

Pressure regulator with solenoid valve VAD

Air/gas ratio control with solenoid valve VAG

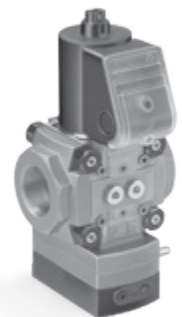
Variable air/gas ratio control with solenoid valve VAV

Product brochure · GB
3 Edition 05.12

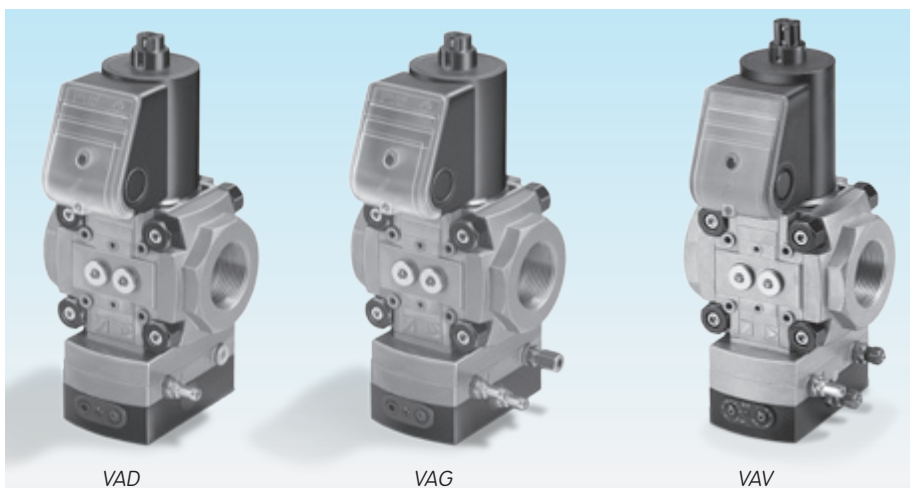


**krom
schroder**

- All-purpose servo regulator for gaseous media with integrated safety valve
- Suitable for a max. inlet pressure of 500 mbar (7 psig)
- Minimum installation effort: no external impulse line required
- Check indication by blue LED
- Setting options from two sides
- EC type-tested and certified
- VAD, VAG: FM, ANSI/CSA and AGA approved
- VAD, VAG, VAV: UL listed
- VAD, VAG, VAV: certified pursuant to GOST-TR
- VAD 1, VAG 1, VAV 1: certified for systems up to SIL 3 and PL e



elster
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VAD: controls gas outlet pressure p_d via setpoint spring.
 VAG: constant gas/air pressure ratio via air control pressure p_{sa} .
 VAV: adjustable gas/air pressure ratio.
 Pressure fluctuations in the combustion chamber can be compensated via the combustion chamber control pressure p_{sc} .

Application

Pressure regulator VAD, air/gas ratio control VAG and variable air/gas ratio control VAV incorporating servo technology for shut-off and precise control of the gas supply to gas burners and gas appliances. For use in gas control and safety systems in all sectors of the iron, steel, glass and ceramics industries, also in domestic or commercial heat generation, such as the packaging, paper and foodstuffs industries.

VAD

Constant pressure governor, Class A, with high control accuracy, for excess air burners, atmospheric burners or single-stage force draught burners. Pressure preset via setpoint spring.

VAG

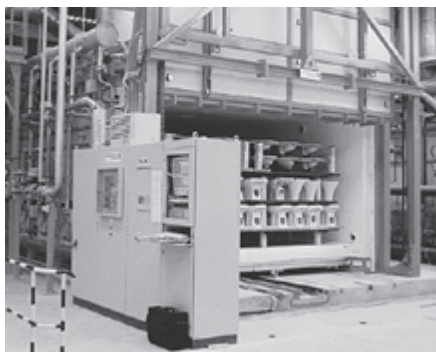
Air/gas ratio control, Class A, for maintaining a constant air/gas pressure ratio for modulating-controlled burners or with VAS 1 bypass valve for stage-controlled burners. Pressure preset by the air control line.

The VAG..N can also be used as a zero governor for gas engines.

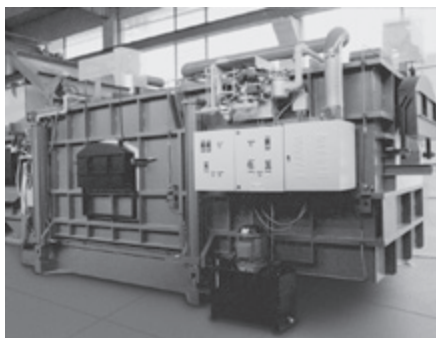
VAV

Variable air/gas ratio control, Class A, for maintaining a constant gas/air pressure ratio for modulating-controlled burners. Pressure preset by the air control line. The ratio of gas pressure to air pressure remains constant. It can be set from 0.6:1 to 3:1.

Pressure fluctuations in the combustion chamber can be compensated via the combustion chamber control pressure p_{sc} .



Pressure regulator on excess air burners in the ceramics industry

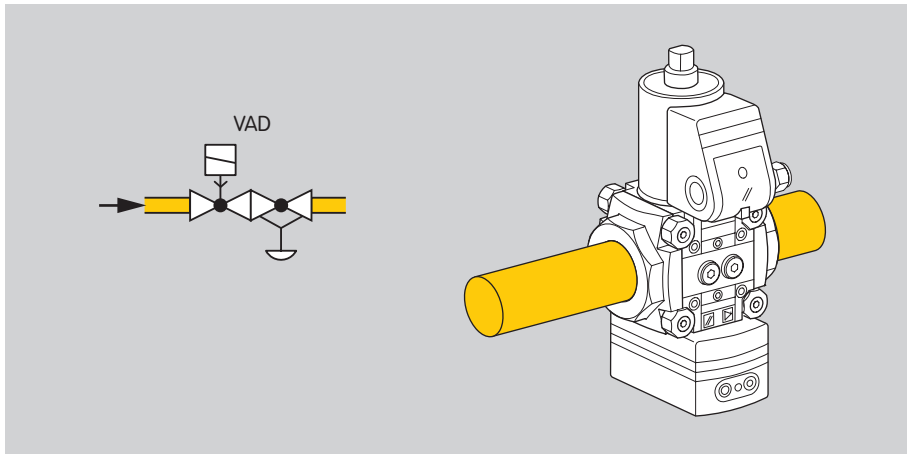


Air/gas ratio control on melting furnace for ensuring stoichiometric combustion over the entire capacity range



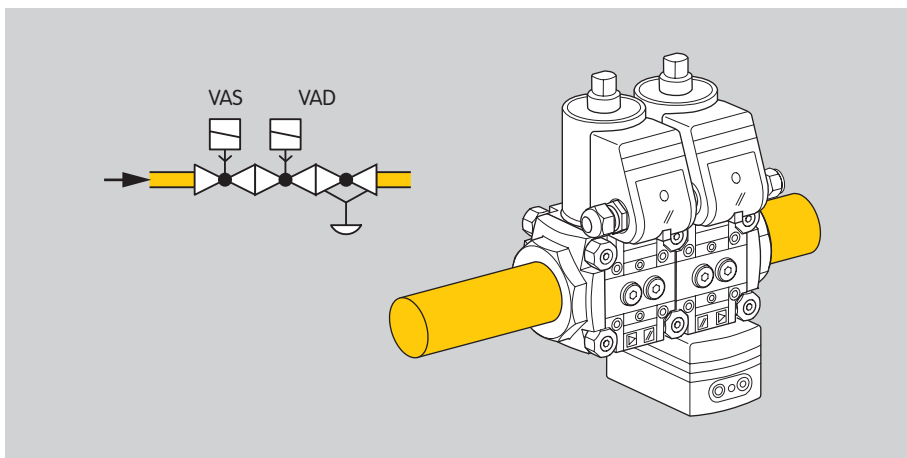
Aluminium age-hardening furnace with air/gas ratio controls for air deficiency cut-out

Examples of application



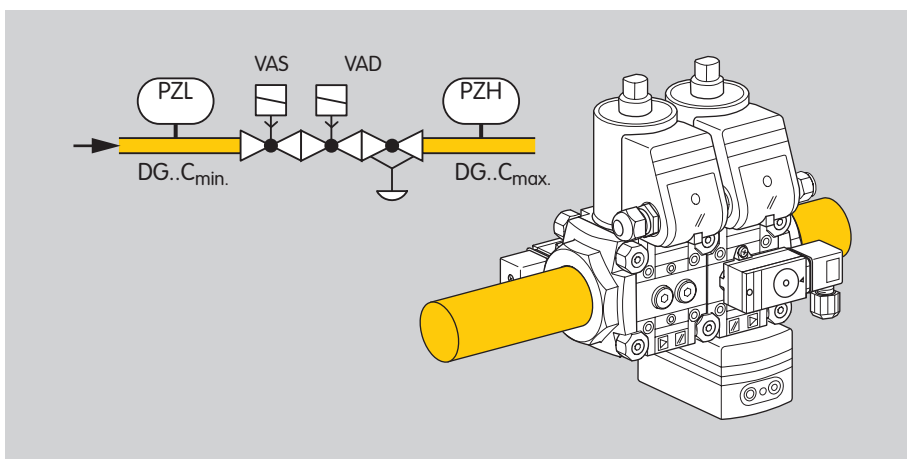
Constant pressure control

The pressure regulator with gas solenoid valve VAD maintains the set gas outlet pressure p_d constant when subject to differing flow rates. If a second gas solenoid valve is used upstream of the VAD, this complies with the requirements of EN 746-2 for two Class A gas solenoid valves connected in series.



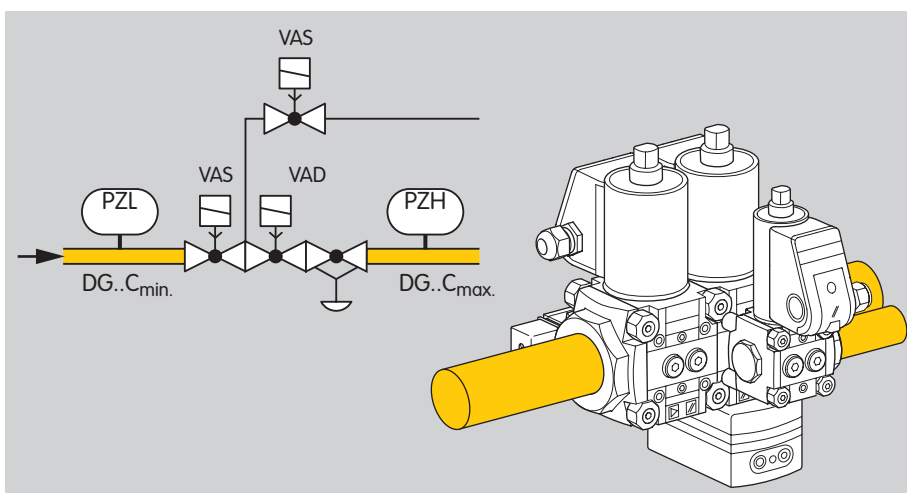
Constant pressure control with two gas solenoid valves

The pressure regulator with gas solenoid valve VAD maintains the set gas outlet pressure p_d constant when subject to differing flow rates.



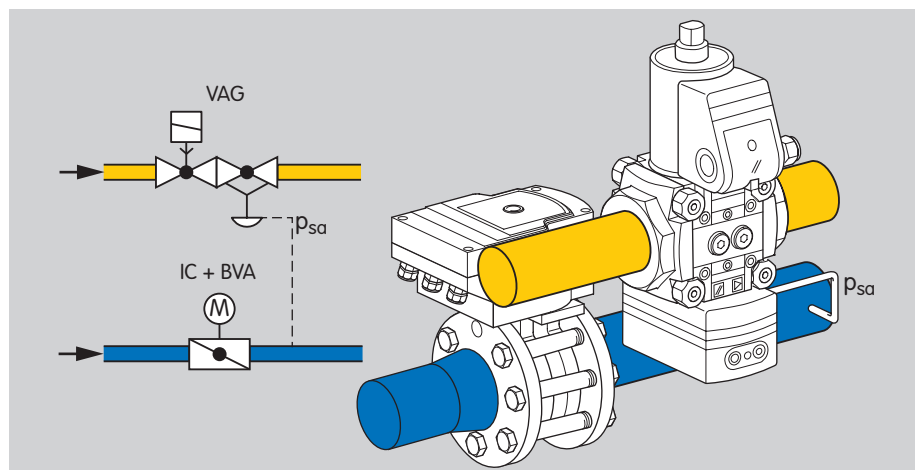
Constant pressure control with max. pressure switch

In this example, the minimum inlet pressure p_u and the maximum outlet pressure p_d are monitored with the pressure switches DG..C. The simple attachment of the pressure switch module makes installation easier.



Constant pressure control with non-controlled pilot gas outlet

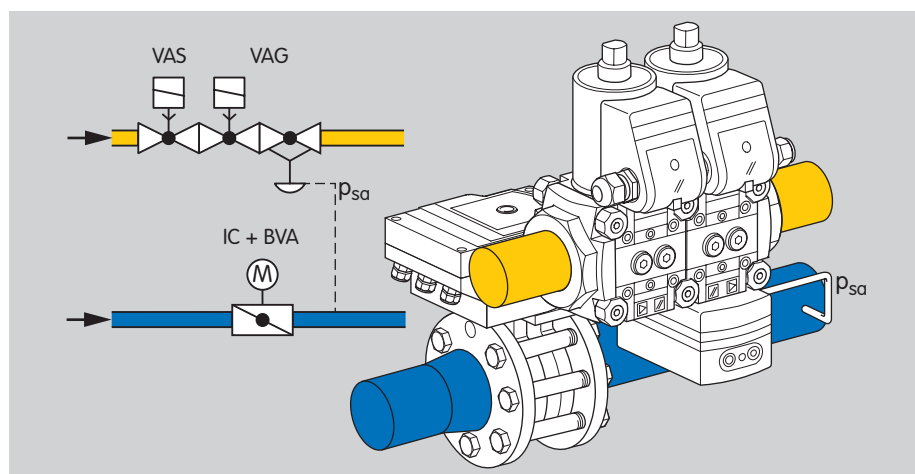
In this application, the pilot burner is supplied with a high inlet pressure via the pilot gas outlet. The simple attachment of the bypass valve module makes installation easier. The minimum inlet pressure p_u and the maximum outlet pressure p_d are monitored with the pressure switches DG..C.



Modulating control

The gas outlet pressure p_d is controlled via the air/gas ratio control with gas solenoid valve VAG. The gas outlet pressure p_d follows the changing air control pressure p_{sa} . The ratio of gas pressure to air pressure remains constant. The VAG is suitable for a control range up to 10:1.

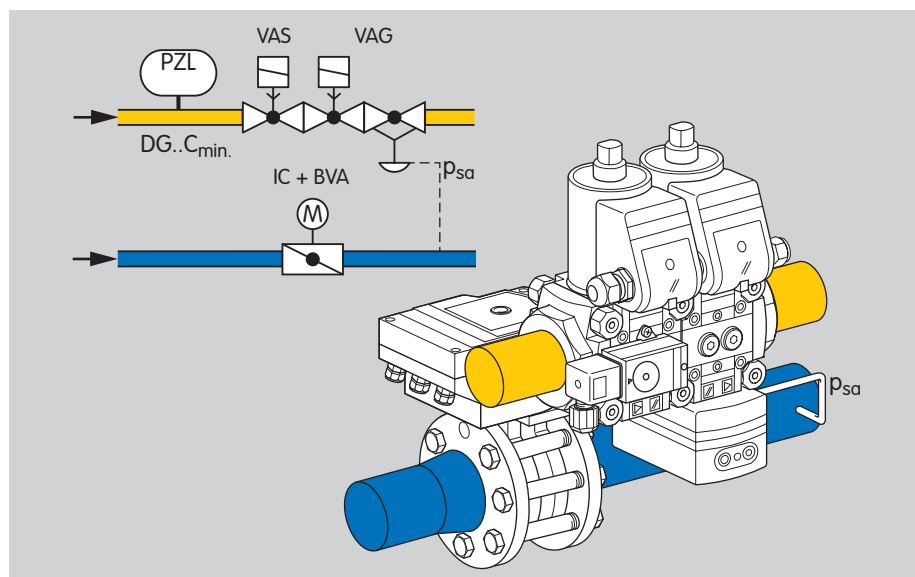
If a second solenoid valve is used upstream of the VAG, this complies with the requirements of EN 746-2 for two Class A valves connected in series.



Modulating control with two gas solenoid valves

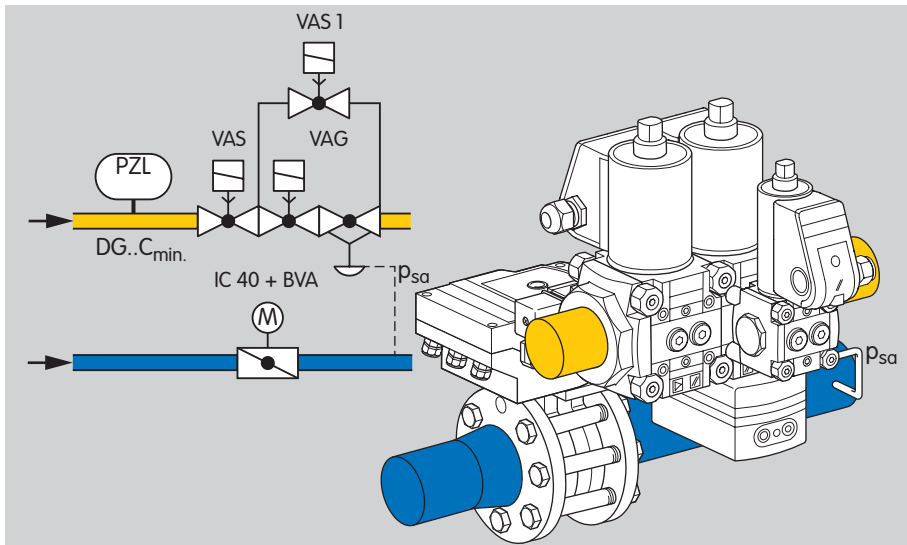
The gas outlet pressure p_d is controlled via the air/gas ratio control with gas solenoid valve VAG. The gas outlet pressure p_d follows the changing air control pressure p_{sa} . The ratio of gas pressure to air pressure remains constant. The VAG is suitable for a control range up to 10:1.

The gas line is two Class A shut-off valves connected in series, in accordance with the requirements of EN 746-2.



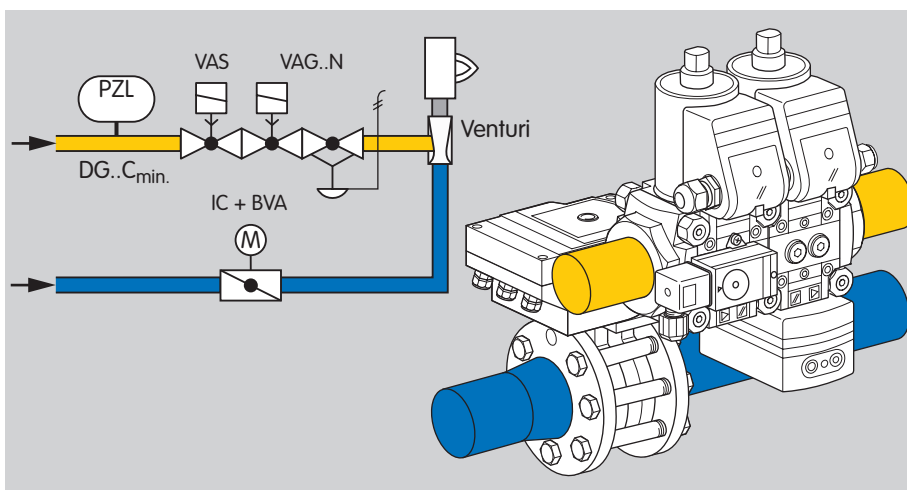
Modulating control with two gas solenoid valves and inlet pressure switch

In this case, the minimum inlet pressure p_u is monitored by the pressure switch DG..C. The simple attachment of the pressure switch module makes installation easier.



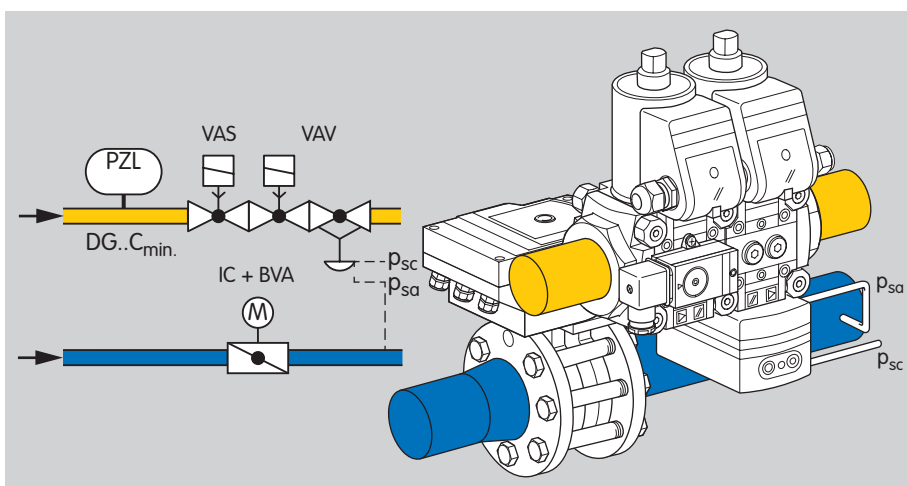
High/Low control

At high fire, the gas outlet pressure p_d follows the air control pressure p_{sa} . The ratio of gas pressure to air pressure remains constant. Low fire is determined via the bypass valve VAS 1. Here as well, the simple attachment of the bypass valve module makes installation easier.



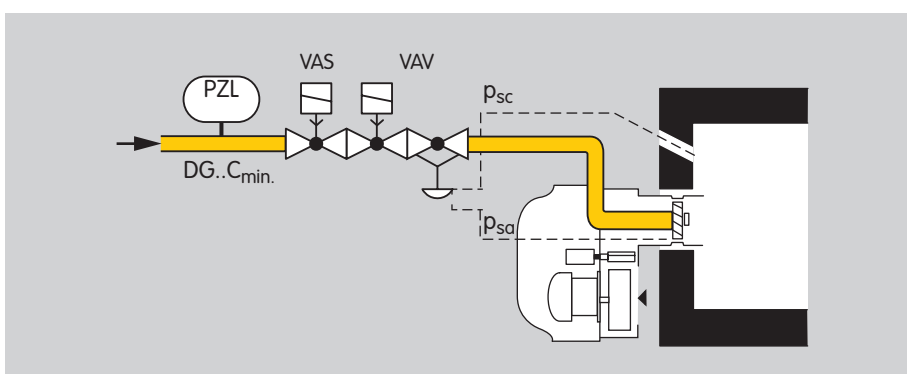
Zero pressure control

In this application, the control air pressure is the atmospheric air pressure. The air flow rate generates a negative pressure in the gas pipe via the Venturi. This negative pressure is compensated by the air/gas ratio control with gas solenoid valve VAG..N. The greater the negative pressure, the greater the gas flow rate.



Modulating control with variable air/gas ratio control with gas solenoid valve

The ratio of gas pressure to air pressure can be adjusted infinitely between 0.6:1 and 3:1. Pressure fluctuations in the combustion chamber can be compensated via the combustion chamber control pressure p_{sc} .



Modulating control in domestic heat generation

This application shows the variable air/gas ratio control with solenoid valve VAV fitted to a modulating-controlled forced draught burner. The combustion air volume is set via a butterfly valve for air or by adjusting the fan speed.

Replacement possibility for MODULINE pressure regulators with gas solenoid valve

GVS, GVI, GVIB and GVR are to be replaced by VAD, VAG, VAG+VAS and VAV

Type code VAD

Code	Description
VAD	Pressure regulator with solenoid valve
1–3	Size
T	T-product
10–65	Nominal inlet and outlet diameter
R	Rp internal thread
N	NPT internal thread
F	ISO flange
/N	Quick opening, quick closing
K	Mains voltage 24 V DC
P	Mains voltage 100 V AC; 50/60 Hz
Q	Mains voltage 120 V AC; 50/60 Hz
Y	Mains voltage 200 V AC; 50/60 Hz
W	Mains voltage 230 V AC; 50/60 Hz
S	Position indicator with visual indicator
G	Position indicator for 24 V with visual indicator
R	Viewed from the right (in the direction of flow)
L	Viewed from the left (in the direction of flow)
-25	Outlet pressure p_d : 2.5–25 mbar
-50	5–50 mbar
-100	10–100 mbar
A	Standard valve seat
B	Reduced valve seat

Type code VAG, VAV

Code	Description
VAG	Air/gas ratio control with gas solenoid valve
VAV	Variable air/gas ratio control with gas solenoid valve
1–3	Size
T	T-product
10–65	Nominal inlet and outlet diameter
R	Rp internal thread
N	NPT internal thread
F	ISO flange
/N	Quick opening, quick closing
K	Mains voltage 24 V DC
P	Mains voltage 100 V AC; 50/60 Hz
Q	Mains voltage 120 V AC; 50/60 Hz
Y	Mains voltage 200 V AC; 50/60 Hz
W	Mains voltage 230 V AC; 50/60 Hz
S	Position indicator with visual indicator
G	Position indicator for 24 V with visual indicator
R	Viewed from the right (in the direction of flow)
L	Viewed from the left (in the direction of flow)
A	Standard valve seat
B	Reduced valve seat
	Connection kit for VAG for air control pressure p_L / for VAV for air control pressure p_L and combustion chamber control pressure p_F :
E	Compression fitting for VAG
K	Plastic hose coupling for VAG, VAV
A	NPT 1/4 adapter for VAG
N	Zero governor for VAG

Technical data

Types of gas: natural gas, town gas, LPG (gaseous), biologically produced methane (max. 0.1 %-by-vol. H₂S); other gases on request. The gas must be dry in all temperature conditions and must not contain condensate.

Inlet pressure range p_u :

10 – 500 mbar (4 – 200 "WC),

FM approved (230 V AC, 120 V AC, 24 V DC), non operational pressure: 700 mbar (10 psig).

ANSI/CSA approved (230 V AC, 120 V AC, 24 V DC) up to 350 mbar (5 psig).

Opening time of the solenoid valve:

quick opening: ≤ 0.5 s,

Closing time: quick closing: < 1 s.

Ambient temperature:

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

Storage temperature:

-20 to +40°C (-4 to 104°F), no condensation permitted.

Safety valve: Class A to EN 161,

Factory Mutual (FM) Research Class: 7410 and 7411

(230 V AC, 120 V AC, 24 V DC),

ANSI Z21.21 and CSA 6.5,

ANSI Z21.18 and CSA 6.3.

Control class A to EN 88-1.

Control range: up to 10:1.

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, $\pm 20\%$.

Cable gland: M20 x 1.5,

electrical connection: electrical cable with max. 2.5 mm² (AWG 12) or plug with socket to EN 175301-803.

Enclosure: IP 65.

Duty cycle: 100%.

Power factor of the solenoid coil: $\cos \varphi = 1$.

Power consumption:

Type	24 V DC [W]	100 V AC [W]	120 V AC [W]	200 V AC [W]	230 V AC [W]
VAD/VAG/VAV 1	29	33	30	33	30
VAD/VAG/VAV 2	46	53	54	54	53
VAD/VAG/VAV 3	46	53	54	54	53

Valve housing: aluminium, valve seal: NBR.

Connection flanges with internal thread:

Rp to ISO 7-1,

NPT to ANSI/ASME.

Position indicator contact rating:

Type	Voltage	Min. current (resistive load)	Max. current (resistive load)
VAX..S, VCX..S	12–250 V AC, 50/60 Hz	100 mA	3 A
VAX..G, VCX..G	12–125 V AC, 50/60 Hz	2 mA	0.1 A

Position indicator switching frequency:

max. 5 × per minute.

Switching current [A]	Switching cycles*	
	$\cos \varphi = 1$	$\cos \varphi = 0.6$
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.

VAD

Outlet pressure p_d :

2.5 – 25 mbar (1 – 10 "WC),

5.0 – 50 mbar (2 – 20 "WC),

10 – 100 mbar (4 – 40 "WC).

VAG

Outlet pressure p_d :

0.5 – 100 mbar (0.2 – 40 "WC).

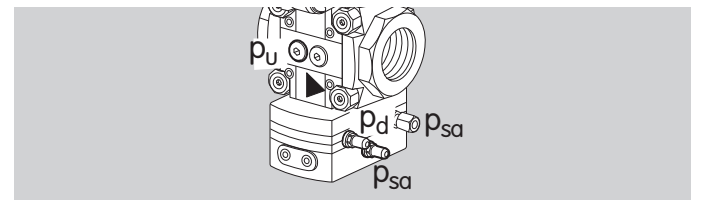
Air control pressure p_{sa} :

0.5 – 100 mbar (0.2 – 40 "WC).

Adjusting range at low fire: ± 5 mbar (± 2 "WC).

Transmission ratio of gas to air: 1:1

The inlet pressure must always be higher than the air control pressure p_{sa} + pressure loss Δp + 5 mbar (2 "WC).



VAG..K: 1 1/8" coupling for plastic hose (internal dia. 3.9 mm (0.15"), external dia. 6.1 mm (0.24")) or

VAG..E: 1 1/8" compression fitting for 6 x 1 tube or

VAG..A: 1 NPT 1/4 adapter or

VAG..N: zero governor with breathing orifice.

VAV

Outlet pressure p_d :

0.5–30 mbar (0.2–11.7 "WC).

Air control pressure p_{sa} :

0.4–30 mbar (0.15–11.7 "WC).

Combustion chamber control pressure p_{sc} :

-20 to 20 mbar (-7.8 to 7.8 "WC).

Min. control pressure differential $p_{sa} - p_{sc}$:

0.4 mbar (0.15 "WC).

Min. pressure differential $p_d - p_{sc}$:

0.5 mbar (0.2 "WC).

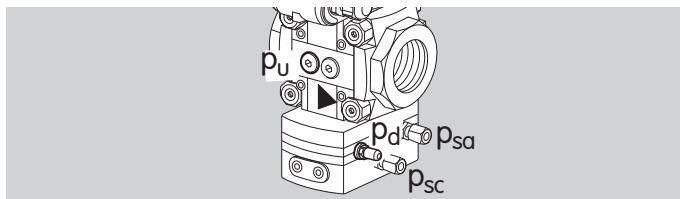
Adjusting range at low fire:

± 1.5 mbar (± 0.6 "WC).

Transmission ratio of gas to air:

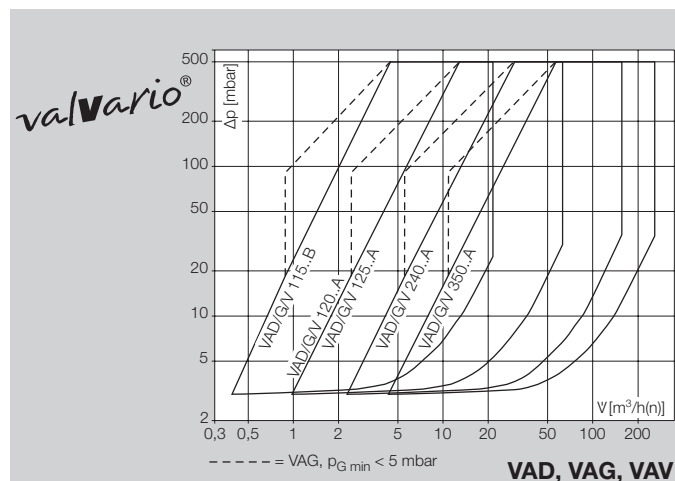
0.6:1 to 3:1.

The inlet pressure p_u must always be higher than the air control pressure p_{sa} x transmission ratio V + pressure loss Δp + 1.5 mbar (0.6 "WC).



VAV..K: 2 plastic hose couplings (internal dia. 3.9 mm (0.15"), external dia. 6.1 mm (0.24")).

Flow rate



Detailed information on this product

www.docuthek.com → Elster Kromschroeder

Search term: VAD, VAG, VAV

Kind of document: Technical information

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