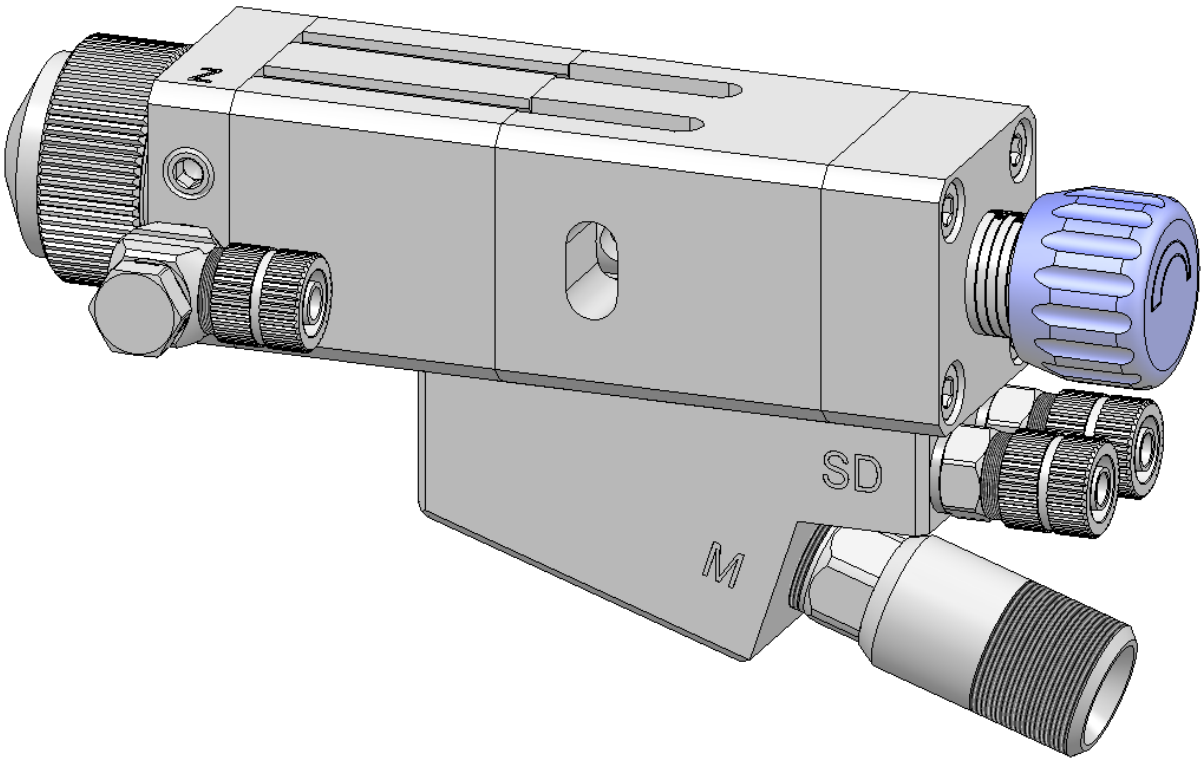
Installation Instructions
for
DISPENSING VALVE
Model VDV-25



Please read these Installation Instructions through carefully before putting the spray valve into operation, and keep them safe for future use.

Contents

1 Identification

Identification data

Manufacturer:	RHEOLOGICAL LIMITED
Description:	DISPENSING VALVE
Model:	Model VDV-25
Valve type:	see below (valve types)
Year of construction:	2019

Manufacturer

Name:	RHEOLOGICAL LIMITED
Address:	UNIT 5, DRUMMONDS PLACE TWICKENHAM TW1 1JN UNITED KINGDOM
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Details of these Operating Instructions

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Version/Revision:	00
Date created:	19.10.2017
Last revised:	22.07.2019

The instructions apply to the following valve types

Model VDV-25-S (Spray version)		**Model VDV-25-L (Luer lock Version)**	**Model VDV-25-V (Full jet version)**
Air cap: • Round spray pattern • Flat spray pattern	Nozzle type: • Standard • Swirl	Adapter for commercial Luer lock dispensing needles	

Dispensing capacity:

- 10-100 mm³/ cycle
- 2.5-25 mm³/ cycle

NOTE!
The illustrations in these instructions may differ slightly from the actual version of the device.

2 User Instructions

2.1 Purpose of the document

These instructions

- ➔ are intended as an important source of information and reference material for personnel who install and operate the device.
- ➔ describe the working procedures, assembly and servicing of the product.
- ➔ provide important advice for handling the product safely and efficiently.

2.2 Explanation of symbols

Important information, such as safety instructions, is identified by corresponding symbols.
It is essential to heed this information in order to prevent accidents and damage to the device.

WARNING! Risk of injury!
This symbol identifies all safety instructions in these Operating/Installation Instructions. Failure to observe them presents a risk of injury or death. Carefully observe these work safety instructions and exercise particular caution when you see this symbol.

IMPORTANT!
This symbol identifies all safety instructions in these Operating/Installation Instructions which must be observed as failure to do so could result in damage to and/or malfunction of the device.

NOTE!
This symbol draws attention to useful tips and other information in these Operating/Installation Instructions. All such information should be observed in the interests of effective device operation.

2.3 Intended use

The **VDV-25 Model** spray valve has been built according to the EC directive in line with the latest state of the art and the recognised rules of engineering.

Nevertheless, its use can present risks to the life and limb of the user or third parties, or can impair the machine or cause other damage.

The **Model VDV-25** spray valve is a needle valve for dispensing sprayable material either continuously or intermittently.

> **IMPORTANT!**
> Only use the **VDV-25 Model** spray valve for its intended purpose and in an entirely safe operating condition! This is the only way to ensure operating safety!

2.4 Reasonably foreseeable incorrect use

> **WARNING! Risk of injury!**
> Using the automatic valve in a way other than intended can lead to serious damage!

Using them in a way that differs from or goes beyond the intended use is considered improper use!

For damage arising from improper use:

- ➔ the operator bears sole responsibility.
- ➔ the manufacturer accepts no liability.

> *NOTE!*
> *Under no circumstances may aggressive materials such as acids, alkalis, cleaning agents, chemicals, poisons, highly flammable or similar substances or gases be used. Consult the manufacturer if you have any doubt as to whether a material is suitable for use.*

2.4.1 Modifications or changes

NOTE!
Unauthorised modifications or changes invalidate any liability or warranty on the part of the manufacturer.

IMPORTANT!
Do not make any changes or additions without consulting the manufacturer and obtaining written agreement!

2.4.2 Spare parts, wearing parts and auxiliary materials

IMPORTANT!
Using spare and wearing parts from third-party manufacturers can present risks. Only use original parts or parts approved by the manufacturer!

IMPORTANT!
The manufacturer accepts no liability for damage arising from the use of spare parts, wearing parts or auxiliary materials that have not been approved by the manufacturer!

2.5 Risks associated with using the product

During use, there is a possible risk of:

- ➔ injury to life and limb of the operator or third parties.
- ➔ damage to the product itself.
- ➔ other damage.

NOTE!
Knowledge of the safety and user instructions in this manual is the basis for safe and fault-free operation.

IMPORTANT!
The Operating Instructions must always be kept at the place of use! The Operating Instructions must be freely accessible at all times to operators, servicing personnel, etc.

The following must also be observed:

- General and local regulations on accident prevention and environmental protection.

The following risks in particular should be taken into account:

WARNING! Risk of injury!
Danger from the device spraying out high-pressure fluids. Always wear personal protective equipment when working on the device!

WARNING! Risk of hearing damage!
Hearing damage may result from the volume and length of exposure to noise. Wear ear protection when working with the device!

WARNING! Danger from pneumatic energy!
The pneumatic energy can cause severe injury. If a component is damaged, high-pressure materials can escape and cause injury and damage!

Therefore:

- – Before beginning work on the pneumatic system, always depressurise the device first.
- – Do not remove safety equipment or disable it by modification.
- – Do not set the pressures higher than the values specified in the Operating/Installation Instructions.

2.6 Residual risks

WARNING! Danger!
Pay attention to the possibility of residual mechanical and pneumatic energy.

WARNING! Danger!
In addition to the precautions recommended by the manufacturer, the operator must take appropriate steps to guard against the risks arising from residual energy.

Personnel must be instructed about the risks and the countermeasures to be taken.

WARNING! Danger!
Danger from pressurised media. Installation, servicing, fault finding, cleaning the device, etc. must only be done when the device is in an unpressurised state.

IMPORTANT!
The device is used in a machine or plant and does not have a dedicated controller.
The user must ensure that the device is integrated in the machine or plant control system in compliance with the applicable accident prevention regulations.

Note the following in relation to this:

- The machine or plant control system must disconnect all power supply cables in the event of a power failure or emergency stop. After the power supply is restored, the device must not make any uncontrolled movements.


Imperative!
The personal protective equipment listed here must be worn when working on or with the product.

IMPORTANT!
The product is partly completed machinery. It must only be put into use when it is established that the machine into which the partly completed machine is intended to be incorporated meets the specifications of the applicable directives!

2.7 Obligations of the operator

The operator is obliged only to allow persons to work with the product who:

- ➔ are familiar with the fundamental regulations relating to work safety and accident prevention.
- ➔ have been instructed in working with the product, and
- ➔ have read and understood these instructions.

The operator must also identify any other hazards that may arise from the special working conditions at the place of use of the product by carrying out a risk assessment pursuant to §3 Ordinance on Industrial Safety and Health (Betriebssicherheitsverordnung). In relation to the risk assessment, operating instructions pursuant to §9 Ordinance on Industrial Safety and Health must be prepared, which combine all further instructions and safety instructions.

The operator will also make the required protective equipment available to the personnel. A list of the necessary personal protective equipment can be found in Chapter 2.9.

> *NOTE!*
> *The requirements of the EC Directive on the Use of Work Equipment 2009/104/EC must be satisfied.*

2.8 Obligations of the operating personnel

! IMPORTANT!

Only authorised, trained and instructed specialist personnel are permitted to handle the product.

All persons who are required to work on the product are obliged, before starting work:

- ➔ to observe the fundamental regulations relating to work safety and accident prevention.
- ➔ to have read and understood these instructions.
- ➔ to wear the personal protective equipment according to Chapter 2.9.

NOTE!

Please contact the manufacturer of the product if you have any unanswered questions!

2.9 Personal protective equipment


Close-fitting work clothing!
(low tear strength, no wide sleeves, no rings or other jewellery, etc.)


Safety goggles!
(to protect the eyes against airborne items and fluids)


Protective gloves!
(to protect the skin against friction, abrasions, aggressive materials, punctures and deep injuries to the hands)


Ear protection!
(to protect against hearing damage when the sound pressure level is above 80 dB (A))

NOTE!
The use of personal protective equipment depends on the environment where the device is used and on the medium being employed. For this reason, also observe the risk assessment of the workplace prepared by the operator.

2.10 Liability and warranty

All information and instructions for the operation, servicing and cleaning of the device are based on our past experience and results, and are given to the best of our knowledge.

We reserve the right to make technical modifications in the interest of enhancement of the device described in these Operating/Installation Instructions.

Translations are also provided to the best of our knowledge. We cannot accept responsibility for errors in translation. The supplied German version of the Operating Instructions remains authoritative.

The descriptions and illustrations may differ from the product supplied. The drawings and diagrams are not to scale.

It is forbidden to pass these Operating/Installation Instructions on to third parties and will result in liability for damages.

2.10.1 Warranty

A warranty with the following scope is provided for this device:

All such parts as prove to be unfit for use or whose fitness for use is greatly compromised within 24 months for one-shift, 12 months for two-shift and 6 months for three-shift operation since handover to the purchaser due to a cause predating this handover – in particular faulty design and defects in materials and workmanship – will be repaired or a replacement supplied at our discretion free of charge.

The warranty takes the form of replacement or repair of the device or individual parts thereof, at our discretion. Expenses hereby incurred (transport, toll, labour or material costs) are borne by us, unless the expenses increase because the device was subsequently brought to a location other than the customer's premises. These extra expenses are the customer's/purchaser's responsibility.

We provide no warranty for damage caused exclusively or partly by the following:

improper or unsuitable use, incorrect installation and/or putting into operation, natural wear and tear, incorrect handling and/or servicing, unsuitable coating substances, substitute materials and/or chemical, electrical and/or physical effects, unless we are responsible for them.

This declaration does not affect statutory rights or the contractual rights stemming from our general terms and conditions of business.

2.10.2 Wearing parts, lifetime warranty

Wearing parts are all parts that come into direct contact with the spray material and/or are subject to wear and tear due to their function (e.g. nozzles, needles, air caps, seals, O-rings, sealing screws, pistons, etc.). Such parts are excluded from warranty and defect claims in so far as they are based on wear and tear. The replacement of a part does not extend the warranty period of the device.

3 Description

3.1 Functional description

The dispensing valve VDV-25 Model is used for exact dispensing of low and high viscosity media. The valve is characterised by its high level of precision as well as very good reproducibility of the rate of application – media such as greases, sealants and also oils with application rates of 10-100 mm³ / 2.5-25 mm³ per cycle can be dispensed. Fluctuations in material pressure or cycle time do not influence dispensing volume.

The valve is controlled pneumatically by means of an external 5/2-way valve (not included in the scope of delivery). The valve has a separate working connection for dispensing and ejection of the application media.

The material is permanently under pressure in the dispensing valve. In its basic position, the pilot valve should let compressed air pass through to the "dispensing" connection (SD). This allows the material piston inside the dispensing valve to be pulled backwards and the dispensing chamber to be filled with material. If the pilot valve receives a signal, air reaches the "eject" connection (SA), which releases the material outlet and causes the material to move the material piston via its own pressure, thus ejecting the previously dispensed volume. (For both cycles, the air pulse should last for a minimum of 0.1 s)

Depending on the nozzle and air cap, a wide variety of application forms can be implemented (from point to flat jet).

The function is: dispensing by air pulse/ejection by air pulse

If the control air fails, the valve remains in the rest position. No material will escape.

In case of prolonged periods of non-usage, the device must be cleaned, and no medium that reacts/cures in the air should be used, as the nozzle is not closed (unlike with a needle valve).

3.2 Parameters (technical data)

Device type	**DISPENSING VALVE Model VDV-25**
Dimensions (L x W x H)	**approx. 113 x 25 x 58**
Weight	approx. 530g
Control air pressure	6-10 bar
Atomising air pressure	0.5-6 bar
Material pressure	max. 150 bar
Dispensing capacity	10-100 mm³/cycle 2.5-25 mm³/cycle
Switching frequency	max. 5 Hz
Repeat accuracy	>97%

We reserve the right to make technical changes! Last revised: 22.07.2019

3.2.1 Parameters for your application(s)

Application	
Material	
Nozzle type	
Nozzle size	
Air cap	
Nozzle-to-surface distance	
Control air pressure	
Atomising air pressure	
Material pressure	
Dispensing capacity	

Application	
Material	
Nozzle type	
Nozzle size	
Air cap	
Nozzle-to-surface distance	
Control air pressure	
Atomising air pressure	
Material pressure	
Dispensing capacity	

3.3 Dimensions

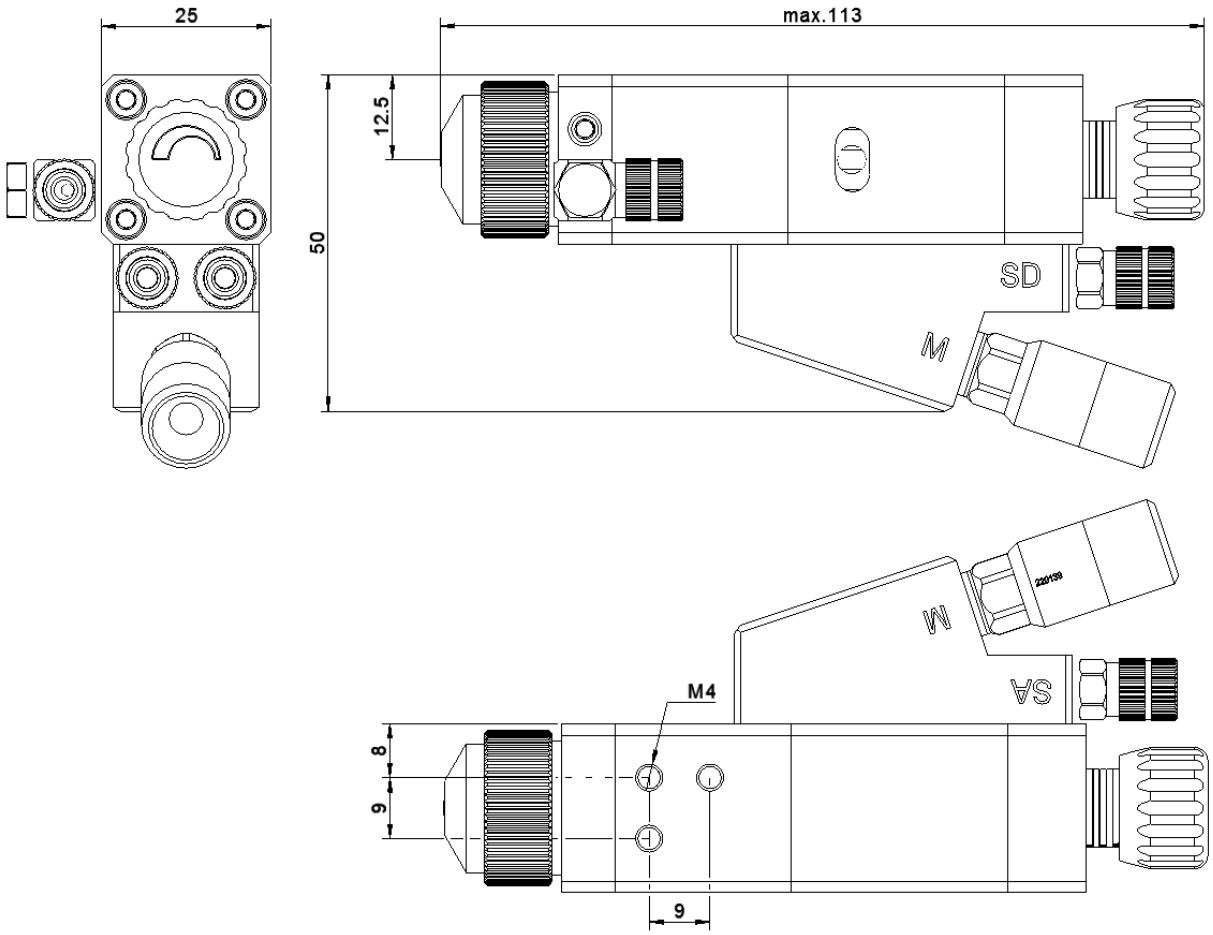


Fig. 3.3/1

3.4 Exploded view

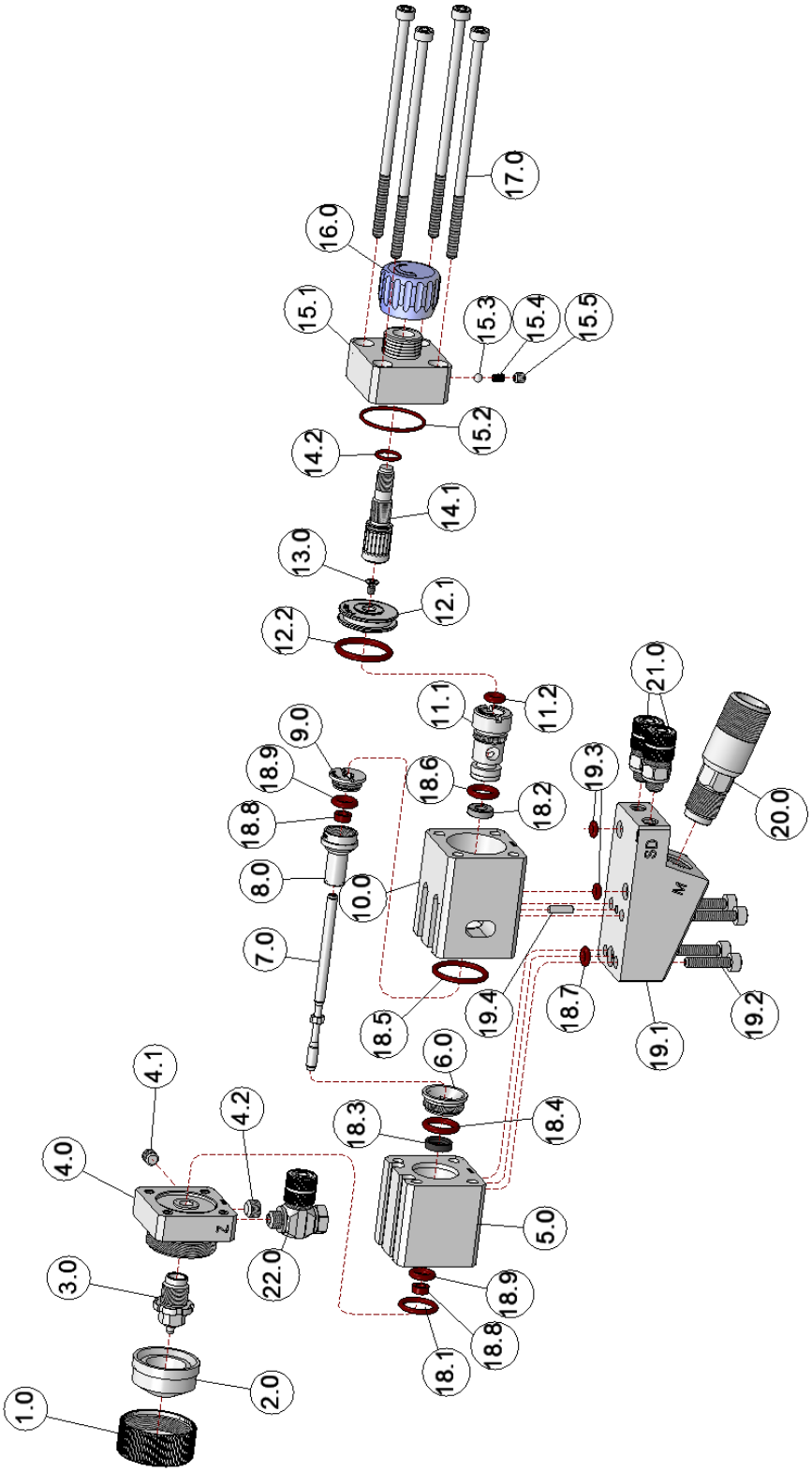


Fig. 3.4/1

3.5 Spare parts list

Drg. no.	Item no.	Qty	Description
1.0	410028	1	Retaining ring, dia. 23 x 10 mm
2.0	*	1	Air cap
3.0	*	1	Nozzle
4.0	512065	1	Spray head, VDV-25, complete
4.1	610019	1	Threaded pin DIN 913 M4 x 4
4.2	610021	1	Threaded pin DIN 913 M5 x 4
5.0	512061	1	Dispensing body, VDV-25, 25 x 25 x 27 mm [2]
6.0	930690	1	Sealant backing layer, dia. 14 x 5.3 mm [2]
7.0	113894	1	Valve needle, dia. 4 x 55.9 mm [2]
8.0	710165	1	Material piston, dia. 11 x 16.5 mm [2]
9.0	930689	1	Sealant backing layer, dia. 11 x 4 mm
10.0	512060	1	Main body, VDV-25, 25 x 25 x 33 mm
11.0	810122	1	Sealing screw, complete, VA, Viton®
11.1	810121	1	Sealing screw, VA
11.2	640026	1	O-ring 2.90 x 1.78/Viton®
12.0	710167	1	Air piston, dia. 17.8 x 8 mm, complete
12.1	710166	1	Air piston, dia. 17.8 x 7.5 mm
12.2	640007	1	O-ring 14 x 1.78/Viton®
13.0	610666	1	Countersunk screw with hexagon socket DIN 7991 M2 x4
14.0	610784	1	Regulating spindle, dia. 8 x 29.5 mm, complete
14.1	610783	1	Regulating spindle, dia. 8 x 29.5 mm
14.2	640039	1	O-ring 6 x 1/Viton®
15.0	512066	1	End plate, VDV-25, complete
15.1	512063	1	End plate, VDV-25, 25 x 25 x 18.8 mm
15.2	640405	1	O-ring 18 x 1/Viton®
15.3	650004	1	Cone, stainless steel, 2.5 mm
15.4	820077	1	Pressure spring, 0.4 x 5.5mm
15.5	610017	1	Threaded pin DIN 913 M3 x 3
16.0	321241	1	Regulating knob, dia. 13 x 13 mm, blue anodised
17.0	610785	4	Cylinder-head screw with hexagon socket DIN 912 M3 x 70

18.0	640945	1	Material sealing set VDV2501, Viton® ²
18.1	640046	1	O-ring 9 x 1.5/Viton®
18.2	640004	1	Variseal 2.65 x 2.0 x 2.8
18.3	640946	1	Glyd Ring 6 x 2 x 1 ²
18.4	640001	1	O-ring 7.65 x 1.78/Viton® ²
18.5	640761	1	O-ring 14 x 1.5/Viton®
18.6	640021	1	O-ring 6.07 x 1.78/Viton®
18.7	640808	1	O-ring 3 x 1.5/Viton®
18.8	640024	2	Glyd Ring 3 x 2 x 1
18.9	640027	2	O-ring 4.47 x 1.78/Viton®
19.0	512068	1	Connecting plate, VDV-25, 50 x 25 x 21.5 mm, complete
19.1	512062	1	Connecting plate, VDV-25, 50 x 25 x 21.5 mm
19.2	610199	4	Cylinder-head screw with hexagon socket DIN 912 M3 x14
19.3	640351	2	O-ring 2 x 1.5/Viton®
19.4	320165	1	Dowel pin DIN 7 2m6 x 8 mm
20.0	220139	1	Reducer fitting, stainless steel, 1/4" external thread – 1/8" external thread
21.0	220089	2	Screwed connection, complete
22.0	220151	1	Angled screw connection, pivoted, complete

Other seal materials and connections available on request!

***** Item numbers may be found in chapter **8.0 "Spare parts and accessories"**

3.5.1 ² for dispensing capacity 2.5-25mm²

Drg. no.	Item no.	Qty	Description
5.0	512299	1	Dispensing body, VDV-25, 25 x 25 x 27 mm
6.0	930720	1	Sealant backing layer, dia. 13.6 x 7.4 mm
7.0	114023	1	Valve needle, dia. 3.4 x 55.9 mm
8.0	710173	1	Material piston, dia. 11 x 16.5 mm
18.0	641017	1	Material sealing set VDV2504, Viton®
18.1	640046	1	O-ring 9 x 1.5/Viton®
18.2	640004	1	Variseal 2.65 x 2.0 x 2.8
18.3+18.4	640946	1	O-ring 4 x 1.5/Viton®
18.5	640761	1	O-ring 14 x 1.5/Viton®
18.6	640021	1	O-ring 6.07 x 1.78/Viton®
18.7	640808	1	O-ring 3 x 1.5/Viton®
18.8	640024	2	Glyd Ring 3 x 2 x 1
18.9	640027	2	O-ring 4.47 x 1.78/Viton®

4 Installation

WARNING! Risk of injury!
The pneumatic energy can cause severe injury. If a component is damaged, high-pressure materials can escape and cause injury and damage!

4.1 Assembly

The spray valve **Model VDV-25** can be installed in any position.

The distance between nozzle opening and application level depends on the required application width of the material. The greater the distance between nozzle opening and application level, the greater the application width of the material.

Securely and tightly screw the dispensing valve to the arm or machine.

Natural oscillation occurs in intermittent operation.

To achieve clean application, it is essential to avoid the transmission of natural oscillation both from the machine to the spray valve and from the spray valve to the machine.

4.2 Hose installation

Control air, atomising air and material are supplied to the spray valve via three separate connections. The connection ports are differentiated as follows (see Fig. 4.2/1):

- **Atomising air** (blue)
  Connection Z: to 2/2-way solenoid valve
- **Control air ejection** (black)
  Connection SA: to 5/2-way solenoid valve
- **Control air dispensing** (black)
  Connection SD: to 5/2-way solenoid valve
- **Material** (transparent or white)
  Connection M: to pressure tank or pump

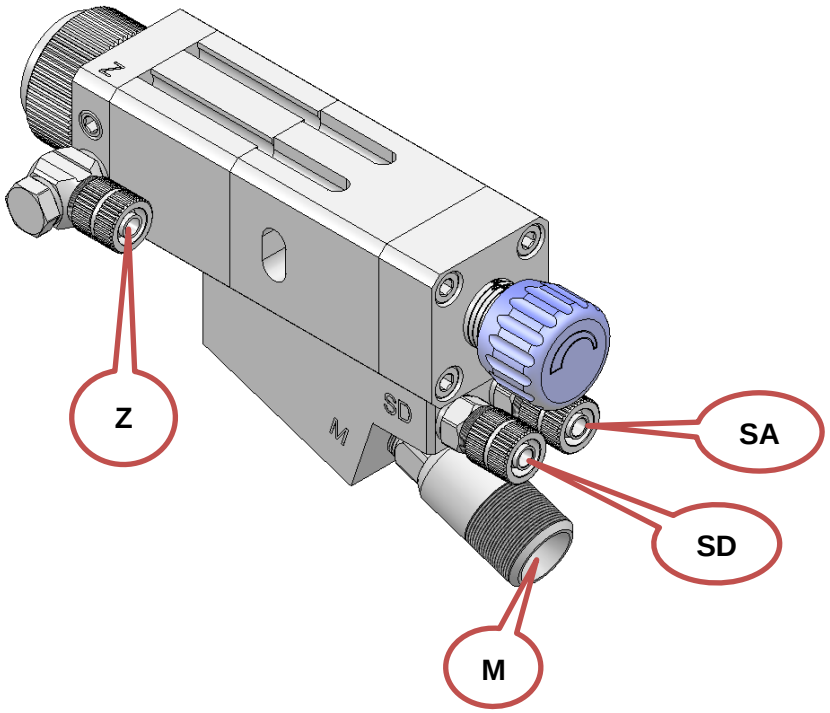


Fig. 4.2/1

! IMPORTANT!

To prevent malfunctions and damage to the spray valve and machine or plant, it is essential to ensure that the pressure lines are connected up to the correct hose connections on the spray valve.

Pressure line connection

⚠ WARNING! Risk of injury due to compressed air and material pressure!

Only qualified personnel may work on the pressure plant in accordance with the safety regulations.

When working on the pressure plant, be sure to:

- ➔ Depressurise the plant before beginning work.
- ➔ Not remove or disable safety equipment.
- ➔ Not set pressures above the maximum permitted values.
- ➔ Install all hoses safely so that the pressure lines cannot be damaged by moving machine or plant components.
- ➔ Not put the pressure plant into operation until work is completed.

Hose installation:

Control and atomising air

1. Unscrew the retaining cap from the screwed connection and push it over the hose.
2. Insert the open hose end into the connection port on the screwed connection.
3. Screw the retaining cap back onto the screwed connection and tighten.

Material connection

1. Tighten the screw connection properly and firmly

IMPORTANT!
Only hoses which can withstand the maximum working pressure of the pressure line may be used.

4.3 Installation instructions

WARNING! Risk of injury!
To prevent personal injury and/or property damage, it is essential to observe the following when installing the device in a machine or plant:

The device must be installed in a machine or plant in such a way as to rule out hazards like:

- ➔ the escape of high-pressure fluids
- ➔ defects in the compressed air supply
- ➔ malfunctions of the device, machine or plant
- ➔ failure or malfunction of plant control
- ➔ loud noises or interference with acoustic signals

in the vicinity. To protect persons working on the device, machine or plant, effective safety devices and warning signs must be put in place. In addition, relevant safety instructions must be incorporated into the Operating/Installation Instructions for the machine or plant.

4.4 Putting into operation

WARNING! Risk of injury!
Only trained qualified personnel may put the machine or plant into operation in accordance with the safety and accident prevention regulations.

Observe the following before putting the machine or plant into operation:

- ➔ Ensure that no tools or other foreign bodies are inside the machine or plant.
- ➔ Check that the device and all other parts are secure.
- ➔ Check that all electrical, hydraulic and pneumatic connections are on the correct ports and are secure.
- ➔ Check that the set pressures correspond to the ratings and connection values of the device.
- ➔ Check that safety devices are working.

1. Switch on power supply.

2. Switch on atomising air supply, control air supply and material supply.

3. Turn on device at plant controller.

4. Check that device is functioning and operating correctly.

5. Check that device is within all the specified set value ranges.

Once it has been established that the device is functioning perfectly, the device may be operated in accordance with all accident prevention regulations.

4.5 Electrical connection

WARNING! Electrical hazard!

Work on the electrical equipment must only be carried out by qualified personnel in accordance with the safety regulations.

Before beginning work, the electrical supply must be switched off, and secured against being switched back on.

For information and instructions on the connection of electrical equipment, please refer to the enclosed documentation, which is attached as an appendix **(Ch.12 "Appendix")**.

5 Operation

5.1 General and safety instructions for operation

In normal operation the device does not require operating personnel. The device is operated via the plant controller.

To prevent disruptions, device function must be checked regularly by trained supervisors.

IMPORTANT!

In the event of faults or irregularities, shut down the plant immediately and inform the local person in charge.

If device faults cannot be corrected (see chap. 7 "Faults"), inform the manufacturer's Customer Service.

Only deploy instructed personnel for regular cleaning.

The device presents the following hazards during operation:

WARNING! Risk of injury!

Danger from the device spraying out high-pressure fluids. Always wear personal protective equipment when working on the device**!**

WARNING! Risk of hearing damage!

Hearing damage may result from the volume and length of exposure to noise.
Wear ear protection when working with the device!

WARNING! Risk of injury!

Housing parts with sharp edges and pointed corners can cause skin abrasions. Wear protective gloves when working on the device!

5.2 Operating instructions

- ➔ The dispensing valve may only be used in intermittent operation. The control air pressure, switching frequency and material pressure are strongly dependent on the medium used. In ideal operating conditions (material pressure, control air pressure, dispensing capacity, short lines) up to 5 cycles per second are possible.
- ➔ The control air pressure should be 6-10 bar.
- ➔ The atomising air has to be regulated so that it is switched on before the ejection process, and is switched off only after the ejection process is finished (reduces the need for maintenance).
- ➔ In the case of prolonged periods of non-usage, the material must be removed from the spray valve as it can clog the device (at least: cleaning of the head area)
- ➔ Only clean, filtered material, atomising air and control air may be used. The control air should ideally be supplied to the spray valve lightly oiled.

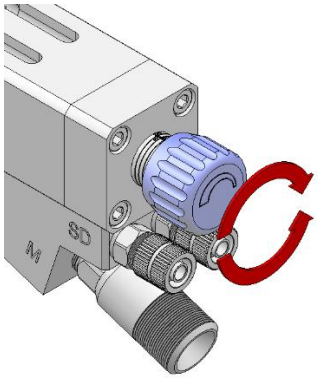


Fig. 5.2/1

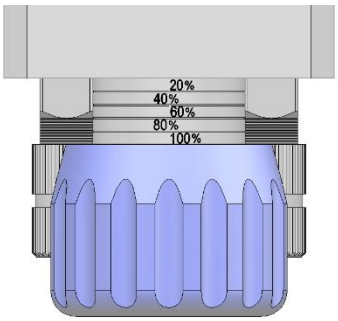


Fig. 5.2/2

NOTE!
The flow of material can be adjusted to suit individual requirements by turning the regulating screw (Fig. 5.2/1):
Turn screw to the right: to reduce the material flow
Turn screw to the left: to increase the material flow

One revolution corresponds to approx. 10 mm³ (2.5mm³) dispensing capacity. (on a scale, the adjusted volume is in % of the max. volume displayed)

NOTE!
Generally the flow of material can be adjusted while operating the valve. The adjustment may appear sluggish due to the regulating spindle being under pressure. To adjust the material flow for more than one revolution of the regulating knob, we recommend to cut off the control air or actuate the "SA" connection.

5.3 Switching on

WARNING! Risk of injury!
Only trained qualified personnel may switch the device on and off in accordance with the safety and accident prevention regulations.

1. Switch on power supply.
2. Switch on atomising air supply, control air supply and material supply.
3. Turn on device at plant controller.
4. Check that device is functioning and operating correctly.
5. Check that device is within all the specified set value ranges.

5.4 Switching off

1. Shut down device at plant controller.
2. Switch off atomising air supply, control air supply and material supply.
3. Switch off power supply.

5.5 Shutdown

Before shutting the device down for an extended period, the following steps must be taken in accordance with the safety regulations:

- ➔ Switch off device (see chap. 5.4 "Switching off") and prevent it from being switched back on.
- ➔ Remove material residue from the device.
- ➔ Clean device inside and out. *(Observe Chapter 6 "Maintenance and servicing")*

6 Maintenance and servicing

6.1 General and safety instructions for maintenance and servicing

Cleaning

The spray valve must be cleaned when

- ➔ it is soiled by use
- ➔ a different material is to be used
- ➔ wearing parts have to be replaced.

This applies in particular to the nozzle needle, the sealing bush and the nozzle.

> ! **IMPORTANT!**
> Do not use any sharp-edged, metallic aids for external cleaning; only use soft brushes.

Servicing

The spray valve is a high-quality precision device, which will usually operate fault-free and without any servicing if handled correctly provided that only clean, filtered material is used. It is also essential that the control air be clean and, ideally, supplied to the dispensing valve lightly oiled. Individual operating conditions and the properties of various materials require a minimum of care to be given to the device.

Before beginning any servicing work:

- ➔ Put on personal protective equipment.
- ➔ Switch off device and prevent it from being switched back on.
- ➔ Switch off pressure plant and prevent it from being switched back on. Depressurise all supply pressure lines and disconnect them from the device.

> ☞ *NOTE!*
> *The device should be checked regularly for wear. It is not possible to specify when wear and tear may occur, since this depends on the material being processed, the switching frequency, and the conditions under which the device is used.*

Safety instructions

WARNING! Risk of injury!
Improper handling of the device carries the risk of severe personal injury and serious damage. Therefore, servicing and cleaning work must only be carried out by qualified personnel or personnel who have been specially trained in these tasks (training to be documented)!

WARNING! Risk of injury!
Only perform servicing and cleaning work on the device when the device and plant are at a standstill!

WARNING! Risk of injury!
There is a risk that components will be ejected! The spray valve must only be opened after the device has been depressurised and is not operational!

6.2 Changing the nozzle, material piston and valve needle

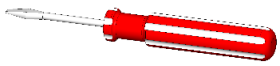
Please follow the explanations in chapter 6.3 "Changing the sealing elements/sealing set".

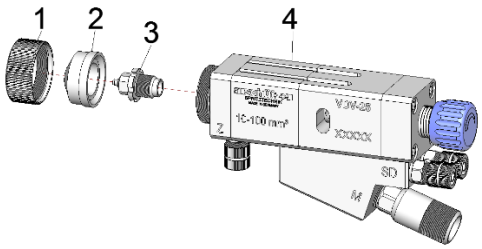
NOTE!
When installing nozzles and needles that have already been in use, they must first be cleaned of all deposits and material residues. Material residues in nozzles can result in leaks in the nozzle-needle system, while nozzle needles with hardened material residues can cause damage to the sealing elements in the spray valve.

6.3 Changing the sealing elements/sealing set

Changing the material sealing set VDV2501/ 2504, Viton® (item no.: 640945/ 641017), Pos. 18

Necessary tools:

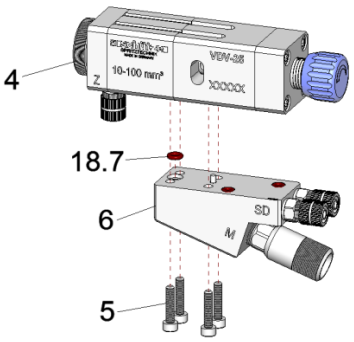
		
Flat-blade screwdriver (width: 0.8 mm)	Allen key (AF size: 1.3 mm / 2.5 mm / 6.0 mm)	Compressed air gun (recommended: Schütze W5)
		
Technical vaseline (e.g. Aviaticon Pharmaline V-18)	Medium-strength threadlocker (e.g. Loctite 243)	

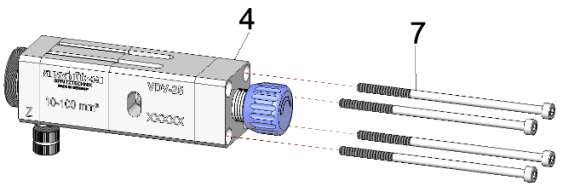


1. Depressurise all connections and stop the supply of energy and material!
2. Unscrew the retaining ring (**1**) from the main body (**4**)
3. Take the off air cap (**2**)
4. Unscrew the nozzle (**3**) from the main body (**4**) *(replace nozzle if necessary)*

5. Unscrew the four cylinder-head screws (**5**) from the main body
6. Take off connecting plate (**6**)
7. Insert a new sealing element (**18.7**) into the connecting plate (**6**)

   (replace the O-ring 19.3 of the connecting plate (Fig. 3.4/1) if necessary)

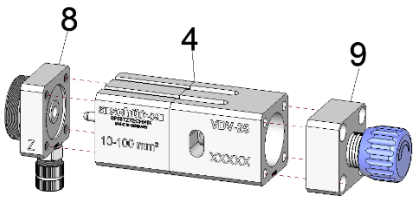


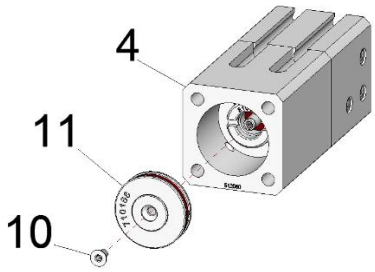


8. Unscrew the four cylinder-head screws (**7**) from the main body (**4**)

9. Separate the spray head (**8**) and end plate (9) from the main body (**4**)

   (replace the O-ring 15.2 of the connecting plate (Fig. 3.4/1) if necessary)

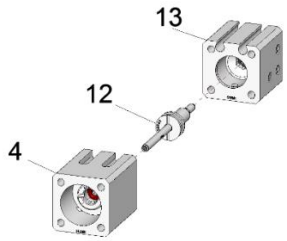


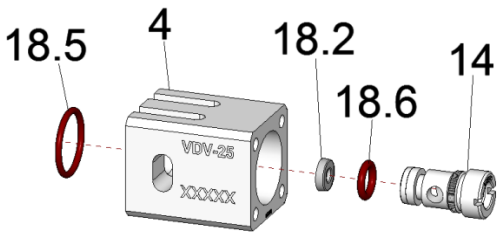


10. Unscrew the countersunk screw (**10**) from the air piston
11. Remove the air piston (**11**)
    (replace the O-ring 12.2 of the air piston (Fig. 3.4/1) if necessary)

    Tip: Using compressed air, push the air piston out (**11**) and carefully supply compressed air from the underside of the main body (**4**)

12. Separate the dispensing body (**13**), valve needle and material piston (**12**) and main body (**4**) from each other.





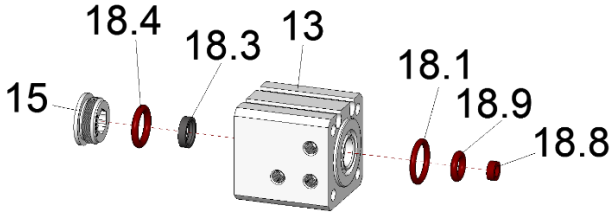
<u>Main body (4):</u>

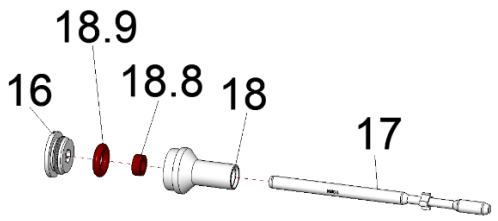
13. Unscrew the sealing screw (**14**) from the main body (**4**)
14. Replace the sealing elements (**18.2 & 18.6**) on the sealing screw (**4**)
    <u>Important:</u> *Insert the sealing element (**18.2**) in the operating direction!*
    (replace the O-ring 11.2 of the sealing screw (Fig. 3.4/1) if necessary)

15. Insert the new O-ring (**18.5**) into the main body (**4**)
16. Lightly grease the sealing screw (**14**) and screw it back into the main body (**4**)

<u>Dispensing body (13):</u>

17. Unscrew the sealant backing layer (**15**) from the dispensing body (**13**)
18. Insert new sealing elements (**18.4 & 18.3**) into the dispensing body (**13**) and reassemble the sealing backing layer (**15**). (**Attention**: With the version 2.5-25 mm³ the positions 18.3+18.4 are replaced by only one sealing element!)
19. Insert new sealing elements (**18.1, 18.9 & 18.8**) into the dispensing body (**13**)





Valve needle and material piston (13):

20. Pull the valve needle(**17**) forwards out of the material piston (**18**) *(replace the valve needle if necessary)*
21. Unscrew the sealant backing layer (**16**) from the material piston (**18**)
22. Insert new sealing elements (**18.8 + 18.9**) into the material piston (**18**)
23. Screw the sealant backing layer(**16**) back into the material piston (**18**) (*secure with medium-strength threadlocker*)
24. Lightly grease the valve needle (**17**) and reinsert it
25. Reconnect the dispensing body (**13**), valve needle with material piston (grease running surface of material piston) (**12**) and main body (**4**).
    ***Important:* Ensure that the sealing elements are positioned correctly!**
26. Guide the air piston (**11**) straight into the main body (4) and secure it with the countersunk screw (*secure with medium-strength threadlocker*)
27. Reattach the spray head (**8**) and the end plate (**9**) to the main body (**4**).
    ***Important:* Ensure that the sealing elements are positioned correctly!**
28. Screw the four cylinder-head screws (**7**) into the main body (**4**)
    ***Important:* Tighten the cylinder-head screws with a max. of 2.3 Nm!**
29. Attach the connection plate (**6**) to the main body (**4**)
    ***Important:* Ensure that the sealing elements are positioned correctly!**
30. Screw the four cylinder-head screws (**5**) into the main body (**4**)
    ***Important:* Tighten the cylinder head screws with a max. of 2.3 Nm!**

31. Screw the nozzle (**3**) into the main body (**4**)

32. Put the air cap on (**2**)

33. Unscrew the retaining ring (**1**)

NOTE!
Do not use sharp-edged or metallic objects to remove or insert the seals, as these may damage the seals.
Lightly grease all moving parts and seals to increase durability.

7 Faults

7.1 General and safety instructions in relation to faults

Only qualified electricians/electronic technicians/engineers may rectify faults. Mechanical, pneumatic or hydraulic faults must be rectified by personnel trained and qualified in the relevant field.

The manufacturer must be informed of faults which cannot be rectified by the measures described.

7.2 In the event of a fault

In case of faults which pose an immediate risk for persons, property and/or the safe operation of the device or plant:

➔ Stop device immediately at the **EMERGENCY-OFF switch**.

In case of faults which do not pose an immediate risk of personal injury or property damage:

➔ Switch off device, machine or plant at the **plant controller**.

➔ Prevent device, machine or plant from being switched back on.

➔ Inform operator of fault immediately.

➔ Have qualified personnel identify the type and cause of the fault.

➔ Have qualified personnel rectify the fault.

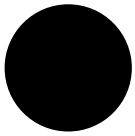
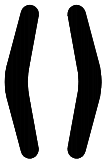
WARNING! Risk of injury!
Improper, incorrect work on the device, machine or plant poses serious risks of personal injury and/or damage. Therefore, only trained qualified personnel may correct faults.

The notices and safety rules in Chapter 6 "Maintenance and servicing" must be observed before, during and after all work to rectify faults!

7.3 Malfunctions

Fault	Possible cause	Rectification
Nozzle needle does not open	Nozzle needle is stuck inside the needle seal	Completely clean needle seal
	Control air pressure too low	Check whether there is sufficient control air pressure (see 3.2 Parameters) at the spray valve
	O-ring (**12.2** Fig. 3.4/1) faulty	Replace O-ring
	Pilot valve does not switch.	Check the pilot valve.
No atomising air	Atomising air pressure too low	Check whether there is sufficient atomising air pressure (see chap. 3.2 Parameters) at the spray valve.
No material comes out	Nozzle blocked by material	Clean the nozzle and the needle.
	Material pressure too low	Check whether sufficient material pressure is being applied to the spray valve (see 3.2 Parameters).
Incorrect spray pattern	Air cap oiled	Clean the air cap.
	Incorrect air ratio	See 7.4 Spray patterns/types of problem.

7.4 Spray patterns/types of problem

SPRAY PATTERN	PROBLEM	CAUSE	SOLUTION
	Normal spray pattern (flat spray pattern)		
	Normal spray pattern (round spray pattern)		
	Top-heavy or bottom-heavy spray pattern	Dirty air cap Dirty nozzle	Clean nozzles
	Banana-shaped spray pattern	Dirty air cap Dirty nozzle	Clean nozzles
	Centre-heavy spray pattern	Too much material Material too thick	Reduce material flow Thin down material
	Split spray pattern	Too little material Flat spray pressure too high	Increase material flow Increase round spray pressure

8 Spare parts and accessories

8.1 General and safety instructions for use

When ordering nozzle sets as spare parts (air cap and nozzle), please state the required size. Nozzle sets should always be replaced together!

Available nozzles and air caps:

0.2 mm / 0.3 mm / 0.5 mm / 0.8 mm / 1.0 mm / 1.2 mm / 1.5 mm / 2.0 mm / 2.5 mm

Special nozzles and air caps can be developed for your particular application upon request!

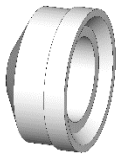
Only use swirl nozzles in combination with the matching round spray cap!

8.2 Spray version

8.2.1 Air caps (2.0)

8.2.1.1 Round spray pattern

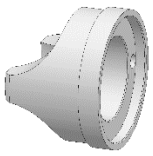
Air cap, round spray pattern, 20 x 10.8 mm



Item no.	Description
310034	Air cap, round spray pattern, 0.2-1.0 mm, 20 x 10.8 mm
310035	Air cap, round spray pattern, 1.2-1.5 mm, 20 x 10.8 mm
310080	Air cap, round spray pattern, 1.8-2.0 mm, 20 x 10.8 mm
310091	Air cap, round spray pattern, 2.5 mm, 20 x 10.8 mm

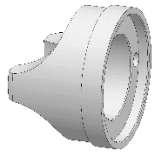
8.2.1.2 Flat spray pattern

Air cap, flat spray pattern, 20 x 14.5 mm, approx. 60°



Item no.	Description
310032	Air cap, flat spray pattern, 0.2-1.0 mm, 20 x 14.5 mm
310033	Air cap, flat spray pattern, 1.2-1.5 mm, 20 x 14.5 mm
310079	Air cap, flat spray pattern, 1.8-2.0 mm, 20 x 14.5 mm
310090	Air cap, flat spray pattern, 2.5 mm, 20 x 14.5 mm

Air cap, flat spray pattern, 20 x 14.5 mm, approx. 90°

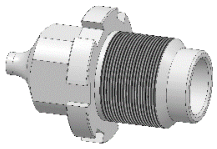


Item no.	Description
310036	Air cap, flat spray pattern, 0.2-1.0 mm, 20 x 14.5 mm
310037	Air cap, flat spray pattern, 1.2-1.5 mm, 20 x 14.5 mm
310166	Air cap, flat spray pattern, 1.8-2.0 mm, 20 x 14.5 mm
310167	Air cap, flat spray pattern, 2.5 mm, 20 x 14.5 mm

8.2.2 Nozzles (3.0)

8.2.2.1 Standard

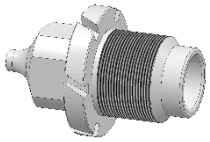
Nozzle, stainless steel, 12 x 18 mm, SW7



Item no.	Description
210110	Nozzle, 0.2 mm, stainless steel, 12 x 18 mm, AF size 7
210111	Nozzle, 0.3 mm, stainless steel, 12 x 18 mm, AF size 7
212851	Nozzle, 0.4 mm, stainless steel, 12 x 18 mm, AF size 7
210112	Nozzle, 0.5 mm, stainless steel, 12 x 18 mm, AF size 7
210113	Nozzle, 0.8 mm, stainless steel, 12 x 18 mm, AF size 7
210114	Nozzle, 1.0 mm, stainless steel, 12 x 18 mm, AF size 7
210115	Nozzle, 1.2 mm, stainless steel, 12 x 18 mm, AF size 7
210116	Nozzle, 1.5 mm, stainless steel, 12 x 18 mm, AF size 7
210946	Nozzle, 1.8 mm, stainless steel, 12 x 18 mm, AF size 7
210117	Nozzle, 2.0 mm, stainless steel, 12 x 18 mm, AF size 7
210118	Nozzle, 2.5 mm, stainless steel, 12 x 18 mm, AF size 7

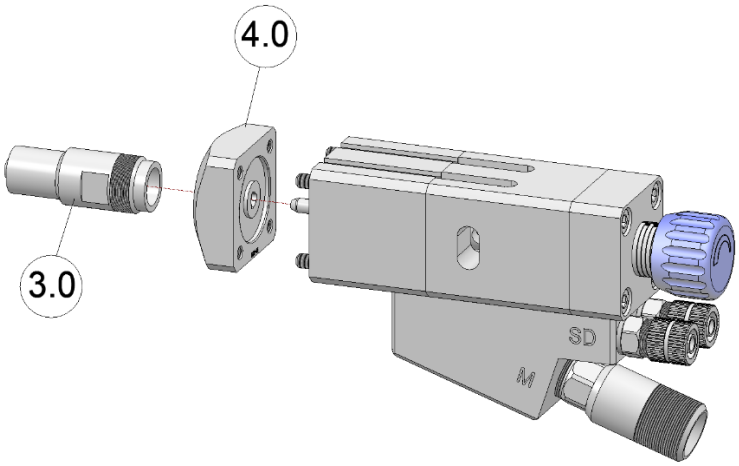
8.2.2.2 Swirl

Nozzle, swirl, stainless steel, 12 x 18 mm, SW6



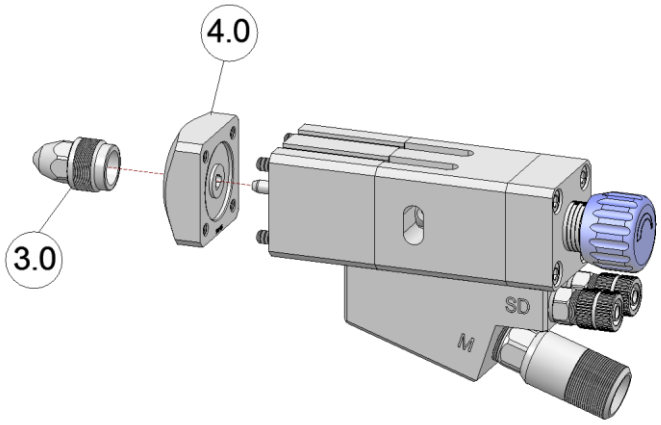
Item no.	Description
210776	Nozzle, swirl, 0.2 mm, stainless steel, 12 x 18 mm, AF size 6
210777	Nozzle, swirl, 0.3 mm, stainless steel, 12 x 18 mm, AF size 6
210778	Nozzle, swirl, 0.5 mm, stainless steel, 12 x 18 mm, AF size 6
211024	Nozzle, swirl, 0.6 mm, stainless steel, 12 x 18 mm, AF size 6
211025	Nozzle, swirl, 0.7 mm, stainless steel, 12 x 18 mm, AF size 6
210779	Nozzle, swirl, 0.8 mm, stainless steel, 12 x 18 mm, AF size 6
210780	Nozzle, swirl, 1.0 mm, stainless steel, 12 x 18 mm, AF size 6
210781	Nozzle, swirl, 1.2 mm, stainless steel, 12 x 18 mm, AF size 6
210782	Nozzle, swirl, 1.5 mm, stainless steel, 12 x 18 mm, AF size 6
210783	Nozzle, swirl, 1.8 mm, stainless steel, 12 x 18 mm, AF size 6
210784	Nozzle, swirl, 2.0 mm, stainless steel, 12 x 18 mm, AF size 6

8.3 Luer lock version



Drg. no.	Item no.	Description
4.0	512145	Universal head, VDV-25, 25 x 25 x 10mm
3.0	211915	Luer lock adapter, dia. 0.2 mm, complete
	211851	Luer lock adapter, dia. 0.3 mm,complete
	211997	Luer lock adapter, dia. 0.5 mm,complete
	212060	Luer lock adapter, dia. 0.8 mm,complete
	211554	Luer lock adapter, dia. 1.0 mm,complete
	211909	Luer lock adapter, dia. 1.5 mm,complete
	212351	Luer lock adapter, dia. 2.0 mm,complete

8.4 Full jet version

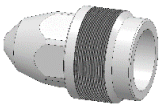


Drg. no.	Item no.	Description
4.0	512145	Universal head, VDV-25, 25 x 25 x 10mm
3.0	*	Nozzle

8.4.1 Nozzles (3.0)

8.4.1.1 KV Nozzles

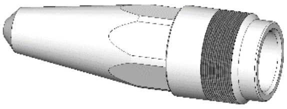
Nozzle, KV, stainless steel



Item no.	Description
210143	Nozzle, KV, 0.2 mm
210144	Nozzle, KV, 0.3 mm
210145	Nozzle, KV, 0.4 mm
210146	Nozzle, KV, 0.5 mm
210147	Nozzle, KV, 0.6 mm
210148	Nozzle, KV, 0.7 mm
210149	Nozzle, KV, 0.8 mm
210150	Nozzle, KV, 1.0 mm
210151	Nozzle, KV, 1.2 mm
210152	Nozzle, KV, 1.5 mm
210153	Nozzle, KV, 2.0 mm

8.4.1.2 LV Nozzles

Nozzle, LV, stainless steel

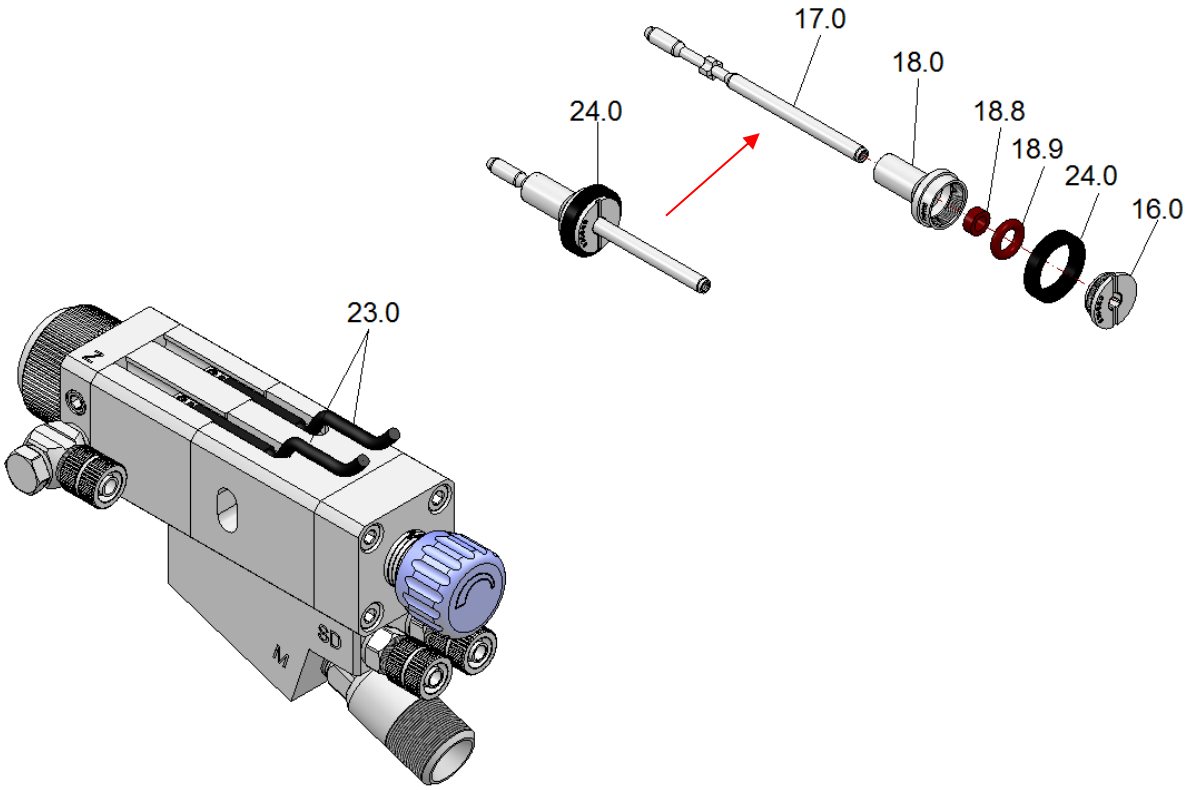


Item no.	Description
210132	Nozzle, LV, 0.2 mm
210133	Nozzle, LV, 0.3 mm
210134	Nozzle, LV, 0.4 mm
210102	Nozzle, LV, 0.5 mm
210136	Nozzle, LV, 0.6 mm
210137	Nozzle, LV, 0.7 mm
210138	Nozzle, LV, 0.8 mm
210139	Nozzle, LV, 1.0 mm
210140	Nozzle, LV, 1.2 mm
210141	Nozzle, LV, 1.5 mm
210142	Nozzle, LV, 2.0 mm

8.5 Monitoring the end position

A magnetic field sensor is required to monitor an end position. These are mounted in the nuts of the main body. For correct function, a ring magnet must be mounted on the material piston.

Disassemble the valve needle (17.0) and the material piston (18.0) as described in section 6.3. Then assemble the ring magnet on the material piston (18.0) and secure it with the sealant backing layer (16.0). Assemble the VDV 25 according to chapter 6.3.



Drg. no.	Item no.	Qty	Description
23.0	250150	1(2)	Magnetic field sensor, ø3,6x24mm
24.0	250149	1	Ring magnet, ø13,5 x 10,1 x 2,4mm

The position of the magnetic field sensor (23.0) must be set according to the desired end position monitoring.

For information and instructions on the connection of electrical equipment, please refer to the enclosed documentation, which is attached as an appendix **(Ch.12 "Appendix")**.

8.6 Clamp

Clamp	
Item no.	**Description**
910220	Clamp, 17.5 x 16 x 10 mm, complete
610215	Cylinder-head screw with hexagon socket DIN 6912 M4 x10
910219	Clamp, 17.5 x 16 x 10 mm

The clamp is a simple means of fastening the spray valve to a shaft. It is screwed onto the spray valve using 2 screws.

(Technical information available upon request)

8.7 Extensions

Extensions are available for a wide range of uses and applications.

Special extensions can be developed upon request.

(Technical information and data sheets are available upon request)

9 Transport, packaging and storage

9.1 Transport

Always transport and store the device with great care:

- ➔ Do not throw or drop the device.
- ➔ Do not place objects on the device or packaging.
- ➔ Protect the device from dirt, damp, heat and cold.
- ➔ Do not use force when unpacking the device. Do not damage plastic parts.
- ➔ If storing the device, leave it in its packaging until installation.

9.2 Transport inspection

Immediately on receipt of the device, check that it is complete and has not been damaged in transit.

If you see external damage in transit, do not accept the delivery, or accept it only with reservation. Note down the extent of damage on the carrier's transport documentation/delivery note. Make a claim.

Report hidden defects as soon as they are discovered, as claims for damages can only be made within the applicable deadlines.

9.3 Packaging

Only environmentally friendly materials are used for packaging.

Therefore, please follow these rules:

- ➔ Separate different types of packaging material for environmentally friendly disposal.
- ➔ Recycle recyclable materials.
- ➔ Reuse reusable packaging components.

9.4 Storage

Store device in its packaging until installation.

The following instructions apply to device storage:

- ➔ Store in a dry place. Relative humidity: max. 60%.
- ➔ Do not store in the open or in an aggressive atmosphere.
- ➔ Protect from direct sunlight. Storage temperature: 15°C to 25°C.
- ➔ Keep dust off device. Avoid mechanical vibration and damage.
- ➔ Do not place underneath other objects or place other parts on top of it.

10 Disposal

Collect all material residues from the processing, and dispose of them in an environmentally sound manner or – if possible – reprocess or recycle them.

Following disassembly, all parts of the spray valve must be properly disposed of.

- ➔ Metal components can be recycled
- ➔ Non-metal parts must be disposed of according to the material they are made of.
- ➔ Operating materials must be disposed of in accordance with regional environmental regulations.

WARNING!
Observe the instructions of the manufacturer of the spray materials and cleaning agents in particular as the incorrect disposal of material poses a risk to health.

11 EC Declaration of Incorporation

EC Declaration of Incorporation

for partly completed machinery as specified in the EC Machinery Directive 2006/42/EC, Annex II 1.B

Manufacturer

hereby declares that the partly completed machinery

Product designation:	**DISPENSING VALVE Model VDV-25**
Purpose of use:	**spraying of sprayable materials**
Year of construction:	**2019**
Serial number:	**from …**

complies with the essential requirements of the Machinery Directive 2006/42/EC: Annex I, Sections:

1.1.6., 1.3.1., 1.3.2., 1.3.3., 1.3.4., 1.3.7., 1.5.5., 1.5.6., 1.5.7., 1.5.8., 1.5.9.

The partly completed machinery must not be put into operation until the machinery into which it is to be incorporated has been declared in conformity with the provisions of Machinery Directive 2006/42/EC

The following harmonised standards were applied:

DIN EN ISO 1953:2013-12

The special technical documentation for the partly completed machinery was prepared in accordance with Annex VII, Part B. The person authorised to compile the technical documentation, who is established in the Community, shall make this documentation available to the competent national authorities upon request.

The person established in the Community who is authorised to compile the technical documentation is:

Name:	NICK CLARK - RHEOLOGICAL LIMITED
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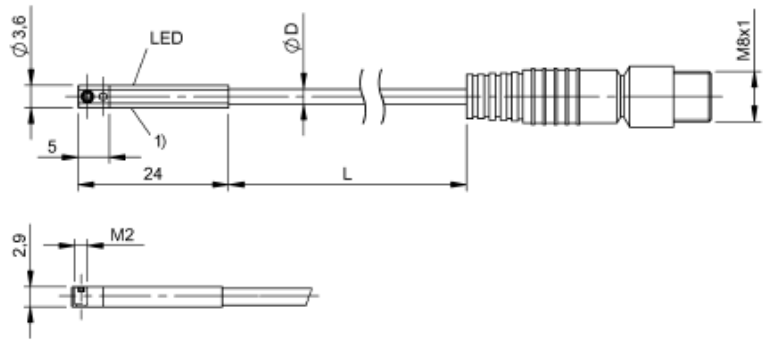
LONDON 04/07/2018	NICK CLARK - MANAGING DIRECTOR	
Place, date	Surname, first name and capacity of signatory	Signature

12 Appendix

Magnetfeld-Sensoren
BMF 233K-PS-C-2A-SA2-S49-01
Bestellcode: BMF00HY



1) aktive Fläche

Allgemeine Merkmale

Anwendung	Pneumatikzylinder mit C-Nut, z.B. Festo, Sommer, etc.
Grundnorm	IEC 60947-5-2
Lieferumfang	Kabelclip für C-Nut Winkelschraubendreher DIN 911 Größe 0.9
Marke	Global
Zulassung/Konformität	cULus CE

Anzeige/Bedienung

Funktionsanzeige	ja

Ausgang/Schnittstelle

Schaltausgang	PNP Schließer (NO)

Elektrische Merkmale

Ausgangswiderstand Ra	open drain
Ausschaltverzug toff max.	0.07 ms
Bemessungsbetriebsspannung Ue DC	24 V
Bemessungsbetriebsstrom Ie	100 mA
Bemessungsisolationsspannung Ui	75 V DC
Bemessungskurzschlussstrom	100 A
Bemessungsschaltfeldstärke Hn	2 kA/m
Betriebsspannung Ub	10...30 VDC
Einschaltverzug ton max.	0.07 ms
Gebrauchskategorie	DC-13
Gesicherte Schaltfeldstärke Ha	2.4 kA/m
Hysterese H max. (% von Hn)	45 %
Lastkapazität max. bei Ue	0.45 µF
Leerlaufstrom Io max., unbedämpft	4.5 mA
Reststrom Ir max.	10 µA
Restwelligkeit max. (% von Ue)	15 %
Schaltfrequenz	3000 Hz
Spannungsfall statisch max.	2 V
Verpolungssicher	ja
Verschmutzungsgrad	3

Elektrischer Anschluss

Anschluss	M8x1-Stecker, 3-polig
Anschlussart	Kabel mit Steckverbinder, 1.00 m, PUR
Kabeldurchmesser D	2.40 mm
Kabellänge	1 m
Kurzschlussschutz	ja
Vertauschmöglichkeit geschützt	ja

Erfassungsbereich/Messbereich

Temperaturdrift max. (% von Hn)	0.3 %

Material

Aktive Fläche, Material	PA 12
Gehäusematerial	PA, PA 12
Mantelmaterial	PUR

Mechanische Merkmale

Abmessung	24 x 2.9 x 3.6 mm
Anzugsdrehmoment	0.07 Nm
Befestigung	von oben einsetzbar in C-Nut
Klemmschrauben-Material	Edelstahl

Magnetfeld-Sensoren
BMF 233K-PS-C-2A-SA2-S49-01
Bestellcode: BMF00HY

BALLUFF

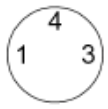
Umgebungsbedingungen

Schutzart IEC 60529	IP67
Umgebungstemperatur	-25...85 °C

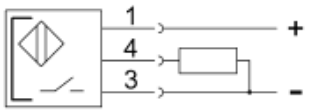
Zusatztext

Montagehinweise	910413

Steckeransicht



Anschlussbild



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