 mm bit.



- ①. Valve body
- ②. Screwed-in valve plug

Valves DN 4		Valves DN 6	
MINIDOS A 3 ... 24		MINIDOS A 40 ...	
Double-ball valves	Spring-loaded valves	Double-ball valves	Spring-loaded valves
Suction valve			
Discharge valve			
<ul style="list-style-type: none"> <li>① O-ring</li> <li>② Valve body</li> <li>③ *) Flat gasket</li> <li>④ Ball guide</li> <li>⑤ *) Valve ball</li> <li>⑥ *) Valve seat</li> <li>⑦ *) O-ring</li> <li>⑧ Valve plug</li> <li>⑨ *) Seal</li> <li>⑩ *) Compression spring</li> </ul>		<ul style="list-style-type: none"> <li>① *) Flat gasket</li> <li>② Ball guide</li> <li>③ *) Valve ball</li> <li>④ *) Valve seat</li> <li>⑤ *) Flat gasket</li> <li>⑥ Valve body</li> <li>⑦ *) Flat gasket</li> <li>⑧ *) Compression spring</li> </ul>	

\* included in the spare parts kits, see Section 11.

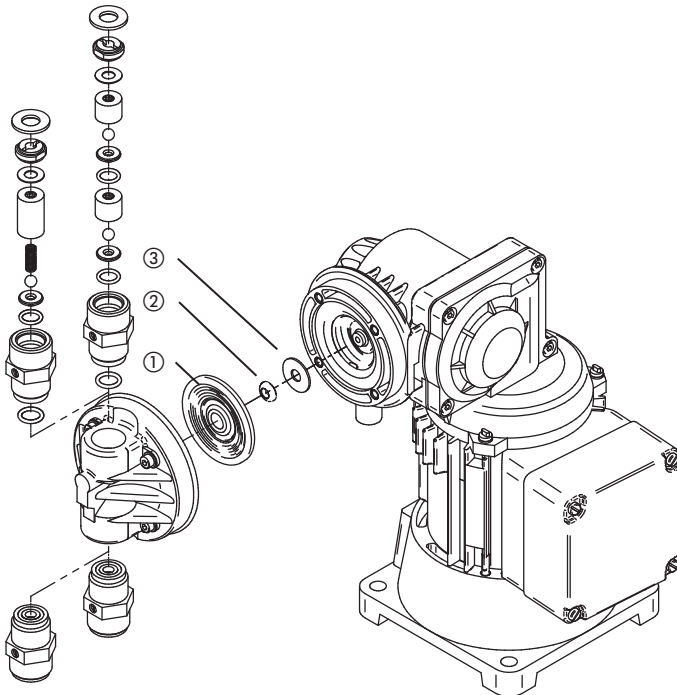
## 11. Spare parts

Use the manufacturer's original spare parts. The wearing parts for MINIDOS A are available as spare parts.

### 11.1 Spare parts MINIDOS A3...24

Spare parts for MINIDOS	A3 ... 8	A14 ... 24
① Diaphragm	81463	81464
② Support plate	23892	-
③ Deflector plate	81260	81260

Spare parts kits for MINIDOS A3 ... A24					
Consisting of:	Material	Double-ball valves		Spring-loaded valves	
		A3 ... 8	A14 ... 24	A3 ... 8	A14 ... 24
<ul style="list-style-type: none"> <li>• Flat gaskets</li> <li>• Valve balls</li> <li>• Valve seats</li> <li>• O-rings</li> <li>• Diaphragm</li> </ul>	PVC/GLASS/FPM	29829	29750	37332	37336
	PVC/GLASS/EPDM	33699	33698	37333	37337
	PVC/GLASS/PTFE	29830	29791	37722	37721
	PP/GLASS/FPM	29829	29750	37332	37336
	PP/GLASS/EPDM	33699	33698	37333	37337
	PVDF/PTFE/PTFE	33862	35572	37340	37341
	Stainless steel/PTFE	29831	29751	37335	37339



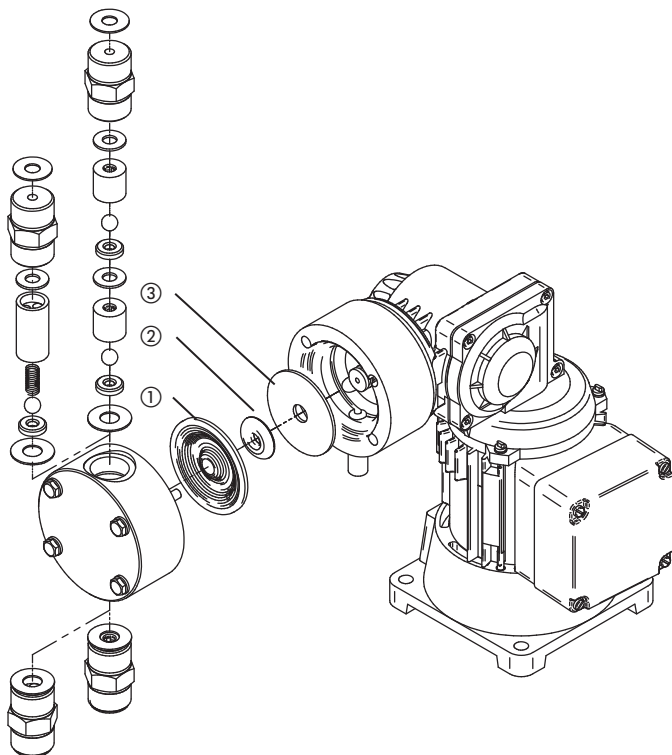
MINIDOS A3...24	Double-ball valves, complete		Spring-loaded valves, complete	
	Suction valve	Discharge valve	Suction valve	Discharge valve
PVC/GLASS/FPM	20890	20891	25087	25088
PVC/GLASS/EPDM	33497	33498	33499	33500
PVC/GLASS/PTFE	24027	24028	25085	25086
PP/GLASS/FPM	35605	35606	35262	34809
PP/GLASS/EPDM	34647	34648	34733	35263
PVDF/PTFE/PTFE	28111	28112	29385	29384
Stainless steel/PTFE	24029	24030	25089	28090

Dosing head, including mounting bolts		
Material	A3 ... 8	A14 ... 24
PVC	23810	23811
PP	34635	34636
PVDF	28119	29178
Stainless steel/PTFE	23813	23814

## 11.2 Spare parts MINIDOS A40

Spare parts for MINIDOS A40	
① Diaphragm	81465
② Support plate	28977
③ Deflector plate	22056

Spare parts kits for MINIDOS A40			
Consisting of: <ul style="list-style-type: none"> <li>• Flat gaskets</li> <li>• Valve balls (spring)</li> <li>• Valve seats</li> <li>• O-rings</li> <li>• Diaphragm</li> </ul>	Material	Double-ball valves	Spring-loaded valves
	PVC/GLASS/FPM	28275	28296
	PVC/GLASS/VSM	28274	28295
	PP/GLASS/FPM	28275	28296
	PP/GLASS/CSM	28274	28295
	Stainless steel/AF	28276	28298



<b>MINIDOS A40</b>	<b>Double-ball valves, complete</b>		<b>Spring-loaded valves, complete</b>	
Material	Suction valve	Discharge valve	Suction valve	Discharge valve
PVC/GLASS/FPM	18185	18186	25162	27517
PVC/GLASS/CSM	18187	18188	25161	27516
PP/GLASS/FPM	35199	35200	35260	35261
PP/GLASS/CSM	34670	34671	34810	34811
Stainless steel/AF	26967	26968	28775	28776

<b>Dosing head, including mounting bolts</b>	
Material	Order No.
PVC	23909
PP	34661
Stainless steel/PTFE	23911

## 12. Troubleshooting

Fault	Possible cause	Remedy
Dosing pump not delivering or output too low.	Valves leaking or blocked.	Clean the valves and vent the dosing pump. See also "Start-up"
	Valves incorrectly installed.	Reassemble the valves. Ensure that the valve balls are located above the valve seats.
	Suction valve or suction line leaking or blocked.	Clean or seal suction line.
	Suction lift too high.	- Set the dosing pump at the inlet. - Install the pulsation damper on the suction side. - Install a priming aid.
	Viscosity too high.	- Install spring-loaded valves. - Increase the pipe diameter. - Use the special dosing head. >> Contact manufacturer
No stroke movement observed	Dosing pump set to zero stroke.	Set the stroke length adjusting knob correctly.
	Diaphragm return spring broken.	Replace the spring.
	Power supply interrupted.	Switch on power supply.
Frequent diaphragm failures	Support plate missing. See Section 10 "Maintenance"	Install new diaphragm and support plate. When replacing the diaphragm, check whether the diaphragm rod is corroded by sprayed medium.
	Diaphragm not screwed up to end stop on diaphragm rod.	Screw a new diaphragm up to the end stop. Support plate must be clamped between diaphragm and diaphragm rod.
	System backpressure too high. (Measured at discharge connection of dosing pump).	Inspect the system. Clean blocked injection nozzle. Install pulsation dampers to reduce pressure peaks if pipes are too long. Check safety valves.
	Media sediment in dosing head.	Clean the dosing head.
Delivery from dosing pump too high. (Dosing pump siphoning.)	Pressure on suction side too high.	Install back-pressure valve or suction pressure regulator.
	Stroke stop shifted.	Readjust stop.
Dosing pump very noisy.	Roller bearing defective.	Replace the roller bearing.
	No molybdenum disulphite lubricant in gearbox	e.g. replace with Molycote.
Motor hums and does not start.	Wrongly connected.	Check electrical wiring.
	Capacitor defective, wrong size or connected incorrectly.	Connect the capacitor correctly or replace.
	Pressure too high.	Check the process.

If the problem cannot be solved with the above remedies, please return the dosing pump to the factory or contact our After-Sales Service for further assistance. Repairs will be carried out immediately.

## Device revision

This operating manual applies to the following devices:

Device	Revision
MINIDOS A3 ... 40	04/1998

It contains all the technical information required for installation, start-up and maintenance. Should you have any questions or require further information regarding this operating manual, please contact the manufacturer or their official national representative.

## Index

### A

Anzugsmoment.....	24
ATE-Stellantrieb.....	13,22
Aufbau der Dosierpumpe.....	7
Auslegung der Leitungen.....	10

### D

Dosierkopf.....	7
Drainageableitung.....	14
Druckhalteventile.....	18

### F

Förderkennlinien.....	12
-----------------------	----

### H

Hublängeneinstellung.....	19
---------------------------	----

### L

Lager.....	22
------------	----

### M

Membranrisse.....	29
Montageort.....	14

### P

PENTABLOC.....	18
----------------	----

### S

Sicherheitsventile.....	18
-------------------------	----

### U

Überströmventile.....	18
Umgebungstemperatur.....	14

**Notes**



## Declaration of No Objection

When sending in for repair, please copy this form, fill in and send along with each device!

### Declaration of No Objection - Form

(please fill in one form for each device and attach it to the outside of the device)

We are returning the following device for repair:

Device and device type: .....

Part No.: .....

Order No.: .....

Date of delivery: .....

Reason for repair: .....

### Medium conveyed

Description: .....

Properties: .....

Irritant: Yes/No\*)

Corrosive: Yes/No\*)

\*) Please delete as appropriate!

We hereby certify that the product has been cleaned thoroughly on the inside and outside before shipment, that it is free from hazardous chemical, biological, or radioactive substances and that the oil has been drained. \*)

If the manufacturer finds it necessary to carry out further cleaning work, we will accept the related costs.

We confirm that the above statements are correct and complete and that the device is being shipped according to legal requirements.

Company: .....

Address: .....

.....

.....

Telephone: .....

Fax: .....

E-mail: .....

Customer No.: .....

Contact person: .....

Date, signature, stamp: .....

## Warranty claim

Please copy and enclose with the device!

If the device fails during the warranty period, please clean it and return, accompanied by the completed warranty claim form.

---

Sender  
Company:..... Telephone: ..... Date: .....  
Address:.....  
Contact person: .....  
Manufacturer order No.: ..... Date of delivery: .....  
Device type:..... Serial number:.....  
Nominal delivery rate:/Nominal pressure:.....  
Description of fault: .....

---

### Type of fault:

1. Mechanical fault

Premature wear

Wearing parts

Breakage/other damage

Corrosion

Damage in transit

2. Electrical fault

Connections, connectors or cables loose

Operating controls (e.g. switches / push-buttons)

Electronics

3. Leaks

Connections

Dosing head

4. No or inadequate operation

Diaphragm defective

Other

---

### Operating conditions of the device

Location/description of installation: .....

Accessories used if any:.....

.....

.....

Commissioning (date):.....

Running time (approx. operating hours): .....

Please indicate the specific features of the installation and enclose a simple sketch showing materials, diameters, lengths and heights.

### EU-Konformitätserklärung

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

### (EN) EU Certificate of Conformity

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

### (FR) Certificat de conformité aux directives européennes

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

### (ES) Declaración de conformidad de la UE

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

### (NL) EU-overeenstemmingsverklaring

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

### (HU) EG (EK)– Egyezőségi nyilatkozat

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

### (PT) Certificado de conformidade da UE

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

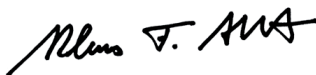
Bezeichnung des Gerätes:	<b>Membran-Dosierpumpe</b>
Description of the unit:	<b>Diaphragm Metering Pump</b>
Désignation du matériel:	<b>Pompes doseuses à membrane mécanique</b>
Descripción de la mercancía:	<b>Bombas dosificadoras de membrana</b>
Omschrijving van het apparaat:	<b>Membraandoseerpomp</b>
A termék megnevezése:	<b>Membrán adagolószivattyúk</b>
Designação do aparelho:	

Typ / Type / Tipo / Típusjelölés:

**MINIDOS A**  
**MIDIDOS E**  
**MEMDOS E**  
**MEMDOS M**  
**MEMDOS ML**  
**MEMDOS MR**  
**MEMDOS GMR**  
**MEMDOS TM**

EU-Richtlinie / EU directives/  
 Directives européennes / Normativa UE /  
 EU-richtlijnen / Vonatkozó EG-irányelvek /  
 Directrizes da UE  
**2006/95/EG**  
**2006/42/EG**

Harmonisierte Normen / harmonized  
 standards / Normes harmonisées /  
 Estándares acordemente / Toegepaste normeringen /  
 Hatályos normák / Normas harmonizadas  
**EN ISO 12100-1 : 2003**  
**EN ISO 12100-2 : 2003**  
**EN 809 : 1998**



i.V. Dipl. Ing. Klaus Albert  
 Lutz-Jesco, Wedemark, 21.12.2009

Technische Leitung / Technical Departement Manager / Direction technique /  
 Dirección Técnica / Hoofd technische dienst / Műszaki irodavezető / Director Técnico



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