elektrogas®

EVRM-NA
EVRM-6NA

Safety solenoid valves for gas
Manual reset - Normally open
DN10 … DN300

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Manual reset - Normally open

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Description

The EVRM-NA /6NA type valve is a manual reset safety valve that is normally open. The closing function is electrically activated. This type of device, connected to one or more gas leakage detectors, safety thermostat or alarm signals for the presence of carbon monoxide, is suitable to perform locking operations on the gas line.

Features

The valves are made of aluminum alloy die-cast (or hot-pressed brass for OT versions), with a wide range for inlet/outlet connections from DN10 up to DN 300.

Sealings are made of NBR-based rubber certified for use with gas (EN 549).

Suitable for use with air and non-aggressive gases included in the 1, 2 and 3 families (EN 437). Special versions suitable for aggressive gases, with plated brass parts and FPM seals.

Pipe connections meet Group 2, according to EN161 requirements.

The whole range can be provided in Ex-proof execution, for use in Zones 2 and 22, according to 2014/34/EU Directive (ATEX).

The kind of valves are normally not powered allowing a remarkable energy saving.

An incorporated fine mesh filter protects the valve seat and disc as well as downstream components and prevents dirty contamination (except brass models).

A proof of closure switch or a visual indicator can be installed (see PCS-VI datasheet for details); in this case the valve has to be equipped with 1/8” connection on the bottom. Models from 2”½-DN65 and above have this features, smaller models can have it on request.

Provided with 1/4” pressure gauge on two sides in the inlet chamber (except brass models), to connect manometers, pressure switches, leakage tester or other gas equipment. Models from 2”½ up to 12” are provided with gauges also in the outlet chamber. Models 1”¼-1”½-2” can be provided on request.

The encapsulated coil is provided with ISO 4400 plug and suitable cable gland.

All components are designed to withstand any mechanical, chemical and thermal condition occurring during typical service. Effective impregnation and surface treatments have been used to improve mechanical sturdiness, sealing and resistance to corrosion of the components.

Valves are 100% tested by computerized testing machineries and are fully warranted.

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Functioning and application

The EVRM-NA /6NA type valve is a manual reset safety valve that is normally open. A manual operation is therefore necessary to open the valve and to reset the mechanism consenting to maintain this state. The powering by means of line current and/or condenser discharge, induced by the leakage detector, safety thermostat or alarm system causes driving of the mechanism and consequent closing of the gas orifice. If energizing of the sensor persists because of the presence of gas, the valve remains under power and does not allow reset. When the causes for locking have been eliminated, valve must be opened manually.

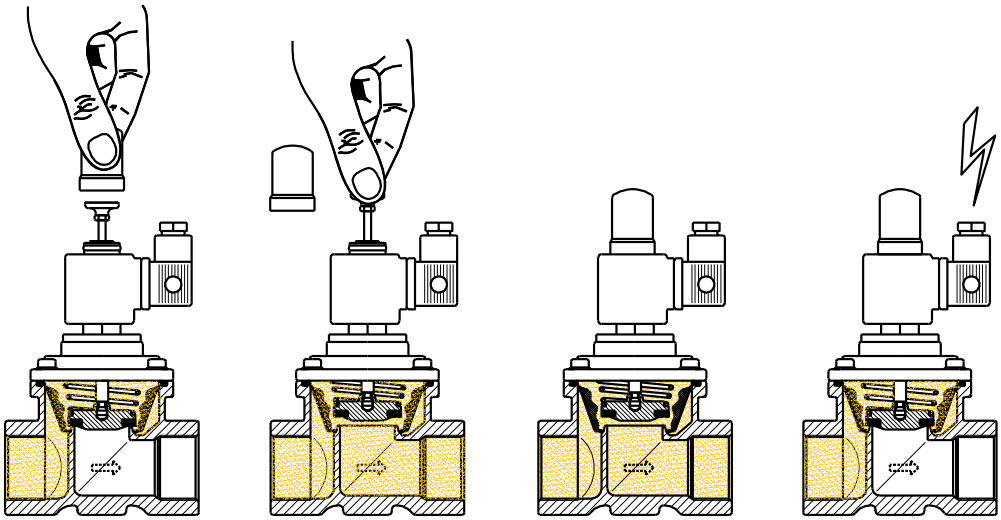

Fig.1

The models from DN125 or bigger and the 6 bar versions are provided with a dual-shutter system for pressure compensation. To open the valve, pull the knob for the first step, wait for pressure compensation, and then pull the knob completely up to full resetting.

This kind of device is normally installed downstream a manual shut-off valve and upstream of the gas regulating train. Figure 2 shows an example of installation.

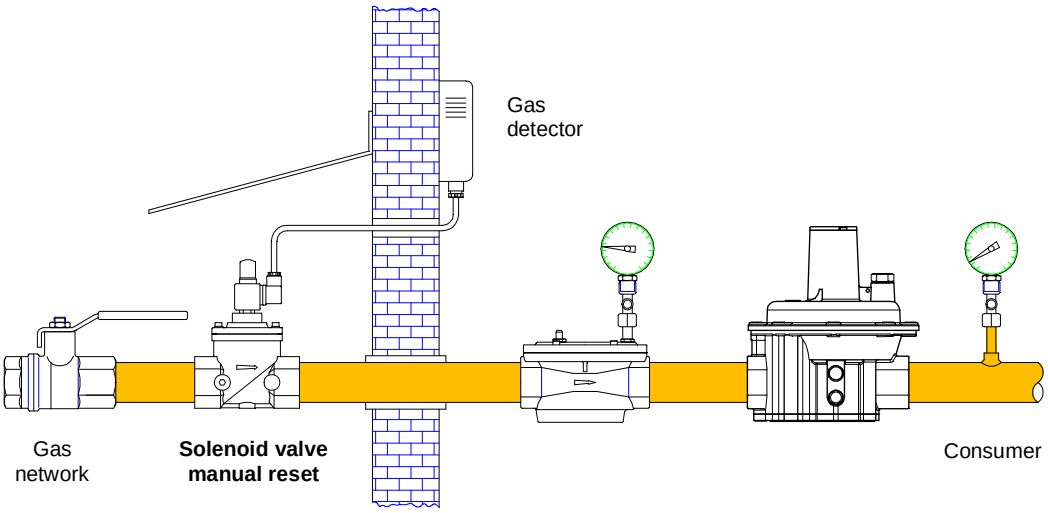

Fig.2

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Technical specifications

Tab. 1

Connections	Internal threaded EN 10226-1 from Rp3/8 to Rp2½ or ANSI-ASME B1.20 from 3/8"NPT to 2"½NPT Flanged ISO 7005 PN16 from DN40 to DN300 or ANSI-ASA-ASME B16.5 class 150 from 2" to 10"
Voltage ratings	230 VAC 50/60 Hz 110 VAC 50/60 Hz 24 VAC; 24 VDC 12 VDC
Voltage tolerance	-15% to +10%
Ambient temperature **Media temperature**	-20°C to +60°C (-4°F to +140°F)
Max. operating pressure	600 mbar (9 psig) 6 bar * (90 psig)
Max test pressure	1 bar (15 psig) 9 bar * (130 psig)
Closing time	< 1 second
Gas strainer	600 µm (0,02 in), metal mesh (except brass models)
Enclosure	IP54 (NEMA 3) (IP65 opzionale NEMA 4)
Cable gland	PG 9
Wires cross-section	1,5 mm^2 max. (AWG 14)
Electrical safety	Class I (EN 60335-1)
Coil winding insulation	Class H (200°C, 392°F)
Coil thermal resistance	Class F (155°C, 311°F)
Materials in contact with gas	Aluminium alloy, Brass, Stainless steel, Plated steel Anaerobic adhesive, Nitrile rubber (NBR), Fluoroelastomer (FPM), Polytetrafluoroethylene (PTFE)

Tab. 2

Power consumption

[W]	230V	110-120V	24V	12V
3/8"-1/2" OT	16	16	12(22)	12(22)
3/4" OT	16	16	12(22)	12(22)
1" OT	16	16	12(22)	12(22)
3/8"-1/2"	16	16	12(22)	12(22)
3/4"-1"	16	16	12(22)	12(22)
1"¼-1"½-2"	16	16	12(22)	12(22)
2"½-3"	19	19	20	20
4"	19	19	20	20
5"- 6"	19	19	20	20
8"	19	19	20	20
10"	19	19	20	20
12"	19	19	20	20

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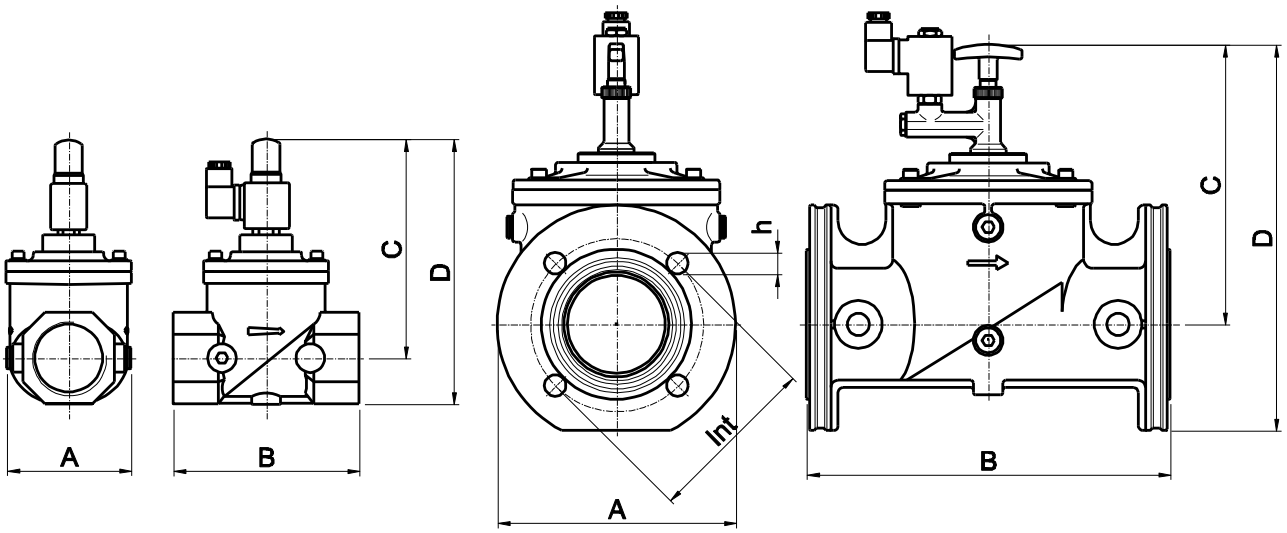

Fig.3

Tab. 3

Body material and connections		Overall dimensions [mm] [in]						Weight [Kg] [lbs]
Brass	Aluminum	A	B	C²	D²	Int	h	
Rp 3/8		**30**	**58**	**115**	**130**			**0,4**
3/8"NPT		1,18	2,28	4,53	5,12			0,9
Rp 1/2		**30**	**58**	**115**	**130**			**0,4**
1/2"NPT		1,18	2,28	4,53	5,12			0,9
G 3/4		**35**	**55**	**113**	**130**			**0,6**
3/4"NPT		1,38	2,17	4,45	5,12			1,3
G 1		**40**	**62**	**115**	**135**			**0,7**
1"NPT		1,57	2,44	4,53	5,31			1,5
	Rp 3/8	**70**	**77**	**139**	**155**			**0,6**
	3/8"NPT	2,76	3,03	5,47	6,10			1,3
	Rp 1/2	**70**	**77**	**139**	**155**			**0,6**
	1/2"NPT	2,76	3,03	5,47	6,10			1,3
	Rp 3/4	**85**	**96**	**146**	**169**			**0,8**
	3/4"NPT	3,35	3,78	5,75	6,65			1,8
	Rp 1	**85**	**96**	**146**	**169**			**0,8**
	1"NPT	3,35	3,78	5,75	6,65			1,8
	Rp 11/4	**120**	**153**	**170**	**203**			**1,6**
	1"¼NPT	4,72	6,02	6,69	7,99			3,5
	Rp 11/2	**120**	**153**	**170**	**203**			**1,6**
	1"½NPT	4,72	6,02	6,69	7,99			3,5
	Rp 2	**106**	**156**	**175**	**213**			**1,9**
	2"NPT	4,17	6,14	6,89	8,39			4,2
	Rp 21/2	**175**	**218**	**252**	**300**			**3,3**
	2"½NPT	6,89	8,58	9,92	11,81			7,3
	DN 40	**150**	**193**	**170**	**245**	**110**	**4x18**	**3,2**
		-	-	-	-	-	-	-
	DN 50	**165**	**196**	**175**	**250**	**125**	**4x18**	**3,2**
	2"ANSI [1]	6,50	7,72	6,89	10,12	4,75	4x¾	13,4
	DN 65	**200**	**305**	**252**	**341**	**145**	**4x18**	**8,2**
	2"½ANSI	7,87	12,01	9,92	13,43	5,50	4x¾	18
	DN 80	**200**	**305**	**252**	**341**	**160**	**8x18**	**8,2**
	3"ANSI	7,87	12,01	9,92	13,43	6,00	4x¾	18
	DN 100	**252**	**350**	**280**	**380**	**180**	**8x18**	**16**
	4"ANSI	9,92	13,78	11,02	14,96	7,50	8x¾	35
	DN 125	**310**	**460**	**331**	**501**	**210**	**8x18**	**28**
	5"ANSI	12,20	18,11	13,03	19,72	8,50	8x⅞	62
	DN 150	**310**	**460**	**331**	**501**	**240**	**8x23**	**30**
	6"ANSI	12,20	18,11	13,03	19,72	9,50	8x⅞	66
	DN 200	**370**	**546**	**372**	**585**	**295**	**12x23**	**45**
	8"ANSI	14,57	21,50	14,65	23,03	11,75	8x⅞	99
	DN 250	**405**	**600**	**453**	**680**	**355**	**12x28**	**72**
	10"ANSI	15,94	23,62	17,83	26,77	14,25	12x1	159
	DN 300	**460**	**700**	**500**	**763**	**410**	**12x28**	**99**
		18,11	27,56	19,69	30,04			218

([1]) Optional kit ([2]) Valve open

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Gas flow chart

(Pressure drop)

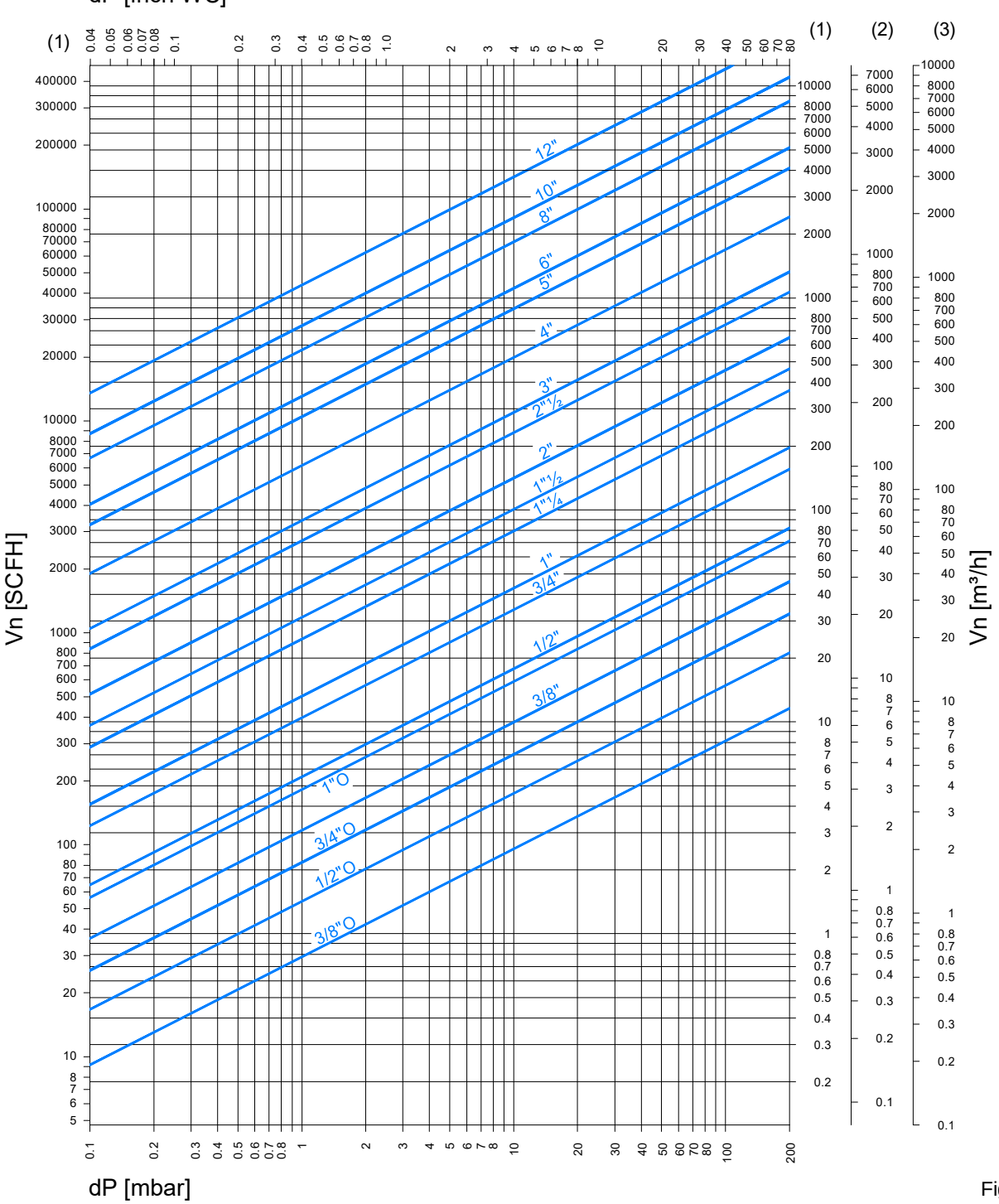

Fig. 4

Formula of conversion from air to other gases

$$V_{GAS} = k \cdot V_{AIR}$$

$$k = \sqrt{\frac{\rho_{AIR}}{\rho_{GAS}}}$$

Tab. 4

Gas type	Specific gravity ρ [Kg/m³]
(1) Natural gas	0,80
(2) LPG	2,00
(3) Air	1,225

15°C, 1013 mbar, dry

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When the flow read on the diagram is referred to operating pressure instead of standard conditions, the pressure drop Δp read on the diagram must be multiplied for the factor:
(1+ relative pressure in bar)

Example:

In the 2" solenoid valve with an air flow of 80 m^3/h at standard conditions there is a pressure drop Δp = 5 mbar.
If we consider that 80 m^3/h is the flow at 200 mbar of inlet pressure, then the pressure drop to be consider is:

Δp = 5x(1+0,2) = 6 mbar

Normally, pressure drop and flow rate for the valves are read from the gas flow diagram.
However, the valves can also be chosen in accordance with the characteristic "Kvs value" which is shown in table 5.
The selection of the valve requires the calculation of the Kv under the operating conditions.

Considering only subcritical pressure drops:

$$\Delta p < \frac{p_1}{2}$$

Kv can be calculated with the formula:

$$Kv = \frac{Vn}{514}\sqrt{\frac{\rho(t+273)}{\Delta p \cdot p_2}}$$

where

Vn = flow rate at standard conditions [m^3/h]
Kv = flow factor [m^3/h]
ρ = density [Kg/m^3]
p_1 = absolute inlet pressure [bar]
p_2 = absolute outlet pressure [bar]
Δp = differential pressure p_1-p_2 [bar]
t = media temperature [°C]

To the Kv value calculated from operating conditions we add an allowance of 20%, to obtain the minimum Kvs value which the valve should have:

Kvs > 1,2 Kv

Tab. 5

Kvs	3/8"O	1/2"O	3/4"O	1"O	3/8"	1/2"	3/4"	1"	1"¼	1"½	2"	2"½
m^3/h	0,7	1,3	2,0	4,5	2,9	4,8	9,5	12	22	29	40	65

	DN65	DN80	DN100	DN125	DN150	DN200	DN250	DN300
m^3/h	65	80	148	250	315	516	660	1020

Valve must be selected considering the following:

- Pressure drops Δp ≤ 0,1p_1 are recommended and Δp > $p_1/2$ are always unadvisable
- Flow velocities w ≤ 15 m/s are recommended and w > 50 m/s are always unadvisable.

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Ordering information

Tab.6

EVRM-6NA	95	N	.B	J

Model and max. working pressure

EVRM-NA	600 mbar (9 psig)
EVRM-6NA	6 bar (90 psig)

Size

Brass body (compact)

0O	3/8"	**2O**	3/4"
1O	1/2"	**3O**	1"

Aluminum body

0	3/8"	**8**	3"
1	1/2"	**9**	4"
2	3/4"	**93**	5"
3	1"	**95**	6"
35	1"¼	**98**	8"
4	1"½	**910**	10"
6	2"	**912**	12"
7	2"½		

Connection

none	Rp internal thread / ISO PN16 flanges
N	NPT internal thread / ANSI flange
F	Flanged connection (1"½-2" only)
T	Threaded connection (2"½ only)

Supply voltage

none	230V 50/60Hz		
B	110V-120V 50/60Hz	**GW**	24V DC (3/8"-2" 22W)
C	24V AC ([1])	**H**	12V DC ([2])
G	24V DC ([2])	**HW**	12V DC (3/8"-2" 22W)

Special versions (only valves with aluminum body)

J	Biogas
M	Bottom connection for disc position indicator (for valve till 2")
G	4 pressure points (for valves 1"¼ to 2")
S	Without inner piston for indirect acting (only 5"-12" 600mbar)
X	Ex execution for zone 2 and 22 (see optional paragraph for details)
Z	Anodization of housing and external aluminum parts
Z1	Epoxy body coating and anodization of inner aluminum parts

([1]) DC operation with impulse only ([2]) 3/8"-2" 12W - Provided with different mechanical parts (not interchangeable)

Special versions and options

- **J**: models with aluminum body from 3/8" to 6" can be supplied in special versions for aggressive gases such as biogas, with plated brass parts and FPM seals in contact with gas. In this case customer shall check compatibility between valve materials and gas contents.
- **M**: a closed position indicator micro-switch (PCS) can be installed. Models from DN65 to DN300 are provided with G1/8 connection on the bottom for these facilities -on request from 3/8" to 2" - (not available for brass models).
- **G**: models 1"¼, 1"½ and 2" can have additional G1/4 pressure test points in the outlet chamber (standard from DN65 to DN300).
- **S**: models from 5" to 12" 600mbar can be supplied without the inner piston for indirect acting.
- **X**: valves can be provided with a special cable gland and Ex-proof marking for use in Zones 2 and 22, according to 2014/34/EU Directive (ATEX):

category	II 3 G,D
protection mode	Ex ec IIA T4 Gc X Ex tc IIIB T135°C Dc X or Ex tc IIIC T135°C Dc X (IP65)
ambient temperature	-20 / +40 °C

- **Z**: aluminum valves can be supplied with anodized housing and external components, to withstand aggressive environments.
- **Z1**: aluminum valves can be supplied with epoxy body coating and anodized inner components, to withstand aggressive gases.

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Design, installation and servicing

To assure a proper and safe operation, as well as a long service life of the valve, consider the following recommendations during the design of the system where the valve will be installed:

- ✓ Ensure that all the features of your system comply with the specifications of the valve (gas type, operating pressure, flow rate, ambient temperature, electrical voltage, etc.).
- ✓ Valve may be mounted with coil in horizontal or vertical position, not upside down.
- ✓ In the event of vertical pipe, the flow direction should be from bottom to top.
- ✓ After removing the end caps make sure no foreign body will enter into the valve during handling or installation (e.g. swarf or excessive sealing agent).
- ✓ A gas filter should be always installed upstream the valve.
- ✓ Ensure that installing area is protected from rain and water splashes or drops.
- ✓ Never install the valve close to walls or other equipment.
- ✓ Perform leak and functional tests after mounting.
- ✓ Check proper operation at least once a year (most often for aggressive gases).
- ✓ Due to seals aging, to ensure safe operation, we recommend the valve replacement after 10 years from the date of manufacture stamped on the product.
- ✓ This control must be installed in compliance with the rules in force.
- ✓ Make sure all works are performed by qualified technicians only and in compliance with local and national codes.
- ✓ To prevent product damage and dangerous situations, read carefully the instructions supplied with the product before use.

For more details see the Installation and Service Instructions.

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Standards and approvals

The product complies with the essential requirements of the following European Directives and their amendments:

2014/68/EU (Pressure Equipment Directive) **CE-Reg.-No. PED/0497/2663/13**
2014/34/EU (ATEX) when shown upon the product
2014/30/EU (Electromagnetic Compatibility)
2014/35/EU (Low Voltage Directive)
2011/65/EU (RoHS II)

The product complies with the Technical Regulations TP TC 004/2011-016/2011-020/2011-032/2013 of Russia, Belarus and Kazakhstan.

Declaration of Conformity: **№ RU Д-IT.PA01.B.08271/18**

Quality Management System is certified according to UNI EN ISO 9001.

The information in this document contains general descriptions of technical options available and based on current specifications.
The company reserves the right to make changes in specifications and models as design improvements are introduced, without prior notice.
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