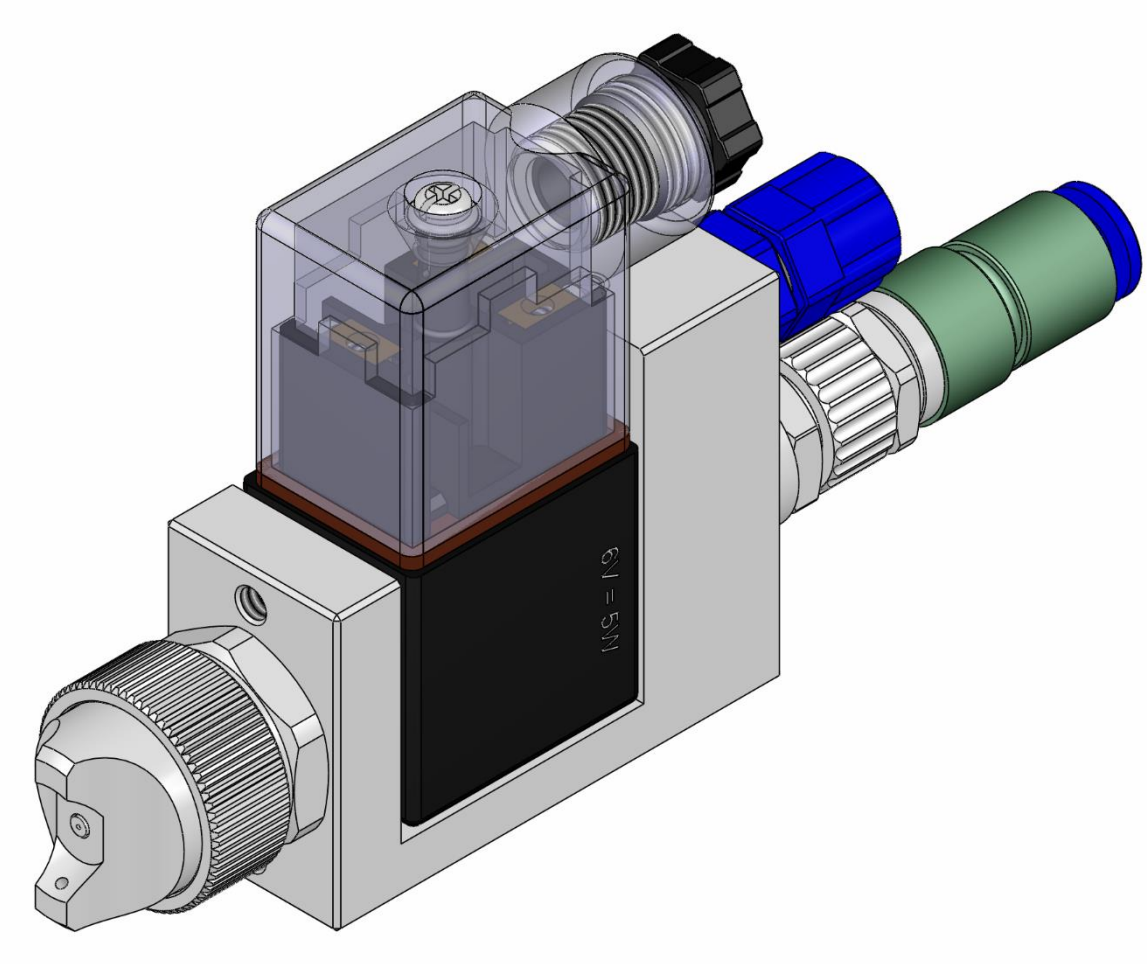
Installation Instructions
for
Electric Spray Valve
ESV-IS



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:	Electric Spray Valve
Model:	ESV-IS
Valve type:	see below (valve types)
Year of construction:	2018

Manufacturer

Name:	RHEOLOGICAL LIMITED
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Details of these Operating Instructions

Doc-ID:	1147
Version/Revision:	00
Date created:	17.11.2015
Last revised:	07.06.2018

The instructions apply to the following valve types

Nozzle:
- Adhesive
- Standard

Air cap:
- Spray angle 60°
- Spray angle 90°
- Round spray pattern
- Adhesive

Solenoid coil:
- 6V-DC-5W
- 24V-DC-9.3W

Sealing materials:
- Viton®
- Isolast®
- EPDM
- PTFE
- NBR

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 for the installation and operation of 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.

WARNING! Electrical hazard!
This symbol draws attention to hazardous situations due to electric current. Failure to observe the safety instructions poses the risk of injury or death. The work to be carried out must only be performed by a trained electrician.

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 **ESV-IS** 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 **ESV-IS** spray valve is a needle valve for dispensing sprayable material either continuously or intermittently.

IMPORTANT!
Only use the **ESV-IS** 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.

WARNING! Electrical hazard!
The electrical energies can cause severe injury. Electricity presents mortal danger if the insulation or individual components are damaged.

Therefore:

- Switch the main switch off and secure it against being switched back on before starting any servicing, cleaning or repair work.
- Before beginning work on the electrical system, always switch off the electricity supply to the device first.
- Do not remove safety equipment or disable it by modification.

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
- ➔ to 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 working clothes!
(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 **ESV-IS** electrical spray valve is an electromagnetically controlled applicator for the processing of materials such as sealants, adhesives, greases, paints, oils and many other materials. The application process is triggered by the solenoid coil and the material feed pressure, and can be either an intermittent or a continuous process.

The spray material remains permanently in the spray valve.

If the solenoid coil receives a signal, the needle armature is pulled to a stop by the occurring magnetic field, which opens the valve and allows the spray material to escape from the nozzle. If the solenoid coil does not receive a signal, the needle closes and thus interrupts the emergence of the spray material

The function of the valve is: to open in response to electromagnetism and to close in response to spring pressure

In the absence of a power supply, the spray valve is closed by the armature spring.

The spray material is supplied to the valve from a pressure vessel or via a pump.

3.2 Parameters (technical data)

Device type	**Electric Spray Valve ESV-IS**
Dimensions (W x H x L) - with round spray pattern air cap - with flat spray pattern air cap	 **23.5 x 66.5 x approx. 130** **23.5 x 66.5 x approx. 134**
Weight	approx. 430 g
Power supply	Depending on coil 6 V / 24 V
Material pressure	0 - 3 bar

We reserve the right to make technical changes! Last revised: 07.06.2018

3.2.1 Parameters for your application(s)

Application	
Material	
Nozzle type	
Nozzle size	
Air cap	
Nozzle-to-surface distance	
Atomising air pressure	
Material pressure (M)	
Other	

Application	
Material	
Nozzle type	
Nozzle size	
Air cap	
Nozzle-to-surface distance	
Atomising air pressure	
Material pressure (M)	
Other	

3.3 Dimensions

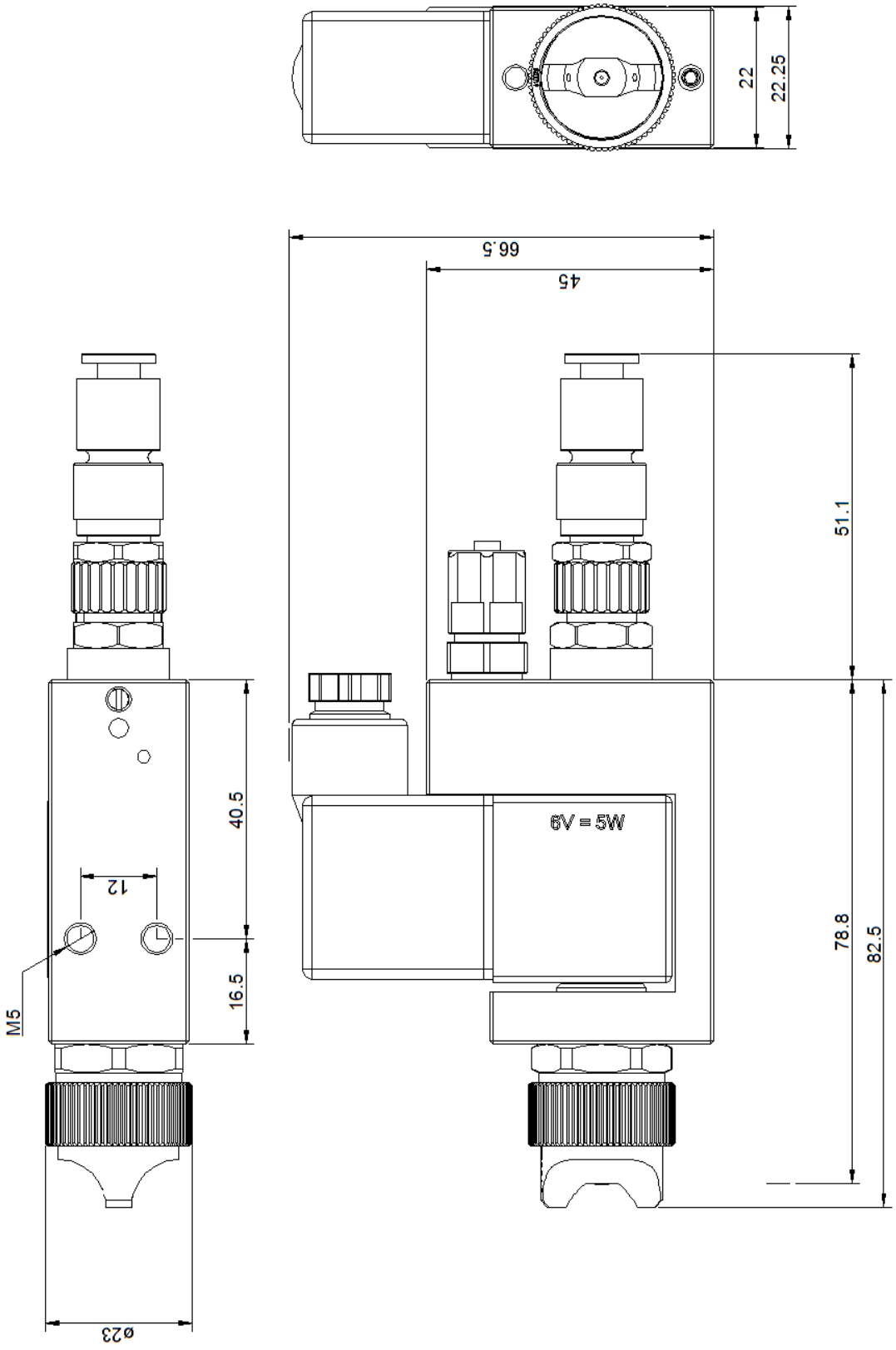


Fig. 3.3/1

3.4 Exploded view

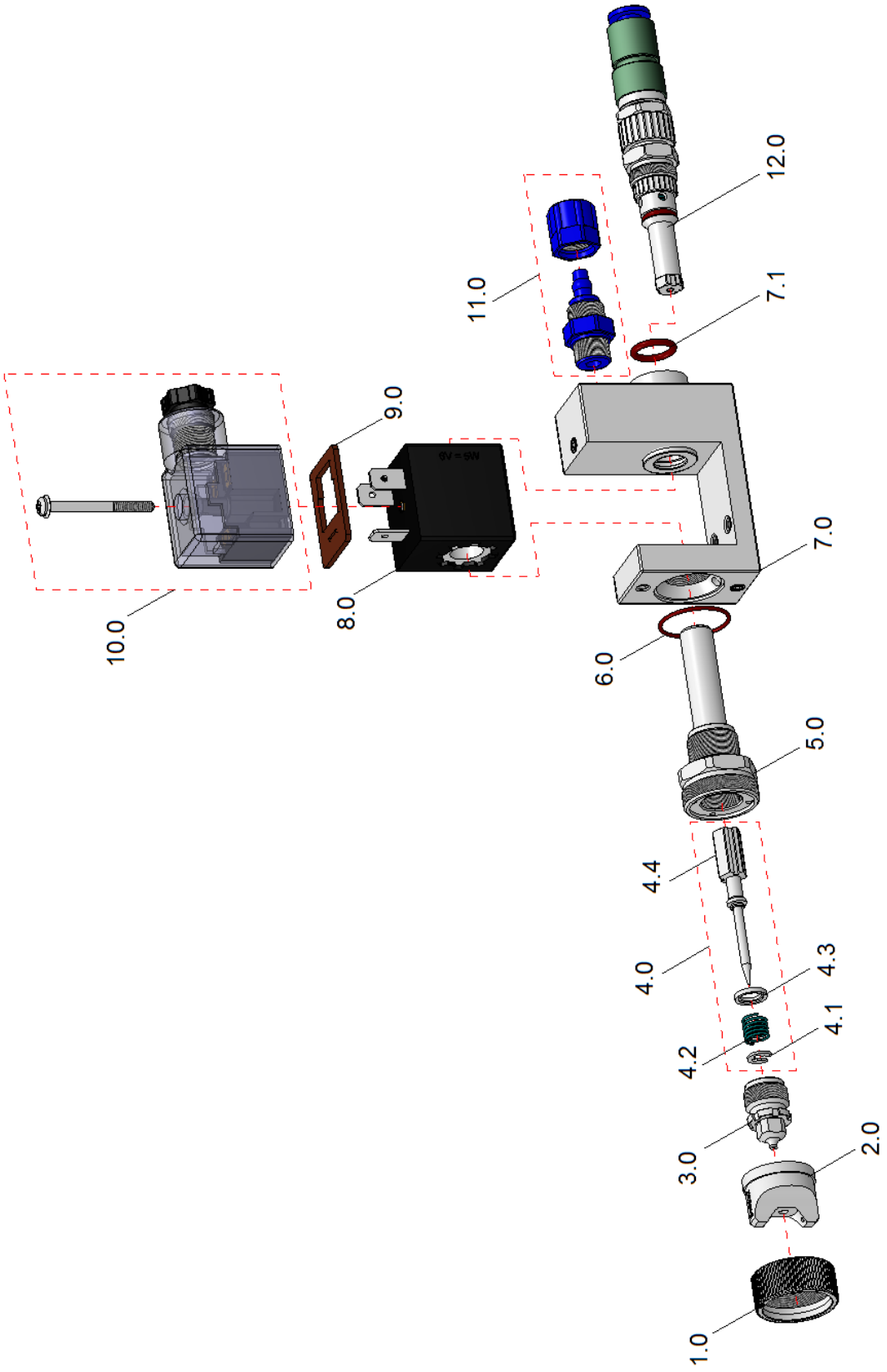


Fig. 3.4/1

3.5 Spare parts list

Drg. no.	Item no.	Qty	Description
1.0	410028	1	Retaining ring, dia. 23 x 10mm
2.0	*	1	Air cap, flat/round spray pattern
3.0	*	1	Nozzle, dia. 12 x 19 mm, AF size 7
4.0	*	1	Anchor with needle, complete, ESV
4.1	620006	1	Lock washer DIN 6799 RA 3,2
4.2	820071	1	Pressure spring, 0.63 x 11.5mm
4.3	930460	1	Spring counter bearing, dia. 8.9 x 1.3 mm
4.4	*	1	Anchor with needle, ESV
5.0	320854	1	Spray anchor housing, 52.5 mm x AF size 20
6.0	640405	1	O-ring 18 x 1 / Viton®
7.0	511551	1	Bracket, ESV, complete
7.1	640040	1	O-ring 9.25 x 1.78 / Viton®, free from paint-wetting impairment substances (PWIS-free)
8.0	150030	1	Device socket, 20 x 29 mm, 24 V with LED
9.0	640915	1	Flat seal GM 207-3, NBR, for GM.209
10.0	*	1	Solenoid coil
11.0	220022	1	Straight screw-in connection 1/8" – 6/4 KU (plastic)
12.0	800166	1	Spray regulation unit ESV
12.1	221173	1	Locking screw for anchor housing, AF size 7 x 7.2 mm
12.2	640031	1	O-ring 6.07 x 1.78 / EPDM
12.3	320862	1	Air armature housing, dia. 12 x 29 mm
12.4	112727	1	Air armature, dia. 5.9 x 22 mm
12.5	640009	1	O-ring 1.5 x 1 / Viton®
12.6	930576	1	Spring counter bearing, dia. 6.8 x 1 mm
12.7	820004	1	Pressure spring, 0.5 x 9.4mm
12.8	320859	1	Hollow screw, AF size 14 x 9 mm
12.9	610610	1	Knurled screw, 22.5 mm, dia 15 mm
12.10	220371	1	Rotary screwed connection 1/8" for 6/4 hose

Other sealing materials may be found in chapter **8.0 "Spare parts and accessories"**!

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

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 **ESV-IS** 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 spray 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

Atomising air and material are supplied to the spray equipment via two separate connections. The connection ports are differentiated as follows (see Fig. 4.2/1):

- **Atomising air** (blue)
  Connection ZL: to 2/2-way solenoid valve
- **Material** (transparent or white)
  Connection M: to pressure tank or pump

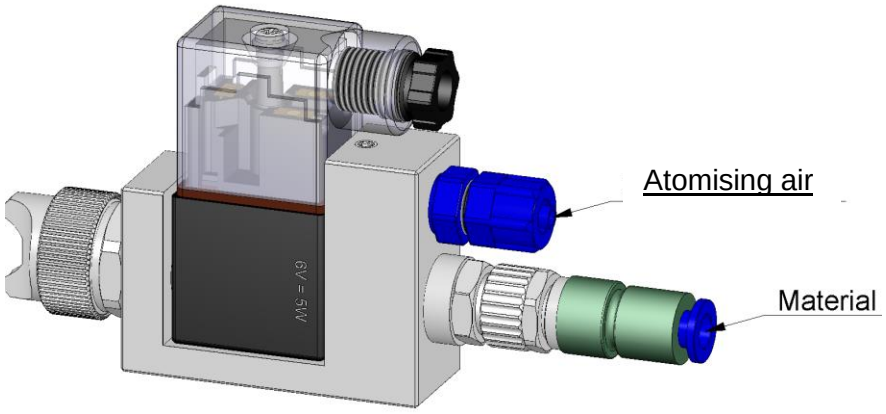


Fig. 4.2/1

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 air, atomising air and material connection

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

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

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 small 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 the atomising 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 spray valve may be used in continuous or intermittent operation. In intermittent operation the control air pressure must be matched to the switching frequency and the material feed pressure. In ideal operating conditions (material pressure, control air pressure, needle stroke, short lines) up to 150 cycles per second are possible.
- ➔ The atomising air has to be regulated so that it is switched on before the needle retracts, and is switched off only after the nozzle closes (reduces the need for maintenance).
- ➔ If the material is kept pressurised with no contact with the outside air, it can remain in the valve during long periods without operation.
- ➔ Only clean, filtered material and atomising air may be used.
- ➔ ***Only for the adhesive version:***

  The atomising air pressure and material pressure are closely related to each other. The atomising air pressure should not be significantly greater than the material pressure, since otherwise back pressure can develop, pushing the material back into the nozzle.

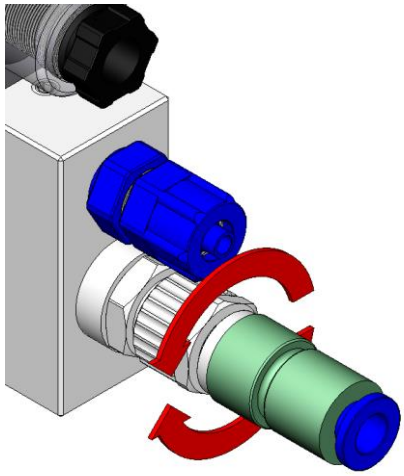


Fig. 5.2/1

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

NOTE!
The illustrations in these instructions may differ slightly from the actual version of the device. Incorrect handling can damage the nozzle and nozzle needle. Only reduce the material flow (by turning the regulating screw to the right) while the material is being dispensed. Once the nozzle closes, do not turn the regulating screw any further to the right.

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 the atomising 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 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 is clean and, ideally, supplied to the spray 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 and nozzle needle

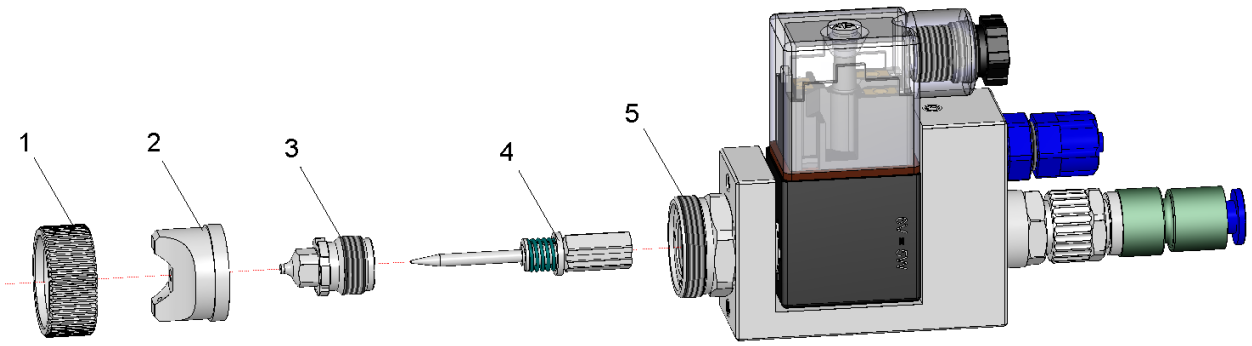


Fig. 6.2/1

1. Depressurise all connections and stop the supply of energy and material!
2. Undo the retaining ring (**1**) and remove the air cap (**2**).
3. Unscrew and remove the nozzle (**3**).
4. Carefully pull the nozzle needle (**4**) out of the spray anchor housing (**5**).
5. Push the new nozzle needle (**4**) into the spray anchor housing (**5**).
6. Screw in the new nozzle (**3**).
7. Screw the air cap (**2**) with the retaining ring (**1**) back on.
8. Carry out a functional test on the device.

! IMPORTANT!
Always install a new nozzle (**3**) and nozzle needle (**4**) at the same time.

NOTE!
When installing nozzles and nozzle 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 stroke adjustment

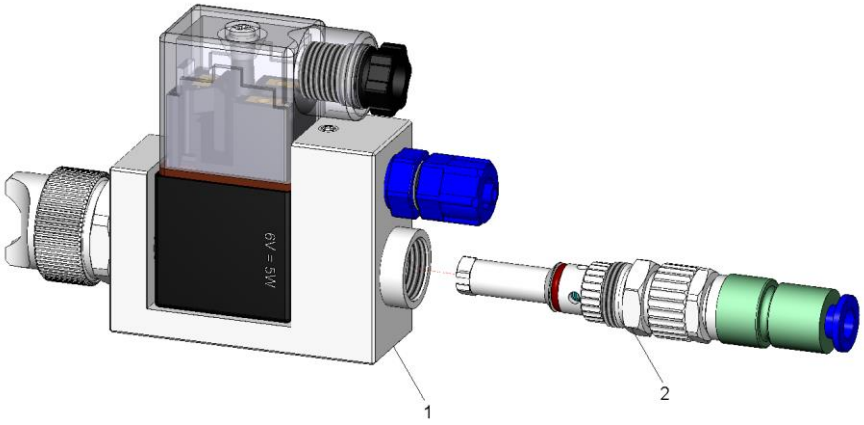


Fig. 6.3/1

1. Depressurise all connections and stop the supply of energy and material!
2. Unscrew the stroke adjustment unit (**2**) from the main body (**1**).
3. Screw the stroke adjustment (**2**) into the main body (**1**).
4. Carry out a functional test on the device.

6.4 Changing/replacing the solenoid coil

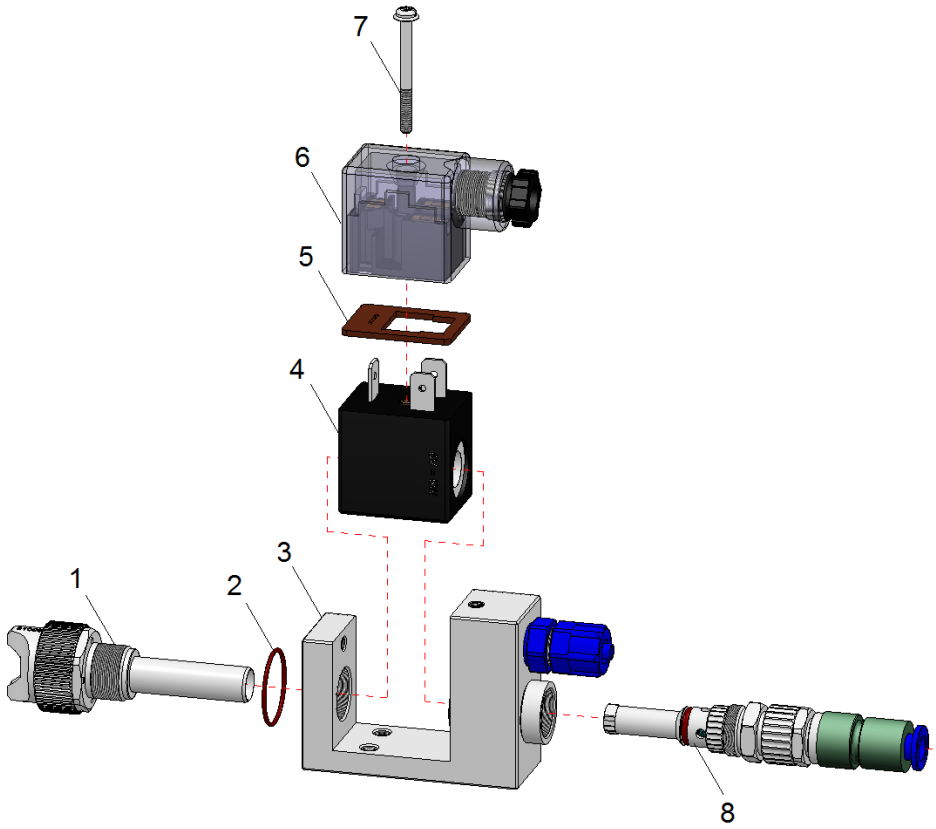


Fig. 6.4/1

1. Depressurise all connections and stop the supply of energy and material!
2. Loosen and unscrew the fastening screw (**7**) of the solenoid coil connector.
3. Remove the solenoid coil connector (**6**) and the seal (**5**).
4. Disassemble and remove the entire spray armature (**1**). Make sure that the O-ring (**2**) does not get lost.
5. Disassemble and remove the stroke adjustment (**8**).
6. Remove the solenoid coil (**4**) and replace it with a new one.
7. Subsequently, reassemble everything by repeating the same steps in the reverse order.
8. Carry out a functional test on the device.

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.

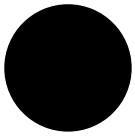
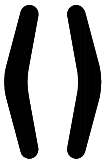
WARNING! Risk of injury!
Improper, incorrect work on the device, machine or plant poses serious risks of personal injury and/or damage. Therefore, only trained qualified personnel may correct faults.

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 spray anchor housing.	Clean the spray valve.
	Solenoid coil not responding.	Check and replace solenoid coil if necessary. (Also see point. solenoid coil does not switch.)
	Needle stroke too short	Increase needle stroke by turning the raster screw (see Ch. 5.2)
	Needle stroke too big	Decrease needle stroke by turning the raster screw (see Ch. 5.2)
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
Solenoid coil not responding	No voltage	Check plug connection and control
	Incorrect voltage range	Adapt voltage range

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 (nozzle needle, air cap and nozzle), please state required size. Nozzle sets should always be replaced together!

Available nozzles, air caps and needle sizes (dia.):

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

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

8.2 Air caps

8.2.1 Standard version

8.2.1.1 Flat spray pattern 60°

Air cap, flat spray pattern, 20 x 14.5 mm	
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

8.2.1.2 Flat spray pattern 90°

Air cap, flat spray pattern, 20 x 14.5 mm	
Item no.	**Description**
310036	Air cap, flat spray pattern, 0.2-1.0 mm, 20 x 14.5 mm
310039	Air cap, flat spray pattern, 1.2-1.5 mm, 20 x 14.5 mm

8.2.1.3 Round spray pattern

Air cap, round spray pattern, 20 x 11mm	
Item no.	**Description**
310034	Air cap, round spray pattern, 0.2-1.0 mm, 20 x 11 mm
310035	Air cap, round spray pattern, 1.2-1.5 mm, 20 x 11 mm

8.2.2 Adhesive version

8.2.2.1 Flat spray pattern 60°, KLS

Air cap, flat spray pattern, KLS, 20 x 14.5 mm	
Item no.	**Description**
310081	Air cap, flat spray pattern, adhesive, 0.2-1.0 mm, 20 x 14.5 mm
310082	Air cap, flat spray pattern, adhesive, 1.2-1.5 mm, 20 x 14.5 mm

8.2.2.2 Flat spray pattern 90°, KLS

Air cap, flat spray pattern, KLS, 20 x 14.5 mm	
Item no.	**Description**
310108	Air cap, flat spray pattern, 0.2-1.0 mm, 20 x 14.5 mm
310211	Air cap, flat spray pattern, 1.2-1.5 mm, 20 x 14.5 mm

8.2.2.3 Round spray pattern, KLS

Air cap, round spray pattern, KLS, 20 x 11 mm	
Item no.	**Description**
310084	Air cap, round spray pattern, adhesive, 0.2-1.0 mm, 20 x 11 mm
310085	Air cap, round spray pattern, adhesive, 1.2-1.5 mm, 20 x 11 mm

8.3 Nozzles

8.3.1 Standard nozzle

Nozzle, dia. 12 x 19 mm, AF size 7	
Item no.	**Description**
212165	Nozzle, 0.3 mm, dia. 12 x 19 mm, AF size 7
212167	Nozzle, 0.5 mm, dia. 12 x 19 mm, AF size 7
212168	Nozzle, 0.8 mm, dia. 12 x 19 mm, AF size 7
212169	Nozzle, 1.0 mm, dia. 12 x 19 mm, AF size 7
212171	Nozzle, 1.2 mm, dia. 12 x 19 mm, AF size 7
212172	Nozzle, 1.5 mm, dia. 12 x 19 mm, AF size 7

8.3.2 KLS nozzle

Nozzle, dia. 12 x 19 mm, AF size 7	
Item no.	**Description**
212375	Nozzle, KLS, 0.3 mm, dia. 12 x 19 mm, AF size 7
212376	Nozzle, KLS, 0.5 mm, dia. 12 x 19 mm, AF size 7
212377	Nozzle, KLS, 0.8 mm, dia. 12 x 19 mm, AF size 7
212378	Nozzle, KLS, 1.0 mm, dia. 12 x 19 mm, AF size 7
212380	Nozzle, KLS, 1.2 mm, dia. 12 x 19 mm, AF size 7
212381	Nozzle, KLS, 1.5 mm, dia. 12 x 19 mm, AF size 7

8.4 Nozzle needles

8.4.1 Standard version

Anchor with needle, ESV	
Item no.	**Description**
112963 113664	Anchor with needle, dia. 0.2 / 0.3 mm, complete, ESV Anchor with needle, dia. 0.2 /0.3 mm, ESV
112964 113665	Anchor with needle, dia. 0.5 mm, complete, ESV Anchor with needle, dia. 0.5 mm, ESV
112965 113666	Anchor with needle, dia. 0.8 mm, complete, ESV Anchor with needle, dia. 0.8 mm, ESV
112966 113667	Anchor with needle, dia. 1.0 mm, complete, ESV Anchor with needle, dia. 1.0 mm, ESV
112967 113668	Anchor with needle, dia. 1.2 mm, complete, ESV Anchor with needle, dia. 1.2 mm, ESV
112968 113669	Anchor with needle, dia. 1.5 mm, complete, ESV Anchor with needle, dia. 1.5 mm, ESV

8.4.2 Adhesive version

Anchor with needle, KLS, ESV	
Item no.	**Description**
112978 113670	Anchor with needle, KLS, dia. 0.2 / 0.3 mm, complete, ESV Anchor with needle, KLS, dia. 0.2 /0.3 mm, ESV
112979 113671	Anchor with needle, KLS, dia. 0.5 mm, complete, ESV Anchor with needle, KLS, dia. 0.5 mm, ESV
112980 113672	Anchor with needle, KLS, dia. 0.8 mm, complete, ESV Anchor with needle, KLS, dia. 0.8 mm, ESV
112981 113673	Anchor with needle, KLS, dia. 1.0 mm, complete, ESV Anchor with needle, KLS, dia. 1.0 mm, ESV
112982 113674	Anchor with needle, KLS, dia. 1.2 mm, complete, ESV Anchor with needle, KLS, dia. 1.2 mm, ESV
112983 113675	Anchor with needle, KLS, dia. 1.5 mm, complete, ESV Anchor with needle, KLS, dia. 1.5 mm, ESV

8.5 Solenoid coil

Item no.	Description
150033	Solenoid coil 6 V-DC-5 W
150034	Solenoid coil 24 V-DC-9.3 W

NOTE!
The data sheet of the solenoid coils can be found in the appendix.

8.6 Sealing materials

Drg. no.	Item no.	Description
6.0	640405	O-ring 18 x 1 / Viton®
	640177	O-ring 18 x 1.5 / EPDM / FDA
	640275	O-ring 18 x 1.5 / ISOLAST®
	640539	O-ring 18 x 1.5 / PTFE
7.1	640040	O-ring 9.25 x 1.78 / Viton®, PWIS-free
	640156	O-ring 9.25 x 1.78 / EPDM
	640176	O-ring 9.25 x 1.78 / ISOLAST®
12.0	640021	O-ring 6.07 x 1.78 / Viton®
	640031	O-ring 6.07 x 1.78 / EPDM
	640158	O-ring 6.07 x 1.78 / ISOLAST®
12.5	640009	O-ring 1.5 x 1 / Viton®
	640234	O-ring 1.5 x 1 / EPDM
	640254	O-ring 1.5 x 1 / NBR
	640374	O-ring 1.5 x 1 / ISOLAST®

8.7 Clamp

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)

8.8 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.

All parts, auxiliary and operating materials for the spray valve:

- ➔ Separate by type:
  - recycle metallic components
  - dispose of non-metallic parts properly and professionally
- ➔ Dispose of according to local regulations and directives.

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

RHEOLOGICAL LIMITED

hereby declares that the partly completed machinery

Product designation:	**Electric Spray Valve ESV-IS**
Purpose of use:	**spraying of sprayable materials**
Year of construction:	**2018**
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:	RHEOLOGICAL LIMITED
Road/no.:	UNIT 5, DRUMMONDS PLACE,
Postcode/city:	TWICKENHAM, TW11JN
Phone:	+44(0) 208 891 0040

LONDON 04/07/2018
Place, date

NICK CLARK - MANAGING DIRECTOR
Surname, first name and capacity of signatory

Signature

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