

User manual Screw Valve DV-5005DFS /-L

Quality
made in
Germany



Dear Customer

Thank you for purchasing the screw valve DV-5005DFS.
For easy operating we developed this user manual.

Your Vieweg Team

Table of contents

1 Designated use	2
2 Scope of delivery	3
3 Technical data	4
4 Part list	4
5 Operating principle	6
6 Installation	7
6.1 Mechanical mounting	7
6.2 Electrical connection	7
6.3 Compressed air supply	9
7 Commissioning	10
7.1 Fill spindle with material	10
7.2 Installation of a new disposable spindle	10
8 Troubleshooting	10

1 Designated use

The spindle valve DV-5005DSF is a revolutionary further development of conventional spindle valves in order to solve the problems occurring there. Two-component material is always a special challenge. Above all because it can completely destroy the valve by hardening. Just as abrasive materials lead to high wear in the shortest possible time.

With the exchangeable material spindle, all these problems could be solved.

The precisely manufactured plastic spindle can be replaced quickly and easily. Cleaning the valve is considerably simplified and is now no longer a time-consuming process. No more expensive spare valves have to be in stock to keep lines running. Replacement spindles are completely sufficient for this.

2 Scope of delivery

The following parts are included in the scope of delivery:



Valve body
(Item.-No. DV-5005DFS or DV-5005DFS-L)



Barrel holder for screw valve
(Item.-No. V-0070)



Reducing rings
10 cc (Item.-No. 560943V)
5 cc (Item.-No. 561184V)
3 cc (Item.-No. 561183V)



30 cc conditioner in a syringe barrel
(Item.-No. 990223-30)



Dispensing tip set small
(Item.-No. 990062-K)



Connecting cable 4 m
(Item.-No. 990083)



Spindles with different pitch
6-pitch (Item.-No. DFS6-A)
8-pitch (Item.-No. DFS8-A)
16-pitch (Item.-No. DFS16-A)

3 Technical data

Motor voltage / power rating	24 V DC, 6 Watt
No load current (motor only)	60-70 mA
Starting current	max. 1,5 A
Terminal resistance	21,6 Ohm
Size	153 x 40 x 34 mm
Weight	235 gr
Output shaft speed	400 U/min
Maximum air pressure requirement	20 psi
Wetted material path	Acetal / PE
Material interface	Luer-Lock adapter
Minimum material viscosity	50,000 cPs

4 Part list

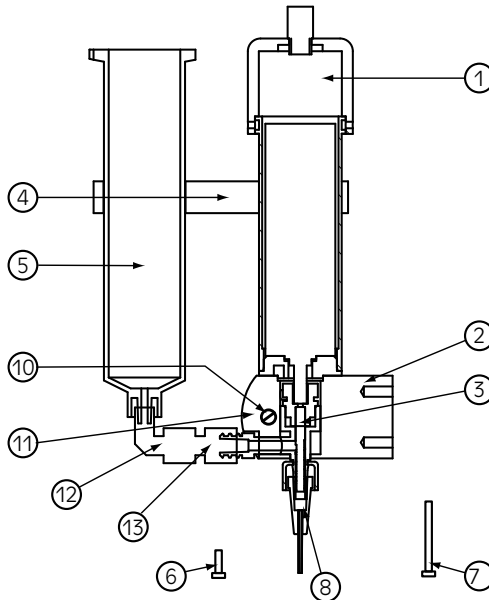


Fig. 1

No. in Fig. 1	Description	Item-No.
1	Motor assembly	V-0051
2*	Valve housing DV-5005DFS, door right	V-0090
2*	Valve housing DV-5005DFS-L, door left	V-0090-L
3	Disposable path assembly (6-, 8- or 16-pitch)	DFS6-A /-8-A/-16-A
4	Syringe bracket assembly	V-0070
5	Sample syringe	
6	Screw short, M3x8	V-0053
7	Screw long, M3x25	V-0054
8	Dispensing tip (e.g. from the disp. tip set)	990062-K
10	Panel screw	V-0092
11*	Door right	V-0093
11*	Door left	V-0093-L
12	Elbow 90 deg.	Luer-Lock-78
13	Luer-Lock male	Luer-Lock-77

* depending on version

not shown

Tip cap	V-0094
Connection socket Lemo	V-0059
Square for motor shaft DV-5000DFS	V-0060
Motor sleeve incl. flange for DV-5000DFS	V-0061
Connection cable 4 m, plug - open ends	990083
Connection cable 4 m, 6 pin DIN plug	990083-DIN
Connection cable 4 m, 6 pin DIN plug 90 deg.	990083-DIN-90
Connection cable 4 m, plug 90 deg. - open ends	990083-90
Connection cable 4 m, plug on both sides	990083-VC1100
Plug Lemo, without cable	V-0064
Axle for locking door	V-0091

5 Operating principle

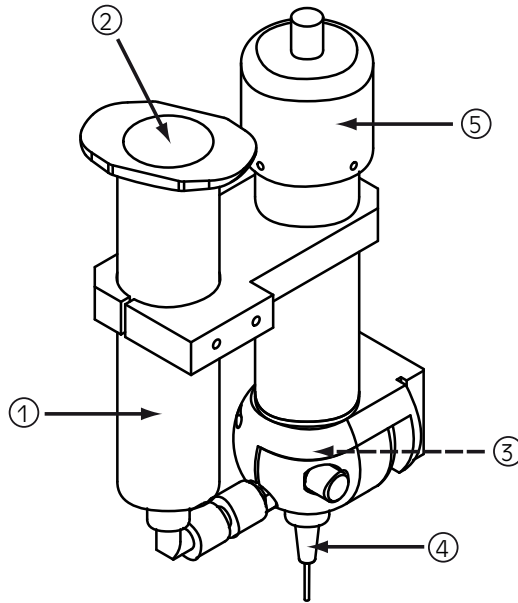


Fig. 2

The DV-5000DFS dispenses fluid with a positive displacement action using a rotary feed screw principle. Fluid material is held in a feed reservoir (1), see Figure 2, under a positive head of air, between 1 to 20 psi (depending upon the viscosity of the material). This positive air pressure, supplied by the air line (2), forces the fluid material out of the barrel into the feed screw chamber (3) material flow from this point, to the dispense tip (4), is controlled by the feed screw rotation in the feed direction. The feed screw is driven by the motor. Applying a DC voltage signal to the motor (5), will rotate the feed screw and the fluid will be forced out of the dispensing tip.

Shearing of the material is achieved by reverse Z-motion (tip retraction). When the motor stops, the unit remains in position for a fraction of a second (dwell) to allow the last of the material to flow out of the dispensing tip. After the dwell period, the automation equipment moves the DV-5000DFS Valve to the next position.

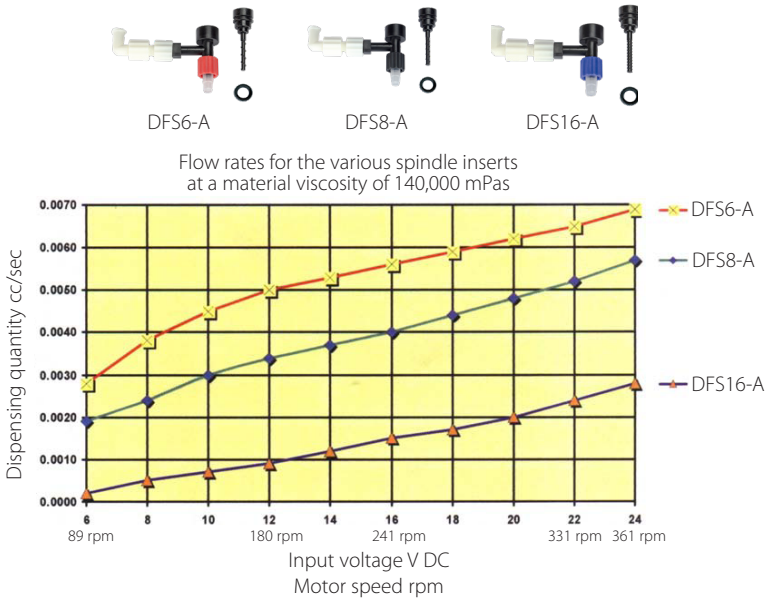


Fig. 3 Spindle variants

6 Installation

Installation requires a mechanical mounting, an electrical connection, and a pressurized air connection.

6.1 Mechanical mounting

Normally, the valve is used on an automated XYZ table with full motion control in the three planes. It is very important that the valve be mounted on the Z-axis mechanical arm in a secure manner that will not allow loosening during continuous operation. The Z-axis must move in a precise vertical motion for successful dispensing.

The mounting bracket, or customer supplied bracket, should be attached to the Z-axis in a manner that will provide the valve perpendicular travel to the horizontal plane of the surface on which the fluid material will be dispensed. The mounting should provide a means of accurately adjusting the gap between the dispense tip and the substrate surface.

6.2 Electrical connection

All valves use a 24 V DC gearmotor. Most XYZ tables provide a 24 V DC solenoid driver output signal. If the tables power supply is sufficient, this signal can be used to operate the valve motor.

The signal should be from a regulated power supply and should be shunted for positive motor stop. A diagram of a simple braking circuit is shown in Figure 4.

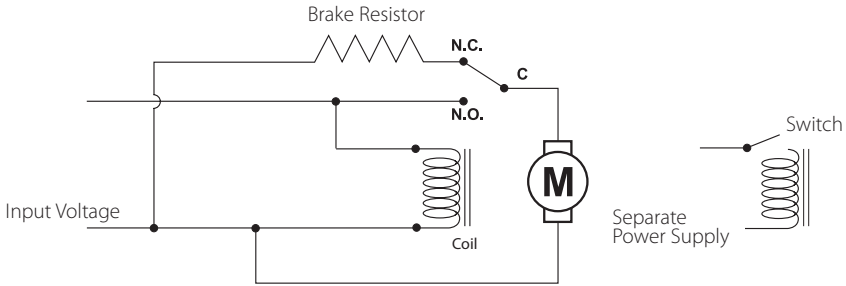


Fig. 4
 Note: relay and motor same voltage
 Note: relay coil can be connected so separate control

The 6.0 watt motor will draw up to 60-70 mA unload. The power supply used should provide up to 1.5 Amps for the 6.0 watt motor.

Check the DC polarity of the signal hook up to the motor to make certain motor is rotating in the correct direction (when viewed from the dispense end of the valve, the feed crew should rotate counterclockwise). Another control option involves using the TS5100 valve controller. The TS5100 provides a regulated, current limited DC signal to a 6.0 watt version of the valve. The footswitch activating circuit, shown in Figure 5, is simply a „switch closing“ circuit. **DO NOT APPLY VOLTAGE** to the foot switch circuit.

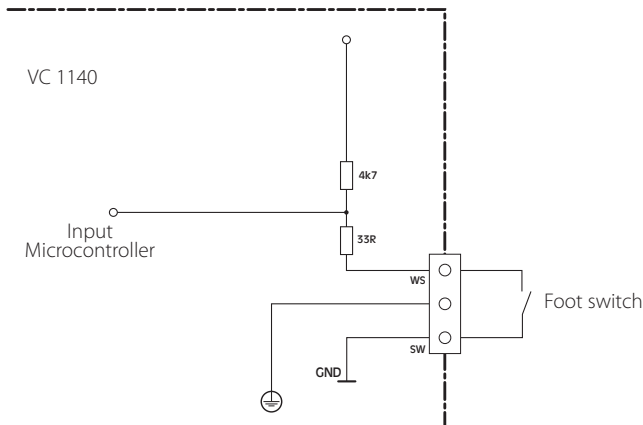


Fig. 5

A normally open contact is required to trigger the VC1100 control unit. If your XYZ system does not provide a normally open contact, but only a 24 V signal, an adapter box can be used (order no. 990234-4100).

The box converts the 24 V signal into a signal that can be sent directly to the VC 1100 control unit.

If the connection between the XYZ system and VC 1100 is established, set the Control unit VC 1100 „manual“ and connect the spindle valve DV-5005DFS to the control unit VC 1100.

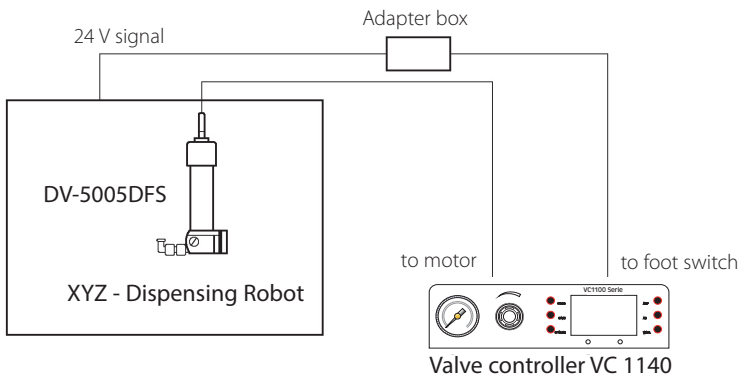


Fig. 6

6.3 Compressed air supply

Cartridges in sizes 55 cc, 30 cc, 10 cc and 5 cc can be directly connected to the material inlet. If larger cartridges are to be connected, this can be done via material lines such as the 580047A series with Luer-Lock connection.

The filtered air supply must be regulated and should initially be set between 1 to 15 psi.

Important!

The air supply is not used as the dispensing force. It is only required to move material to the feed screw chamber. The minimum pressure required to move the material is the optimum air pressure!

7 Commissioning

After all preparations have been completed and all lines connected, the valve must still be filled with material. Either a cartridge or a pressure tank with material line has been connected to the material inlet.

7.1 Fill spindle with material

1. Turn on the air pressure to the barrel to 12 psi for solder paste or lower if using an adhesive or an epoxy. Do not attach a dispense needle.
2. Now turn on the motor and let it run until material consistently flows out the valve outlet.
3. Stop the motor and connect a dispensing needle.
4. Switch the motor on again until material is continuously coming out of the dispensing needle.

7.2 Changing the spindle

Removal:

1. Turn off material feed pressure
2. Remove the material barrel.
3. Loosen the locking screw and open the door.
4. Turn the spindle body approx. 30° to the right and pull it downwards from the motor shaft.

Installation of a new spindle:

1. Insert new Disposable Path into the Valve Housing. Make sure the Square Drive of the Motor Shaft captures the Feed Screw Collar.
2. Push the Material Inlet Port of the Disposable Path inside the Housing Groove.
3. Close the Housing Door and tighten the Panel Screw.
4. Refer to Paragraph 7.1 (fill spindle with material) to purge.

8 Troubleshooting

The following list of problems and solutions will improve your dispensing operation. Most problems can be traced to the dispense material, especially when encountering problems with solder paste dispensing.

*Excessive up and down or „Z“ motion acceleration and velocity can cause filled materials to separate. Decreasing the Z-axis acceleration and velocity or decreasing the barrel size will help to prevent this.

Shots inconsistent in size

- Air entrapped in system (de-air material)
- Increase motor run time
- Adjust dispense gap
- Increase dwell
- Increase reservoir pressure (20 PSI MAX)
- Use braking (shorting)
- Reverse motor action
- System bind or damaged (Call service rep)

Shots too large

- Decrease motor run time
- Use smaller dispense tip
- Increase gap to avoid “squashing” the dot
- Decrease air pressure to reservoir

Tip plugging or clogging

- Tip contacting substrate - Increase gap
- Tip bent or damaged - Replace tip
- Excessive paste for size of needle - Decrease motor run time
- Overfeeding the feed screw - Decrease air pressure on barrel
- Paste has separated - Replace with fresh barrel of paste
- Paste has exceeded shelf life - Replace with fresh barrel of paste
- Paste has poor particle size distribution - Seek an alternate supplier
- System damaged - Call service rep

Valve does not dispense

- No electricity to valve motor - Make sure all connections are secure
- Dispense tip plugged – see tip plugging
- Motor running in reverse – reverse connections
- Out of material - Replace with fresh barrel of paste
- Valve not primed properly - see „Priming Valve“



VIEWEG GmbH
Dosier- und Mischtechnik
Gewerbepark 13
85402 Kranzberg
Deutschland
Tel. +49 8166 6784 -0
Fax +49 8166 6784 -20
info@dosieren.de
www.dosieren.de