



EVRM-NC
EVRM-6NC

Safety solenoid valves for gas
Manual reset - Normally closed
DN10 ... DN300

EVRM-NC

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Manual reset - Normally closed

Contents

| | |
|--|----|
| Description | 2 |
| Features | 2 |
| Functioning and application | 3 |
| Technical specifications | 4 |
| Gas flow chart (pressure drop) | 6 |
| Ordering information | 8 |
| Special versions and optionals | 8 |
| Design, installation and servicing | 9 |
| Standards and approvals | 10 |

Description

The EVRM-NC /6NC type valve is a manual reset safety valve that is normally closed (open when energized). 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 (3/8") up to DN 300 (12").

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, free of non-ferrous metals and with 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).

Qualified for continuous service (100% ED).

The valve is open only when energized: if, for any reason, power supply goes down, the valve closes immediately (intrinsic safe).

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

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 equipments. Flanged models are provided with gauges also in the outlet chamber.

Provided with G1/8 connection to fit a closed position indicator switch or a visual indicator.

The coils are provided with ISO 4400 plug or with terminal box for DN100 or bigger. Both systems are provided with suitable cable gland to avoid water and dirty contamination.

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.

Functioning and application

The EVRM-NC type valve is a manual reset safety valve that is normally closed. When not in working position the spring works on the shutter keeping the gas orifice closed. Simply by energizing the coil the valve does not open. It is necessary to manually move the reset rod located at the top of the coil. Once opened, the valve can maintain this position until electric current circulates on the coil. In absence of electric current the valve closes rapidly and remains shut upon return of same. Once the causes for the lock have been eliminated, valve must be opened manually as described above.

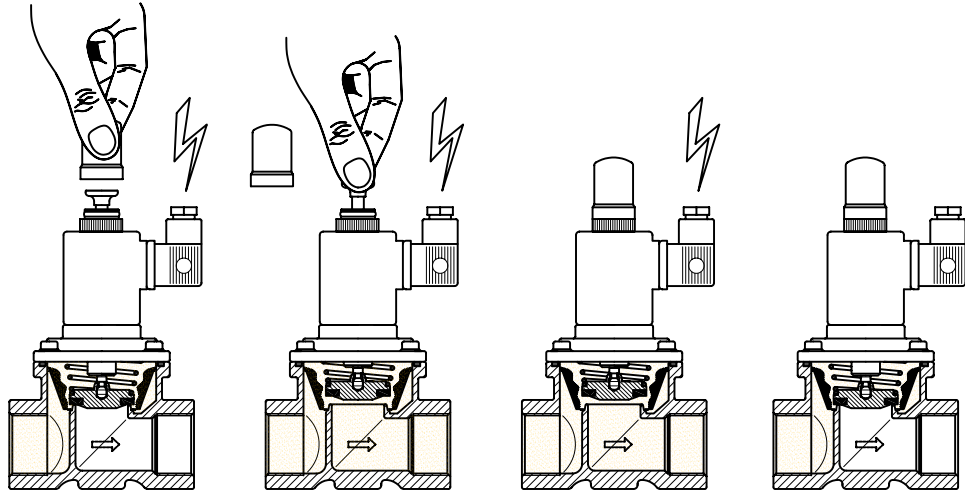


Fig.1



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 a example of installation.

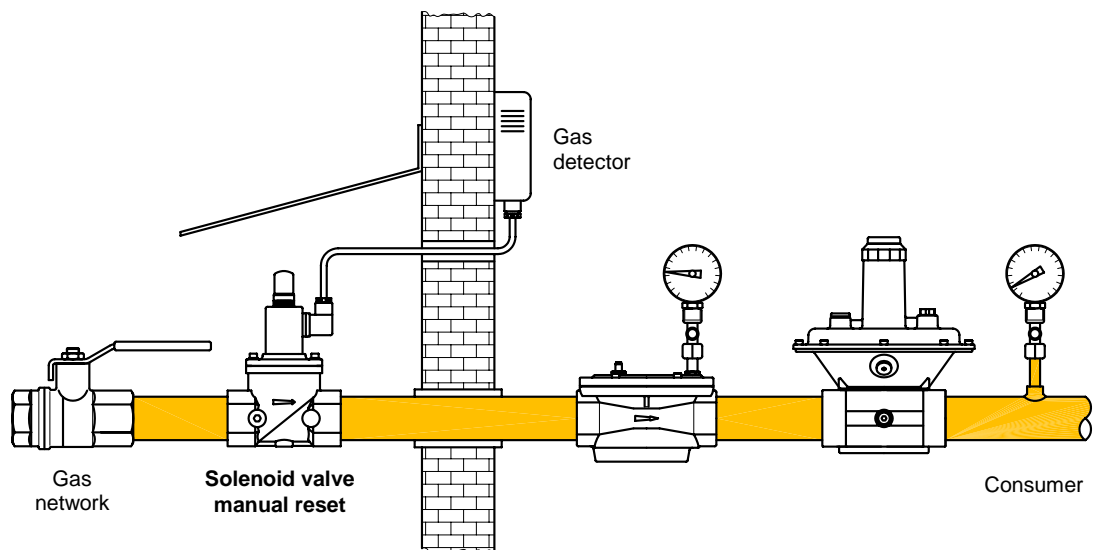


Fig.2

Technical specifications

Tab. 1

| | |
|--|--|
| Connections | Internal threaded ISO 7-1 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 120 VAC 50/60 Hz 110 VAC 50/60 Hz 24 VAC/DC 12 VAC/DC |
| 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) |
| Body 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 | IP65 models with ISO plug DN10..DN80 (NEMA 4) IP54 models with terminal box DN100..DN300 (NEMA 3) (IP65 optional with cable NEMA 4) |
| Cable gland | PG 9 models with ISO plug DN10..DN80 M20 models with terminal box DN100..DN300 |
| Wires cross-section | 2,5 mm ² max. (AWG 12) for terminal board 1,5 mm ² max. (AWG 14) for ISO plug |
| 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) |

Tab. 2

| Power Consumption [W] | 600 mbar (9 psig) | | | | | 6 bar (90 psig) | | | | |
|--------------------------|----------------------|------|------|-----|-----|--------------------|------|------|-----|-----|
| | 230V | 120V | 110V | 24V | 12V | 230V | 120V | 110V | 24V | 12V |
| 3/8"-1/2" OT | 8 | 8 | 8 | 12 | 12 | 8 | 8 | 8 | 12 | 12 |
| 3/4" OT | 8 | 8 | 8 | 12 | 12 | 8 | 8 | 8 | 12 | 12 |
| 1" OT | 8 | 8 | 8 | 12 | 12 | 8 | 8 | 8 | 12 | 12 |
| 3/8"-1/2" | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 3/4"-1" | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 1"¼-1"½-2" | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 2"½-3" | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 | 12 |
| 4" | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| 5"- 6" | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| 8" | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| 10" | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| 12" | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |

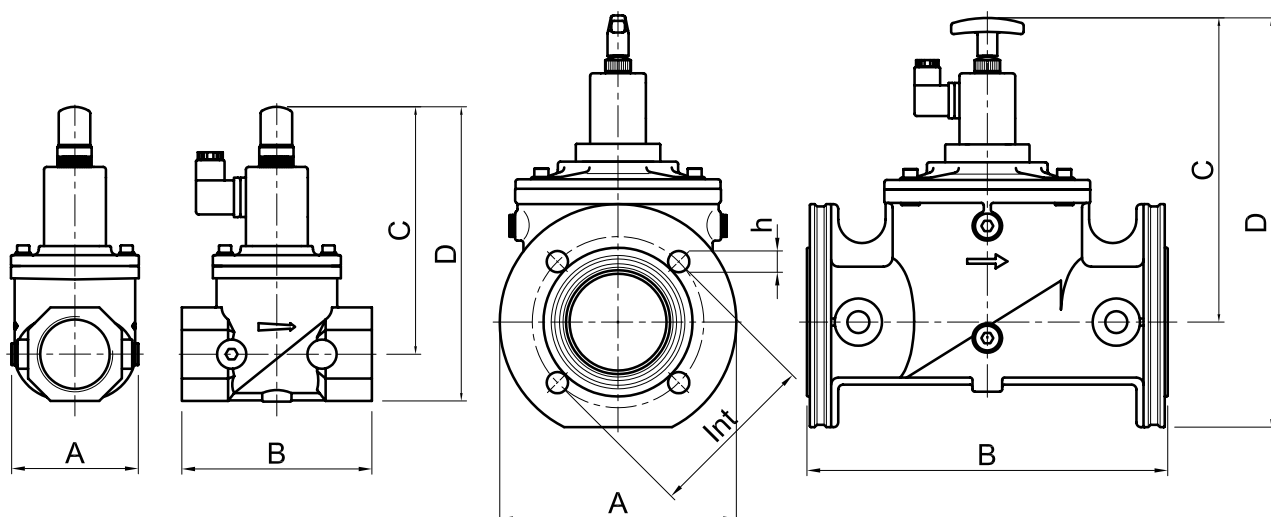


Fig.3

Tab. 3

| Material and connections | | Overall dimensions [mm] [in] | | | | | Weight [Kg] [lbs] | |
|--------------------------|--------------------------|------------------------------------|------------|----------------|----------------|------------|-------------------------|------------|
| CuZn | AlSi | A | B | C ² | D ² | 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 | 137 | | | 0,7 |
| 1"NPT | | 1,57 | 2,44 | 4,53 | 5,39 | | | 1,5 |
| | Rp 3/8 | 70 | 77 | 156 | 172 | | | 0,9 |
| | 3/8"NPT | 2,76 | 3,03 | 6,14 | 6,77 | | | 2,0 |
| | Rp 1/2 | 70 | 77 | 156 | 172 | | | 0,9 |
| | 1/2"NPT | 2,76 | 3,03 | 6,14 | 6,77 | | | 2,0 |
| | Rp 3/4 | 85 | 96 | 167 | 190 | | | 1,1 |
| | 3/4"NPT | 3,35 | 3,78 | 6,57 | 7,48 | | | 2,4 |
| | Rp 1 | 85 | 96 | 167 | 190 | | | 1,1 |
| | 1"NPT | 3,35 | 3,78 | 6,57 | 7,48 | | | 2,4 |
| | Rp 1 1/4 | 120 | 153 | 201 | 234 | | | 2 |
| | 1 1/4"NPT | 4,72 | 6,02 | 7,91 | 9,21 | | | 4,4 |
| | Rp 1 1/2 | 120 | 153 | 201 | 234 | | | 2 |
| | 1 1/2"NPT | 4,72 | 6,02 | 7,91 | 9,21 | | | 4,4 |
| | Rp 2 | 106 | 156 | 207 | 245 | | | 2,3 |
| | 2"NPT | 4,17 | 6,14 | 8,15 | 9,65 | | | 5,1 |
| | Rp 2 1/2 | 175 | 218 | 252 | 300 | | | 5,5 |
| | 2 1/2"NPT | 6,89 | 8,58 | 9,92 | 11,81 | | | 12 |
| | DN 40¹ | 150 | 193 | 201 | 276 | 110 | 4x18 | 3,7 |
| | | 5,91 | 7,60 | 7,91 | 10,87 | | | 8,2 |
| | DN 50¹ | 165 | 196 | 207 | 289 | 125 | 4x18 | 4,3 |
| | 3"ANSI | 6,50 | 7,72 | 8,15 | 11,38 | 4,75 | 4x3/4 | 9,5 |
| | DN 65 | 200 | 305 | 266 | 355 | 145 | 4x18 | 7,6 |
| | 2 1/2"ANSI | 7,87 | 12,01 | 10,47 | 13,98 | 5,50 | 4x3/4 | 17 |
| | DN 80 | 200 | 305 | 266 | 355 | 160 | 8x18 | 7,6 |
| | 3"ANSI | 7,87 | 12,01 | 10,47 | 13,98 | 6,00 | 4x3/4 | 17 |
| | DN 100 | 252 | 350 | 305 | 405 | 180 | 8x18 | 17 |
| | 4"ANSI | 9,92 | 13,78 | 12,01 | 15,94 | 7,50 | 8x3/4 | 37 |
| | DN 125 | 310 | 460 | 375 | 545 | 210 | 8x18 | 29 |
| | 5"ANSI | 12,20 | 18,11 | 14,76 | 21,46 | 8,50 | 8x7/8 | 64 |
| | DN 150 | 310 | 460 | 375 | 545 | 240 | 8x23 | 31 |
| | 6"ANSI | 12,20 | 18,11 | 14,76 | 21,46 | 9,50 | 8x7/8 | 68 |
| | DN 200 | 370 | 546 | 427 | 640 | 295 | 12x23 | 46 |
| | 8"ANSI | 14,57 | 21,50 | 16,81 | 25,20 | 11,75 | 8x7/8 | 101 |
| | DN 250 | 405 | 600 | 488 | 715 | 355 | 12x28 | 72 |
| | 10"ANSI | 15,94 | 23,62 | 19,21 | 28,15 | 14,25 | 12x1 | 159 |
| | DN 300 | 460 | 700 | 527 | 790 | 410 | 12x28 | 99 |
| | | 18,11 | 27,56 | 20,75 | 31,10 | | | 218 |

(1) Optional Kit (2) Valve open

Gas flow chart

(Pressure drop)

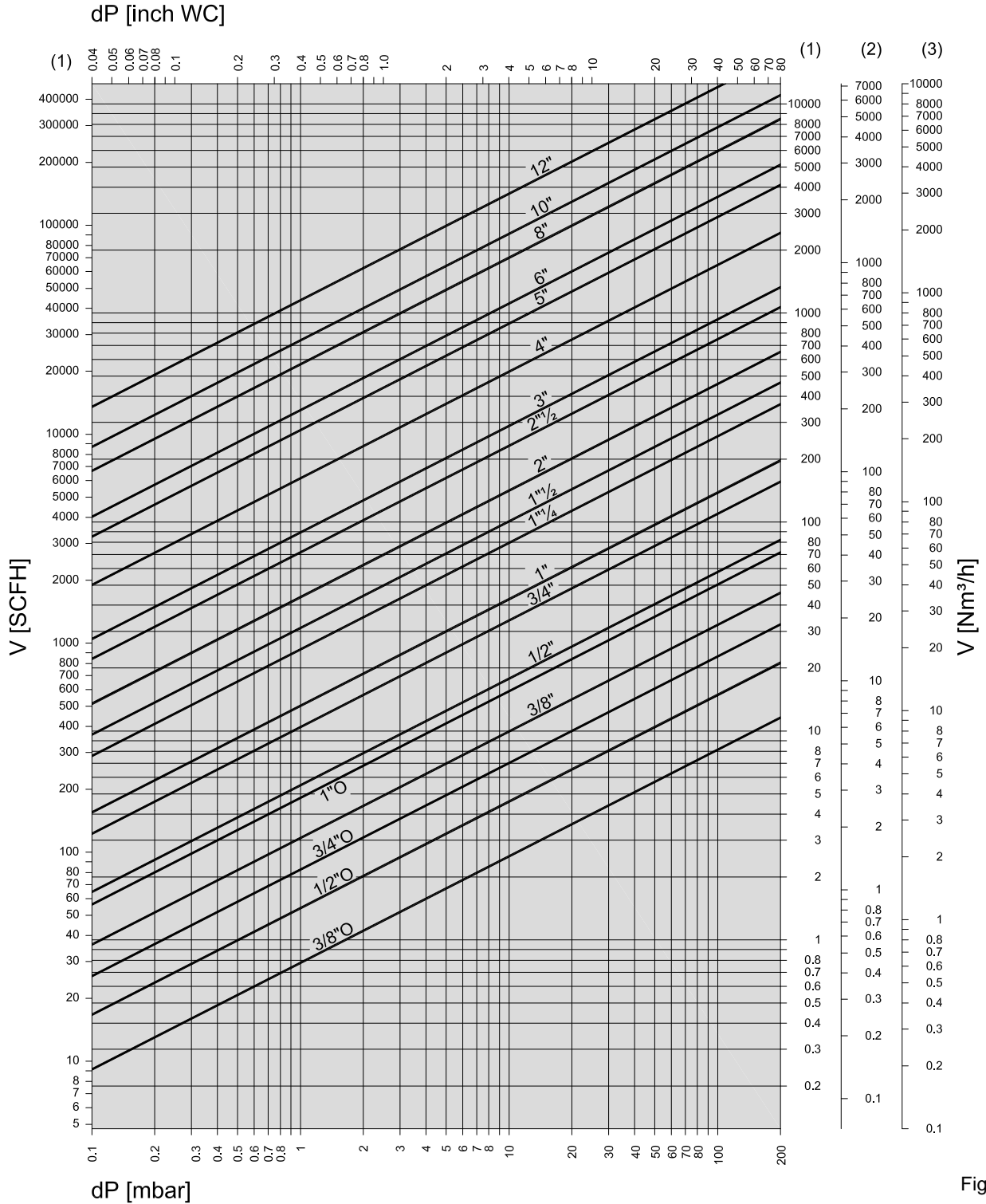


Fig. 4

Formula of conversion from air to other gases

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

Tab. 4

| Gas type | Specific gravity ρ [Kg/m³] | $k = \sqrt{\frac{1.25}{\rho_{GAS}}}$ |
|-----------------|---------------------------------------|--------------------------------------|
| (1) Natural gas | 0,80 | 1,25 |
| (2) LPG | 2,08 | 0,77 |
| (3) Air | 1,25 | 1,00 |

15°C, 1013 mbar, dry

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 Nm³/h there is a pressure drop $\Delta p = 5$ mbar. If we consider that 80 m³/h is the flow at 200 mbar of inlet pressure, then the pressure drop to be consider is:

$$\Delta p = 5 \times (1 + 0,2) = 6 \text{ mbar}$$

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:

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

where

- V = flow rate [Nm³/h]
- Kv = flow factor [m³/h]
- ρ = density [Kg/m³]
- p₁ = absolute inlet pressure [bar]
- p₂ = absolute outlet pressure [bar]
- Δp = differential pressure p₁-p₂ [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 $\Delta p \leq 0,1 p_1$ are recommended and $\Delta p > p_1/2$ are always undesirable
- Flow velocities $w \leq 15$ m/s are recommended and $w > 50$ m/s are always undesirable.

Ordering information

Tab.6

| | | | | | | | |
|--------------------------------|--------------|---|----------|----------|-----------|----------|--|
| | EVRM- | 6NC | 4 | N | .B | J | |
| Valve type | | | | | | | |
| Max. Operating pressure | | | | | | | |
| -NC | | 600 mbar (9 psig) | | | | | |
| -6NC | | 6 bar (90 psig) | | | | | |
| Size | | | | | | | |
| 00T | 3/8" | brass body | | | | | |
| 10T | 1/2" | brass body | | | | | |
| 20T | 3/4" | brass body | | | | | |
| 30T | 1" | brass body | | | | | |
| 0 | 3/8" | 8 | 3" | | | | |
| 1 | 1/2" | 9 | 4" | | | | |
| 2 | 3/4" | 93 | 5" | | | | |
| 3 | 1" | 95 | 6" | | | | |
| 35 | 1 1/4" | 98 | 8" | | | | |
| 4 | 1 1/2" | 910 | 10" | | | | |
| 6 | 2" | 912 | 12" | | | | |
| 7 | 2 1/2" | | | | | | |
| Connection | | | | | | | |
| none | | Rp internal thread / ISO flange | | | | | |
| N | | NPT internal thread / ANSI flange | | | | | |
| T | | Threaded (Rp2 1/2" only) | | | | | |
| Supply voltage | | | | | | | |
| none | | 230V 50/60Hz (120V 50/60Hz with "N" connection) | | | | | |
| B | | 110V 50/60Hz | | | | | |
| C | | 24V AC/DC | | | | | |
| D | | 12V AC/DC | | | | | |
| Special versions | | | | | | | |
| J | | Biogas | | | | | |
| S | | Without inner piston for indirect acting | | | | | |

NOTE: models up to 3" are provided with ISO plug, models from 4" up to 12" are provided with terminal box.

Special versions

J-version: the models with aluminum body from 3/8" to 6" can be supplied in special versions for aggressive gases such as biogas, they are free of non-ferrous metals in contact with gas and provided with special seals.

S-version: the models from 5" to 12" can be supplied without the inner piston for indirect acting.

Optionals

The sizes 1 1/4", 1 1/2" and 2" can be provided with 1/4" gauges also in the outlet chamber.

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).

The threaded models 1 1/2" and 2" can be provided with flanged connections using an optional kit

All the valves can be provided with anodizing housing or epoxy coating to withstand the aggressive environments.

The whole range 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 nA IIA T4 Gc X Ex tc IIIB T135°C Dc X or Ex tc IIIC T135°C Dc X (IP65) |

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 equipments.
- ✓ Perform leak and functional tests after mounting (test pressure 1,5 Pmax).
- ✓ 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](#).



Standards and approvals

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



2014/68/EU (Pressure Equipment Directive)
 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)

CE-Reg.-No. PED/0497/895/07



The product complies with the Technical Regulation 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.



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