

# Solenoid valve for air VAA

## OPERATING INSTRUCTIONS

· Edition 11.22 · EN · 03251614



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## 1 SAFETY

### 1.1 Please read and keep in a safe place



Please read through these instructions carefully before installing or operating. Following the installation, pass the instructions on to the operator. This unit must be installed and commissioned in accordance with the regulations and standards in force. These instructions can also be found at [www.docuthek.com](http://www.docuthek.com).

### 1.2 Explanation of symbols

**1, 2, 3, a, b, c** = Action

→ = Instruction

### 1.3 Liability

We will not be held liable for damage resulting from non-observance of the instructions and non-compliant use.

### 1.4 Safety instructions

Information that is relevant for safety is indicated in the instructions as follows:

#### **⚠ DANGER**

Indicates potentially fatal situations.

#### **⚠ WARNING**

Indicates possible danger to life and limb.

#### **⚠ CAUTION**

Indicates possible material damage.

All interventions may only be carried out by qualified gas technicians. Electrical interventions may only be carried out by qualified electricians.

### 1.5 Conversion, spare parts

All technical changes are prohibited. Only use OEM spare parts.

## 2 CHECKING THE USAGE

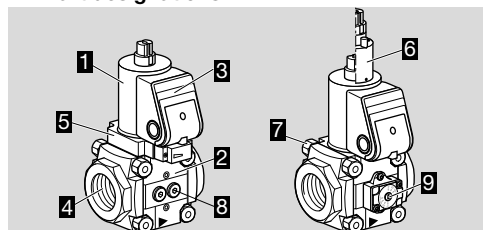
The valVario solenoid valve for air VAA is used for the staged control of industrial burners in cold air operating mode.

This function is only guaranteed when used within the specified limits – see page 10 (12 Technical data). Any other use is considered as non-compliant.

### 2.1 Type code

<b>VAA</b>	Solenoid valve for air
<b>1-3</b>	Sizes
<b>-</b>	Without flange
<b>15-65</b>	Inlet and outlet flange nominal size
<b>R</b>	Rp internal thread
<b>F</b>	Flange to ISO 7005
<b>N</b>	NPT internal thread
<b>/N</b>	Quick opening, quick closing
<b>/L</b>	Slow opening, quick closing
<b>/R</b>	Slow opening, slow closing
<b>W</b>	Mains voltage 230 V AC, 50/60 Hz
<b>Q</b>	Mains voltage 120 V AC, 50/60 Hz
<b>K</b>	Mains voltage 24 V DC
<b>P</b>	Mains voltage 100 V AC, 50/60 Hz
<b>Y</b>	Mains voltage 200 V AC, 50/60 Hz
<b>S</b>	With PS and visual position indicator
<b>G</b>	With PS for 24 V and visual position indicator
<b>R</b>	Viewing side: right
<b>L</b>	Viewing side: left

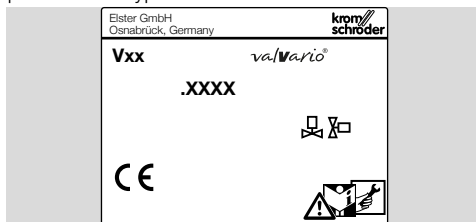
### 2.2 Part designations



- 1 Solenoid actuator
- 2 Flow body
- 3 Connection box
- 4 Connection flange
- 5 Position switch
- 6 Damping unit
- 7 Connection parts
- 8 Sealing plug
- 9 Variable bypass

### 2.3 Type label

Mains voltage, electrical power consumption, ambient temperature, enclosure, inlet pressure and installation position: see type label.



## 3 INSTALLATION

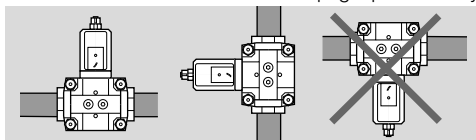
### ⚠ CAUTION

Incorrect installation

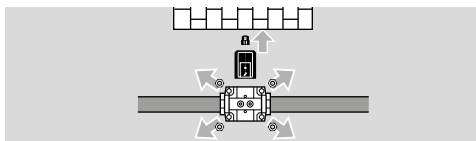
Please observe the following to ensure that the unit is not damaged during installation and operation:

- Sealing material and dirt, e.g. thread cuttings, must not be allowed to get into the valve housing.
- A filter must be installed upstream of every system.
- Dropping the device can cause permanent damage. In this event, replace the entire device and associated modules before use.
- Do not clamp the unit in a vice. Only secure the flange by holding the octagon with a suitable spanner. Risk of external leakage.
- Solenoid valves with position switch VAA..S or VAA..G: actuator cannot be rotated.

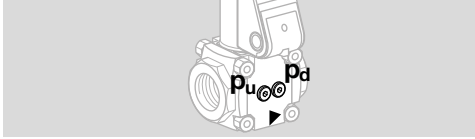
- Install the unit in the pipe free of mechanical stress.
- Installation position: black solenoid actuator in the vertical upright position or tilted up to the horizontal, not upside down. In humid environments: black solenoid actuator in the vertical upright position only.



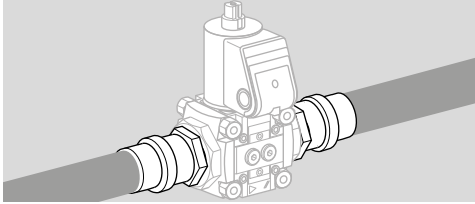
- The housing must not be in contact with masonry, minimum clearance 20 mm (0.79").
- Ensure that there is sufficient space for installation, adjustment and maintenance work. Minimum clearance of 25 cm (9.8") above the black solenoid actuator.



→ The inlet pressure  $p_u$  and the outlet pressure  $p_d$  can be measured using the pressure test points on both sides, see accessories.



→ The seals in some gas compression fittings are approved for temperatures of up to 70°C (158°F). This temperature limit will not be exceeded if the flow through the pipe is at least 1 m³/h (35.31 SCFH) of gas and the maximum ambient temperature is 50°C (122°F).

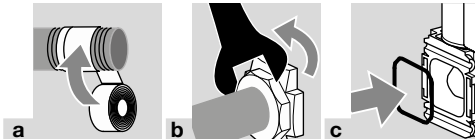


- 1 Remove the adhesive label or screw cap from the inlet and outlet.
- 2 Obey the direction of flow as marked on the housing.

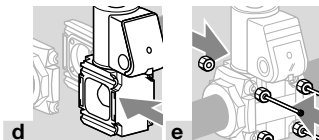
### 3.1 VAA with flanges



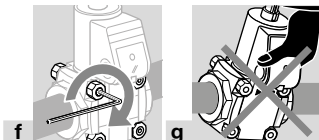
### 3.2 VAA without flanges



→ O-ring (Fig. c) must be fitted.



→ Note the recommended tightening torques for the connection parts. See page 10 (12 Technical data)



## 4 WIRING

### ⚠ WARNING

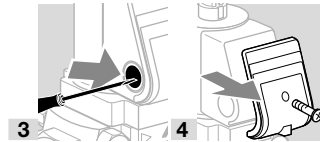
Risk of injury!

Please observe the following to ensure that no damage occurs:

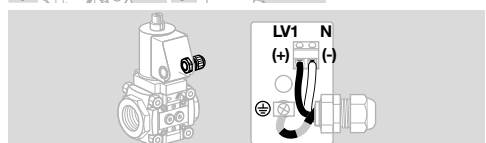
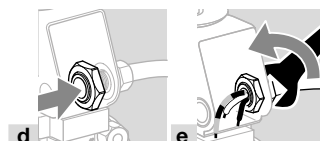
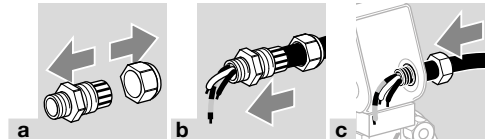
- Electric shocks can be fatal! Before working on possible live components, ensure the unit is disconnected from the power supply.
- The solenoid actuator heats up during operation. Surface temperature approx. 85°C (approx. 185°F).



- Use temperature-resistant cable (> 80°C).
- 1 Disconnect the system from the electrical power supply.
- 2 Shut off the air supply.
- Wiring to EN 60204-1.
- Push through and remove the knock-out in the connection box before removing the cover. If the M20 cable gland or plug is already fitted, it is not necessary to remove the knock-out.

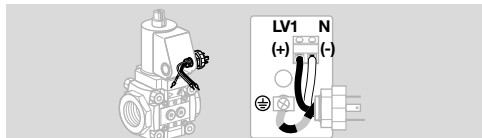
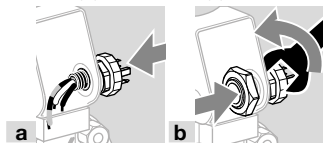


### M20 cable gland



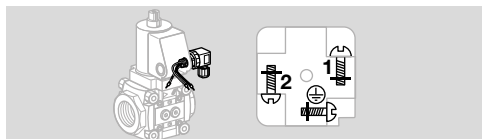
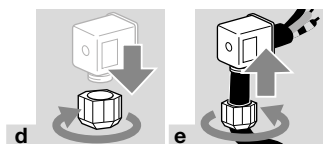
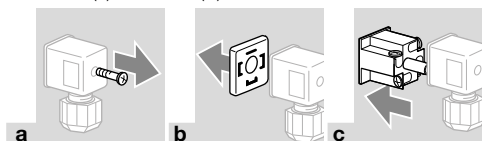
## Plug

→ LV1 (+) = black, N (-) = blue



## Socket

→ 1 = N (-), 2 = LV1 (+)



## Position switch

→ VAA open: contacts 1 and 2 closed,  
VAA closed: contacts 1 and 3 closed.

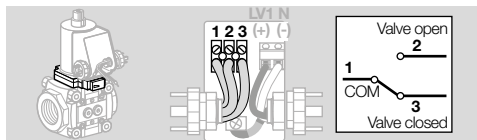
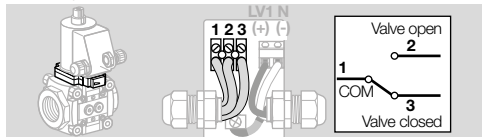
→ Indicator of position switch: red = VAA open, white = VAA closed.

## CAUTION

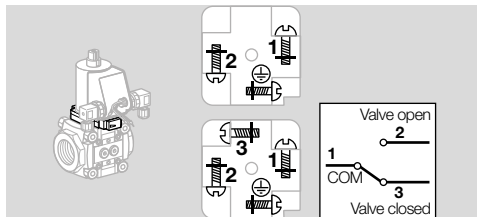
Please observe the following to ensure smooth operation:

– Route valve and position switch cables separately through M20 cable glands or use two separate plugs. Otherwise, there is a risk of interference between valve voltage and position switch voltage.

→ To make wiring easier, the connection terminal for the position switch can be removed.



→ When installing two plugs on VAA a with position switch: label the sockets and plugs to avoid confusion.



→ Ensure that the connection terminal for the position switch has been reconnected.

## Finishing the wiring



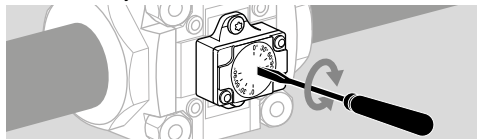
## 5 SETTING THE BYPASS

The system can be operated at burner low-fire rate or purge air using a variable bypass.

The flow rate is adjusted individually using the scale on the bypass.

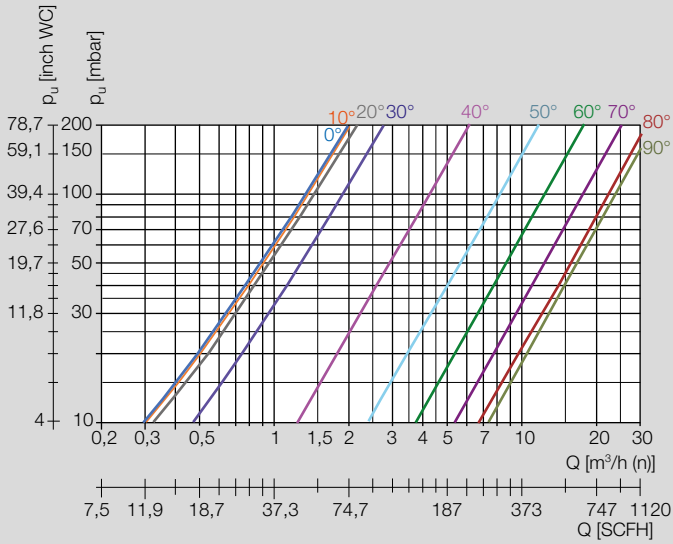
The bypass can be attached at the right- and/or left-hand side of the flow body.

→ The bypass is set to the closed position (0°) at the factory.



→ We recommend to note the set opening angle on the type label.

## 5.1 Bypass flow rate



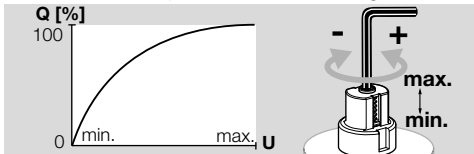
The characteristic flow rate curves have been measured with the valve closed.

The setting for the opening angle in the bypass depends on the supply pressure and air requirement.

## 6 COMMISSIONING

### 6.1 Setting the flow rate

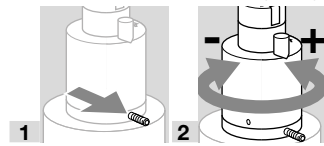
- At the factory, the valve is adjusted for maximum flow rate  $Q$ .
- The markings on the cover cap can be used for coarse adjustment of the flow rate.
- The cover cap can be rotated without changing the current flow rate.
- Allen key: 2.5 mm.
- Do not turn beyond the "max." setting.



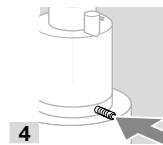
- The VAA remains tight even if the adjusting screw is overturned.

### 6.2 Setting the start rate on the VAA../L

- The start rate can be set by turning the damping unit a maximum of 5 turns.
- Check max. switching frequency, see page 10 (12.2 Mechanical data).
- Loosen the M5 setscrew (2.5 mm hexagon socket), but do not unscrew completely.



- 3 Set the start rate by turning the damping unit clockwise or anticlockwise.



- 5 Screw the M5 setscrew back in.

### 6.3 Setting the damping speed on the VAA../L

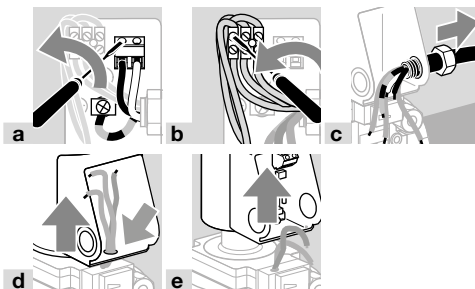
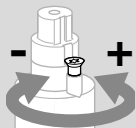
→ The opening speed can be influenced by turning the nozzle screw on the damping unit.

#### CAUTION

Attention! To avoid leakage, please observe the following:

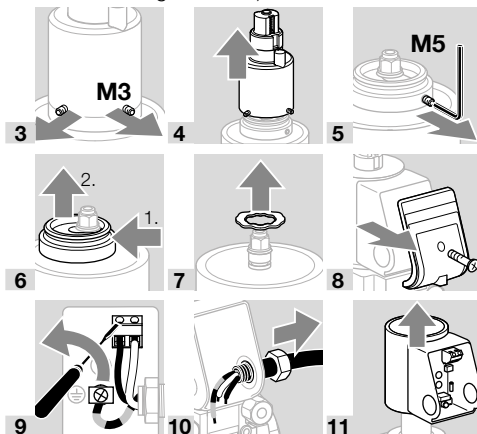
– If the nozzle screw is turned by more than 1 turn, the damping unit will leak and will have to be replaced.

→ Turn the nozzle screw a maximum of 1/2 a turn in the appropriate direction.



#### VAA with damping unit

- 1 Disconnect the system from the electrical power supply.
  - 2 Close the gas supply.
- Remove the M20 cable gland or other type of connection.
- Loosen the setscrews, but do not unscrew completely (M3 = 1.5 mm hexagon socket, M5 = 2.5 mm hexagon socket).



## 7 REPLACING THE ACTUATOR

→ The actuator adapter set for the new actuator must be ordered separately.



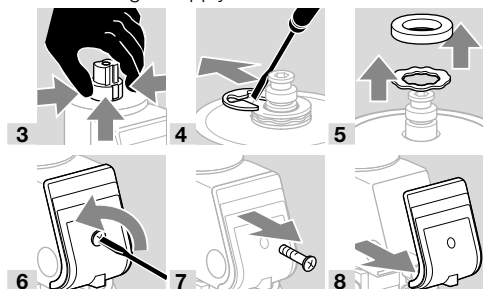
VAx 1, VCx 1: Order No. 74924468,

VAx 2-3, VCx 2-3: Order No. 74924469.

### 7.1 Removing the actuator

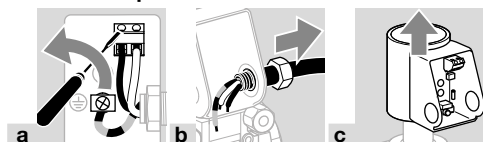
#### VAA without damping unit

- 1 Disconnect the system from the electrical power supply.
- 2 Close the gas supply.



→ Remove the M20 cable gland or other type of connection.

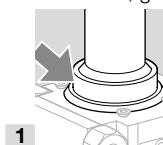
#### VAA without proof of closure switch



#### VAA with proof of closure switch

### 7.2 Fitting the new actuator

- The seals of the actuator adapter set are covered with a non-stick coating. No additional grease is required.
- Depending on the construction stage of the unit, there are two different methods for replacing the actuator: If the unit concerned has no O-ring in this place (arrow), replace the actuator as described here. Otherwise, go to the next note.

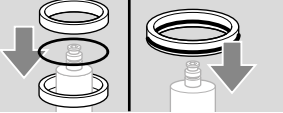


- 1
- 2 Insert seals.

3 Position of the metal ring can be selected.

VAx 1, VAN 1

VAx 2-3, VAN 2



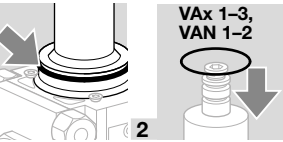
4

5 Slide seal under the second groove.



6

→ If the unit concerned has an O-ring in this place (arrow), replace the actuator as described here: VAA 1: use all seals from the actuator adapter set. VAA 2, VAA 3: use the small seal from the actuator adapter set and only one of the large seals.



1

2

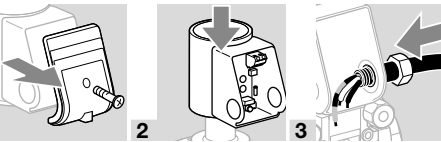
VAx 1-3,  
VAN 1-2

3 Slide seal under the second groove.



4

### VAA without damping unit



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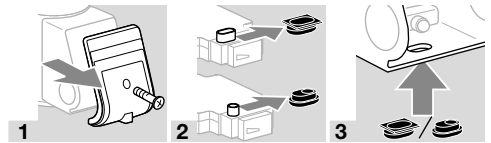
5

6

7 Open the gas solenoid valve and the gas supply.

### VAA with proof of closure switch

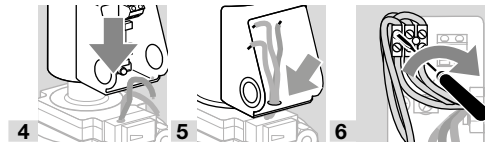
→ Depending on the design of the proof of closure switch, one of the two enclosed seals must be inserted in the connection box housing.



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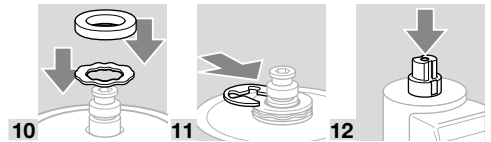
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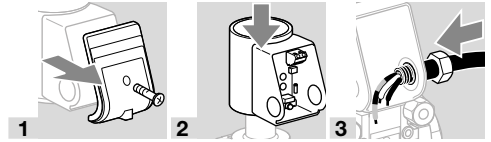
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12

13 Open the gas solenoid valve and the gas supply.

### VAA with damping unit



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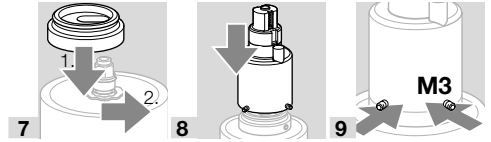
3



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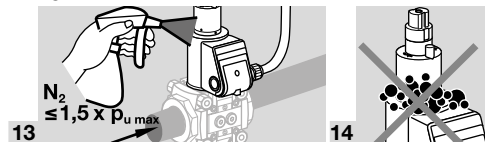
10 Screw in the M3 setscrews.

11 Open the gas solenoid valve and the gas supply.

12 Set the start gas rate, see page 5 (6.2

Setting the start rate on the VAA../L).

The connection between solenoid actuator and damping unit must then be checked for tightness.



13

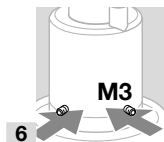
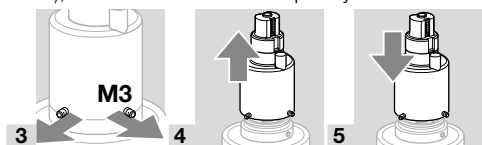
14

$N_2$   
 $\leq 1,5 \times p_{u,max}$

## 8 REPLACING THE DAMPING UNIT

### Slow opening/quick closing

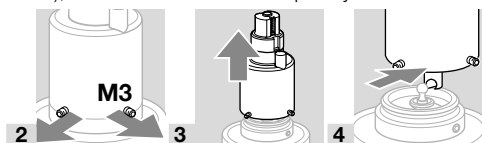
- 1 Disconnect the system from the electrical power supply.
  - 2 Shut off the air supply.
- Loosen the M3 setscrews (1.5 mm hexagon socket), but do not unscrew completely.



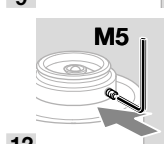
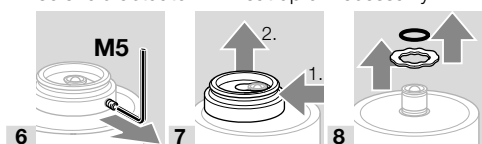
- 6
- 7 Set the start gas rate, see page 5 (6.2 Setting the start rate on the VAA../L).

### Slow opening/slow closing

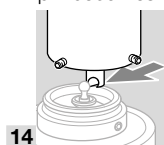
- 1 Shut off the air supply.
- The solenoid actuator remains switched on.
- Loosen the M3 setscrews (1.5 mm hexagon socket), but do not unscrew completely.



- 5 Switch off the solenoid actuator. Otherwise, the solenoid actuator will heat up unnecessarily.



- 12
- 13 Switch on the solenoid actuator so that the guide pin becomes visible.



- 15 Switch off the solenoid actuator. The damping unit is lowered.



- 16
- 17
- 18 Open the air supply and switch on the power supply.

## 9 REPLACING THE CIRCUIT BOARD

### ⚠ WARNING

Risk of injury!

Please observe the following to ensure that no damage occurs:

- Electric shocks can be fatal! Before working on possible live components, ensure the unit is disconnected from the power supply.
- The solenoid actuator heats up during operation. Surface temperature approx. 85°C (approx. 185°F).

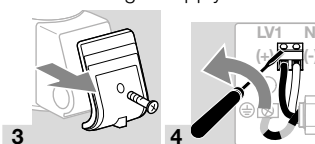


→ We recommend making a note of the contact assignment for subsequent rewiring.

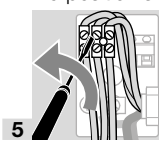
→ 1 = N (-), 2 = LV1 (+)

### 9.1 VAA 1–3

- 1 Disconnect the system from the electrical power supply.
- 2 Close the gas supply.

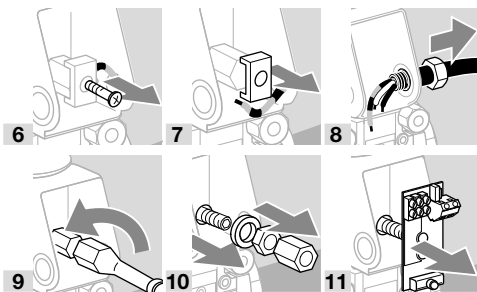


→ If a position switch is wired, disconnect it.



→ Keep all components for subsequent assembly in a safe place.





- 12** Insert new circuit board.  
**13** Follow the reverse procedure when reassembling.  
**14** Re-establish all connections.

→ Wire the new circuit board, see page 3 (4 Wiring).

→ Leave the connection box open for the electrical system test.

### 9.2 Electric strength test

**1** Once the wiring has been carried out and before the devices are commissioned, a voltage surge test must be carried out.

Test points: mains connection terminals (N, L) with respect to PE wire terminal (PE ⊕).

Rated voltage > 150 V: 1752 V AC or 2630 V DC, testing time 1 second.

Rated voltage ≤ 150 V: 1488 V AC or 2240 V DC, testing time 1 second.

**2** Screw the cover onto the connection box once the electrical test has been completed successfully.

**3** The unit is fit for use again.

## 10 MAINTENANCE

### ⚠ CAUTION

In order to ensure smooth operation, check the device function:

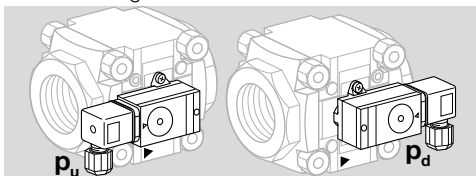
- Check electrical installations once a year in line with local regulations; pay particular attention to the PE wire, see page 3 (4 Wiring).

## 11 ACCESSORIES

### 11.1 Pressure switch for gas DG..VC

The pressure switch for gas monitors the inlet pressure  $p_U$  and the outlet pressure  $p_D$ .

- Monitoring the inlet pressure  $p_U$ : the pressure switch for gas is mounted on the inlet side.  
 Monitoring the outlet pressure  $p_D$ : the pressure switch for gas is mounted on the outlet side.



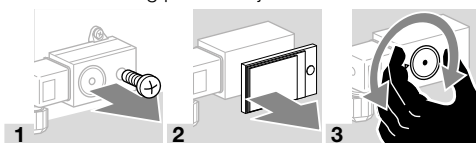
Scope of delivery:

- 1 x pressure switch for gas,
- 2 x self-tapping retaining screws,
- 2 x sealing rings.

Also available with gold-plated contacts for voltages of 5 to 250 V.

→ When retrofitting the pressure switch for gas, see enclosed operating instructions “Pressure switches for gas DG..C”, section entitled “Mounting the DG..C.. on valVario gas solenoid valves”.

→ The switching point is adjustable via hand wheel.

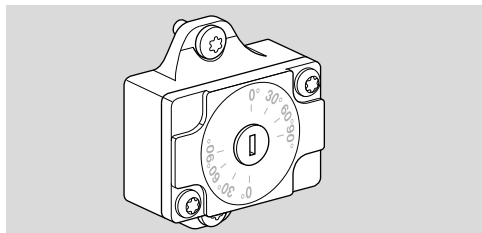


Type	Adjusting range (adjusting tolerance = ± 15% of the scale value)		Mean switching differential at min. and max. setting	
	[mbar]	[°WC]	[mbar]	[°WC]
DG 17VC	2–17	0.8–6.8	0.7–1.7	0.3–0.8
DG 40VC	5–40	2–16	1–2	0.4–1
DG 110VC	30–110	12–44	3–8	0.8–3.2
DG 300VC	100–300	40–120	6–15	2.4–8

→ Deviation from the switching point during testing pursuant to EN 1854 Gas pressure switches: ± 15%.

## 11.2 Variable bypass VAA /B

For retrofitting on the VAA, the bypass can be supplied as an additional item.

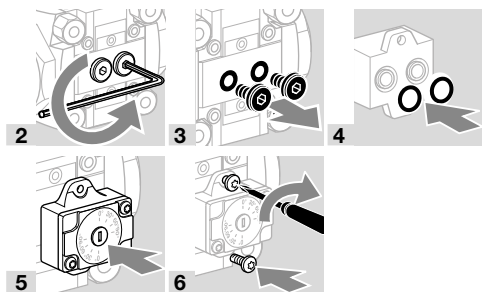


The bypass can be attached at the right- and/or left-hand side of the flow body.

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1 Shut off the air supply.

→ Use the enclosed self-tapping screws and O-rings for installation.



## 12 TECHNICAL DATA

### 12.1 Ambient conditions

Icing, condensation and dew in and on the unit are not permitted.

Avoid direct sunlight or radiation from red-hot surfaces on the unit. Note the maximum medium and ambient temperatures!

Avoid corrosive influences, e.g. salty ambient air or SO<sub>2</sub>. The unit may only be stored/installed in enclosed rooms/buildings.

The unit is suitable for a maximum installation height of 2000 m AMSL.

Ambient temperature: -20 to +60°C (-4 to +140°F), no condensation permitted.

Long-term use in the upper ambient temperature range accelerates the ageing of the elastomer materials and reduces the service life (please contact manufacturer).

Storage temperature = transport temperature: -20 to +40°C (-4 to +104°F).

Enclosure: IP 65.

This unit is not suitable for cleaning with a high-pressure cleaner and/or cleaning products.

### 12.2 Mechanical data

Gas types: clean air. The air must be clean and dry in all temperature conditions and must not contain condensate.

Medium temperature = ambient temperature.

CE approved, max. inlet pressure  $p_U$ : 500 mbar (7.25 psig).

Flow adjustment limits the maximum flow rate to between approx. 20 and 100%.

Adjustment of the start rate: 0 to approx. 70%.

Opening times:

VAA../N quick opening: < 1 s;

VAA../L slow opening: up to max. 10 s,

VAA../R slow opening: 4 s.

Closing time:

VAA../N, VAA../L quick closing: < 1 s,

VAA../R slow closing: 4 s.

Switching frequency:

VAA../N: any, max. 30 x per minute.

VAA../L: max. 2 x per minute. There should be a period of 20 seconds between switching off and on again so that the damping is fully effective.

VAA../R: max. 6 x per minute.

Valve housing: aluminium, valve seal: EPDM.

Connection flanges:

up to size 3: Rp internal thread to ISO 7-1, NPT to ANSI/ASME;

size 2 and higher: with PN 16 ISO flange (pursuant to ISO 7005) .

Cable gland: M20 x 1.5.

Electrical connection: cable with max. 2.5 mm<sup>2</sup> (AWG 12) or plug with socket to EN 175301-803.

Duty cycle: 100%.

Power factor of the solenoid coil:  $\cos \varphi = 0.9$ .

### 12.2.1 Tightening torque

Recommended tightening torques for the connection parts:

Connection parts	Tightening torque [Ncm]
VAX 1: M5	500 ± 50
VAX 2: M6	800 ± 50
VAX 3: M8	1400 ± 100

### 12.3 Electrical data

Mains voltage:

230 V AC, +10/-15%, 50/60 Hz;

200 V AC, +10/-15%, 50/60 Hz;

120 V AC, +10/-15%, 50/60 Hz;

100 V AC, +10/-15%, 50/60 Hz;

24 V DC, ±20%.

Power consumption:

Type	Voltage	Power
VAA 1	24 V DC	25 W
VAA 1	100 V AC	25 W (26 VA)
VAA 1	120 V AC	25 W (26 VA)
VAA 1	200 V AC	25 W (26 VA)
VAA 1	230 V AC	25 W (26 VA)
VAA 2, VAA 3	24 V DC	36 W
VAA 2, VAA 3	100 V AC	36 W (40 VA)
VAA 2, VAA 3	120 V AC	40 W (44 VA)
VAA 2, VAA 3	200 V AC	40 W (44 VA)
VAA 2, VAA 3	230 V AC	40 W (44 VA)

Contact rating of position switch:

Type	Voltage	Current (resistive load)	
		min.	max.
VAA..S	12– 250 V AC, 50/60 Hz	100 mA	3 A
VAA..G	12– 30 V DC	2 mA	0.1 A

Switching frequency of position switch: max. 5 x per minute.

Switching current	Switching cycles*	
	cos $\phi$ = 1	cos $\phi$ = 0.6
0.1	500,000	500,000
0.5	300,000	250,000
1	200,000	100,000
3	100,000	–

\* Limited to max. 200,000 cycles for heating systems.

## 13 DESIGNED LIFETIME

This information on the designed lifetime is based on using the product in accordance with these operating instructions. Once the designed lifetime has been reached, safety-relevant products must be replaced. Designed lifetime (based on date of manufacture) in accordance with EN 13611, EN 161 for VAA:

Type	Designed lifetime	
	Switching cycles	Time (years)
VAA 115 to 225	500,000	10
VAA 232 to 365	200,000	10

You can find further explanations in the applicable rules and regulations and on the afecor website ([www.afecor.org](http://www.afecor.org)).

This procedure applies to heating systems. For thermoprocessing equipment, observe local regulations.

## 14 LOGISTICS

### Transport

Protect the unit from external forces (blows, shocks, vibration).

Transport temperature: see page 10 (12 Technical data).

Transport is subject to the ambient conditions described.

Report any transport damage on the unit or packaging without delay.

Check that the delivery is complete.

### Storage

Storage temperature: see page 10 (12 Technical data).

Storage is subject to the ambient conditions described. Storage time: 6 months in the original packaging before using for the first time. If stored for longer than this, the overall service life will be reduced by the corresponding amount of extra storage time.

## 15 CERTIFICATION

### 15.1 Certificate download

Certificates – see [www.docuthek.com](http://www.docuthek.com)

### 15.2 Declaration of conformity



We, the manufacturer, hereby declare that the products VAA comply with the requirements of the listed Directives and Standards.

Directives:

- 2014/35/EU – LVD
- 2014/30/EU – EMC
- 2011/65/EU – RoHS II
- 2015/863/EU – RoHS III

Standards:

- based on EN 161
- Elster GmbH

### 15.3 UKCA certified



Gas Appliances (Product Safety and Metrology etc. (Amendment etc.) (EU Exit) Regulations 2019) in accordance to BS EN 1613

### 15.4 Eurasian Customs Union



The products VAA meet the technical specifications of the Eurasian Customs Union.

## 15.5 ANSI/CSA approved



American National Standards Institute/Canadian Standards Association

ANSI/UL429 Electrically operated valves – CSA C22.2 No. 139—19 Electrically operated valves.

## 15.6 REACH Regulation

The device contains substances of very high concern which are listed in the Candidate List of the European REACH Regulation No. 1907/2006. See Reach list HTS at [www.docuthek.com](http://www.docuthek.com).

## 15.7 China RoHS

Directive on the restriction of the use of hazardous substances (RoHS) in China. Scan of the Disclosure Table China RoHS2, see certificates at [www.docuthek.com](http://www.docuthek.com).

## 16 DISPOSAL

Devices with electronic components:

### WEEE Directive 2012/19/EU – Waste Electrical and Electronic Equipment Directive



At the end of the product life (number of operating cycles reached), dispose of the packaging and product in a corresponding recycling centre. Do not dispose of the unit with the usual domestic refuse. Do not burn the product. On request, old units may be returned carriage paid to the manufacturer in accordance with the relevant waste legislation requirements.

## FOR MORE INFORMATION

The Honeywell Thermal Solutions family of products includes Honeywell Combustion Safety, Eclipse, Exothermics, Hauck, Kromschroder and Maxon. To learn more about our products, visit [ThermalSolutions.honeywell.com](http://ThermalSolutions.honeywell.com) or contact your Honeywell Sales Engineer.  
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