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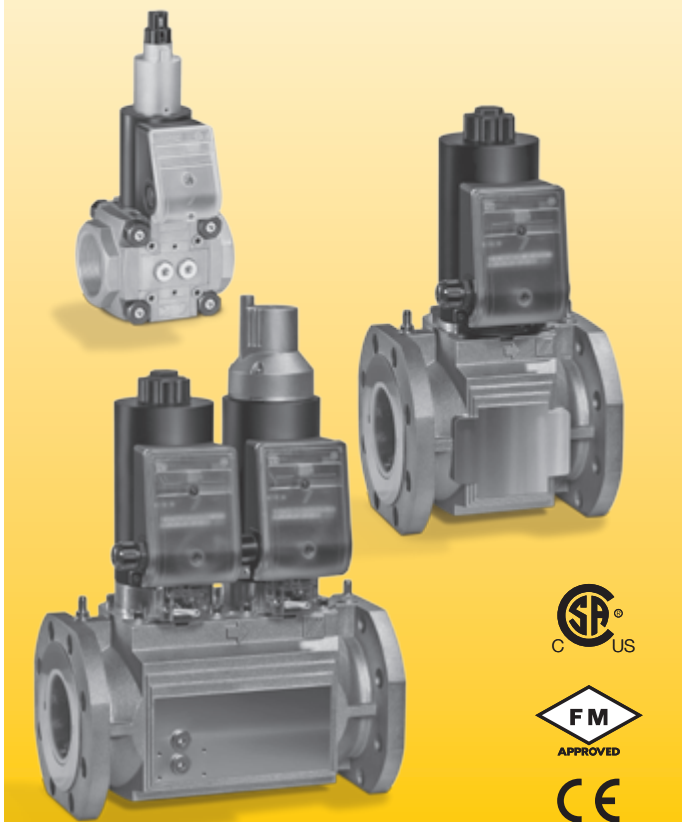

krom//schroder

MORTERA Y COMPAÑIA, S. A DE C. V.

Solenoid valves for gas VAS, Double solenoid valves VCS

- A further development of the solenoid valves for gas VG and VS
- Suitable for a max. inlet pressure of 500 mbar (7 psig)
- Easy installation into a system
- Compact design saves space
- No extra valve required owing to integrated flow adjustment
- Check indication by blue LED
- Position indicator with integral visual indicator
- Suitable for intermittent operation
- Wide-ranging applications due to the modular construction
- Higher flow rates with the same nominal size
- EC type-tested and certified
- VAS/VCS 1-3: FM and CSA approved

3.1.0.2 Technical Information
Edition 02.07 GB

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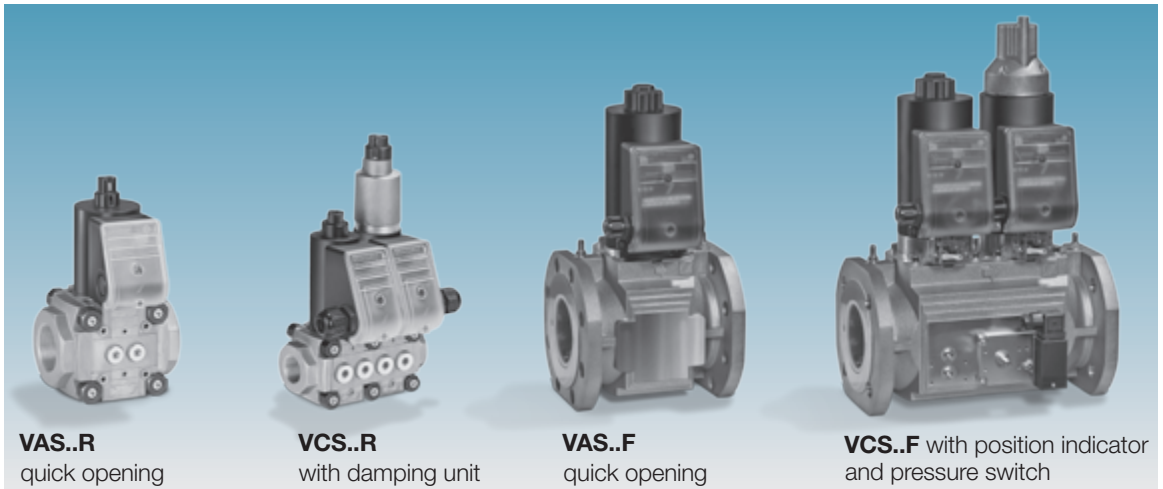


VAS..R
quick opening

VCS..R
with damping unit

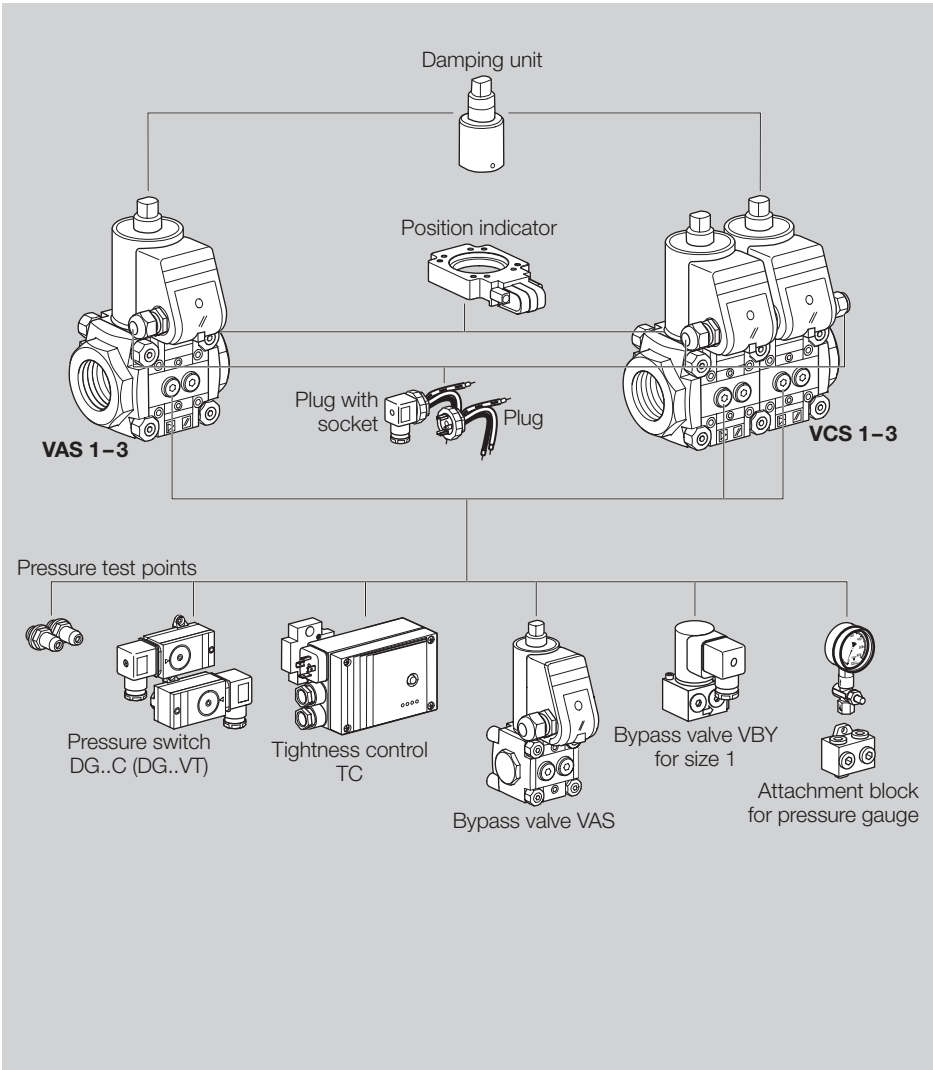
VAS..F
quick opening

VCS..F with position indicator and pressure switch

The modular design principle allows the individual components of the VAS, VCS Series to be easily assembled: e.g. quick opening, slow opening, with position indicator and visual indicator, slow opening with attached pressure switch.

Application

Solenoid valves for gas VAS and double solenoid valves VCS for safeguarding and controlling the air and 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 commercial heat generation, such as the packaging, paper and foodstuffs industries.



Examples of application

Solenoid valve for gas VAS 1–3, Double solenoid valve VCS 1–3

With threaded flange for pipe connections from DN 10 to 65.

Modularly expandable with:

– Damping unit
– Position indicator
– Plug (with or without socket)
– Pressure test points
– Pressure switch DG..C (DG..VT) for inlet and/or outlet pressure
– Tightness control TC
– Bypass/pilot gas valve
– Attachment block for the connection of a pressure gauge, for example.

Function

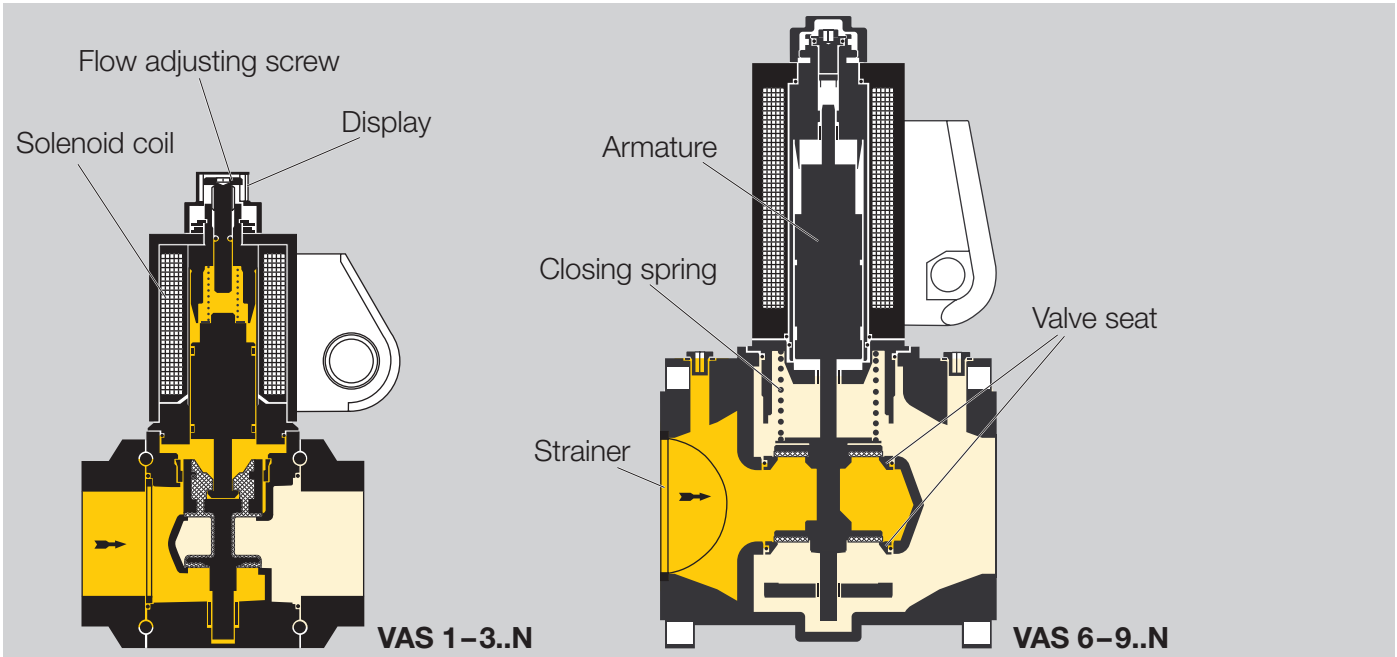
The gas solenoid valve VAS is closed when it is disconnected from the power supply.

Opening: Connect the system to the electrical power supply (alternating voltage will be rectified). The blue LED lights up. The coil's magnetic field pulls the armature with the attached valve disc upwards. The gas solenoid valve VAS opens. The double valve seat means that the forces from the inlet pressure are divided almost equally between the two valve seats.

Closing: Disconnect the VAS from the electrical power supply. The blue LED goes out. The armature is pressed into its initial position by the closing spring. The gas solenoid valve closes within 1 s.

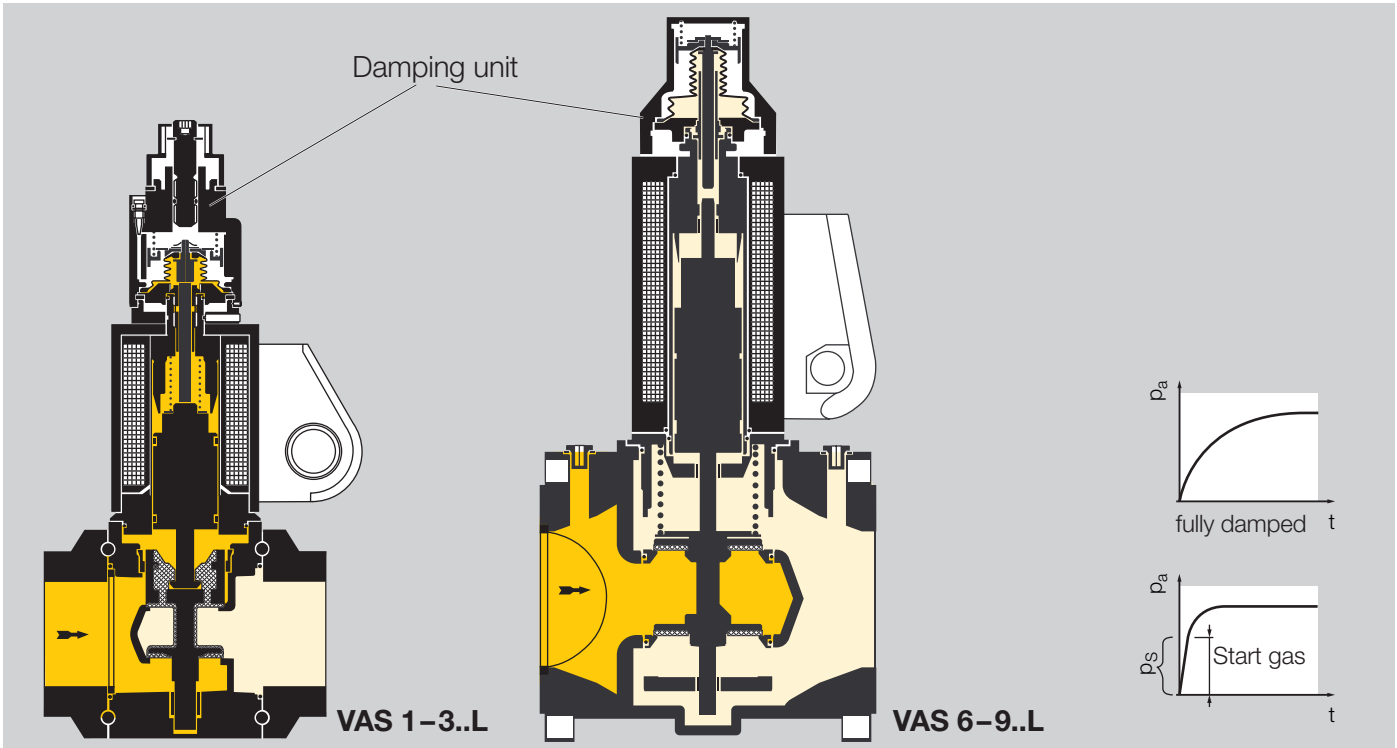
The strainer in the inlet of the gas solenoid valve prevents deposits of dirt particles on the valve seats. The pressure loss through the strainer is very low.

The flow rate can be varied by a flow adjusting screw on the actuator within a range from 20 to 100%. On VAS 1–3, the setting can be monitored on an indicator.



VAS..N, quick opening

The solenoid valve for gas VAS..N opens within 0.5 s.

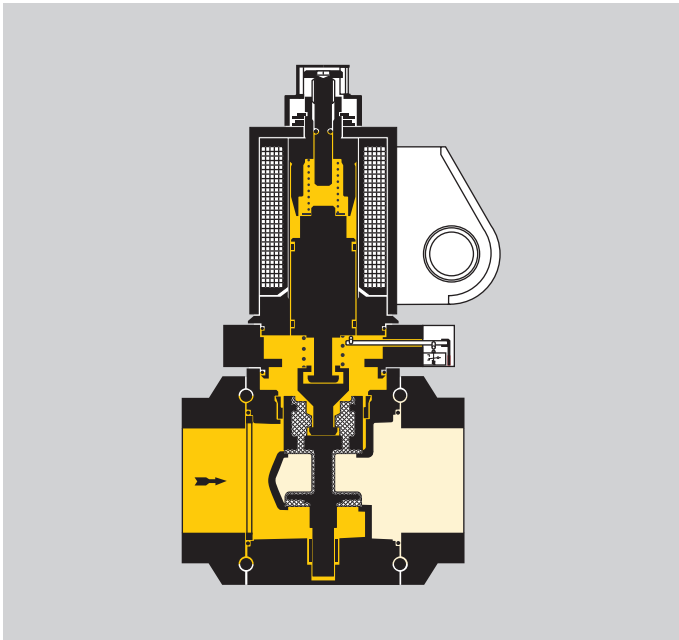


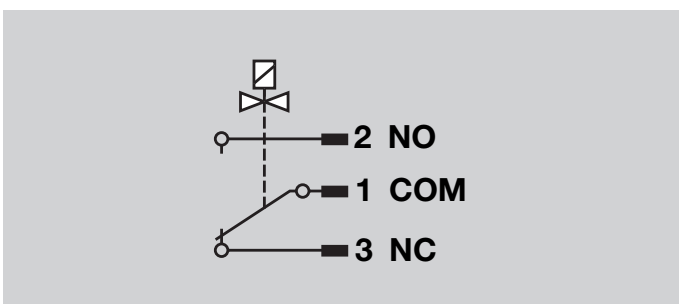
Solenoid valve for gas VAS..L, slow-opening

The solenoid valve for gas VAS..L opens within 10 s.

Start gas rate adjustment: The gas solenoid valve opens with a quick initial lift and then continues slowly until it is fully open. The start gas rate can be set. This setting is required, for example if a tightness control TC is to be used.

By turning the damping unit the start gas rate can be set between 0 and 70%:
turning it clockwise will reduce the start gas rate,
turning it anti-clockwise will increase the gas start rate.





Solenoid valve for gas VAS..S, position indicator with visual indicator

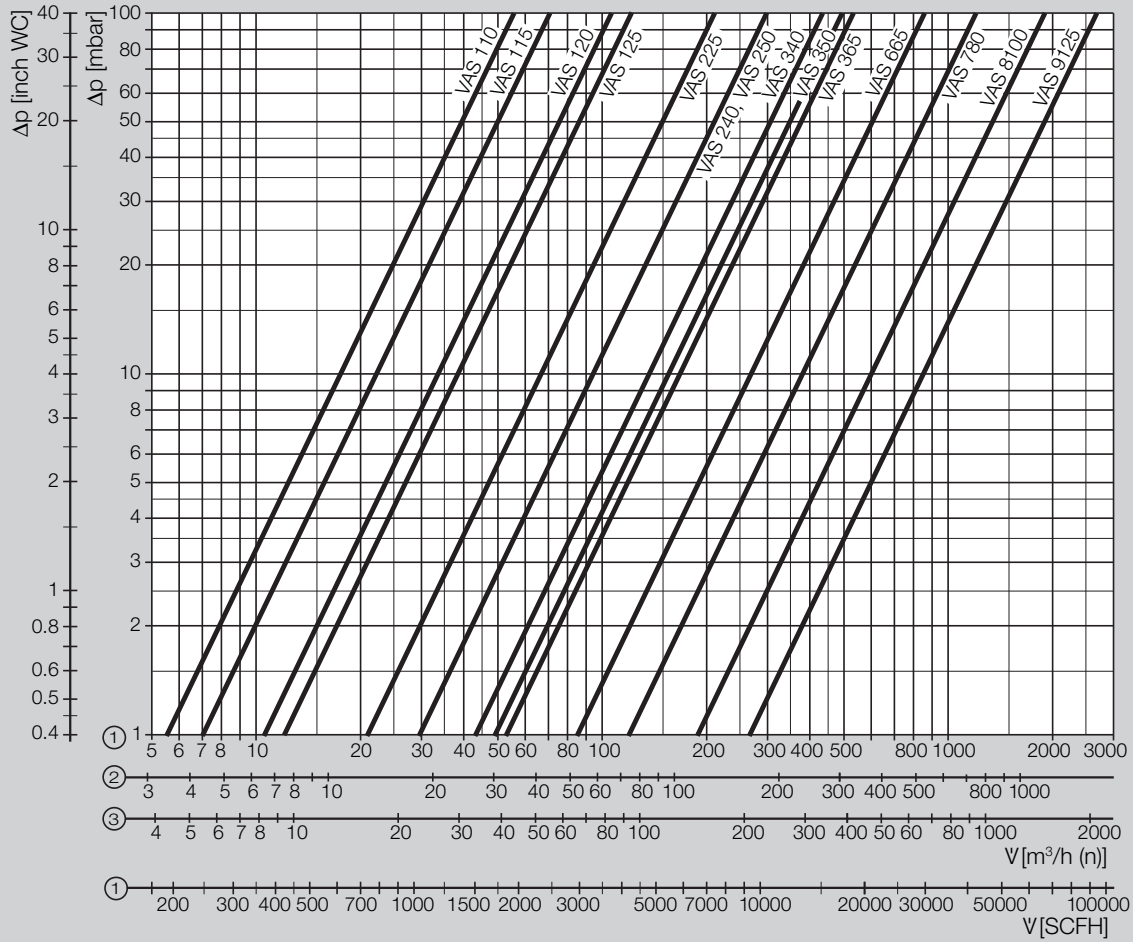
Opening: When the gas solenoid valve is opened, the position indicator is operated first.

The visual position indicator is activated. The “open” signal is marked in red. Only then does the double valve seat open to release the volume of gas (overtravel principle).

Closing: The gas solenoid valve VAS is disconnected from the voltage supply and the closing spring presses the double valve disc on to the valve seat. The position indicator is then actuated. The visual position indicator is white for “closed”.

The actuator cannot be rotated on a gas solenoid valve with a position indicator and a visual position indicator.

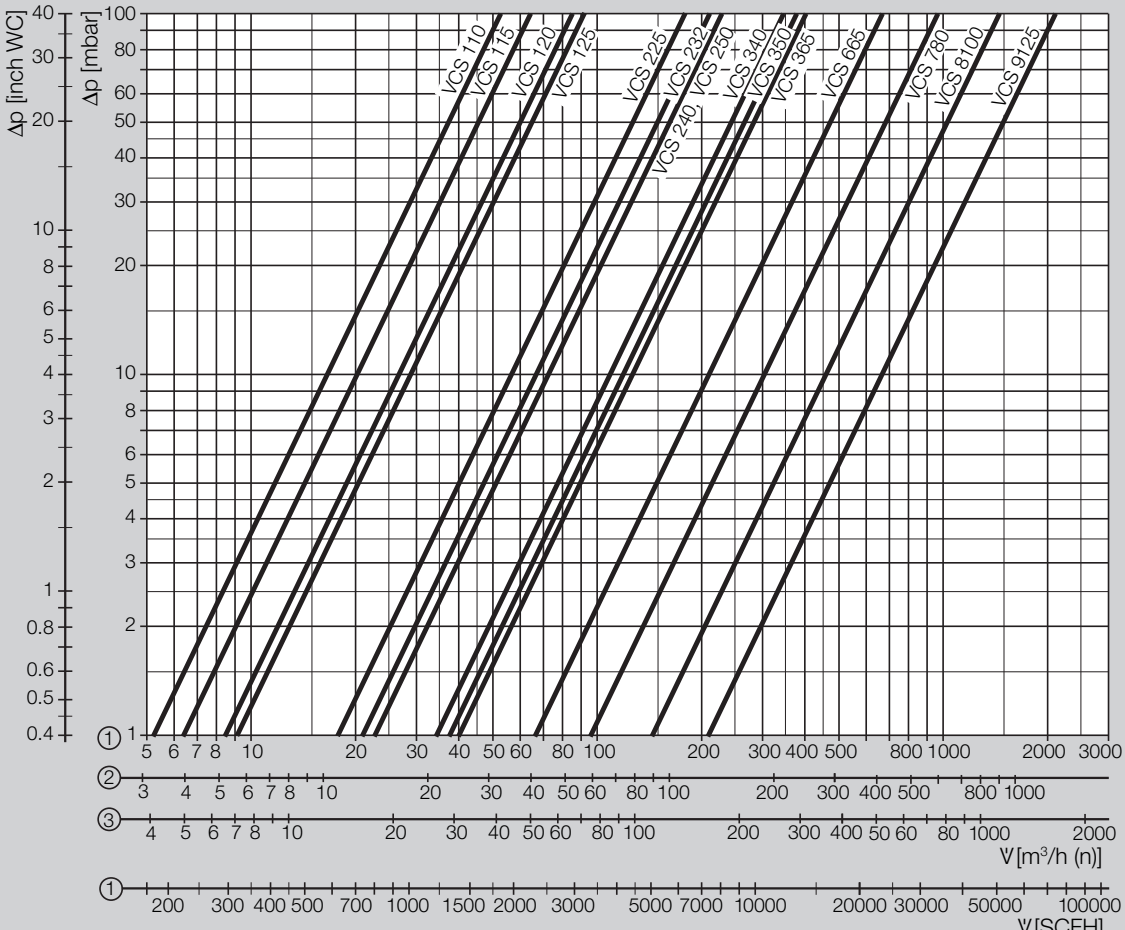
NOTE: NFPA 86 – As soon as the capacity of the pilot or main burner exceeds 117 kW (400,000 BTU/h) at least one safety shut-off valve must be closed between each burner and the fuel supply during the pre-purging process. The closed position can be verified using the position indicator of the gas solenoid valve VAS..S.



Flow rate VAS

The characteristic flow rate curves have been measured with the specified flanges and a fitted strainer. If two or more valves are combined the pressure loss of each additional valve drops by approx. 5%.

① = Natural gas (ρ = 0.80 kg/m³)
② = Propane (ρ = 2.01 kg/m³)
③ = Air (ρ = 1.29 kg/m³)



VCS

The characteristic flow rate curves have been measured with the specified flanges and a fitted strainer.

① = Natural gas (ρ = 0.80 kg/m³)
② = Propane (ρ = 2.01 kg/m³)
③ = Air (ρ = 1.29 kg/m³)

k_V value

The size and nominal flange width is determined using the flow rate diagram or by calculation using the k_V value.

$\dot{V}_{(n)}$ = Flow rate (standard state) [m³/h]
k_V = Valve coefficient (see table)
Δp = Pressure loss [bar]
p_a = Outlet pressure (absolute) [bar]
ρ_n = Density [kg/m³] (air 1.29, natural gas 0.80, propane 2.01, butane 2.71)
T = Medium temperature (absolute) [K]
(see conversion factors)

$$k_V = \frac{\dot{V}_{(n)}}{514} \cdot \sqrt{\frac{\rho_n \cdot T}{p \cdot p_a}} \qquad \dot{V}_{(n)} = 514 \cdot k_V \cdot \sqrt{\frac{p \cdot p_a}{\rho_n \cdot T}}$$

$$p = \left(\frac{\dot{V}_{(n)}}{514 \cdot k_V}\right)^2 \cdot \frac{\rho_n \cdot T}{p_a}$$

VAS	k_V m³/h
VAS 110	5.0
VAS 115	6.4
VAS 120	9.6
VAS 125	10.9
VAS 225	19.2
VAS 232	24.1
VAS 240	26.9
VAS 250	26.9
VAS 340	39.1
VAS 350	44.4
VAS 365	47.4
VAS 665	69.0
VAS 780	112.0
VAS 8100	171.0
VAS 9125	251.0

VCS	k_V m³/h
VCS 110	4.7
VCS 115	5.7
VCS 120	7.6
VCS 125	8.1
VCS 225	16.3
VCS 232	19.1
VCS 240	20.4
VCS 250	20.7
VCS 340	31.2
VCS 350	34.1
VCS 365	35.9
VCS 665	61.0
VCS 780	87.0
VCS 8100	131.0
VCS 9125	193.0

Example

We want to find the size and nominal flange width for a gas solenoid valve VAS.
We have the maximum flow rate $V_{(n)\ max}$, the inlet pressure p_e and the natural gas temperature T.

$\dot{V}_{(n)\ max} = 60\ m^3/h$
$p_e = 70\ mbar = 0.07\ bar \Rightarrow$
$p_{e\ absolute} = 0.07\ bar + 1\ bar = 1.07\ bar$
$\Delta p_{max} = 0.01\ bar$ (desired)
$p_{a\ absolute} = p_{e\ absolute} - \Delta p_{max}$
$p_{a\ absolute} = 1.07\ bar - 0.01\ bar = 1.06\ bar$
$T = 27\ °C \Rightarrow$
$T_{absolute} = 27 + 273\ K = 300\ K$

$$k_V = \frac{60}{514} \cdot \sqrt{\frac{0.83 \cdot 300}{0.01 \cdot 1.06}} = 17.9$$

The gas solenoid valve is selected using the next higher k_V value (see table): VAS 225.

Cont.

Type	R	N	F	A	05 [1]	N	L	K	Q	W	A	S*	G*	R*	L*	3 [1]			P [1]	M [1]
VAS 1	●	○			●	●	●	●	●	●		○	○	○	○	●	○	○		
VAS 2	●	○			●	●	●	●	●	●		○	○	○	○	●	○	○		
VAS 3	●	○			●	●	●	●	●	●		○	○	○	○	●	○	○		
VAS 6			●	○	●	●	●	●	●	●		○	○	○	○	●	○	○	●	●
VAS 7			●	○	●	●	●	●	●	●		○	○	○	○	●	○	○	●	●
VAS 8			●	○	●	●	●	●	●	●		○	○	○	○	●	○	○	●	●
VAS 9			●	○	●	●					●	○	○	○		●	○	○	●	●

Rp internal thread = R
NPT internal thread = N
ISO flange = F
ANSI flange = A

Max. inlet pressure
p_e max. 500 mbar = 05 [1]

Quick opening, quick closing = N
Slow opening, quick closing = L

Mains voltage: 24 V DC = K
120 V AC; 50/60 Hz = Q
230 V AC; 50/60 Hz = W
120–230 V AC; 50/60 Hz = A

Position indicator with visual indicator = S*
Position indicator with visual indicator and gold contacts = G*

Viewing side: right = R*
left = L*

Electrical connection:
M20 cable gland = 3 [1]
Plug with socket
Plug without socket

Measuring connection at the top: 2 screw plugs at the inlet and outlet = P [1]
2 pressure test points at the inlet and outlet = M [1]

* VAS 1–3: Position indicator and bypass valve cannot be fitted together on one side.
[1] The specifications are only included in the type designation for VAS 6-9.

Cont.

Type	R	N	F	A	05 [1]	N	L	N	L	K	Q	W	A	S*	G*	R*	L*	3 [1]			P [1]	M [1]
VCS 1	●	○			●	●	●	●	●	●	●	●		○	○	○	○	●	○	○		
VCS 2	●	○	○**	○**	●	●	●	●	●	●	●	●		○	○	○	○	●	○	○		
VCS 3	●	○	○**	○**	●	●	●	●	●	●	●	●		○	○	○	○	●	○	○		
VCS 6			●	○	●	●		●	●	●	●	●		○	○	○	○	●	○	○	●	●
VCS 7			●	○	●	●		●	●	●	●	●		○	○	○	○	●	○	○	●	●
VCS 8			●	○	●	●		●	●	●	●	●		○	○	○	○	●	○	○	●	●
VCS 9			●	○	●	●		●					●	○	○	○		●	○	○	●	●

Rp internal thread = R
NPT internal thread = N
ISO flange = F
ANSI flange = A

Max. inlet pressure p_e max.
500 mbar = 05 [1]

1st valve quick opening, quick closing = N
1st valve slow opening, quick closing = L

2nd valve quick opening, quick closing = N
2nd valve slow opening, quick closing = L

Mains voltage: 24 V DC = K
120 V AC; 50/60 Hz = Q
230 V AC; 50/60 Hz = W
120–230 V AC; 50/60 Hz = A

Position indicator with visual indicator = S*
Position indicator with visual indicator and gold contacts = G*

Viewing side: right = R*
left = L*

Electrical connection:
M20 cable gland = 3 [1]
Plug with socket
Plug without socket

Measuring connections at the top of the inlet/outlet flange: Screw plugs = P1)
Pressure test points = M1)

* VCS 1–3: Position indicator and bypass valve cannot be fitted together on one side.

** Available for inlet/outlet flange nominal sizes DN 40 and DN 50.

[1] The specifications are only included in the type designation for VAS 6–9.

Conversion factors

SI unit ×	multiplier =	US unit
m^3/h	35.31	SCFH
bar	0.0145	psi
mbar	14.52	psi
mbar	0.39	"WC
mm	0.039	inch
kg	2.2	lbs
litres	0.26	gal

US unit ×	multiplier =	SI unit
SCFH	0.0283	m^3/h
psi	0.0689	bar
psi	68.89	mbar
"WC	2.54	mbar
inch	25.4	mm
lbs	0.45	kg
gal	3.79	litres

$°C = (°F - 32) \times 5/9$

$°F = (°C \times 9/5) + 32$