

Motorized valves for gas VK

Technical Information · GB
3 Edition 08.16

- Safety valves for gas
- Flow rate can be restricted
- Robust design for a long service life
- Energy-saving thanks to automatic motor shut-off
- Explosion-proof version available
- One- or two-stage, available with position indicator
- EC type-tested and certified
- AGA approved



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1 Application



VK..R



VK..F



VK..X

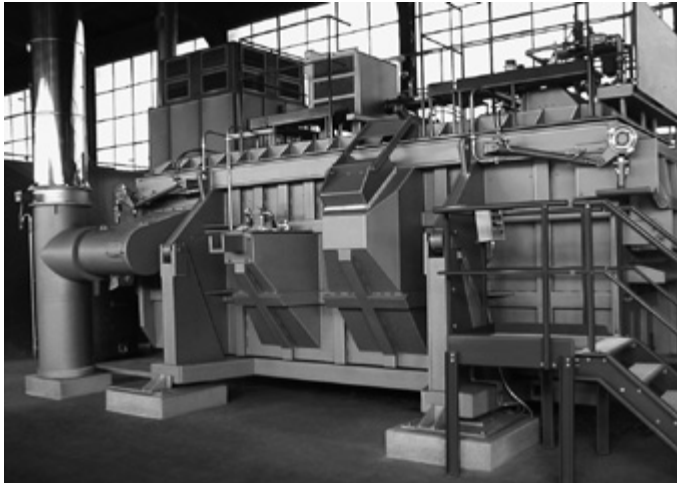
Robust motorized valves for gas VK for safeguarding and controlling the air and gas supply to gas burners and gas appliances. For heavy-duty use in gas control and safety systems in industrial heat generation. When a position indicator is fitted, two-stage operation is possible.

Special device versions are suitable for Zone 1 and 2 hazardous areas or comply with the requirements pursuant to TRD 412, Para. 4.2 "Use in open-air installations" and 5.1 "Shut-off valves outside the boiler room".

1.1 Examples of application



Metallurgical industry: forging furnace



Aluminium industry: smelting furnace



Ceramics industry: intermittent shuttle kiln

2 Certification

EU 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 (2014/35/EU)
- EMC Directive (2014/30/EU)

VK 40-200..X, VK 50-250..HX

pursuant to

- Directive 2014/34/EU “Equipment and protective systems intended for use in potentially explosive atmospheres” in conjunction with EN 60079

AGA approved



Australian Gas Association, Approval No.: 3968

www.agasn.au/product_directory

Approval for Russia



The product VK meets the technical specifications of the Eurasian Customs Union.

IECEx system

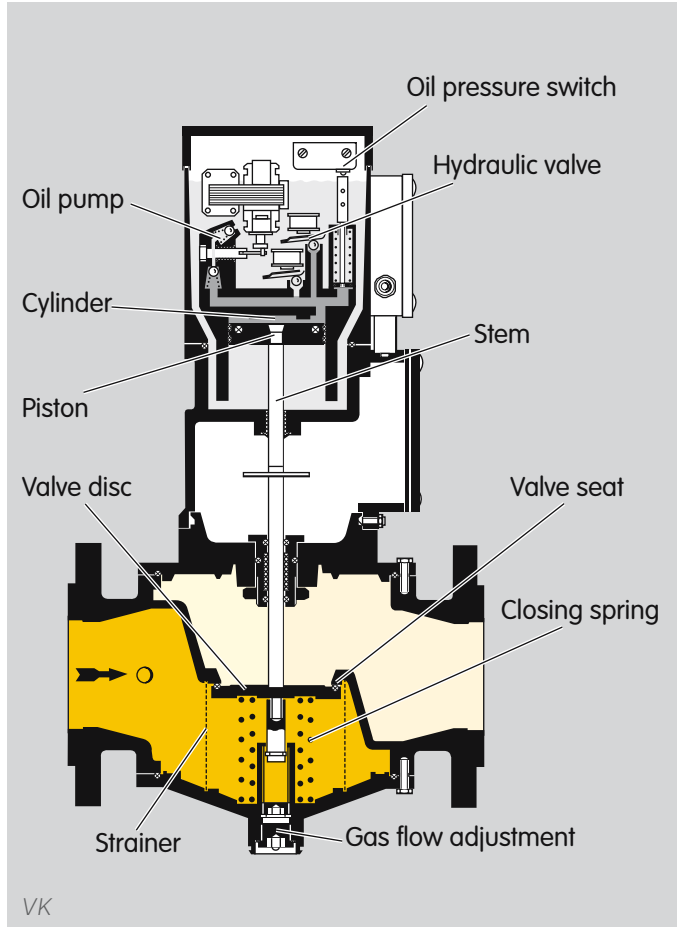


Complies with the requirements of the IECEx system in conjunction with the IEC 60079 standards.

For IECEx Certificate of Conformity, see:

<http://iecex.iec.ch/iecex/iecexweb.nsf/certificates-ajaxall/IECEx%20BVS%2015.0115%20issue:%200?opendocument>

3 Function



3.1 Motorized valve for gas VK

Motorized valve for gas VK is a hydraulically actuated safety valve that is closed when de-energized.

Opening: the hydraulic valve closes once mains voltage has been applied. The oil pump fills the cylinder with oil and the piston is moved down against the force of the closing spring. The valve opens. If piston, stem and valve disc are at the limit, the pressure will increase in the cylinder and the pressure switch will switch the motor off.

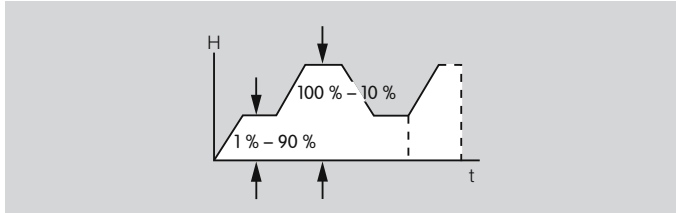
Closing: when the voltage is disconnected, the hydraulic valve opens and the piston is pushed up again by the force of the closing spring. The motorized valve closes within 1 second and the gas supply is stopped.

The gas volume can be set by limiting the valve stroke.

The strainer in the inlet of the motorized valve for gas prevents deposits of dirt particles on the valve seat.

3.2 Motorized valve for gas VK..Z

The motorized valve for gas VK..Z features a two-stage actuator. The first stage can be set between 1% and 90% using a switch. A second stage can be set between 10% and 100% using an additional flow rate restrictor.

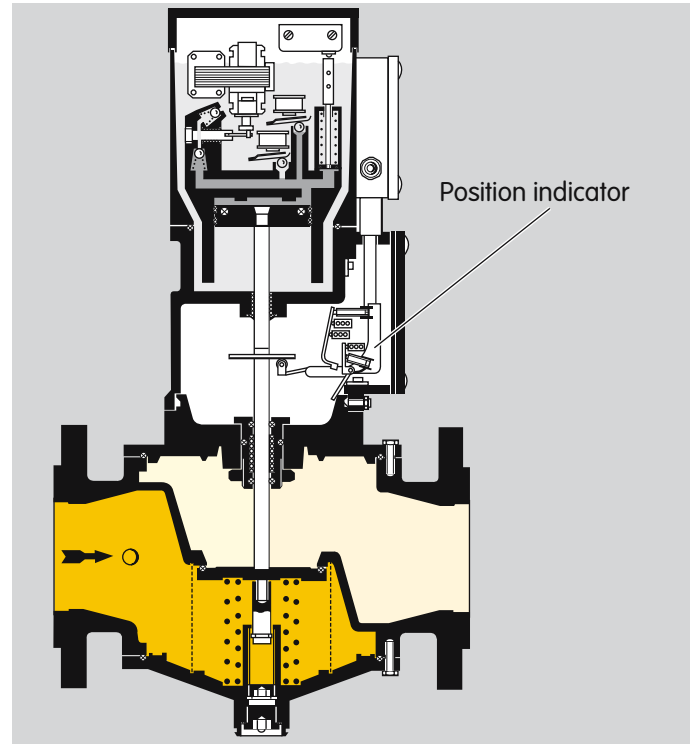


3.3 VK with position indicator

Opening: when the motorized valve for gas is opened, the position indicator switches and returns the “open” signal.

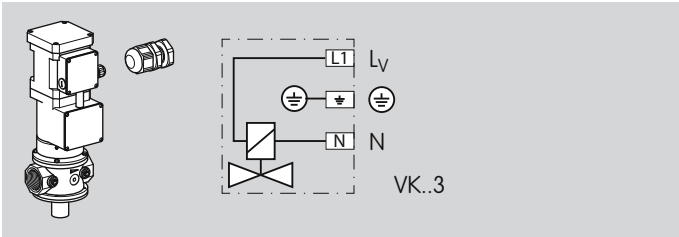
Closing: the motorized valve for gas VK is disconnected from the voltage supply and the closing spring presses the valve disc on to the valve seat. In the process, the position indicator switches and returns the “closed” signal.

Connection rating: 30 – 250 V, 50/60 Hz, max. 10 A (resistive load).

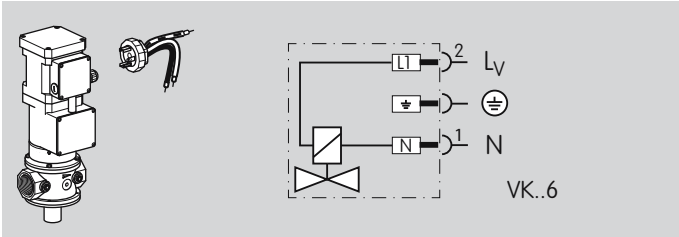


3.4 Connection diagram

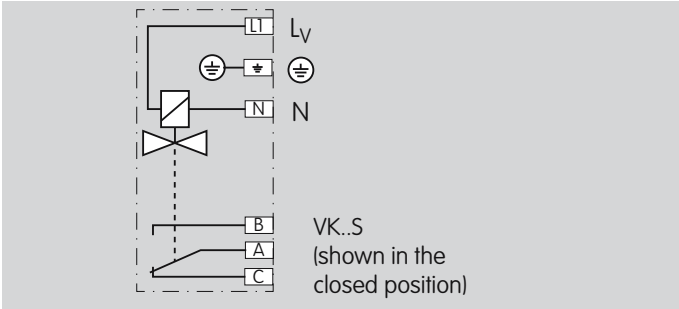
3.4.1 VK with M20 cable gland



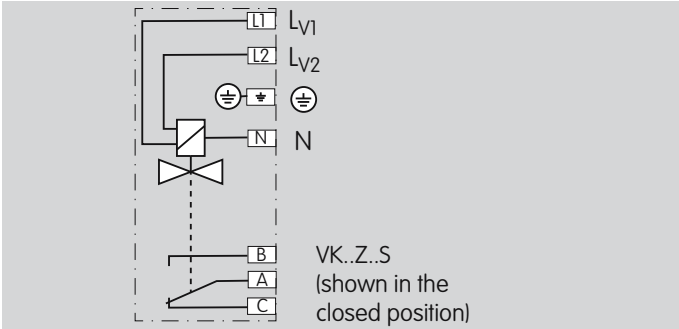
3.4.2 VK with plug



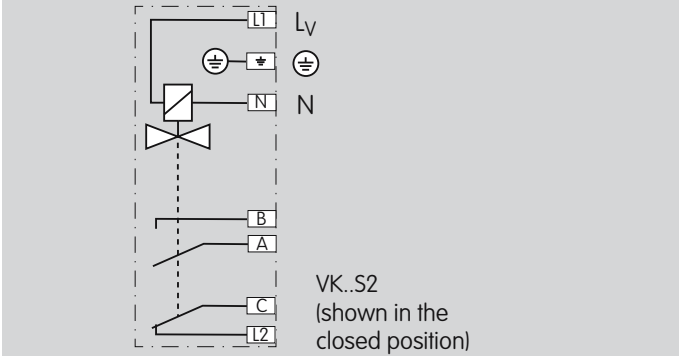
3.4.3 VK with position indicator



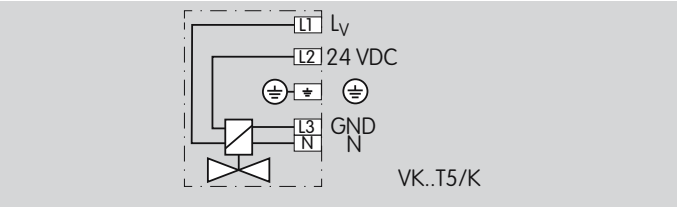
3.4.4 VK, two-stage, with position indicator



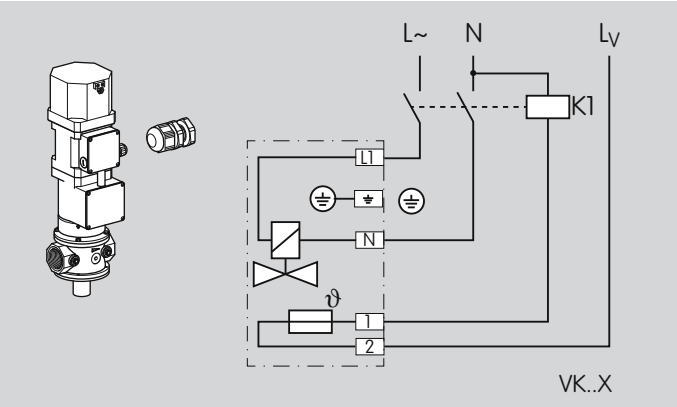
3.4.5 VK with two position indicators



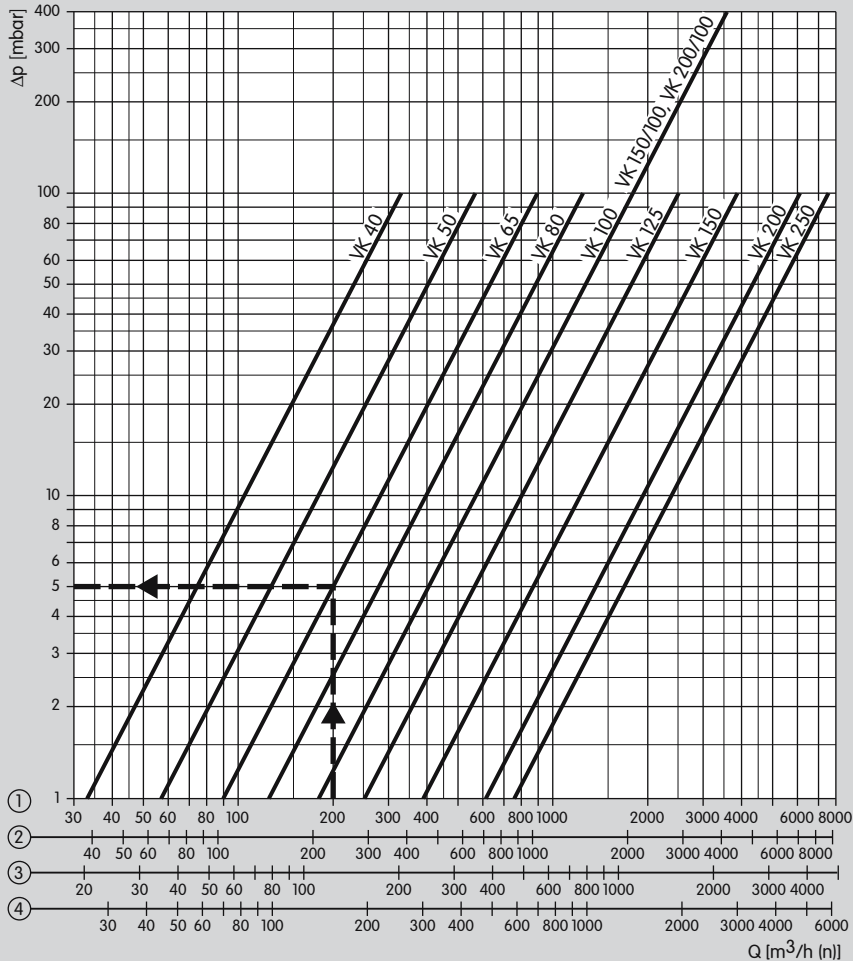
3.4.6 VK with 24 V holding voltage



3.4.7 VK, explosion-proof version, with M20 cable gland



4 Flow rate



① = natural gas ($\rho = 0.80 \text{ kg/m}^3$)

③ = LPG ($\rho = 2.01 \text{ kg/m}^3$)

② = town gas ($\rho = 0.64 \text{ kg/m}^3$)

④ = air ($\rho = 1.29 \text{ kg/m}^3$)

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 $Q_b = 200 \text{ m}^3/\text{h}$,

Δp from diagram = 5 mbar,

$\Delta p = 5 \text{ mbar} \times (1 + 1) = 10 \text{ mbar}$ on the motorized valve VK 65.

4.1 Calculating the nominal size

Enter density

Flow rate Q (standard)

Inlet pressure p_u

Δp_{max}

Medium temperature

Flow rate Q (operation)

Product $\Delta p \quad v$

4.2 k_v value

The nominal size 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]

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

VK	k _v m ³ /h
VK 40	30.8
VK 50	52.6
VK 65	83.1
VK 80	117.1
VK 100	168.2
VK 125	235.1
VK 150	363.1
VK 200	557.7
VK 250	701.0

Example

We want to find the nominal size for a motorized valve for gas VK.

We have the maximum flow rate Q_{(n) max.}, the inlet pressure p_u and the temperature T for the medium of natural gas.

Q_{(n) max.} = 400 m³/h

p_u = 500 mbar = 0.5 bar →

p_{u absolute} = 0.5 bar + 1 bar = 1.5 bar

Δp_{max.} = 0.01 bar (desired)

p_{d absolute} = p_{u absolute} - Δp_{max.}

p_{d absolute} = 1.5 bar - 0.01 bar = 1.49 bar

T = 27°C →

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 motorized valve for gas with the next higher k_v value is to be selected (see table): VK 80.

5 Selection

5.1 VK, VK..Z

	R	F	02	04	06	10	24	31	40	Z ¹⁾	T5	W5	W6	Y	Q6	M	P	T5/K	A	G ²⁾	9	6	3	D	S ¹⁾	S2	V	F	
VK 40	●	●				●			○	○	●	○	○	○	○	○	○	○	○	●		●	○	●	●	○	○	○	○
VK 50	●	●				●			○	○	●	○	○	○	○	○	○	○	○	●	○	●	○	●	●	○	○	○	○
VK 65	●	●				●			○	○	●	○	○	○	○	○	○	○	○	●	○	●	○	●	●	○	○	○	○
VK 80		●				●				○	●	○	○	○	○	○	○	○	○	●	○	●	○	●	●	○	○	○	○
VK 100		●				●				○	●	○	○	○	○	○	○	○	○	●	○	●	○	●	●	○	○	○	○
VK 125		●			●					○	●	○	○	○	○	○	○	○	○	●	○	●	○	●		○	○	○	○
VK 150		●		●						○	●	○	○	○	○	○	○	○	○	●	○	●	○	●		○	○	○	○
VK 200		●	●							○	●	○	○	○	○	○	○	○	○	●	○	●	○	●		○	○		○

- 1) The VK..Z is always supplied with a position indicator.
- 2) The higher inlet pressure is applicable for VK..G. It is only available with a flanged connection.
- = standard, ○ = optional

Order example:

VK 65R10T5A93D

5.2 VK..H

	F	05	10	15	20	40	60	80	T5	W5	W6	Y	Q6	M	P	T5/K	H	A	G	9	6	3	D	S	S2	V	F
VK 50..H	●							●	●	○	○	○	○	○	○	○	●		●	●	○	●	●	○	○	○	○
VK 65..H	●							●	●	○	○	○	○	○	○	○	●		●	●	○	●	●	○	○	○	○
VK 80..H	●						●		●	○	○	○	○	○	○	○	●		●	●	○	●	●	○	○	○	○
VK 100..H	●					●			●	○	○	○	○	○	○	○	●		●	●	○	●	●	○	○	○	○
VK 125..H	●		●		●				●	○	○	○	○	○	○	○	●		●	●	○	●			○	○	○
VK 150..H	●		●	●					●	○	○	○	○	○	○	○	●		●	●	○	●			○	○	○
VK 150/100..H	●					●			●	○	○	○	○	○	○	○	●		●	●	○	●			○	○	○
VK 200..H	●		●						●	○	○	○	○	○	○	○	●		●	●	○	●			○	○	○
VK 200/100..H	●					●			●	○	○	○	○	○	○	○	●		●	●	○	●			○	○	○
VK 250..H	●	●							●	○	○	○	○	○	○	○	●	●		●	○	●			○	○	○

1) For 1 bar: AlSi = standard
● = standard, ○ = optional

Order example:
VK 100F40T5HG93D

5.3 VK..X

	R	F	02	04	06	10	24	31	40	W5	W6	M	X	A	G ¹⁾	4	3	D	V
VK 40..X	●	●				●			○	●	○	○	●	●		●	●	●	○
VK 50..X	●	●				●			○	●	○	○	●	●	○	●	●	●	○
VK 65..X	●	●				●		○		●	○	○	●	●	○	●	●	●	○
VK 80..X		●				●	○			●	○	○	●	●	○	●	●	●	○
VK 100..X		●				●				●	○	○	●	●	○	●	●	●	○
VK 125..X		●			●					●	○	○	●	●	○	●	●		○
VK 150..X		●		●						●	○	○	●	●	○	●	●		○
VK 200..X		●	●							●	○	○	●	●	○	●	●		

1) The higher inlet pressure is applicable for VK..G. It is only available with a flanged connection.

● = standard, ○ = optional

Order example:

VK 50R10W5XA43D

5.4 VK..HX

Typ	F	05	10	15	20	40	60	80	W5	W6	M	H	X	A	G	4	3	D	V
VK 50..HX	●							●	●	○	○	●	●		●	●	●	●	○
VK 65..HX	●							●	●	○	○	●	●		●	●	●	●	○
VK 80..HX	●						●		●	○	○	●	●		●	●	●	●	○
VK 100..HX	●					●			●	○	○	●	●		●	●	●	●	○
VK 125..HX	●		●		●				●	○	○	●	●	○	●	●	●		○
VK 150..HX	●		●	●					●	○	○	●	●	○	●	●	●		○
VK 150/100..HX	●					●			●	○	○	●	●		●	●	●		
VK 200..HX	●		●						●	○	○	●	●	○	●	●	●		○
VK 200/100..HX	●					●			●	○	○	●	●		●	●	●		
VK 250..HX	●	●							●	○	○	●	●	●		●	●		

● = standard, ○ = optional

Order example:

VK 100F40W5HXG43D

5.5 Type code

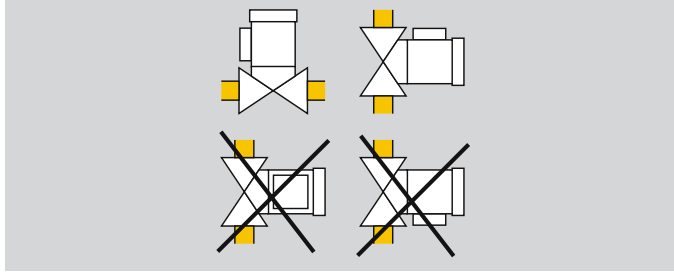
Code	Description
VK	Motorized valve for gas
40-250	Nominal size
R	Rp internal thread
F	Flange to ISO 7005
02	p _u max. 230 mbar
04	p _u max. 400 mbar
05	p _u max. 500 mbar
06	p _u max. 600 mbar
10	p _u max. 1 bar
15	p _u max. 1.5 bar
20	p _u max. 2 bar
24	p _u max. 2.4 bar
31	p _u max. 3.1 bar
40	p _u max. 4 bar
60	p _u max. 6 bar
80	p _u max. 8 bar
Z	2-stage
T5	Mains voltage: 220/240 V AC; 50 Hz
T5/K	Mains voltage: 220 V AC; 50 Hz / 24 V DC
W5	Mains voltage: 230 V AC; 50 Hz
Q6	Mains voltage: 120 V AC; 60 Hz
W6	Mains voltage: 230 V AC; 60 Hz
M	Mains voltage: 110 V AC; 50/60 Hz
P	Mains voltage: 100 V AC, 50/60 Hz
Y	Mains voltage: 200 V AC, 50/60 Hz
X	Explosion-proof version, IP 65
H	For higher inlet pressures
A	Valve housing made of AISi
G	Valve housing made of GGG 50 complying with TRD 412 and GUV
4	Terminal connection box, IP 65
6	Terminal connection box with 4-pin standard socket, IP 54
6L	Terminal connection box with 4-pin standard socket, with lamp, IP 54
9	Metal terminal connection box, IP 54

Code	Description
3	Screw plugs at the inlet and outlet
D	With flow adjustment
S	With position indicator
S2	With 2 position indicators
V	With Viton valve disc seal
F	With viewing window

6 Project planning information

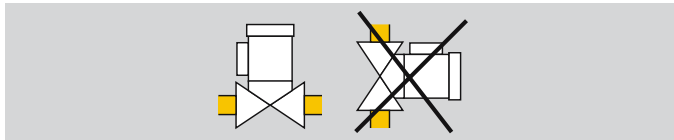
6.1 Installation

VK, VK..H

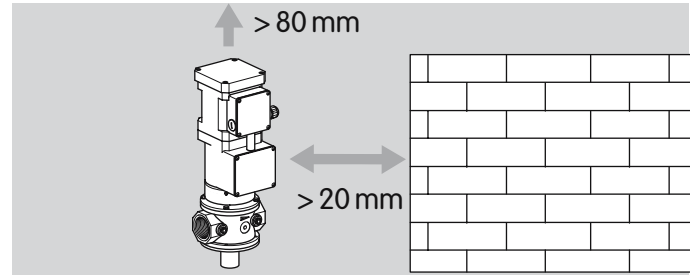


Installation position: actuator in the vertical upright position or tilted up to the horizontal, not upside down. The connection box must point upwards.

VK..X, VK..HX

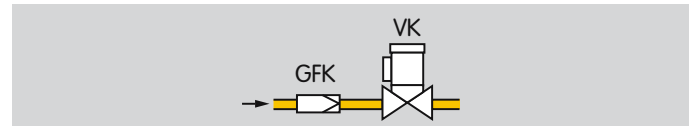


Installation position: actuator in the vertical upright position only.



The motorized valve for gas VK must not be in contact with masonry. Minimum clearance to the side: 20 mm. Ensure that there is sufficient space for installation and adjustment. Minimum clearance to the top: 80 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.

6.2 Explosion protection

Motorized valves for gas VK..X and VK..HX can be installed in Zone 1 and 2 hazardous areas. Only design-approved electrical operating equipment may be used for this.

Marking pursuant to ATEX:

 II 2G Ex e o IIC T5 Gb

Marking pursuant to IECEx:

2G Ex e o IIC T5 Gb

 II 2G Ex e o IIC T5 Gb	
	Specific marking of explosion protection
II	Equipment group for general industries, all flammable gases and vapours (as defined by Directive 2014/34/EU)
2G	Equipment category for explosive gases, vapours and hazes
Ex	Symbol for electrical equipment built according to European standards
e	Type of ignition protection: increased safety
o	Type of ignition protection: oil immersion
IIC	Suitable for gases of explosion group IIC; field of application: electrical equipment for all hazardous areas except for mines susceptible to firedamp
T5	Maximum surface temperature of the device determined: 100°C
Gb	Equipment protection level (EPL); device with high level of protection for use in potentially explosive atmospheres, in which there is no danger of ignition in normal operation or in the case of foreseeable faults/malfunctions

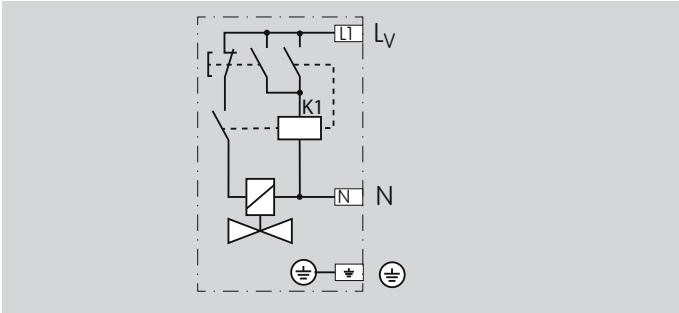
7 Accessories

7.1 Position indicator



For the “closed” or “not closed” signal.

Type	Order No.
VK..S	74911637
VK..S2	74960023
VK..HS	74918705
VK..HS2	74919317



7.2 Switch box with holding relay

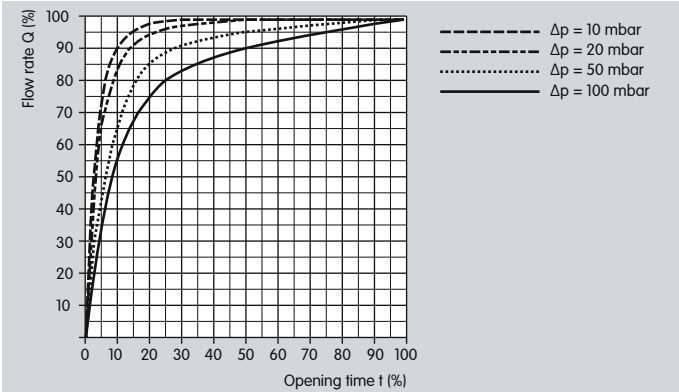
For “manual restart”, a separate switch box with holding relay can be connected. The holding relay prevents the gas from being automatically released in the case of a power failure.

Two different voltage variants are available:
220/240 V switch box: SK HR-T, Order No. 84408017,
110/120 V switch box: SK HR-N, Order No. 84408018,

8 Technical data

Gas types: natural gas, town gas, LPG (gaseous), biogas (max. 0.02 %-by-vol. H2S), landfill gas or clean air; other gases on request. The gas must be dry in all temperature conditions and must not contain condensate.

Opening time:



Nominal size	Opening time t VK	Opening time t VK..H
DN 40	5 s	-
DN 50 – 65	8 s	12 s
DN 80 – 100	10 s	18 s
DN 125 – 200	13 s	24 s
DN 250	-	24 s

Closing time: < 1 s.

Ambient temperature:

VK., VK..H, VK..Z: -15°C to +60°C,
VK..X, VK..HX: -15°C to +40°C.

Storage and transport temperature: -20°C to +40°C.

Safety valve: Class A Group 2 pursuant to EN 161.

Mains voltage:

220/240 V AC, +10/-15%, 50 Hz (standard),
230 V AC, +10/-15%, 50 Hz,
230 V AC, +10/-15%, 60 Hz,
220 V AC, +10/-15%, 50 Hz, 24 V DC,
200 V AC, +10/-10%, 50/60 Hz,
120 V AC, +10/-15%, 60 Hz,
110 V AC, +10/-15%, 50/60 Hz,
100 V AC, +10/-15%, 50/60 Hz.

Power consumption:

when opening: 90 VA, 50 W,
open: 9 VA, 9 W.

Electrical connection:

- M20 x 1.5,
- plug with socket to EN 175301-803,
- cable gland: M 20,
- connection terminal: 2.5 mm².

Enclosure: IP 54.

Duty cycle: 100%.

Safety class 1.

Valve housing:

aluminium, GGG 40 (coated inside and outside with epoxy powder coating).

Valve disc: Perbunan, Viton.

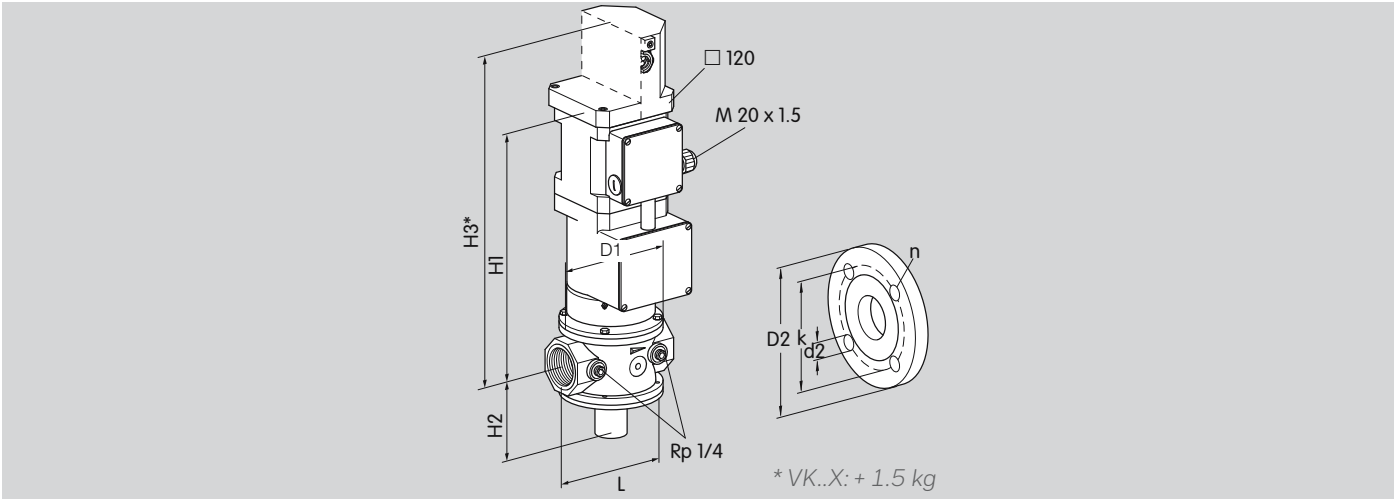
Actuator/drive: AlSi.

Internal thread: Rp to ISO 7-1.

Flange: ISO 7005, PN 16.

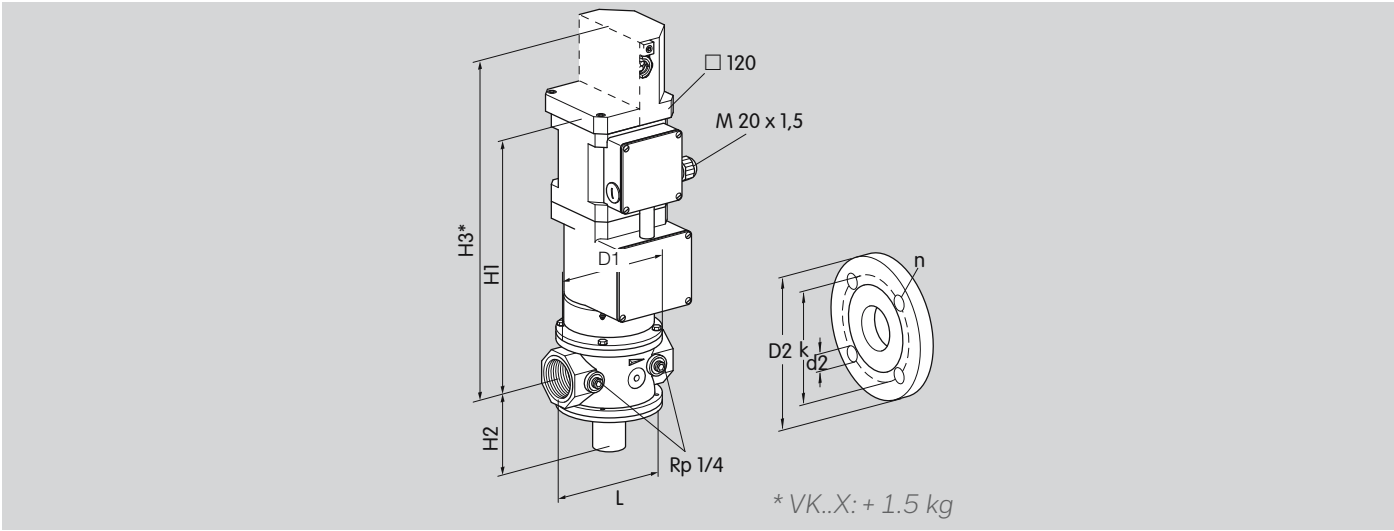
8.1 Dimensions

8.1.1 VK



Type	Dimensions									Drilling		p _u max.		Q	Weight	
	Connection		L	H1	H2	H3	D1	D2	k	d2	n	AlSi	GGG	Δp = 1 mbar	Al	GGG
	DN	Rp	mm	mm	mm	mm	mm	mm	mm	mm		mbar	mbar	m³/h air	kg	kg
VK 40..	-	Rp 1½	150	345	100	430	127	-	-	-	-	1000/4000	-	27.5	8	-
VK 40..	40	-	200	345	100	430	127	150	110	18	4	1000/4000	-	27.5	9	-
VK 50..	-	Rp 2	180	350	117	435	155	-	-	-	-	1000/4000	-	45.0	9	-
VK 50..	50	-	230	350	117	435	155	165	125	18	4	1000/4000	4000	45.0	11	20.5
VK 65..	-	Rp 2½	218	370	135	455	182	-	-	-	-	1000/3100	-	70.0	11	
VK 65..	65	-	290	370	135	455	182	185	145	18	4	1000/3100	3100	70.0	13	26
VK 80..	80	-	310	378	137	463	210	200	160	18	8	1000/2400	2400	103.0	15	32
VK 100..	100	-	350	400	163	485	248	229	180	18	8	1000	1000	148.0	19	41.5
VK 125..	125	-	400	450	158	535	314	250	210	18	8	600	600	206.0	24	60
VK 150..	150	-	480	445	173	530	344	285	240	23	8	400	400	310.0	32	80
VK 200..	200	-	600	475	218	560	420	340	295	23	12	230	230	490.0	52	141

8.1.2 VK..H



Type	Dimensions							Drilling			p _u max.		Q	Weight	
	Connection	L	H1	H2	H3	D1	D2	k	d2	n	Class A		Δp = 1 mbar	Al	GGG
	DN	mm	mm	mm	mm	mm	mm	mm	mm		AlSi mbar	GGG mbar	m ³ /h air	kg	kg
VK 50..H	50	230	414	117	499	155	165	125	18	4	-	8000	45.0	-	21
VK 65..H	65	290	434	135	519	182	185	145	18	4	-	8000	70.0	-	27
VK 80..H	80	310	442	137	527	210	200	160	18	8	-	6000	103.0	-	33
VK 100..H	100	350	464	163	549	248	220	180	18	8	-	4000	148.0	-	43
VK 125..H	125	400	514	158	599	314	250	210	18	8	1000	2000	206.0	25	61
VK 150..H	150	480	509	173	594	344	285	240	23	8	1000	1500	310.0	33	81
VK 150/100..H	150	480	509	173	-	344	285	240	23	8	-	4000	148.0	-	81
VK 200..H	200	600	539	218	624	420	340	295	23	12	1000	1000	490.0	53	142
VK 200/100..H	200	600	539	218	-	420	340	295	23	12	-	4000	148.0	-	142
VK 250..H	250	730	573	270	658	496	405	355	27	12	500	-	590.0	80	-

9 Maintenance cycles

At least once a year, at least twice a year in the case of biogas.

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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