

**VRA**  
**VLA**  
**VTA**

**Solenoid valves for  
combustion Air regulation  
DN20 ... DN80**

# VRA VLA VTA

## Solenoid valves for combustion Air regulation

### Contents

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

### Description

The VRA/VLA/VTA types are normally closed solenoid valves for cold combustion air regulation (open when energized). This type of device is suitable for high/low control of combustion air in industrial gas burners.

### Features

The valves are made of aluminum alloy die-cast, with a wide range for inlet/outlet connections from DN 20 (3/4" )up to DN 80 (3").

Pipe connections meet group 2, according to EN161 requirements.

Suitable for use with cold combustion air (not for safety shut-off).

Provided with two flow adjustments: minimum and maximum flow rate, for high/low operation.

Suitable for heavy-duty cycle operation and for continuous service (100% ED).



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 valve is supplied without an internal filter, because in many applications the air is very dirty and it should clog the filter in short time. It is provided with a special dust cover able to protect mechanical moving parts.

Provided with 1/4" pressure gauge on two sides in the inlet chamber, to connect manometers, pressure switches or other equipments. Flanged models are provided with gauges also in the outlet chamber.

The coils are provided with terminal box or with ISO 4400 plug (optional). 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 VRA type valve is a fast opening/closing solenoid valve. The VLA type is a slow opening and fast closing solenoid valve. The VTA type is a slow opening/closing solenoid valve. Both Min./Max. can be set from 0 to 100%.

When not energized the spring works on the disc keeping the minimum passage of air. When powering the coil the valve opens, moving the disc to the maximum open position. When power is switched off the valve moves to the minimum position.

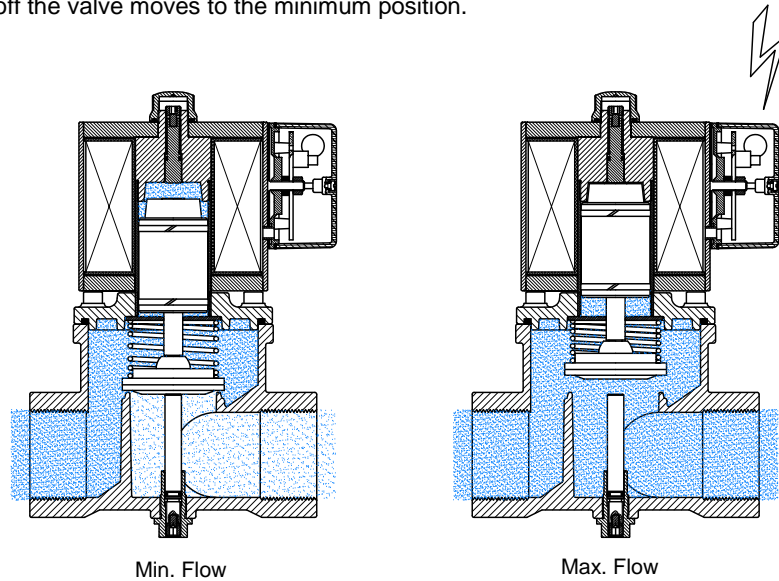
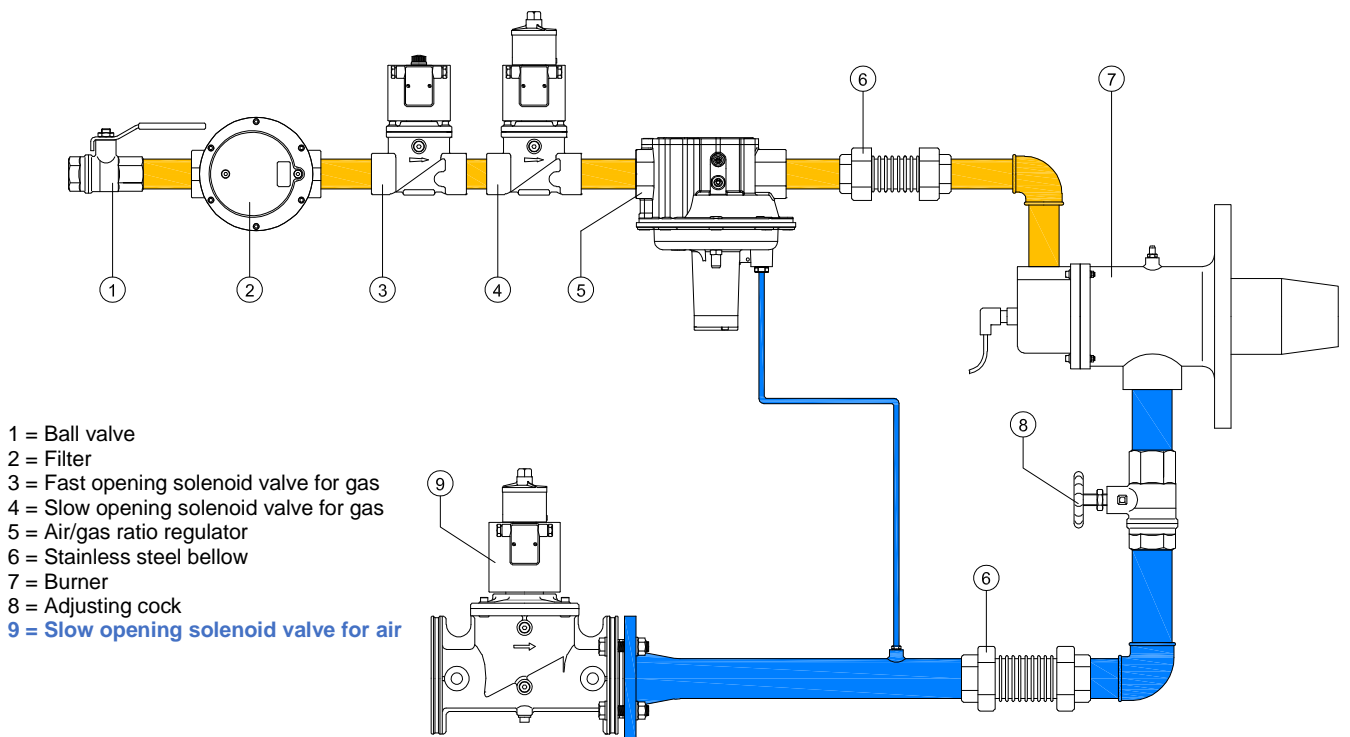


Fig.1

Figure 2 shows an example of installation.



- 1 = Ball valve
- 2 = Filter
- 3 = Fast opening solenoid valve for gas
- 4 = Slow opening solenoid valve for gas
- 5 = Air/gas ratio regulator
- 6 = Stainless steel bellow
- 7 = Burner
- 8 = Adjusting cock
- 9 = Slow opening solenoid valve for air

Fig.2

## Technical specifications

Tab. 1

<b>Connections</b>	Gas threaded ISO 7-1 from Rp3/4 to Rp2½ or ANSI-ASME B1.20 from 3/4"NPT to 2"½NPT Flanged PN16 – ISO 7005 from DN40 to DN80 or ANSI-ASA-ASME B16.5 class 150 from 2" to 3"
<b>Voltage rating</b>	230 VAC 50/60 Hz 120 VAC 50/60 Hz 110 VAC 50/60 Hz 24 VAC/DC 12 VAC/DC
<b>Voltage tolerance</b>	-15% / +10%
<b>Ambient temperature Media temperature</b>	-15°C to +60°C ( +5°F to +140°F)
<b>Max. operating pressure</b>	200 mbar (3 psig)
<b>Operating time</b>	VRA: 1s opening/closing VLA: ~4s opening / 1s closing VTA: ~4s opening/closing
<b>Protection class</b>	IP54 (NEMA 3) optional IP65 with cable (NEMA 4)
<b>Cable gland</b>	M20x1,5 for terminal box PG 9 for ISO plug
<b>Wires cross-section</b>	2,5 mm <sup>2</sup> max. (AWG 12) for terminal board 1,5 mm <sup>2</sup> max. (AWG 14) for ISO plug
<b>Electrical safety</b>	Class I (EN 60335-1)
<b>Coil winding insulation</b>	Class H (200°C, 392°F)
<b>Coil thermal resistance</b>	Class F (155°C, 311°F)

Tab. 2

Power Consumption [W]		200 mbar (3 psig)				
		230V	120V	110V	24V	12V
3/4"-1"	O	25	30	30	30	30
	H	25	30	30	30	30
1"¼-1"½-2"	O	180	180	180	65	65
	H	45	45	45	65	65
2"½-3"	O	180	180	180	-	-
	H	45	45	45	-	-

O – opening power consumption

H – holding power consumption

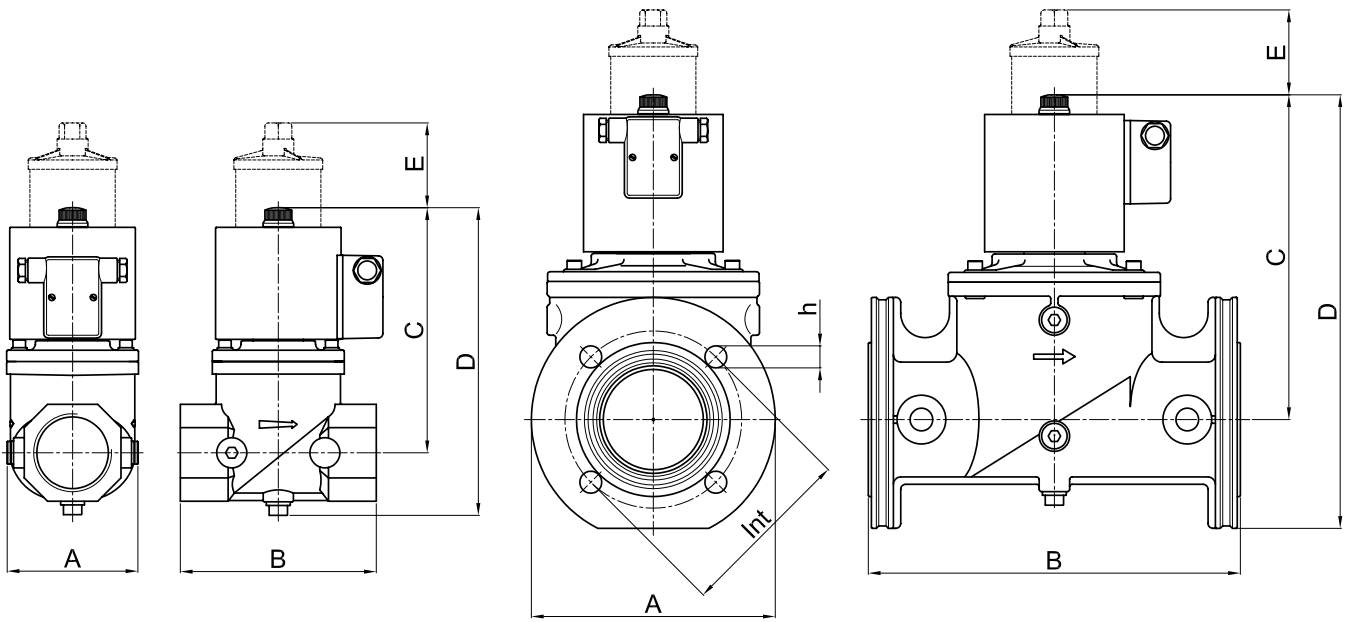


Fig.3

Tab. 3

Connections	Overall dimensions <sup>(3)</sup>							Weight <sup>(2)</sup>
	A	B	C	D	E	Int	h	[Kg] [lbs]
<b>Rp 3/4</b>	<b>88</b>	<b>96</b>	<b>145</b>	<b>179</b>	<b>54</b>	-	-	<b>2,5 / 2,7</b>
3/4"NPT	3,46	3,78	5,71	7,05	2,13	-	-	5,5 / 6,0
<b>Rp 1</b>	<b>88</b>	<b>96</b>	<b>145</b>	<b>179</b>	<b>54</b>	-	-	<b>2,5 / 2,7</b>
1"NPT	3,46	3,78	5,71	7,05	2,13	-	-	5,5 / 6,0
<b>Rp 1 1/4</b>	<b>120</b>	<b>153</b>	<b>191</b>	<b>235</b>	<b>70</b>	-	-	<b>5,7 / 6,2</b>
1 1/4"NPT	4,72	6,02	7,52	9,25	2,76	-	-	12,6 / 13,7
<b>Rp 1 1/2</b>	<b>120</b>	<b>153</b>	<b>191</b>	<b>235</b>	<b>70</b>	-	-	<b>5,7 / 6,2</b>
1 1/2"NPT	4,72	6,02	7,52	9,25	2,76	-	-	12,6 / 13,7
<b>Rp 2</b>	<b>106</b>	<b>156</b>	<b>195</b>	<b>245</b>	<b>70</b>	-	-	<b>6,0 / 6,5</b>
2"NPT	4,17	6,14	7,68	9,65	2,76	-	-	13,2 / 14,3
<b>Rp 2 1/2</b>	<b>180</b>	<b>218</b>	<b>254</b>	<b>315</b>	<b>70</b>	-	-	<b>11,6 / 12,1</b>
2 1/2"NPT	7,09	8,58	10,00	12,40	2,76	-	-	25,6 / 26,7
<b>DN 40 <sup>(1)</sup></b>	<b>150</b>	<b>193</b>	<b>191</b>	<b>266</b>	<b>70</b>	<b>110</b>	<b>4x18</b>	<b>7,1 / 7,6</b>
	5,91	7,60	7,52	10,47	2,76			15,7 / 16,8
<b>DN 50 <sup>(1)</sup></b>	<b>165</b>	<b>196</b>	<b>195</b>	<b>278</b>	<b>70</b>	<b>125</b>	<b>4x18</b>	<b>7,8 / 8,3</b>
2"ANSI <sup>1</sup>	6,50	7,72	7,68	10,94	2,76	4,75	4x3/4	17,2 / 18,3
<b>DN 65</b>	<b>200</b>	<b>305</b>	<b>266</b>	<b>355</b>	<b>70</b>	<b>145</b>	<b>4x18</b>	<b>14,0 / 14,5</b>
2 1/2"ANSI	7,87	12,01	10,47	13,98	2,76	5,50	4x3/4	30,9 / 32,0
<b>DN 80</b>	<b>200</b>	<b>305</b>	<b>266</b>	<b>355</b>	<b>70</b>	<b>160</b>	<b>8x18</b>	<b>14,0 / 14,5</b>
3"ANSI	7,87	12,01	10,47	13,98	2,76	6,00	4x3/4	30,9 / 32,0

(1) Optional Kit

(2) VRA / VLA

(3) VTA type: E+10 mm

**Air flow chart**  
(Pressure drop)

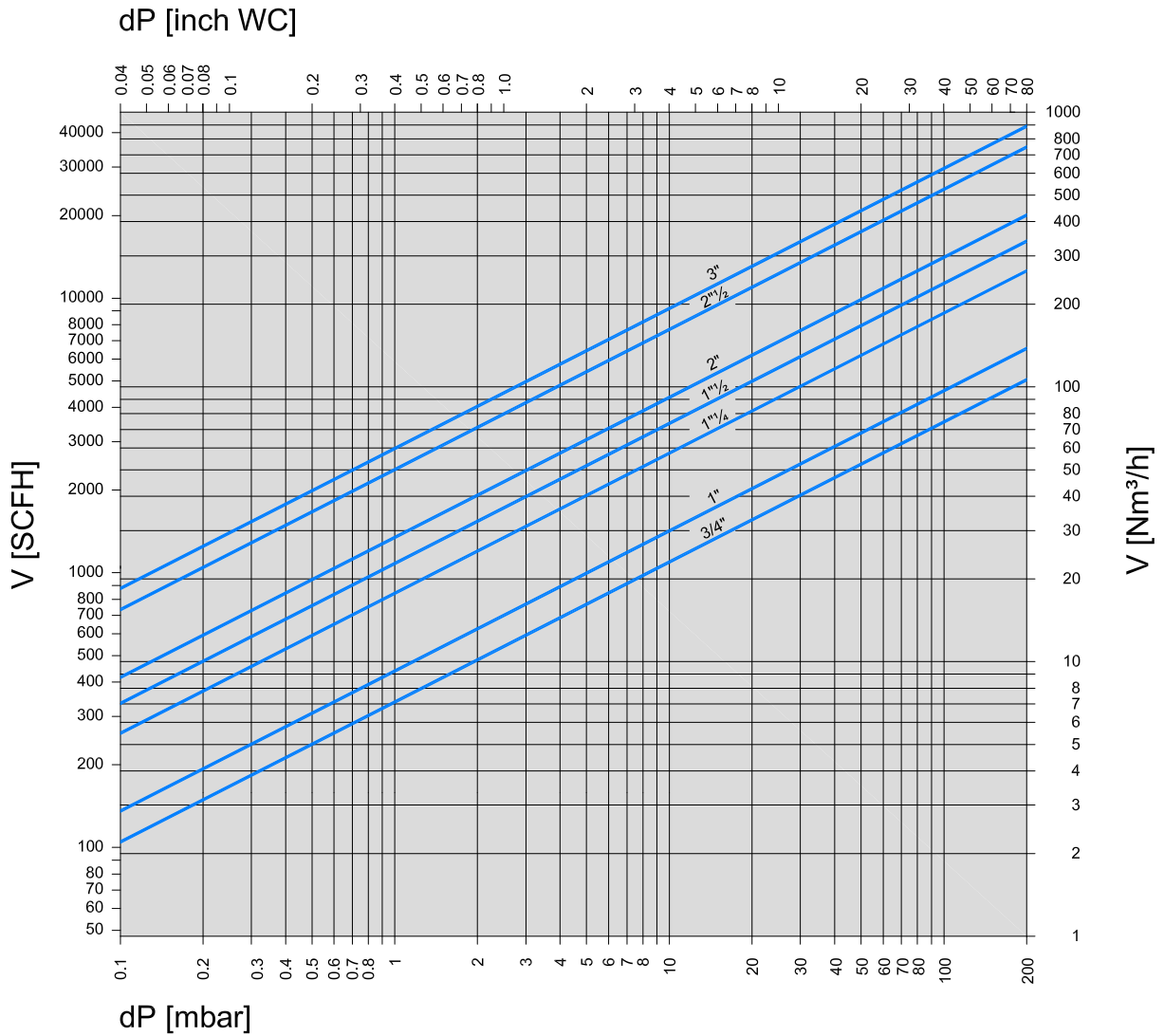


Fig.4

1,25 Kg/ m<sup>3</sup>, 15°C, 1013 mbar, dry

If requested, the valves can be supplied with a bypass bore in the valve body for low fire. The diameter must be chosen according to the min. flow rate required. The approximate formula to calculate the flow rate is the following:

$$V_{\min} = 0.024 \cdot d^2 \sqrt{\frac{p_1}{\rho}}$$

where:

- V<sub>min</sub> = min. flow rate [Nm<sup>3</sup>/h]
- d = diameter of bypass bore [mm]
- ρ = density [Kg/m<sup>3</sup>]
- p<sub>1</sub> = relative inlet pressure [mbar]

When the flow read on the diagram is referred to operating pressure instead of standard conditions, the pressure drop  $\Delta p$  read on the diagram must be multiplied for the factor  $(1 + \text{relative pressure in bar})$ .

*Example:*

In the VRA62 2" solenoid valve with 70 Nm<sup>3</sup>/h of airflow the pressure drop is  $\Delta p = 6$  mbar. If we consider that 70 m<sup>3</sup>/h is the flow at 200 mbar of inlet pressure, then the pressure drop to be consider is:

$$\Delta p = 6 \times (1 + 0,2) = 7,2 \text{ mbar}$$

Normally, pressure drop and flow rate for the valves are read from the air flow diagram. However, the valves can also be chosen in accordance with the characteristic "Kvs value" which is shown in table 4.

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 [Nm<sup>3</sup>/h]
- Kv = flow factor [m<sup>3</sup>/h]
- $\rho$  = density [Kg/m<sup>3</sup>]
- p<sub>1</sub> = absolute inlet pressure [bar]
- p<sub>2</sub> = absolute outlet pressure [bar]
- $\Delta p$  = differential pressure p<sub>1</sub>-p<sub>2</sub> [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. 4

Kvs	3/4"	1"	1"¼	1"½	2"	2"½	
				DN40	DN50	DN65	DN80
m <sup>3</sup> /h	8,3	10,5	20	26	32	56	66



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 unadvisable
- Flow velocities  $w \leq 15$  m/s are recommended and  $w > 50$  m/s are always unadvisable.

## Ordering information

Tab.5

	<b>VRA</b>	<b>2</b>	<b>-2</b>	<b>N</b>	<b>.B</b>	
<b>Valve type</b>						
<b>VRA</b>	fast opening – fast closing					
<b>VLA</b>	slow opening – fast closing					
<b>VTA</b>	slow opening – slow closing <sup>(1)</sup>					
<b>Size</b>						
<b>2</b>	3/4"					
<b>3</b>	1"					
<b>35</b>	1 1/4"					
<b>4</b>	1 1/2"					
<b>6</b>	2"					
<b>7</b>	2 1/2"					
<b>8</b>	3"					
<b>Max. Operating pressure</b>						
<b>-2</b>	200 mbar (3 psig)					
<b>Connection</b>						
<b>none</b>	Rp internal thread / ISO flange					
<b>N</b>	NPT internal thread / ANSI flange					
<b>Supply voltage</b>						
<b>none</b>	230V 50/60Hz (120V 50/60Hz with "N" connection)					
<b>B</b>	110V 50/60Hz					
<b>C</b>	24V AC/DC <sup>(2)</sup>					
<b>D</b>	12V AC/DC <sup>(2,3)</sup>					

<sup>(1)</sup> VTA not available for sizes 3/4" -1".

<sup>(2)</sup> 12-24V not available for sizes 2 1/2" -3".

<sup>(3)</sup> 12V available for VRA type only.

## Special versions e optionals

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

Protection class can be increased up to IP65. The valves will be provided with a sealed terminal box and cable set.

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)

Whole range can be provided with electrical connection made by standard plug ISO 4400 (optional with LED indicator).

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

The valves can be supplied with a bypass bore in the valve body for low fire.



## 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 (media type, operating pressure, flow rate, ambient temperature, electrical voltage, etc.).
- ✓ Valve may be mounted with coil in horizontal or vertical position, not upside down. Coil may be oriented 360 degrees in any direction.
- ✓ 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).
- ✓ Ensure that installing area is protected from rain and water splashes or drops.
- ✓ Perform functional test after mounting.
- ✓ Do not use to safety shut-off.
- ✓ The continuous service (100% ED) causes inevitable coil heating, depending on working environment. Never install the valve close to walls or other equipments. To improve the coil cooling, install the valve allowing free air circulation.
- ✓ Perform maintenance according to service instructions at least once a year.
- ✓ 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:



2014/34/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 Regulation RT UD 004/2011, RT UD 020/2011 of Russia, Belarus and Kazakhstan.

**Certificate No.: UD № RU Д-IT.PA01.B.40712**

**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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