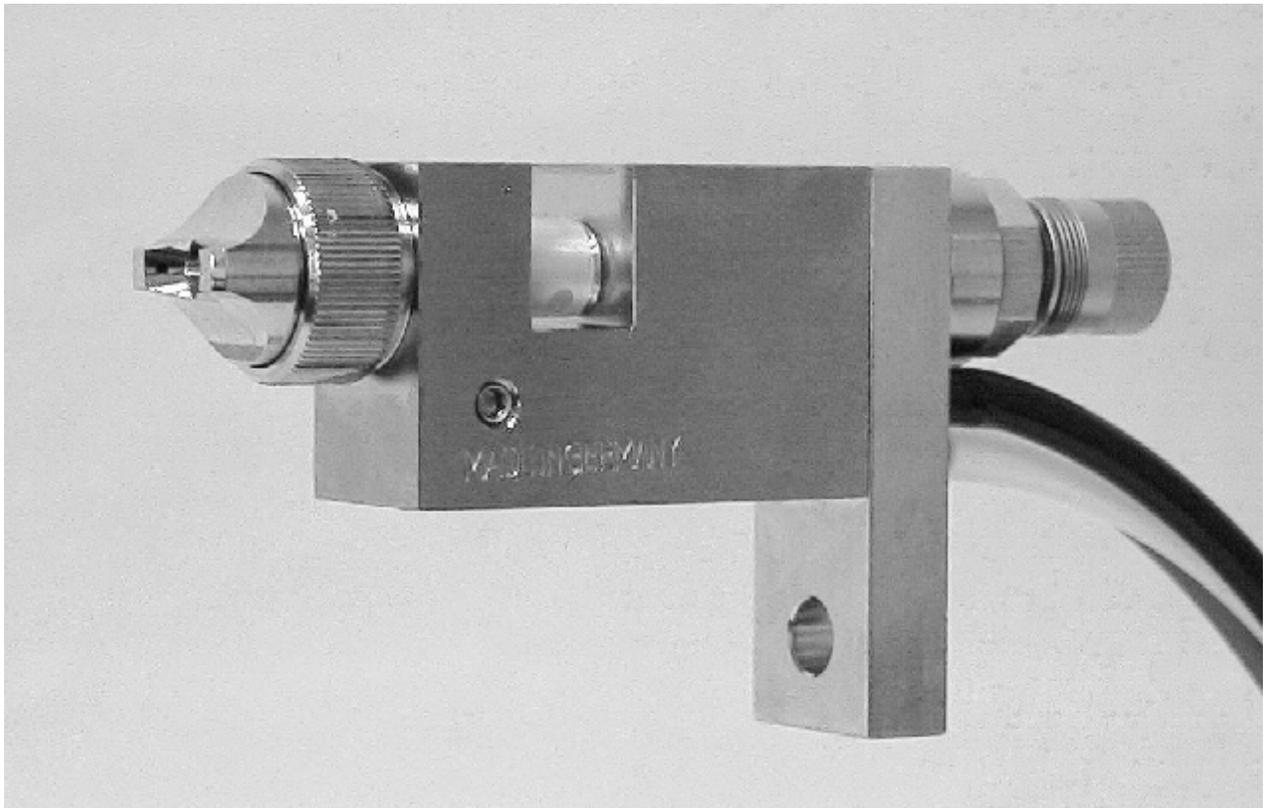


# **Operating manual for Automatic sprayvalve MFS and MFS/KLS**



Read this manual carefully before installing, operating or servicing this equipment.  
Keep always handy for further use.

# 1 Introduction

The automatic spray valves **MFS** and **MFS/KLS** are designed and constructed for application of thin materials f.i. release agents, colours or other fluids of low viscosity. Depending on air cap this spray valve sprays in flat- or roundspray. Depending on viscosity of fluid, the application can be adjusted individually via nozzle dimension, atomizing air pressure and material pressure. The supply of atomizing air, control air and material should be done via three hoses. Spray valves are precision tools. Always keep clean and observe minimum instructions to maintain a long usefull life of the valve.

## 2 Safety

### 2.1 Duties of the user

- The user must read this service manual carefully before performing any operations.
- Application and service operations should not be carried out if the user is not absolutely sure of the purpose and consequence of the operations.

### 2.2 Definitive Use

The automatic spray valves **MFS** and **MFS/KLS** are pneumatically controlled spray valves. They are suitable for continuously or intermittent use. They are not suitable for spraying aggressive fluids like acid, alkaline solutions, cleaning agents, chemicals etc.. In case of doubt, please contact the manufacturer.

### 2.3 Warning against danger

This operating manual warns users of operations which may put their health at risk. The warnings are indicated by combinations of text and symbols corresponding to the different danger classes.

#### **WARNING!**

Signs a possible dangerous situation.  
If you don't avoid, *death or severe injuries* can follow.

#### **CAUTION!**

Indicates a situation which may be dangerous.  
Failure to heed the caution may result in *personal injury*. This indication is also used where material damage is possible.

#### **IMPORTANT!**

Indicates tips for usage and other helpful information.

## 3 Function Description

The spray valves **MFS** and **MFS/KLS** are pneumatically controlled: air open; spring return. The spraying material is to be fed to the valves via pressure tank or pump. The separate controlled atomizing air atomizes the material to a spray jet. Depending on mounted air cap valve sprays a flat- or roundspray jet.

## 4 Installation

The **MFS** and **MFS/KLS** can be installed in any position. Vibrations of the valve caused by fast intermitting cycles require solid and massive installation. For solid attachment the use of mounting (9.1.0) is recommend. The hole in mounting (9.1.0) has 8mm diameter. Distance to spraying surface varies of application. Vibration of the equipped machine to the valve should be limited as far as possible.

### 4.1 Hose connection and assembly

Connect hoses for atomizing air and control air to seperatly control valves (pressure reducers and solenoids). Then fluidhose to material pressure tank or other means of feeding fluid as under:

- atomizing air (Z) (hose blue):
  - è to 2/2 way solenoid
- control air (S) (hose black):
  - è to 3/2 way solenoid
- fluid (M) (hose transparent):
  - è to feeding device

The three hoses are fixed by the mounting (9.1.0). To assembly new hoses to the spray valve, unscrew ratchet assembly (10.0.3). Then take off the mounting with hoses. Connect new hoses to the hose sockets (11.1.0) and put hose sockets into the valve body (4.1.0). Assemble mounting (9.1.0) with correct side to the valve body (4.1.0).



#### **IMPORTANT !**

Nozzle and needle can be damaged. Before adjusting ratchet assembly to the valve body, please turn (open) regulating knob (10.1.1) anti-clockwise.

Turn (open) regulating knob anti-clockwise and screw in the ratchet assembly (10.0.3). Connect fitting (13.0.0) for control air and fittings (13.0.1) for material and atomizing air to the hoses.

### 4.2 Operating instructions



#### **CAUTION !**

Never point the sprayjet against persons. Wearing eye protection is strongly recommended. Spraying procedures cause noises depending on the used pressure. If necessary, wearing of ear protection is recommend.



#### **WARNING !**

Danger caused by combustibile and noxious spraying material. Safety instructions on fluid can and material data of fluid manufacturer must definitely be observed.

The valves **MFS** and **MFS/KLS** need 5 – 6 bar control air pressure. The atomizing air should be 0,5 – 6 bar. To avoid hit back of material when using version MFS/KLS, the atomizing air pressure has to be less then material pressure. The maximum material pressure in standard version is 4 bar. For higher material pressures or using long hose length the use of mounting ¼” (9.1.1) is needed. In any case, please observe the regulations of the professional/trade association having liability for industrial safety and insurance.

When you are certain, that fluid pressure stands up to the nozzle, actuate 2/2 way solenoid for atomizing air. After that actuate 3/2 way solenoid for control air. This way you receive socalled “pre-air” prior to opening fluid flow. After each cycle solenoids are to actuate in reverse order, so you will still have “purging-air” after needle has closed nozzle and fluid flow was stopped. This prevent fluid to form out drops instead of being atomized.

Set atomizing air pressure and fluid pressure according to required spray droplet sizes. Two separate pressure reducers must be available. Intermittent use as well as continuous use is possible. Standard version of valve has flat spray aircap (1.1.0). If round spray jet is required, install round spray aircap (1.1.1). Flat spray aircap can be positioned for horizontal, vertical or any in between position of jet. Depending on viscosity of fluid, nozzle diameters are available in 0,2 / 0,3 / 0,5 / 0,8 / 1,0 / 1,2 / 1,5 / 2,0mm Ø. The travel of needle is giving way to fluid as adjusted by the regulating knob (10.1.1). Turning this knob in anti-clockwise turn = more fluid; clockwise turn = less fluid. One revolution of regulating knob (10.1.1) gives 0,5mm more or less stroke. Do not over-tight the regulating knob.



### **IMPORTANT !**

The maximum fluid outlet is already reached, when no further ratchets are noticeable. Do not turn the regulating knob (10.1.1) in anti-clockwise turn any further.



### **IMPORTANT !**

To avoid damages to nozzle and needle adjust decrease of fluid flow (turning regulating knob 10.1.1 clockwise) only when fluid is emitted from the nozzle. This is the only way to observe the steady reduction of fluid flow until an absolute stop of fluid. Going on to turn the regulating knob clockwise would at once push the needle into the nozzle to such an extent that both parts could be damaged. This applies especially to valves where needle regulation is executed by hexagon key (special design, not shown in sectional drawing).

It is harmless to leave fluid within the valve (no connection to outside air), if system stays under pressure.

## **5 Repair and Maintenance**

Before starting maintenance or repair work, ensure that all air operated tools are disconnected from the air supply.



### **WARNING !**

Danger caused by combustible and noxious spraying material. Safety instructions on fluid can and material data of fluid manufacturer must definitely be observed.



### **WARNING !**

Before opening the spray valve it has to be disconnected from the air and fluid supply. Otherwise ejected elements can cause danger.

These spray valves are high precision tools. Always keep clean and observe minimum instructions to maintain a long and useful life of valve. We recommend lubricating moveable parts regularly, and greasing threads, especially the nozzle threads, when replacing or cleaning the nozzle. It is recommended to use clean and filtered application fluid only. Also atomizing air should be clean. Control air should be slightly oiled.

### **5.1 Cleaning**

To clean valve, spray solvent until pure solvent leaves nozzle. Do not submerge entire valve in solvent. At longer working interruptions it is advisable to clean air cap and nozzle by putting these parts only into solvent. If necessary use a soft brush. Moving parts and threads should always be greased slightly. The spray valve should be cleaned using an appropriate thinner. To clean small drill holes, use our special nozzle cleaning needles.

## 5.2 Trouble shooting

- If drops form on the retainer (6.1.0), the packing set (5.0.0) is worn out. To exchange gaskets, remove needle (see “4.3 changing nozzle set”). Then unscrew retainer (6.1.0) and change packing set (5.0.0).  
Re-assemble in reverse order. The o-rings (6.2.0) and (7.4.0) are to be renewed if uncontrolled air blow is noticeable.
- If drops form on the nozzle (2.1.0), either needle or nozzle is worn and should be replaced. Or needle is not closing properly f.i. because of particle residues within nozzle.
- If there is an uneven and not steady spray jet: Make sure that nozzle (2.1.0) is screwed in tight. Other reason could also be dirt residue within air cap (chapter “4.1 cleaning”).

## 5.3 Changing the nozzle set

A nozzle set includes needle (7.0.X), nozzle (2.1.X) and air cap (1.1.X)

If nozzle size is to be changed, always change all three parts. Change the complete set also when only one of the parts is defect. Before starting maintenance or repair work, ensure that all air operated tools are disconnected from the air supply.

- Remove ratchet assembly (10.0.3)
- Remove mounting (9.1.0) and hoses
- Pull out needle spring (8.1.0)
- Pull out needle (7.0.0)
- Remove air cap (1.1.0) and unscrew nozzle (2.1.0) with wrench SW 6.

Before unscrewing nozzle, please observe that needle never is under spring pressure.

**RE-ASSAMBLE IN REVERSE ORDER.**

Please observe chapter “3.1 hose connection”.

Needle nuts (7.2.0) must be counter-screwed in such a position where “pre- and purging-air” works according to chapter “3.2 operating instructions”.

## 5.4 Changing gaskets



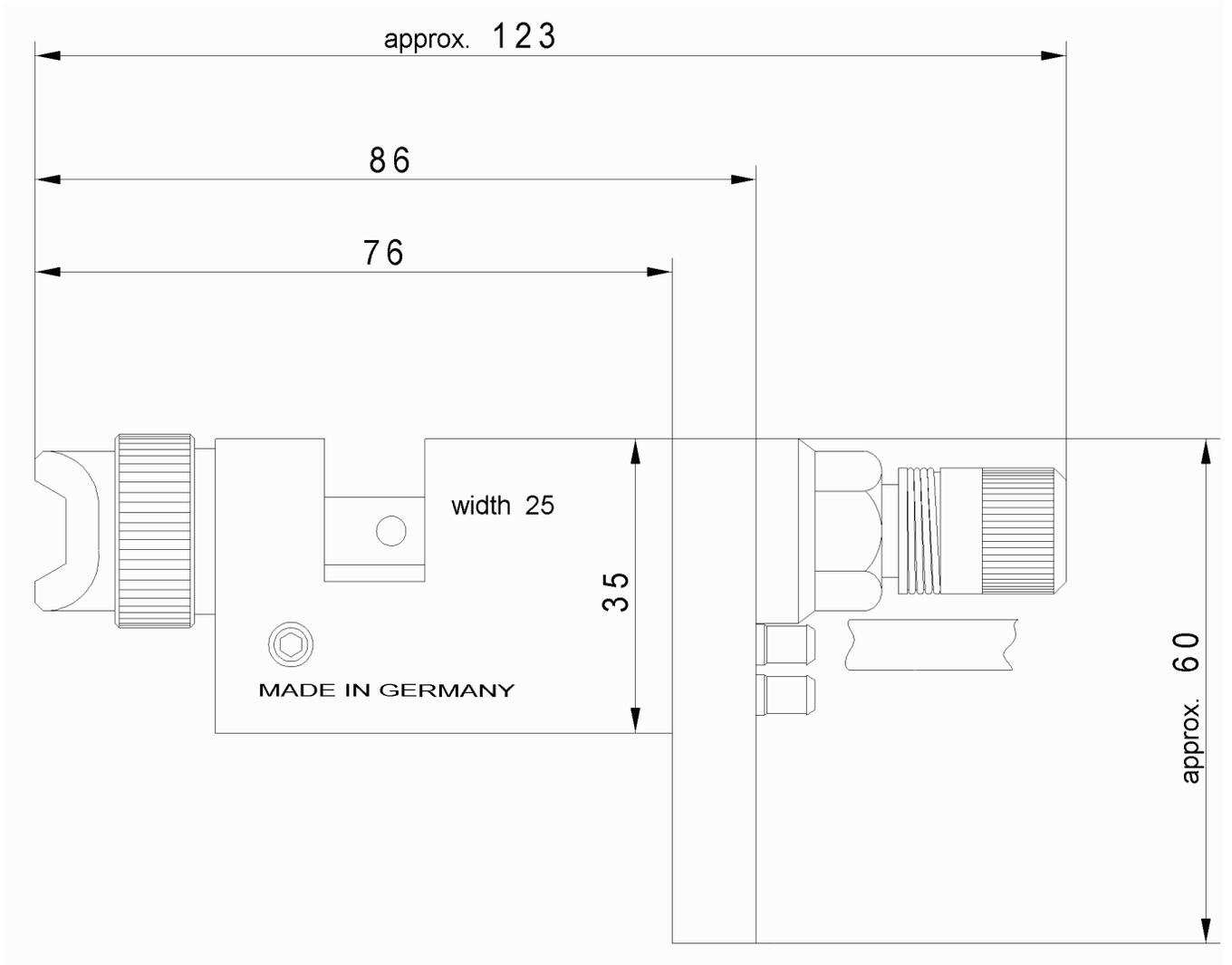
### **IMPORTANT !**

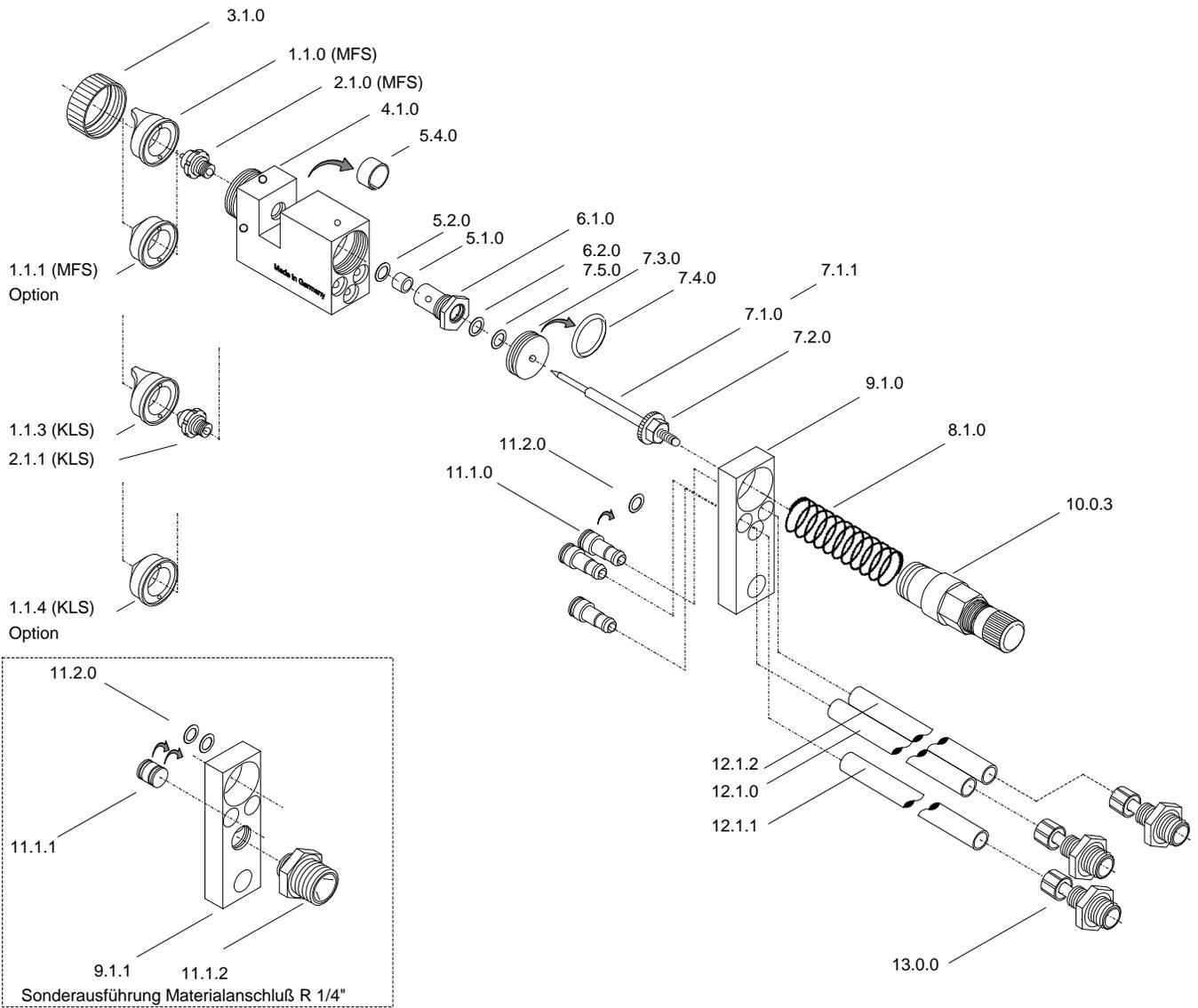
Do not use metalical aid to remove and insert gaskets and gasket seats !  
Gaskets and gasket seats can be damaged.

Before starting maintenance or repair work, ensure that all air operated tools are disconnected from the air supply.

- Remove ratchet assembly (10.0.3)
- Remove mounting (9.1.0) and hoses
- Pull out needle spring (8.1.0)
- Pull out needle (7.0.0)
- Unscrew retainer (6.1.0) with socket spanner SW 12

Pull out gaskets. New gaskets should be greased slightly. O-Ring (6.2.0) is to be placed into the retainer (6.1.0). o-ring (5.2.0) is to be placed into the seat of valve body. After that insert shaped gasket (5.1.0) into the center of o-ring (5.2.0). The shaped gasket (5.1.0) is not symmetrical. The somewhat wider opening must be positioned to point to the front of spray valve i.e. after assembling retainer in direction “nozzle”. When inserting o-rings and gaskets, do not use any sharp or pointed metallic implements. Mainly the gasket as a very precise and sensitive component is not able to stand impacts. Completed retainer (6.0.0) slightly greased then is put back into valve body (4.1.0). **RE-ASSAMBLE IN REVERSE ORDER**





## 6. Sparepartslist

draw.-no.	part no.	Qty.	Description
1.1.0	*	1	air cap, flat spray
1.1.1	*	1	air cap , round spray
1.1.3	*	1	air cap, flat spray, KLS
1.1.4	*	1	air cap, round spray, KLS
1.1.5	*	1	air cap, one cone
1.1.6	*	1	air cap, one cone, KLS
2.1.0	*	1	nozzle, stainless steel
2.1.1	*	1	nozzle, KLS, stainless steel
3.1.0	410028	1	collar ring
4.1.0	510024	1	valve body
5.0.0	640099	1	packing set
5.1.0	640029	1	shaped gasket 4 x 8,9 x 2,2mm
5.2.0	640021	1	o-ring 6,07 x 1,78mm
5.4.0	640100	1	plastic protection cover
6.0.0	810012	1	retainer, complete
6.1.0	810011	1	retainer
6.2.0	640032	1	o-ring 3,68 x 1,78mm
7.0.0	*	1	needle, stainless steel, complete
7.0.1	*	1	needle KLS, stainless steel, complete
7.1.0	*	1	needle, stainless steel
7.1.1	*	1	needle KLS, stainless steel
7.2.0	410004	1	needle nut M4
7.2.0	410017	1	needle nut M4, 9 x 4mm
7.3.0	710002	1	piston
7.4.0	640007	1	o-ring 14,00 x 1,78mm
7.5.0	640032	1	o-ring 3,68 x 1,78mm
8.1.0	820001	1	needle spring
9.1.0	910012	1	mounting
9.1.1	910013	1	mounting R1/4"
10.0.3	900002	1	ratchet assembly, complete
10.1.1	610088	1	regulating knob with spring and pin
10.2.1	220085	1	lock
11.0.0	220087	3	hose socket, complete
11.1.0	220086	3	hose socket
11.2.0	640036	3	o-ring 4,7 x 1,42mm
11.0.1	320091	1	hose socket, complete
11.1.1	320090	1	hose socket
11.2.0	640036	1	o-ring 4,7 x 1,42mm
11.1.2	610064	1	double nipple 1/4" - 1/8"
12.1.0	340006	1m	hose, black (control air)
12.1.1	340007	1m	hose, translucent (fluid)
12.1.2	340005	1m	hose, blue (atomizing air)
13.0.0	220034	1	fitting 1/8"
13.0.1	220023	2	fitting 1/4"

\* part-no. see the following pages.

When ordering nozzles, needles and air caps, please indicate nozzle dimension.

Available dimensions: 0,2 / 0,3 / 0,5 / 0,8 / 1,0 / 1,2 / 1,5 / 2,0 and 2,5mm Ø

In standard version all o-rings are made from viton.

Measurements of o-rings = inner diameter x thickness

## 6.1 Part-no. for needles, nozzles and air caps

<b>*needle, complete</b>		
draw-no.	part no.	description
7.0.0	110129	0,2/0,3mm
7.0.0	110130	0,5mm
7.0.0	110131	0,8mm
7.0.0	110132	1,0mm
7.0.0	110133	1,2mm
7.0.0	110134	1,5mm
7.0.0	110135	2,0mm

<b>*needle</b>		
draw-no.	part no.	description
7.1.0	110122	0,2/0,3mm
7.1.0	110123	0,5mm
7.1.0	110124	0,8mm
7.1.0	110125	1,0mm
7.1.0	110126	1,2mm
7.1.0	110127	1,5mm
7.1.0	110128	2,0mm

<b>*nozzle</b>		
draw-no.	part no.	description
2.1.0	210069	0,2mm
2.1.0	210063	0,3mm
2.1.0	210064	0,5mm
2.1.0	210065	0,8mm
2.1.0	210066	1,0mm
2.1.0	210067	1,2mm
2.1.0	210068	1,5mm
2.1.0	210103	2,0mm

<b>*air cap, flat spay 45°</b>		
draw-no.	part no.	description
1.1.0	310038	for nozzle 0,2 - 1,0mm
1.1.0	310039	for nozzle 1,2 - 1,5mm

<b>*air cap, flat spray 60° (standard-version)</b>		
draw-no.	part no.	description
1.1.0	310032	for nozzle 0,2 - 1,0mm
1.1.0	310033	for nozzle 1,2 - 1,5mm
1.1.0	310079	for nozzle 2,0mm

<b>* air cap, flat spray 90°</b>		
draw-no.	part no.	description
1.1.0	310036	for nozzle 0,2 - 1,0mm
1.1.0	310037	for nozzle 1,2 - 1,5mm
1.1.0	310166	for nozzle 2,0mm

<b>* air cap, round spray 15°</b>		
draw-no.	part no.	description
1.1.1	310034	for nozzle 0,2 - 1,0mm
1.1.1	310035	for nozzle 1,2 - 1,5mm
1.1.1	310080	for nozzle 2,0mm

<b>* air cap, one cone 45° (not in draw)</b>		
draw-no.	part no.	description
1.1.5	310149	for nozzle 0,2 - 1,0mm

<b>*needle KLS, complete</b>		
draw no.	part no.	description
7.0.1	110142	0,3mm
7.0.1	110143	0,5mm
7.0.1	110144	0,8/1,0mm
7.0.1	110145	1,5mm
7.0.1	110146	2,0mm

<b>*needle KLS</b>		
draw no.	part no.	description
7.1.1	110136	0,3mm
7.1.1	110137	0,5mm
7.1.1	110138	0,8/1,0mm
7.1.1	110140	1,5mm
7.1.1	110141	2,0mm

<b>*nozzle KLS</b>		
draw no.	part no.	description
2.1.1	210104	0,3mm
2.1.1	210105	0,5mm
2.1.1	210106	0,8mm
2.1.1	210107	1,0mm
2.1.1	210108	1,5mm
2.1.1	210109	2,0mm

<b>air cap, flat spray 60° KLS (standard version)</b>		
draw no.	part no.	description
1.1.3	310081	for nozzle 0,2 - 1,0mm
1.1.3	310082	for nozzle 1,5mm
1.1.3	310083	for nozzle 2,0mm

<b>*air cap, flat spray 90° KLS</b>		
draw no.	part no.	description
1.1.3	310108	for nozzle 0,2 - 1,0mm

<b>* air cap, round spray 15° KLS</b>		
draw no.	part no.	description
1.1.4	310084	for nozzle 0,2 - 1,0mm
1.1.4	310085	for nozzle 1,5mm
1.1.4	310086	for nozzle 2,0mm

<b>* air cap, one cone 45° KLS (not in draw)</b>		
draw no.	part no.	description
1.1.6	310087	for nozzle 0,2 - 1,0mm
1.1.6	310088	for nozzle 1,5mm
1.1.6	310089	for nozzle 2,0mm

## 7. Technical data

### Measurements:

with air cap flatspray = 125,5mm x 22mm x 35mm (without mounting)

with air cap roundspray = 122mm x 22mm x 35mm (without mounting)

Weight = approx. 470g (without hoses)

Air consumption = approx. 133ltr. (at 3 bar, nozzle 1,0 and air cap flatspray)

Control air pressure = 5 – 6 bar

Atomizing air pressure = as required, max. 6 bar

Material Pressure = max. 6 bar

Special designs on request. Technical alterations reserved. October 2000