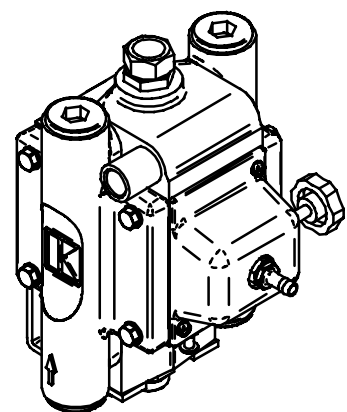


## Operating instructions Diaphragm pump MP-400

Dok-236-GB-6bar.doc Rev. 0

Article No: 200-0102

-keep for further use-



CE

**Krautzberger** 

## CE Declaration of Conformity

in acc. with Annex II A of the EC Machine Directive 98/37/EC



Krautzberger GmbH  
Stockbornstraße 13  
65343 Eltville am Rhein

WE HEREBY DECLARE THAT THE FOLLOWING PRODUCT:

DESIGNATION                    **Diaphragm pump MP-400**

UNIT NO.                        **200-0102**

FUNCTION                        Compressed air-driven pump for painting and coating applications

COMPLIES WITH THE FOLLOWING PROVISIONS IN ITS DELIVERED VERSION  
EG – Machine directive 98/37/EG

THE FOLLOWING HARMONISED EU STANDARDS WERE APPLIED:

DIN EN ISO 12100 1/2                    DIN EN 1050  
DIN EN 809                                DIN EN 12639

THE FOLLOWING NATIONAL STANDARDS WERE APPLIED:

DIN 24289 Teil 1 und 2  
DIN 24299 Teil 1 und 2

Date / Signature                        25.11.2004, i.A.



Details of signatory

Head of Design

M. Stoffels

## CE Declaration of Conformity

in acc. with Annex X of the EC Directive 94/9/EG (ATEX 100a)

WE HEREBY DECLARE THAT THE FOLLOWING PRODUCT:

DESIGNATION                    **Diaphragm pump MP-400**

UNIT NO.                        200-0102

FUNCTION                        Compressed air-driven pump for painting and coating applications

complies with the following provisions in its delivered version:  
EC Directive 94/9

THE FOLLOWING HARMONISED EU STANDARDS WERE APPLIED:


■ DIN EN 1127-1                    ■ DIN EN 13463-1

THE UNIT BEARS THE FOLLOWING ADDITIONAL MARKING:

■  II 2 G c                    Notified body: 0637 IBExU

Date / Signature  
Details of signatory

25.11.2004, i.A.  
Head of Design

  
M. Stoffels

## Contents

1	USE FOR INTENDED PURPOSE .....	4
2	GENERAL SAFETY NOTES .....	4
2.1	Important when using hazardous substances:.....	5
3	FUNCTIONAL PRINCIPLE .....	6
4	INSTALLATION .....	6
5	STARTUP .....	7
6	CLEANING .....	7
7	SHUTDOWN DURING INTERRUPTIONS TO WORK.....	7
8	DISPOSAL .....	8
9	TROUBLESHOOTING.....	9
10	REGULAR CHECKS .....	9
10.1	Diaphragms and gaskets .....	9
10.2	Hoses and pipelines .....	10
11	MAINTENANCE.....	10
11.1	Replacing valve parts [Drawings on page 10].....	10
11.2	Replacing the diaphragms [Drawings, page 11] .....	10
12	TECHNICAL DATA.....	10
13	SPARE PARTS DRAWINGS.....	11
14	SPARE PARTS LIST .....	12
14.1	Control unit .....	13
15	ACCESSORIES .....	14
15.1	Suction devices (flexible) .....	14
15.2	Suction devices (angled, flexible) .....	15
15.3	Suction devices (rigid) .....	16
15.4	Pressure equalisation tank .....	17
15.5	Pressure pipe.....	18

## 1 USE FOR INTENDED PURPOSE

The diaphragm pump MP-400 is a pump driven by compressed air and is designed exclusively for the:

- conveying of liquid and low-viscosity coating material from pressureless storage containers
- supply of material to spray guns, automatic spray guns, metering devices and similar

It is mainly used for painting and coating operations.

The diaphragm pump MP-400 complies with equipment category II 2G (ATEX 100a) and may be operated in potentially explosive areas in "Zone 1".

When used in potentially explosive areas, the pump must be operated with a run-dry protection device (*e.g. filling level probe in the material container with auto pump switchoff feature!*)

In addition, the diaphragms must be regularly checked for wear during safety inspections.

### **Material conveying properties**

<b>Material</b>	<b>Suitability</b>
Paints (containing solvents)	good
Water-based paints, dispersion paints, Latex, wood preservative	good
Water	good
Oils, fuel oil, diesel oil	good
Emulsions, soaps, detergents	good
Alcohol, glazing agents	with qualifications
Lime slurry	with qualifications
Cellulose and fibrous materials	unsuitable
Paste Sludge, mash, paste	unsuitable

*In case of doubt, ask about the suitability of non-listed materials. In special cases, we conduct trials to determine suitability.*

## 2 GENERAL SAFETY NOTES



**Diaphragm pumps may only be used in line with the operating parameters (pressure, temperature etc.) specified under "Technical data"!**



**The operator must check the compatibility of the pump materials with the coating substance to be used. To ensure compatibility, refer to the safety data sheet supplied by the manufacturer of the coating substance!**



**All work connected with installation and maintenance must be performed by suitably qualified personnel. Always use original parts when replacing worn or damaged parts.**



**Each time before you start working, check the material and compressed air connections for firm seat and damage! Loose, pressurised hoses may cause accidents due to whiplash-like movement and the discharge of fluids.**



**Never point compressed air at people or animals!**



**Highly abrasive, chemically aggressive, extremely hot or extremely cold materials may only be used in consultation with Krautzberger GmbH!**



**After the material has been used up, the pumps may only be operated at low pressure (< 4 bar) – set on the air regulator.  
No-load operation increases wear and may destroy the pump!  
Ensure that the material container is always sufficiently full!**

## **2.1 Important when using hazardous substances:**



**Always comply with the stipulations in the safety data sheet of the manufacturer of the coating substance. In particular, adhere to instructions relating to:**

- **the wearing of personal protective equipment**
- **the avoidance of explosive or harmful environments**



**Electrostatic charges during operation of the pump can lead to electric shocks and spark formation.**

**The pump must therefore be earthed!**

**Also earth air pipes, operating equipment and electrically conductive surfaces in the working zone.**

**Connected hose lines must be conductive (<1 Mega-Ohm) and must also be earthed.**



**Rooms in which hazardous substances are stored or processed must have adequate ventilation. It may be necessary to install a technical ventilation system.**

**If the ventilation system fails, work must be stopped immediately and the pump switched off.**

**In such cases, always comply with the national and regional regulations.**



**Do not store any flammable substances, empty coating substance containers or other materials that have been in contact with the coating substance (paper, cloths etc.) in the working zone of the pump.**



**Do not use halogenated detergents. Chemical reactions may create explosive and caustic compounds!**



**In the working zone, avoid open flames and red-hot components as well as equipment, tools and parts that can create ignitable sparks.**



**Hang up “No Smoking” signs in a 5 metre radius of the working zone!  
make fire extinguishers available if these are not already in place!**



**Comply with all national and regional water protection regulations!  
Comply with all national and regional waste disposal regulations!**

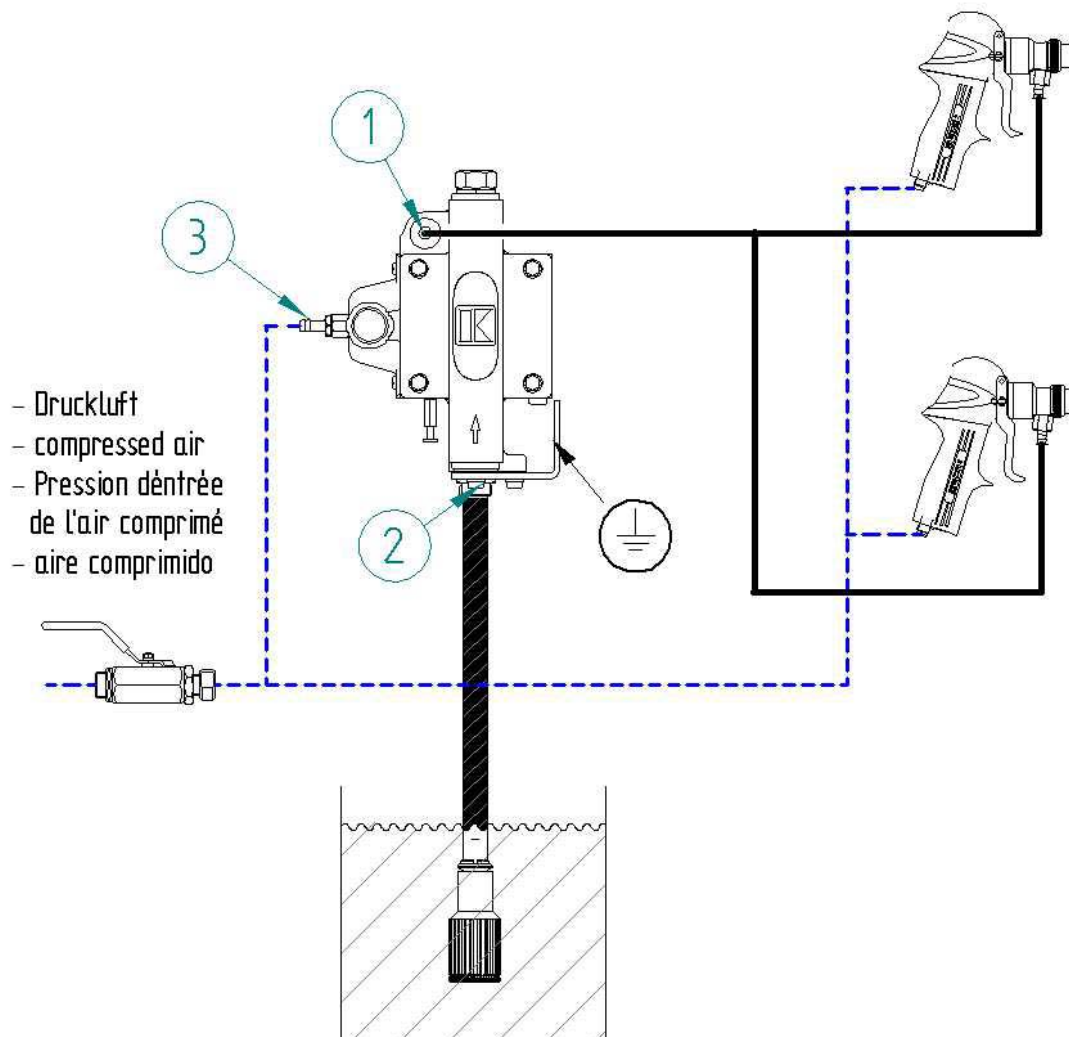
### 3 FUNCTIONAL PRINCIPLE

The pump consists of the diaphragm housing, the compressed air controller, material suction and pressure connection, compressed air connection and air regulator.

The pressure desired at the extraction point can be adjusted steplessly via the air regulator.

As soon as the set material pressure is reached, the pump switches off automatically.

The material pressure is maintained until material is extracted at the extraction point. The pump switches on automatically and keeps the set material pressure constant.



### 4 INSTALLATION

Mount the pump vertically (material inlet at bottom!) on a wall or a suitable supporting structure. Correct operation of the pump is only assured if it is mounted vertically.

- Connect the material suction hose to the material inlet (2).
- At the material outlet, connect the material pressure hose to your extraction point (1).
- Connect the compressed air supply at the air connection (3).

*The compressed air supply must be dry, oil-free and protected using an overpressure valve. Make the necessary provision for a suitable shutoff device (ball valve etc.) to permit fast switch-off in the event of malfunction.*

- *Connect the earthing device.*

*Always ensure that a run-dry protection device is present during use in potentially explosive areas!*

*Ground the pump as well as conductive surfaces and working equipment in the potentially explosive area*

## **Check the firm seat of all connections!**

## **5 STARTUP**

Ensure that:

- an air pressure of 4-12 bar is present at the compressed air connection.
- the material suction hose is immersed in the material.



*The first time the unit is started up, there is air in the pump and in the supply line. The wear on the pump is particularly strong during no-load operation. You should therefore set a low air inlet pressure on the air regulator at the start. Activate the extraction point until material is discharged.*

- After performing venting, set the desired material pressure using the air regulator.

---

## **6 CLEANING**

Thoroughly clean the pump after use. Immerse the material suction hose in a suitable detergent.



**OBSERVE THE SAFETY INSTRUCTIONS OF THE DETERGENT MANUFACTURER. DETERGENTS CAN BE HARMFUL TO YOUR HEALTH AND MAY BE HIGHLY FLAMMABLE!**

**OBSERVE THE SAFETY INSTRUCTIONS OF THE DETERGENT MANUFACTURER. DETERGENTS CAN BE HARMFUL TO YOUR HEALTH AND MAY BE HIGHLY FLAMMABLE!**

Rinse the pump through by activating the extraction point. To ensure that material residues do not harden, you should leave the **detergent** in the pump until the next time it is used.

---

## **7 SHUTDOWN DURING INTERRUPTIONS TO WORK**

- Clean the pump as described above.
- Close the air regulation wheel by turning to the left.
- Interrupt the compressed air feed at a suitable point in your system.

Dissipate any remaining material pressure by activating the material extraction point.

## **8 DISPOSAL**

Clean the pump if necessary to ensure that no residues of toxic, flammable or explosive material remain in the housing.

After dismantling the pump:

Dispose of the individual components through the appropriate recycling channels.


Please observe the regulations of the local disposal companies.



## 9 TROUBLESHOOTING

Defect	Cause	Remedy
Air bubbles in material container	Loose/Leaky suction line	Check/Tighten
	Damaged gasket	Replace
	Diaphragm damaged	Replace
Uneven action of pump	Foreign body in ball valve, or valve is worn	Check ball valve, replace if necessary
	Air is sucked in	Check suction device
	Suction line blocked	Check/Clean
	Waste air line blocked	Check/Clean
	Soiled/Leaking valve ball/valve seat	Clean/Replace
Pump does not start	No working air	Switch on and/or check compressed air supply
	Pressure regulator defective	Activate auxiliary actuator (34) Replace pressure regulator
Pump works but does not build up any pressure or suction power	Suction filter soiled or suction hose bent	Clean suction filter/Check suction hose
	Suction device leaky, air is sucked in	Check gasket
	Valve ball/Valve seat soiled	Clean valve ball
	Valve blocked	Foreign body in valve; rinse out pump
	Valve seat or valve ball worn	Replace valve seat/valve ball
	O-ring seal damaged	Replace
Pressure fluctuations during operation Different running noise	Diaphragm worn	Replace
Please contact our service department for assistance with other queries / problems.		

## 10 REGULAR CHECKS

	<p><b>DURING ALL INSPECTION AND MAINTENANCE WORK: BEFORE OPENING THE PUMP</b></p> <ul style="list-style-type: none"> <li>▪ <b>CLEAN PUMP USING DETERGENT</b></li> <li>▪ <b>SHUT OFF COMPRESSED AIR SUPPLY</b></li> <li>▪ <b>DISSIPATE MATERIAL PRESSURE BY ACTIVATING THE EXTRACTION POINT</b></li> </ul>
---	---

*Maintenance intervals depend on the coating substance used and the mode of operation. These intervals cannot therefore be exactly specified and must be determined by the user.*

### 10.1 Diaphragms and gaskets

- Diaphragms and gaskets are subject to natural wear and tear. We recommend regular safety checks and replacement of diaphragms and gaskets. Always change the gaskets with the diaphragms.

## 10.2 Hoses and pipelines

- Even when handled correctly, the useful life of hoses and pipelines is always affected by environmental factors. As a precautionary measure, all hoses and pipelines should be regularly replaced (at intervals depending on the load to which they are subjected).

## 11 MAINTENANCE

### 11.1 Replacing valve parts [Drawings on page 10]

- Shut off compressed air supply and dissipate any remaining material pressure
- Unscrew sealing screws (10)
- Remove and replace gasket (9), valve spring (8), valve ball (7), valve seat (6) with O-ring seal (5)
- Tighten sealing screws (10) - 90Nm

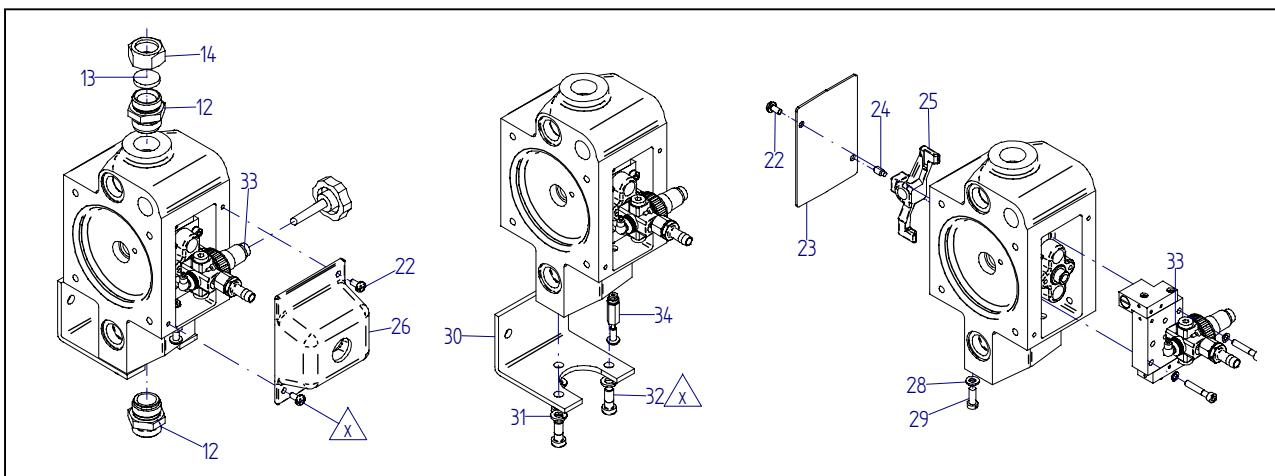
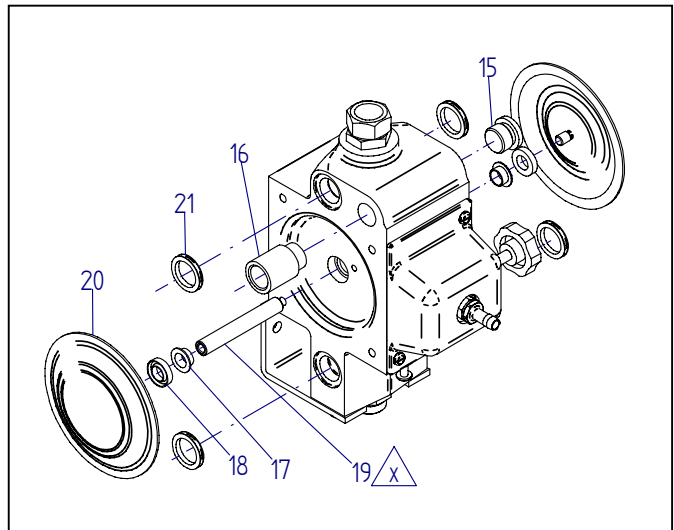
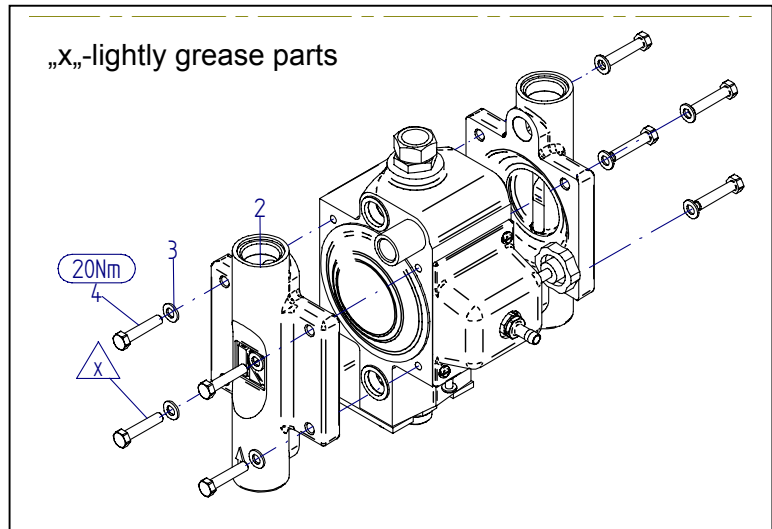
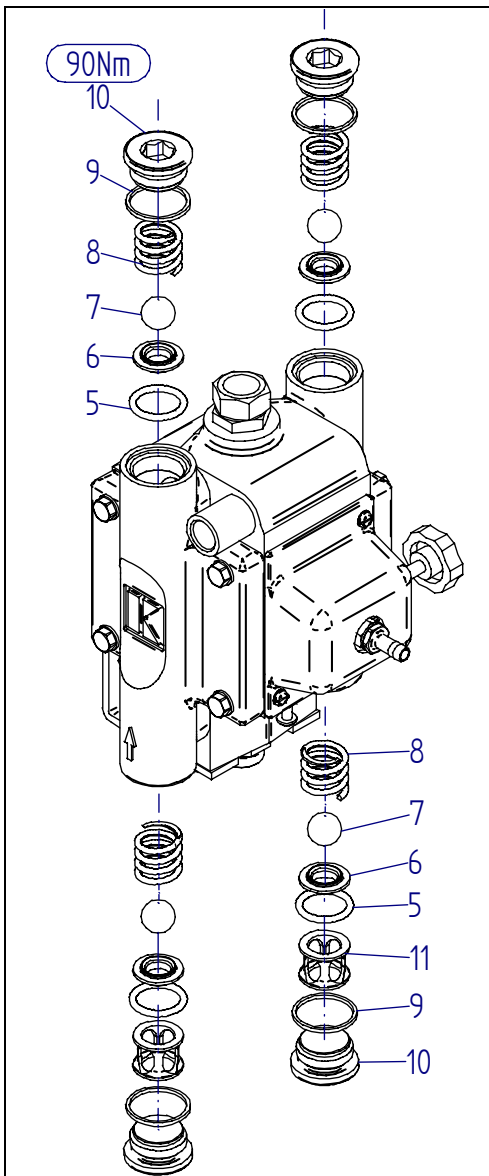
### 11.2 Replacing the diaphragms [Drawings, page 11]

- Shut off compressed air supply and dissipate any remaining material pressure
- Loosen screws (4) and remove cover (2)
- Unscrew diaphragm (20) from control bolt (19)
- Clean contact surfaces of cover and housing
- Screw new diaphragms into control bolt
- Replace O-ring seals (21)
- Screw cover (2) on tight (2); arrow pointing upwards!
- Tighten screws (4) - 20Nm

## 12 TECHNICAL DATA

	<b>MP-400</b>
Conveying capacity (based on water, 8bar):	20 l/min (free outflow)
Material connection (outlet):	G 1/2 female thread
Max. temperature of coating material:	0°C...+50°C
Max. pressure:	6 bar
Maximum admissible operating pressure:	6 bar
Compressed air feed:	non-lubricated, filtered
Compressed air connection:	hose nozzle NW 8/9
Air inlet pressure:	min. 4 to max. 8 bar
Transmission ratio:	1:1
Max. stroke rate (twin strokes):	120 twin str./min
Recommended stroke rate (twin strokes):	100 twin str./min
Weight:	7.5 Kg
Air consumption (at 8bar):	160l/min

### 13 SPARE PARTS DRAWINGS



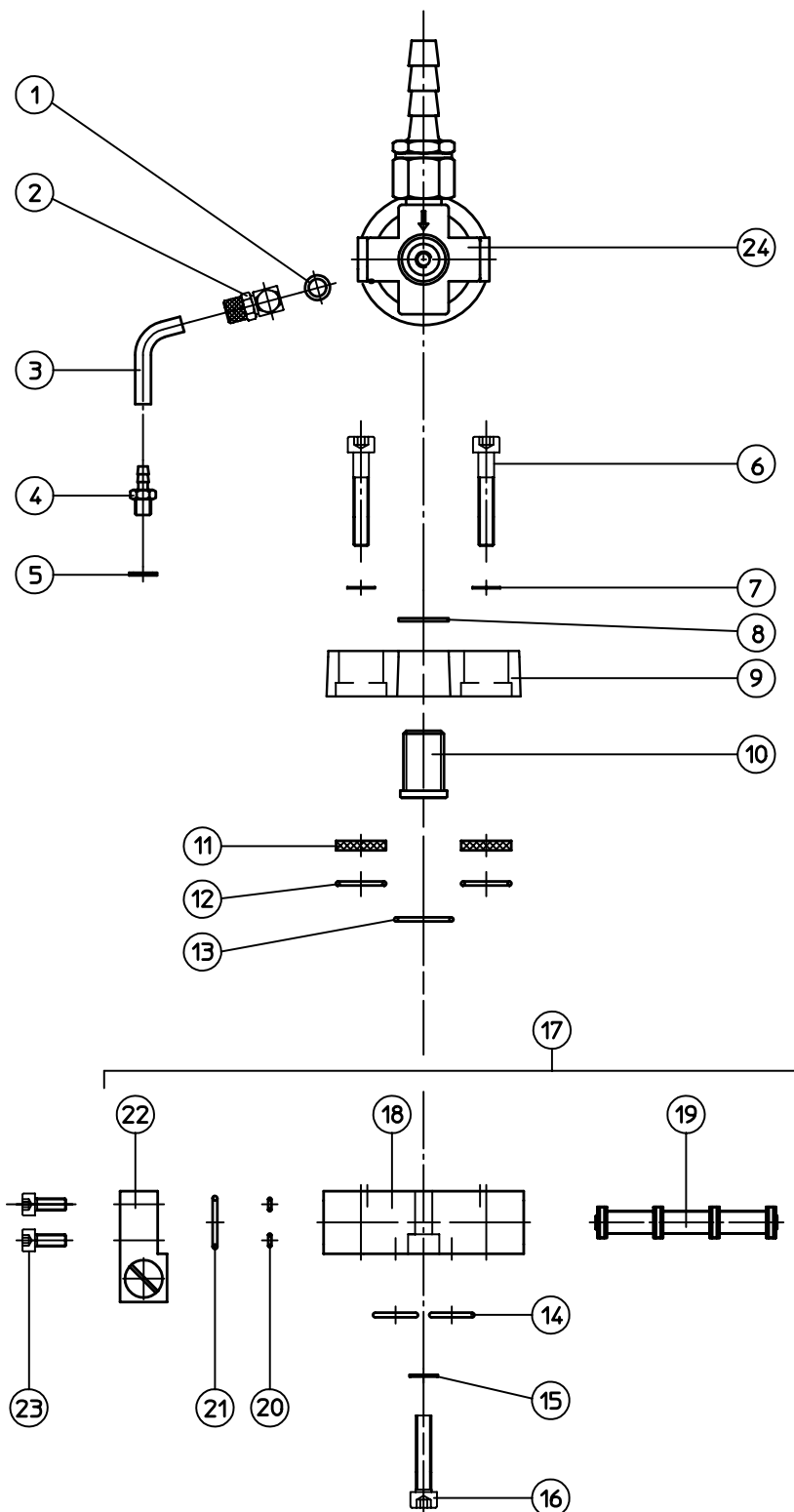
## 14 SPARE PARTS LIST

Item no.	Article no.	Designation	Item no.	Article no.	Designation
1	6540-040-2136	Control housing	15	6542-030-2138	Sealing screw, brass
2	6540-040-2138	Cover	15	6543-030-2138	Sealing screw, brass
3	6540-030-2865	Washer	16	6540-030-2107	Intermed. piece, brass
4	6540-030-0562	Hex head screw	16	6541-040-0967	Intermed. piece, st. steel
5	6540-010-0291+	O ring seal, PTFE	16	6542-030-2107	Intermed. piece, brass
5	6541-010-0291+	O ring seal, PTFE	16	6543-030-2107	Intermed. piece, brass
5	6542-010-0335+	O ring seal, NBR	17	6540-040-0961	Headed liner
5	6543-010-0291+	O ring seal, PTFE	18	6540-010-0197+	Slotted ring
6	6540-040-0962++	Valve seat, st. steel	19	6540-040-0959	Control bolt
6	6541-040-0962++	Valve seat, st. steel	20	6540-010-0455++	Diaphragm, PTFE
6	6542-080-0369++	Valve seat, HM	20	6541-010-0455++	Diaphragm, PTFE
6	6543-080-0369++	Valve seat, HM	20	6542-010-0451++	Diaphragm, NBR
7	6540-030-2753++	Valve ball, st. steel	20	6543-010-0455++	Diaphragm, PTFE
7	6541-030-2753++	Valve ball, st. steel	21	6540-010-0199+	O ring seal
7	6542-030-2752++	Valve ball, PUR	22	6540-030-0564	Screw
7	6543-030-2754++	Valve ball, HM	23	6540-040-0958	Cover panel
8	6540-020-0081	Valve spring	24	6540-030-0441	Set screw
9	6540-010-0307+	Gasket	25	6540-040-0957	Control unit
10	6540-040-0964	Sealing screw, brass		6540-080-5946	Control unit w. stroke limit
10	6541-040-0968	Sealing screw, st. steel	26	6540-100-0427	Cover hood
10	6542-040-0964	Sealing screw, brass	27	6540-030-2894	Serrated lock washer
10	6543-040-0964	Sealing screw, brass	28	6540-030-2862	Washer
11	6540-040-0965	Distance cage	29	6540-030-0274	Cheese head screw
12	6540-040-0963	Double nipple, brass	30	6540-040-0960	Holder
12	6541-040-0966	Double nipple, st. steel	31	6540-030-1982	Lock washer
12	6542-040-0963	Double nipple, brass	32	6540-030-0563	Cheese head screw
12	6543-040-0963	Double nipple, brass	33	6540-130-0281	Control unit, compl.
13	6540-010-0198+	Gasket	34	6540-080-2345	Auxiliary actuator
14	6540-040-1246	Union nut		6540-010-0442	Gasket set
15	6540-030-2138	Sealing screw, brass		6540-080-1455	Set of wearing parts
15	6541-030-0561	Sealing screw, st. steel			(incl. gasket set)

+ included in gasket set

++ included in set of wearing parts

### 14.1 Control unit



1	6540-010-0203+	Gasket
2	6540-030-2427	Swivel screw connection
3	6540-110-0101	Air hose
4	6540-030-2207	Hose nozzle
5	6540-010-0203+	Gasket
6	6540-030-0565	Screw
7	6540-030-0707	Circlip
8	6540-010-0244+	Gasket
9	6540-040-0954	Valve adapter
10	6540-030-1855	Fastening nipple
11	6540-030-1444++	Sound absorber
12	6540-010-0046+	Gasket
13	6540-010-0150+	Gasket
14	6540-010-0146+	Gasket
15	6540-030-0707	Circlip
16	6540-030-0147	Screw
17	6540-080-2465	Control valve, compl.
18	6540-030-3235	Housing
19	6540-030-3237++	Control piston
20	6540-010-0494+	Gasket
21	6540-010-0056+	Gasket
22	6540-030-3236	Control valve, compl.
23	6540-030-0212	Screw
24	6540-130-0217	Pressure regulator, compl.
25	6540-080-2464	Plunger valve, compl.
	6540-010-0696	Gasket set
	6540-080-1452	Set of wearing parts incl. gasket set

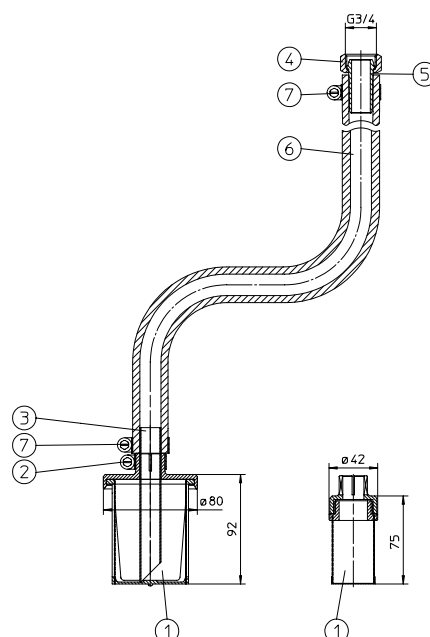
## 15 ACCESSORIES

- Pressure equalisation tank with screw-off cleaning cover and pressure gauge for equalisation of pulsation and indication of the set material pressure
- Suction devices in various versions, with filter basket
- Pressure pipe with pressure gauge for indication of the set material pressure
- Material filter with drain valve
- Material pressure regulator for absolutely constant material pressure, even in extremely low pressure ranges
- Pneumatic pump lifting devices
- Trolley with storage space
- Wall brackets
- Stand for holding a wall bracket
- Tank cover for diaphragm pump mounting
- Holder for cover mounting
- Material drain valve
- Other accessories in request

### 15.1 Suction devices (flexible)

Item no.	Article no.	Designation	Suction cage $\varnothing$	Hose length (mm)
	9000-080-0776	Suction device, compl.	42	+
	9000-080-0777	Suction device, compl.	80	+
	9000-080-0778	Suction device, compl.	42	750
	9000-080-0779	Suction device, compl.	80	750
1	9000-080-0014	Suction cage	42	
1	9000-080-0066	Suction cage	80	
2	9000-030-1396	Hose clamp		
3	9000-040-0887	Suction piece		
4	9000-040-1246	Union nut		
5	9000-040-1300	Hose nozzle		
6	9000-110-0013	Suction hose		+
6	9000-110-0005	Suction hose		750
7	9000-030-1397	Hose clamp		

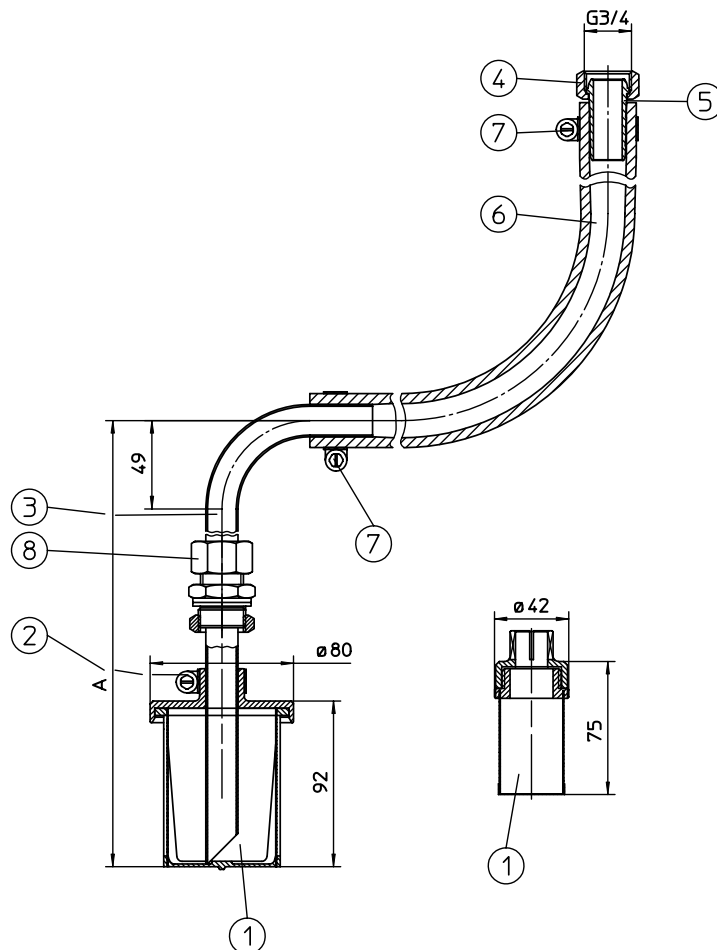
+ When ordering, please state hose length in mm



## 15.2 Suction devices (angled, flexible)

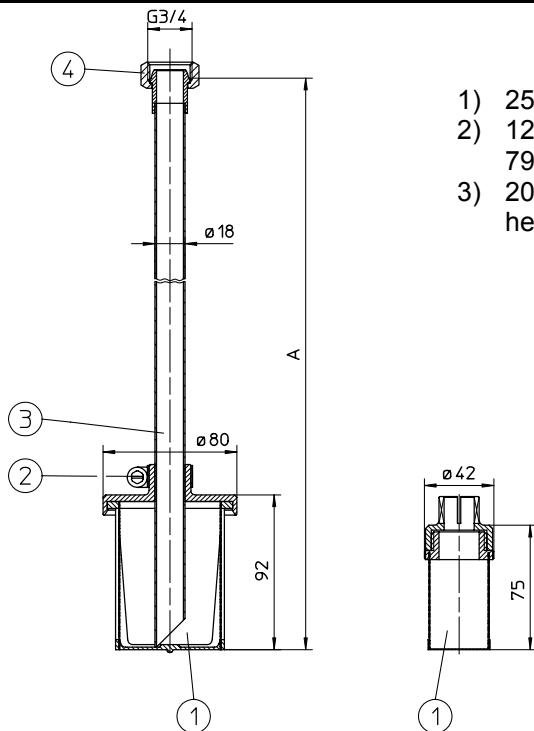
Item no.	Article no.	Designation	Dim. A	Suction cage Ø	Hose length (mm )
	9000-080-1714	Suction device, compl.	440	42	+
	9000-080-1715	Suction device, compl.	440	80	+
	9000-080-1716	Suction device, compl.	920	42	+
	9000-080-1717	Suction device, compl.	920	80	+
	9000-080-0288	Suction device, compl.	440	42	750
	9000-080-0298	Suction device, compl.	440	80	750
	9000-080-0774	Suction device, compl.	920	42	1100
	9000-080-0775	Suction device, compl.	920	80	1100
	9000-080-2331	Suction device, compl.	1100	80	1000
1	9000-080-0014	Suction cage		42	
1	9000-080-0066	Suction cage		80	
2	9000-030-1396	Hose clamp			
3	9000-040-0886	Suction pipe	440		
3	9000-040-1897	Suction pipe	920		
3	9000-040-3864	Suction pipe	1100		
4	9000-040-1246	Union nut			
5	9000-040-1300	Hose nozzle			
6	9000-110-0013	Suction hose			+
6	9000-110-0005	Suction hose			750
6	9000-110-0093	Suction hose			1100
7	9000-030-1397	Hose clamp			
8	9000-080-3511	Screw connection			

+ When ordering, please state hose length in mm.



### 15.3 Suction devices (rigid)

Item	Article no.	Designation	Dim. A	Suction cage Ø	Applications					Pressureless Krautzberger
					MP 400	MP 100	25 l (1)	120 l (2)	200 l (3)	
	9000-090-0118	Suction device, compl.	+	42	X					
	9000-090-0119	Suction device, compl.	+	80	X					
	9000-090-0120	Suction device, compl.	+	42		X				
	9000-090-0121	Suction device, compl.	+	80		X				
	9000-090-0122	Suction device, compl.	405	42		X	X			
	9000-090-0123	Suction device, compl.	795	42		X		X		
	9000-090-0124	Suction device, compl.	885	42		X			X	
	9000-090-0125	Suction device, compl.	405	42	X		X			
	9000-090-0126	Suction device, compl.	795	42	X			X		
	9000-090-0127	Suction device, compl.	885	42	X				X	
	9000-090-0128	Suction device, compl.	405	80		X	X			
	9000-090-0129	Suction device, compl.	795	80		X		X		
	9000-090-0130	Suction device, compl.	885	80		X			X	
	9000-090-0131	Suction device, compl.	405	80	X		X			
	9000-090-0132	Suction device, compl.	795	80	X			X		200 l / 250 l
	9000-090-0133	Suction device, compl.	885	80	X				X	
	9000-090-2844	Suction device, compl.	547	80		X				50 l
	9000-090-1278	Suction device, compl.	540	80	X					50 l
	9000-090-1279	Suction device, compl.	640	80	X					100 l / 150 l
	9000-090-1283	Suction device, compl.	940	80	X					300 l / 350 l / 400 l
	9000-090-1284	Suction device, compl.	1040	80	X					450 l / 500 l
1	9000-080-0014	Suction cage		42						
1	9000-080-0066	Suction cage		80						
2	9000-030-1396	Hose clamp								
3	9000-080-0076	Suction pipe	+		X					
3	9000-080-0077	Suction pipe	+			X				
3	9000-080-0078	Suction pipe	405			X	X			
3	9000-080-0079	Suction pipe	795			X		X		
3	9000-080-0080	Suction pipe	885			X			X	
3	9000-080-0081	Suction pipe	405		X		X			
3	9000-080-0082	Suction pipe	795		X			X		200 l / 250 l
3	9000-080-0083	Suction pipe	885		X				X	
3	9000-080-3140	Suction pipe	547			X				50 l
3	9000-080-1325	Suction pipe	540		X					50 l
3	9000-080-1326	Suction pipe	640		X					100 l / 150 l
3	9000-080-1330	Suction pipe	940		X					300 l / 350 l / 400 l
3	9000-080-1331	Suction pipe	1040		X					450 l / 500 l
4	9000-040-1246	Union nut								



- 1) 25 l hobcock container, height 385 mm
- 2) 120 l plastic standard barrel, height 795mm
- 3) 200 l barrel with lid M7 DIN 6644, height 871 mm

+ When ordering, please state dimension A!



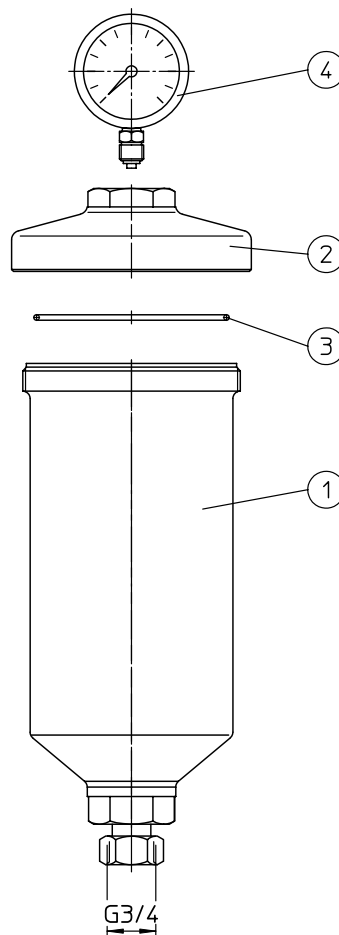
### 15.4 Pressure equalisation tank (only 8bar!)

Pressure equalisation tank, cmpl. (brass screw connection 9040-090-0088 )

Item no.	Article no.	Designation
	9040-090-0088	Pressure equalis. tank, cmpl.
1	9040-080-0098	Container, cmpl.
2	9040-100-0475	Cover
3	9040-010-0162	Gasket
4	9040-030-1039	Pressure gauge, 0-10 bar
	9040-080-0099	Cover, cmpl. comprising items 2 to 4

Pressure equalisation tank, cmpl. (stainless steel screw connection 9041-090-0087 )

Item no.	Article no.	Designation
	9041-090-0087	Pressure equalis. tank, cmpl.
1	9041-080-0097	Container, cmpl.
2	9041-100-0475	Cover
3	9041-010-0162	Gasket
4	9041-030-1039	Pressure gauge, 0-10 bar
	9041-080-0099	Cover, cmpl. comprising items 2 to 4



## 15.5 Pressure pipe

Pressure pipe, cmpl.(brass, 9035-080-0338 )

Item no.	Article no.	Designation
	9035-080-0338	Pressure pipe, cmpl.
1	9035-080-0340	Pressure pipe
2	9035-040-1246	Union nut
3	9035-030-1039	Pressure gauge, 0-10 bar

Pressure pipe, cmpl., stainless steel 9036-080-0339 )

1	9036-080-0340	Pressure pipe
2	9036-040-1246	Union nut
3	9036-030-1039	Pressure gauge, 0-10 bar

