

Solenoid valves for gas VG

Technical Information · GB

3 Edition 06.13



- Safety valves for gas
- Quick or slow opening with adjustable start gas rate
- Flow rate can be restricted
- Robust design for a long service life
- Suitable for high-duty cycling
- EC type-tested and certified
- AGA approved
- Certified by Gosstandart under Technical Regulations



krom
schröder

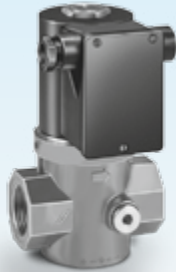
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1 Application



VG 6 to 15/10



*VG..R..N
quick opening*



*VG..R..L
slow opening*



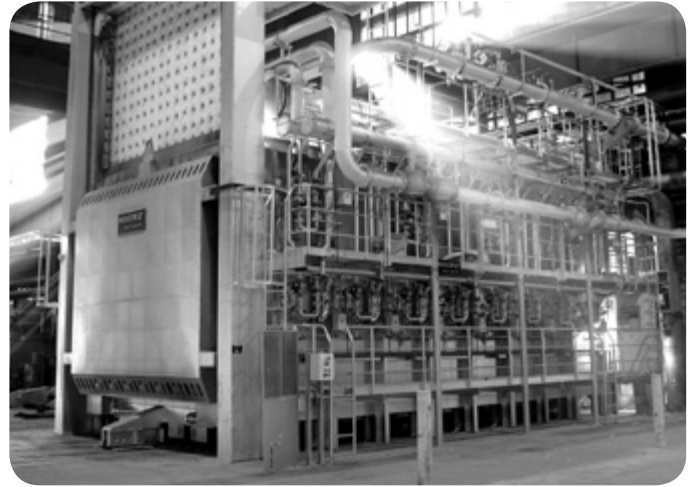
*VG..F..N
quick opening*

Robust gas solenoid valves VG for safeguarding and controlling the air and gas supply to gas burners and gas appliances. For heavy duty use in gas control and safety systems in industrial heat generation.

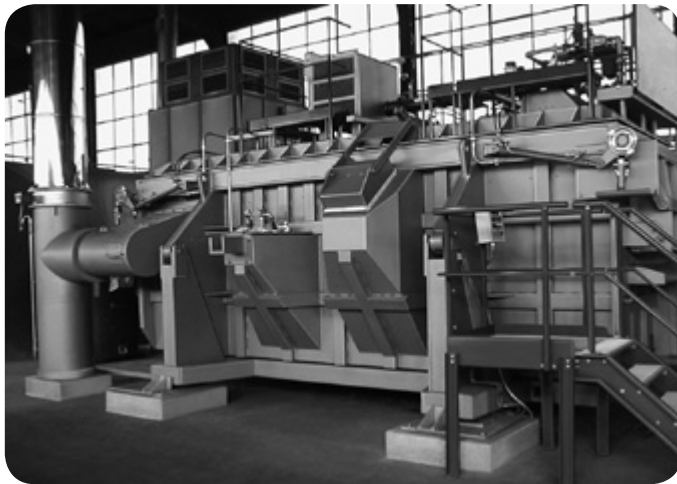
1.1 Examples of application



Metallurgical industry: forging furnace



Ceramics industry: intermittent shuttle kiln



Aluminium industry: smelting furnace

2 Certification

EC type-tested and certified



pursuant to

- Gas Appliances Directive (2009/142/EC) in conjunction with EN 13611 and EN 161

Meets the requirements of the

- Low Voltage Directive (2006/95/EC),
- EMC Directive (2004/108/EC).

AGA approved



Australian Gas Association, Approval No.: 3968

www.agasn.au/product_directory

Approval for Russia



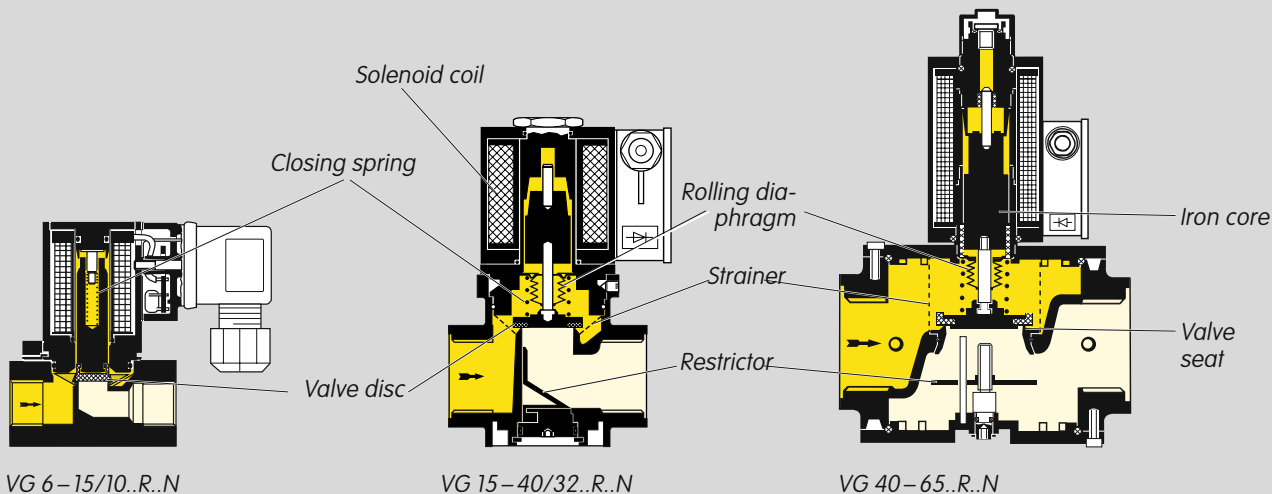
Certified by Gosstandart under Technical Regulations.

Approved by Rostekhnadzor (RTN).

Scan of the approval for Russia (RUS) – see www.docuthek.com → Elster Kromschroder → Products → 03 Valves and butterfly valves → Solenoid valves for gas VG → Kind of document: Certificate → VG B00071 (nat. Zertifikat Russland) (RUS)

3 Function

3.1 Solenoid valve for gas VG..R..N, quick opening



The gas solenoid valve VG is closed when de-energized.

Opening: the applied AC voltage is rectified and generates a powerful magnetic field in the solenoid coil. The magnetic field attracts the iron core and lifts the valve disc from the valve seat, acting against the effective inlet pressure and the closing spring force. The gas solenoid valve VG opens and the gas supply is released.

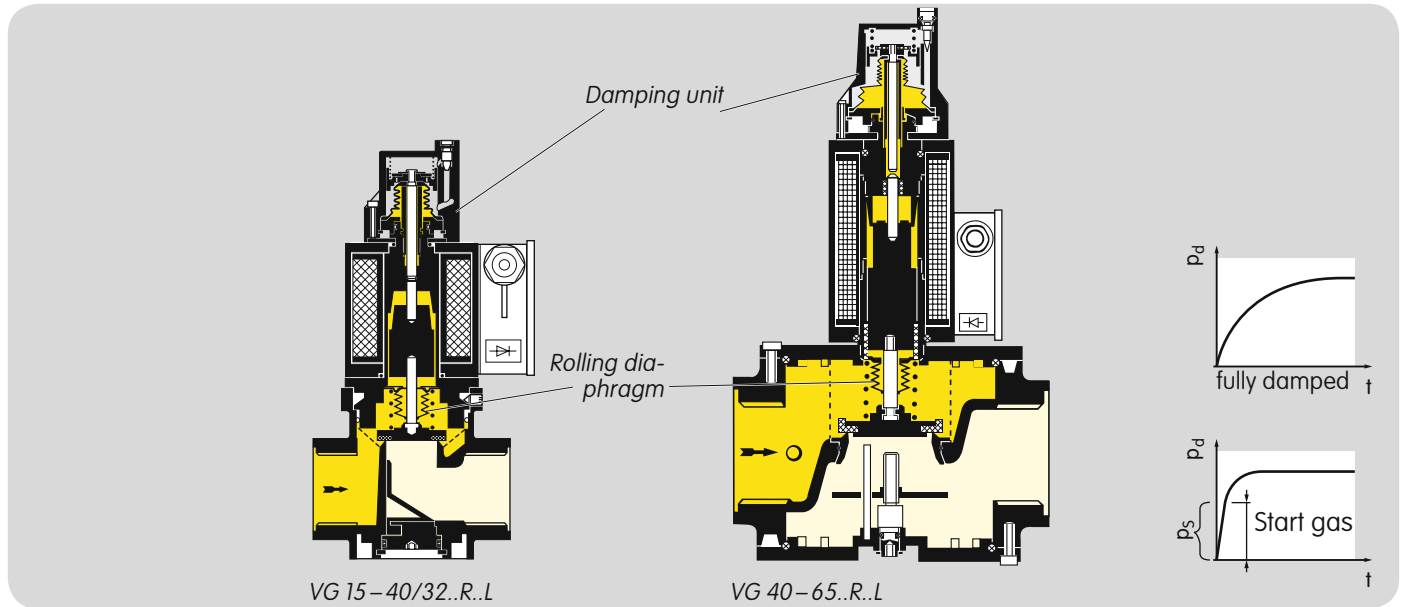
Closing: when the voltage is disconnected, the magnetic field collapses and within 1 s, the closing spring pushes the iron core with valve disc back onto the valve seat. The gas solenoid valve VG closes and the gas supply is stopped.

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

VG 15–65

In the standard version, the solenoid valves are suitable for operation with biologically produced methane. A rolling diaphragm prevents dirt deposits in the guide tube. The flow rate can be varied by a restrictor in the housing bottom.

3.2 Solenoid valve for gas VG..R..L, slow opening



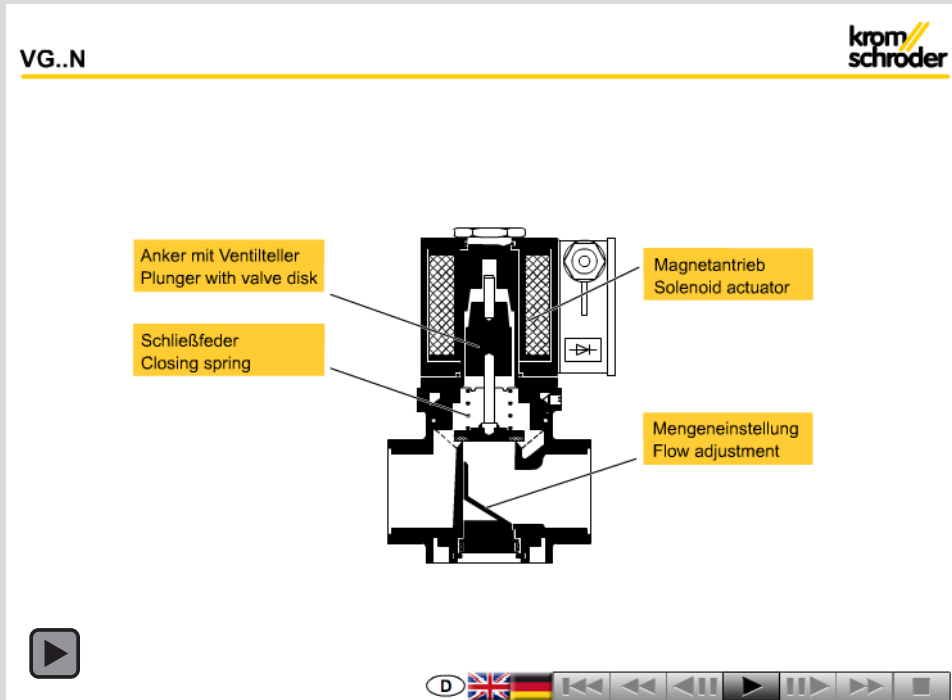
The gas solenoid valve VG..L opens within 10 s.

With start gas rate: the gas solenoid valve opens with a quick initial lift and then continues slowly until it is fully open. A start gas rate 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% of the flow rate (at $\Delta p = 1$ mbar):

Turning it clockwise will decrease the start gas rate and turning it anti-clockwise will increase the start gas rate. No start gas rate is set at the factory.

3.3 Animation VG..R..N, quick opening



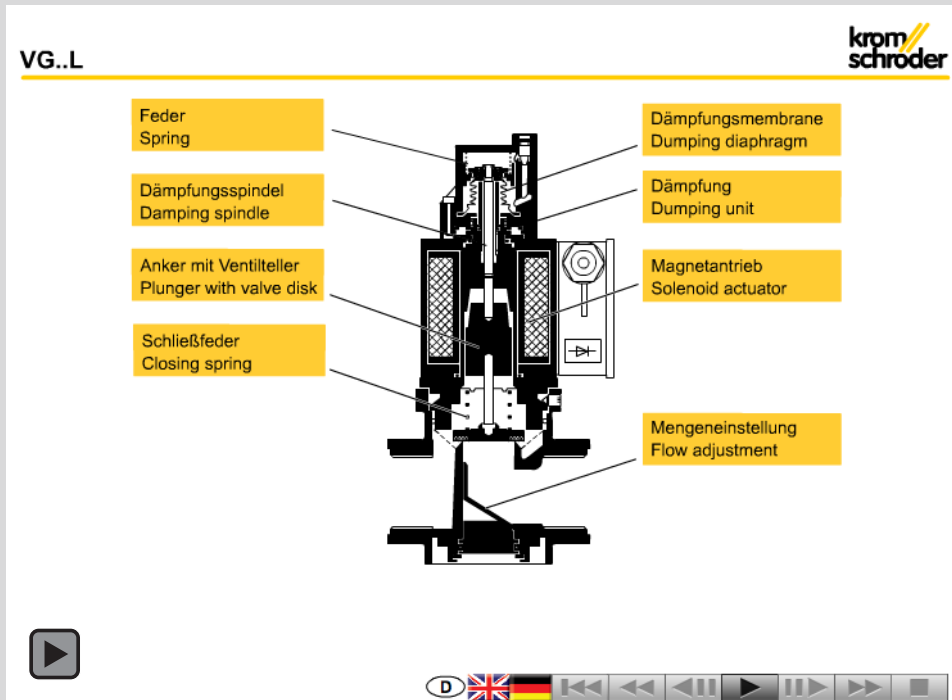
The interactive animation shows the function of the gas solenoid valve VG..N, quick opening.

Click on the picture. The animation can be controlled using the control bar at the bottom of the window (as on a DVD player). To play the animation, you will need Adobe Reader 9 or a newer version. If you do not have Adobe Reader on your system, you can download it from the Internet.

Go to www.adobe.com, click on "Adobe Reader" in the "Download" section and follow the instructions.

If the animation does not start to play, you can download it from the document library (Docuthek) as an independent application.

3.4 Animation VG..R..L, slow opening



The interactive animation shows the function of the gas solenoid valve VG..L, slow opening.

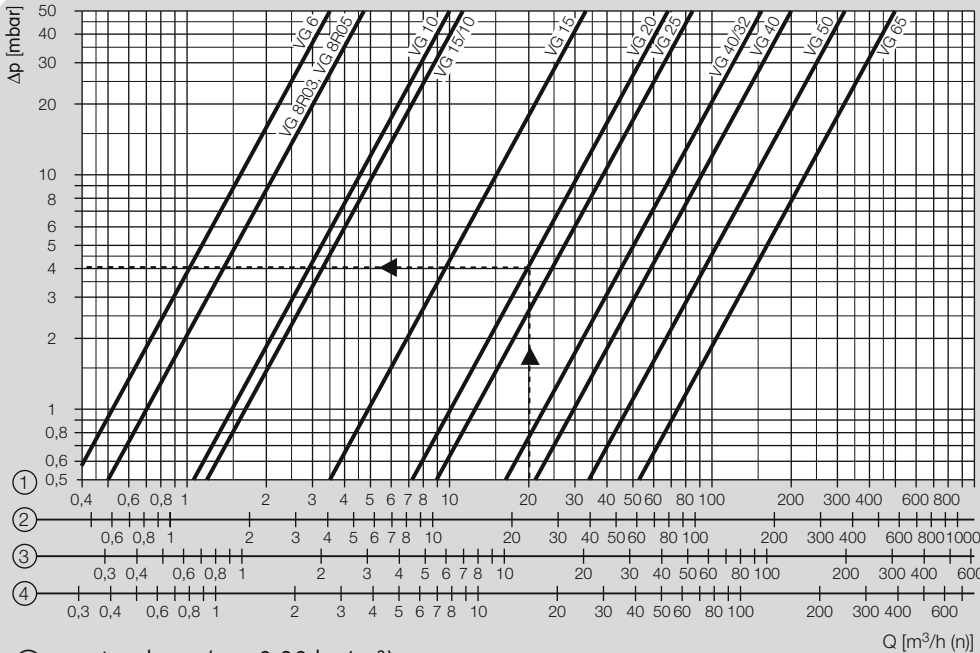
Click on the picture. The animation can be controlled using the control bar at the bottom of the window (as on a DVD player). To play the animation, you will need Adobe Reader 9 or a newer version. If you do not have Adobe Reader on your system, you can download it from the Internet.

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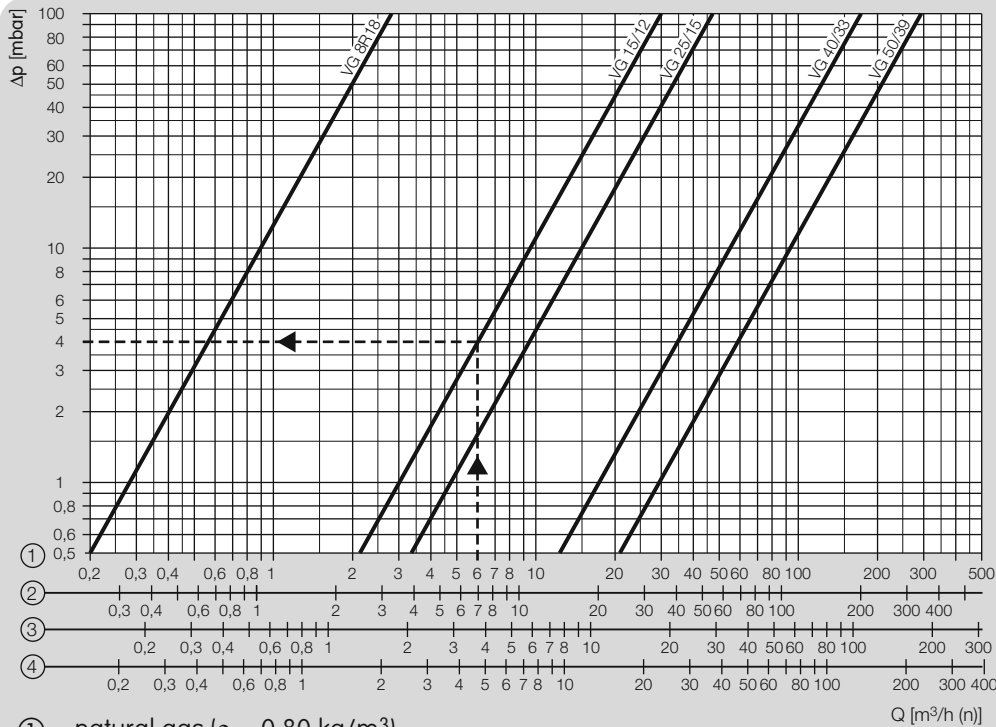
If the animation does not start to play, you can download it from the document library (Docuthek) as an independent application.

4 Flow rate

4.1 Valves for low inlet pressures, $p_u < 1$ bar



4.2 Valves for higher inlet pressures, $p_U \geq 1$ bar



Reading instructions: when determining the pressure loss, operating cubic metres must be entered. Then the pressure loss Δp read must be multiplied by the absolute pressure in bar (positive pressure + 1) to account for the change in the medium's density.

Example:

inlet pressure p_U (positive pressure) = 1 bar,
 gas type: natural gas,
 operating flow rate $Q_b = 6 \text{ m}^3/\text{h}$,
 Δp from diagram = 4 mbar,
 $\Delta p = 4 \text{ mbar} \times (1 + 1) = 8 \text{ mbar}$ on the solenoid valve VG 15/12.

4.3 k_v value

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

$Q_{(n)}$ = Flow rate (standard state) [m³/h]

k_v = Valve coefficient

Δp = Pressure loss [bar]

p_d = 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]

$$k_v = \frac{Q_{(n)}}{514} \cdot \sqrt{\frac{\rho_n \cdot T}{\Delta p \cdot p_d}} \quad Q_{(n)} = 514 \cdot k_v \cdot \sqrt{\frac{\Delta p \cdot p_d}{\rho_n \cdot T}}$$

$$\Delta p = \left(\frac{Q_{(n)}}{514 \cdot k_v} \right)^2 \cdot \frac{\rho_n \cdot T}{p_d}$$

$p_u < 1$ bar

VG	k_v m ³ /h
VG 6	0.6
VG 8	0.8
VG 10	1.6
VG 15/10	1.9
VG 15	5.6
VG 20	11.3
VG 25	14.3
VG 40/32	26.1
VG 40	33.8
VG 50	53.4
VG 65	83.0

$p_u \geq 1$ bar

VG	k_v m ³ /h
VG 8R18	0.3
VG 15/12R18	3.5
VG 25/15R18	5.4
VG 40/33..10	20.1
VG 50/39..10	34.0

Example

We want to find the size and nominal flange width for a gas solenoid valve VG.

We have the maximum flow rate $Q_{(n) \max.}$ the inlet pressure p_u and the natural gas temperature T .

$Q_{(n) \max.} = 60$ m³/h

$p_u = 70$ mbar = 0.07 bar →

$p_u \text{ absolute} = 0.07 \text{ bar} + 1 \text{ bar} = 1.07 \text{ bar}$

$\Delta p_{\max} = 0.01$ bar (desired)

$p_d \text{ absolute} = p_u \text{ absolute} - \Delta p_{\max}$

$p_d \text{ absolute} = 1.07 \text{ bar} - 0.01 \text{ bar} = 1.06 \text{ bar}$

$T = 27$ °C →

$T_{\text{absolute}} = 27 + 273 \text{ K} = 300 \text{ K}$

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

The gas solenoid valve is selected using the next higher k_v value (see table): VG 40/32.

5 Selection

5.1 VG 6-15/10

Type	R	K	01	03	05	18	T	Q	K	5	6	6L	G	V
VG 6		●		●	○		●	○	○	○	●	○	●	
VG 6	●				●		●	○	○	○	●	○		
VG 8	●			●	○	○	●	○	○	○	●	○	●	○
VG 10	●		●				●	○	○	○	●	○		
VG 15/10	●		●				●	○	○	○	●	○	○	

● = standard

○ = optional

Order example:

VG 8R03T6G

5.1.1 Type code

Code	Description
VG	Gas solenoid valve
6, 8, 10, 15/10	Nominal diameter
K	Double-cone olive for 8 mm tube loosely enclosed
R	Rp internal thread
01	p _u max. 100 mbar
03	p _u max. 360 mbar
05	p _u max. 500 mbar
18	p _u max. 1.8bar
T	Mains voltage 220/240 V AC, 50/60 Hz
Q	Mains voltage 120 V AC, 50/60 Hz
K	Mains voltage 24 V DC
5	Connection via standard plug without socket
6	Connection via standard plug and socket
6L	Connection via standard plug and socket with lamp
G	Low-noise
V	Viton valve disc seal

5.2 VG 15-65

Type	R	F	02	03	10	18	N	L	T	Q	K	3	1	3	D	M	V	Z
VG 15	●		●				●	○	●	○		●	●		●	○	○	○
VG 15/12	●						●		●	○	○	●	●					
VG 20	●			●		●	●	○	●	○	○	●	●		●	●	●	●
VG 25	●			●			●	○	●	○	○	●	●		●	●	●	●
VG 25/15	●					●	●		●	○	○	●	●					
VG 40/32	●		●				●	○	●	○	○	●	●		●	●	●	●
VG 40	●			●			●	○	●	○	○	●		●	●	●	●	●
VG 40/33	●	●				●	●		●	○	○	●		●				
VG 50	●	●		●			●	○	●	○	○	●			●	●	●	●
VG 50/39	●	●				●	●		●	○	○	●		●				
VG 65		●	●				●	○	●	○	○	●		●	●	●	●	●

● = standard
○ = optional

Order example

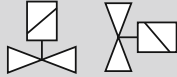
VG 40R03NT33DMVZ

5.2.1 Type code

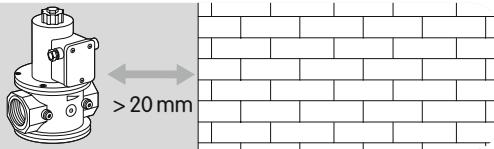
Code	Description
VG	Gas solenoid valve
15-65	Nominal diameter
R	Rp internal thread
F	Flange to ISO 7005
02	p _u max. 200 mbar
03	p _u max. 360 mbar
10	p _u max. 1 bar
18	p _u max. 1.8 bar
L	Slow opening, quick closing
N	Quick opening, quick closing
T	Mains voltage 220/240 V AC, 50/60 Hz
Q	Mains voltage 120 V AC, 50/60 Hz
K	Mains voltage 24 V DC
3	Terminal connection box, IP 54
1	Screw plug at the inlet
3	Screw plug at the inlet and outlet
D	With flow adjustment
M	Suitable for biologically produced methane
V	Viton valve disc seal
Z	With rolling diaphragm

6 Project planning information

6.1 Installation

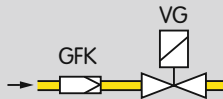


Installation position: black solenoid actuator in the vertical upright position or tilted up to the horizontal, not upside down.



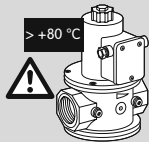
The gas solenoid valve VG must not be in contact with masonry. Minimum clearance 20 mm.

Do not store or install the unit in the open air.



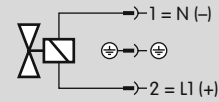
Sealing material and dirt, e.g. thread cuttings, must not be allowed to get into the valve housing.

Install a filter (GFK) upstream of every system.



The solenoid body heats up during operation depending on ambient temperature and voltage.

6.2 Wiring



Wiring to EN 60204-1.

7 Technical data

Gas types: natural gas, town gas, LPG (gaseous), biologically produced methane (max. 0.1 %-by-vol. H₂S) – VG..M version only – or clean air; other gases on request. The gas must be dry in all temperature conditions and must not contain condensate.

Opening time:

VG..N: quick opening, 0.5 s.

VG..L: slow opening, 10 s.

Closing time:

VG..N, VG..L < 1 s.

Ambient temperature: -20 to +60°C.

Storage temperature: -20 to +40°C.

Safety valve:

Class A Group 2 pursuant to EN 161.

Mains voltage:

240/220 V AC, +10/-15%, 50/60 Hz,

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

24 V DC, +10/-15%.

Electrical connection of VG 6-15/10:

- plug with socket to EN 175301-803.

Electrical connection of VG 15-40/32:

- plug with socket to EN 175301-803,
- cable gland: PG 11,
- connection terminal: 2.5 mm².

Electrical connection of VG 40-65:

- plug with socket to EN 175301-803,
- cable gland: PG 13.5,
- connection terminal: 2.5 mm².

Enclosure: IP 54.

Duty cycle: 100%.

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

Solenoid coil insulation: class F insulating material.

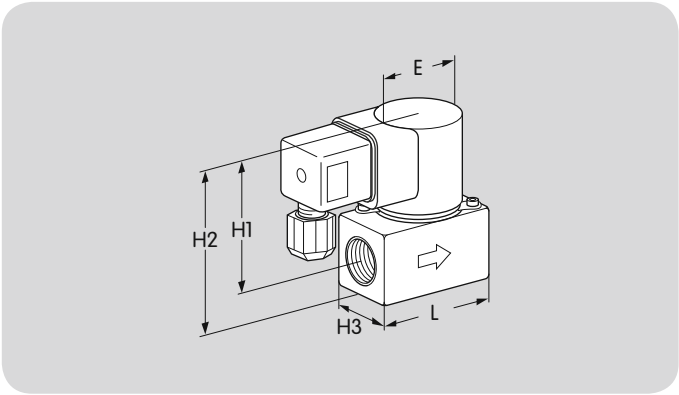
Switching frequency: any.

Valve housing: aluminium,
valve disc: Perbunan.

Internal thread: Rp to ISO 7-1.

Flange: ISO 7005 (DN 65 to DIN 2501), PN 16.

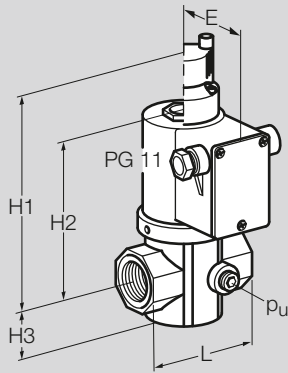
7.1 Dimensions VG 6 to 15/10



Data table

Type	Dimensions							p _U max. mbar	Q Δp = 1 mbar m³/h air	P 220 V AC 120 V AC 24 V DC VA/W	P 240 V AC VA/W	Weight g
	DN	Conne- ction	L mm	H1 mm	H2 mm	H3 mm	E mm					
VG 6K03G	6	M1 2 x 1	53	63	76	26	35	360	0.45	8	9.5	400
VG 6K05	6	M1 2 x 1	53	63	76	26	35	500	0.45	8	9.5	400
VG 6R05	6	Rp 1/8	53	63	76	26	35	500	0.45	8	9.5	400
VG 8R03G	8	Rp 1/4	53	63	76	26	35	360	0.60	8	9.5	400
VG 8R05	8	Rp 1/4	53	63	76	26	35	500	0.60	8	9.5	400
VG 8R18	8	Rp 1/4	53	63	76	26	35	1800	0.25	8	9.5	400
VG 10R01	15	Rp 3/8	60	66	82	32	35	100	1.25	8	9.5	450
VG 15/10R01	15	Rp 1/2	71	66	82	32	35	100	1.35	8	9.5	450
VG 15/10R01G	15	Rp 1/2	71	66	82	32	35	100	1.35	8	9.5	450

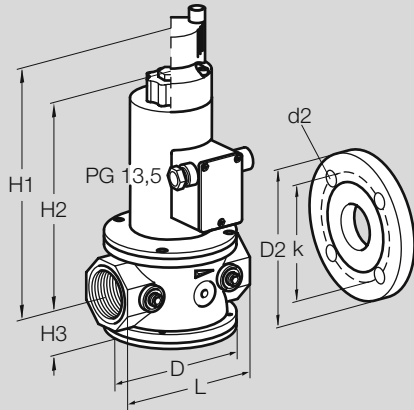
7.2 Dimensions VG 15 to 40/32



Data table

Type	Dimensions							p _u max. mbar	Q Δp = 1 mbar m ³ /h air	P 220 V AC 120 V AC 24 V DC VA/W	P 240 V AC VA/W	Weight kg
	DN	Connection	L mm	H1 mm	H2 mm	H3 mm	E mm					
VG 15R02..	15	Rp ½	71	161	112	24	56	200	3.8	32	38	1.26
VG 15R03..	15	Rp ½	71	161	112	24	56	360	3.8	32	38	1.26
VG 15/12R18..	15	Rp ½	71	–	112	24	61	1800	2.3	31	37	1.58
VG 20R03..	20	Rp ¾	91	175	126	33	66	360	8	36	42	2.25
VG 25R03..	25	Rp 1	91	175	126	33	66	360	10	36	42	2.25
VG 25/15R18..	25	Rp 1	91	–	126	33	66	1800	3.8	36	42	2.25
VG 40/32R02..	40	Rp 1½	128	194	145	39	66	200	18	36	42	2.80

7.3 Dimensions VG 40 to 65



Data table

Type	Dimensions							Flange		Hole		p _u max. mbar	Q Δp = 1 mbar m ³ /h air	P 220 V AC 120 V AC 24 V DC VA/W		Weight kg
	DN	Con- nection	L mm	D mm	H1 mm	H2 mm	H3 mm	D2 mm	k mm	d2 mm	No.			VA/W	VA/W	
VG 40R02..	40	Rp 1½	150	129	280	210	51	–	–	–	–	200	24	73	86	7.1
VG 40/33R10..	40	Rp 1½	150	129	280	210	51	–	–	–	–	1800	13.5	73	86	7.1
VG 40/33F10..	40	40	150	129	280	210	51	150	110	18	4	1000	13.5	73	86	8.8
VG 50R03..	50	Rp 2	180	157	291	221	62	–	–	–	–	360	37	85	99	12.8
VG 50F03..	50	50	230	157	291	221	62	165	125	18	4	360	37	85	99	14.8
VG 50/39R10..	50	Rp 2	180	157	–	221	62	–	–	–	–	1000	23	85	99	12.8
VG 50/39F10..	50	50	230	157	–	233	62	165	125	18	4	1000	23	85	99	14.8
VG 65F02..	65	65	290	183	303	233	74	185	145	18	4	200	57	85	99	16.3

8 Maintenance cycles

At least once a year, twice a year in the case of biologically produced methane.

Feedback

Finally, we are offering you the opportunity to assess this "Technical Information (TI)" and to give us your opinion, so that we can improve our documents further and suit them to your needs.

Clarity

Found information quickly
Searched for a long time
Didn't find information
What is missing?
No answer

Comprehension

Coherent
Too complicated
No answer

Scope

Too little
Sufficient
Too wide
No answer



Use

To get to know the product
To choose a product
Planning
To look for information

Navigation

I can find my way around
I got "lost"
No answer

My scope of functions

Technical department
Sales
No answer

Remarks

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