



VMM

**Multiple safety solenoid valve
for gas regulating trains
DN20 ... DN80**

VMM

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Description

The VMM type valve is a combination of two solenoid valves in an only compact and versatile valve housing.

This type of device is suitable for air or gas blocking and releasing controls (with one or two stages operation), required in gas power burners, atmospheric gas boiler, industrial kilns and others gas consuming appliances.

Features

The valves are made of aluminum alloy die-cast, with a range for inlet/outlet connections from DN20 up to DN80.

Pipe connections meet group 2 and backpressure sealing is compliant with class A, according to EN161 requirements.

A by-pass valve can be fitted on each side with capacity of DN15 or DN25.

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



The whole range can be provided in Ex-proof execution, for use in Zones 2 and 22, according to 94/9/EC Directive (ATEX).

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

Suitable for cycle operation and qualified for continuous service (100% ED).

Equipped with flow rate adjustment.

An incorporated fine mesh filter protects the valve seat and disc as well as downstream components and prevents dirty contamination.

Provided with bilateral pressure gauges on two sides in all pressure chambers, to connect manometers, pressure switches, leakage tester or other gas equipments.

The coils are provided with terminal box or with ISO 4400 plug. 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.



WARNING

This control must be installed in compliance with the rules in force

Functioning and application

The VMM type valve is a safety shutting device using auxiliary power supply.

The first valve (A) is a fast opening safety solenoid valve. When it is de-energized, the spring pushes on the seal disc, keeping the gas passage closed. Now, the inlet chamber is under the gas line pressure, and it forces on the disc too, improving the seal.

When the coil is powered the valve opens rapidly, against the strength of the spring and gas pressure.

If the power supply is shut off, the valve rapidly closes, interrupting the gas flow.

Equally, the second valve (B) may be a fast opening or a slow opening solenoid valve to adjust the gas flow, with a first adjustable fast stroke and a second adjustable slow stroke.

It is possible to connect a third by-pass valve (C), which performs by driver stage or to obtain a second fast (slow) stroke or both.

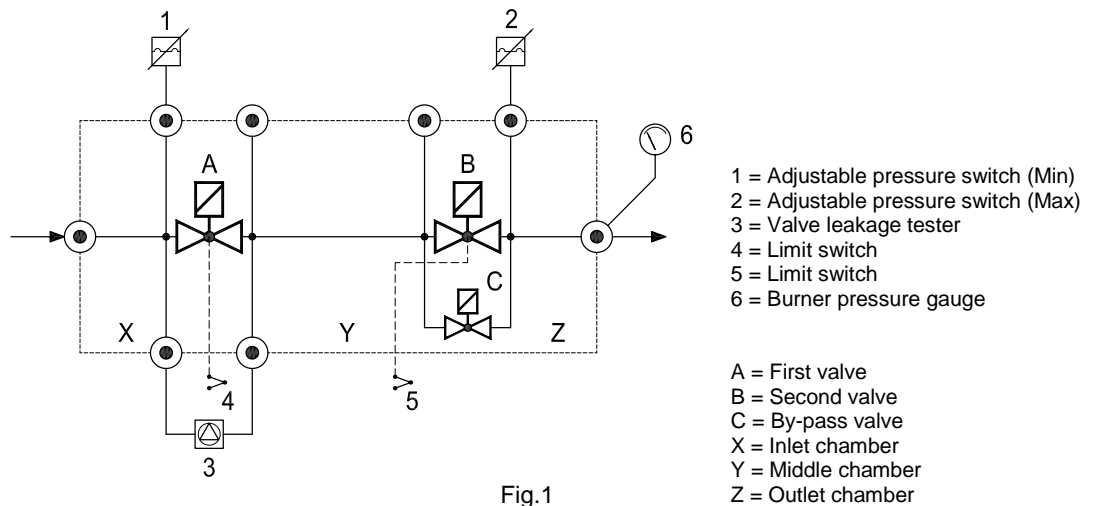


Fig.1

This kind of valve is normally installed as safety and regulating device in gas trains, for industrial applications and gas firing systems.

Figure 2 shows an example of installation.

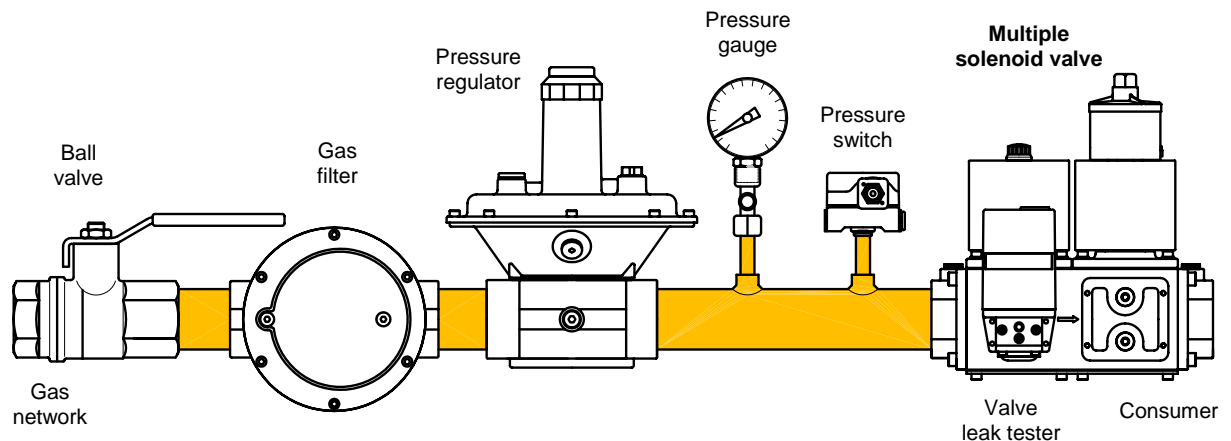


Fig.2



WARNING

Location and mode of installation must be in compliance with local rules in force.

Technical specifications

Tab. 1

Connections	Gas threaded ISO 7-1 from Rp3/4 to Rp2 Flanged PN16 – ISO 7005 from DN40 to DN80 (with optional kit)
By-pass size	DN15 or DN25
Voltage rating	230 VAC 50/60 Hz 110 VAC 50/60 Hz 24 VAC/DC
Voltage tolerance	-15% / +10%
Power consumption	70W for 3/4" – 1" 90W (working) for 1"¼ -3" by-pass 1/2" 25W by-pass 1" 35W
Ambient temperature	-15°C / +60°C
Max. operating pressure	200 mbar (20 kPa) 500 mbar (50 kPa)
Flow capacity	see charts
Closing time	< 1 second
Opening time	Adjustable up to 25 seconds
Pressure gauges	G1/4 (add. G1/8 onto flanged models)
Filter	600 µm, metal mesh
Protection class	IP54 (EN 60529) (optional IP65)
Cable gland	M20x1,5 (EN 50262) for terminal box PG 9 for standard plug
Wires cross-section	2,5 mm ² max.
Electrical safety	Class I (EN 60335-1)
Coil winding insulation	Class H (200°C)
Coil thermal resistance	Class F (155°C)
Materials in contact with gas	Aluminium alloy Brass Stainless steel Plated steel Anaerobic adhesive Nitrile rubber (NBR) Fluoro elastomer (FPM) Polytetrafluoroethylene (PTFE)

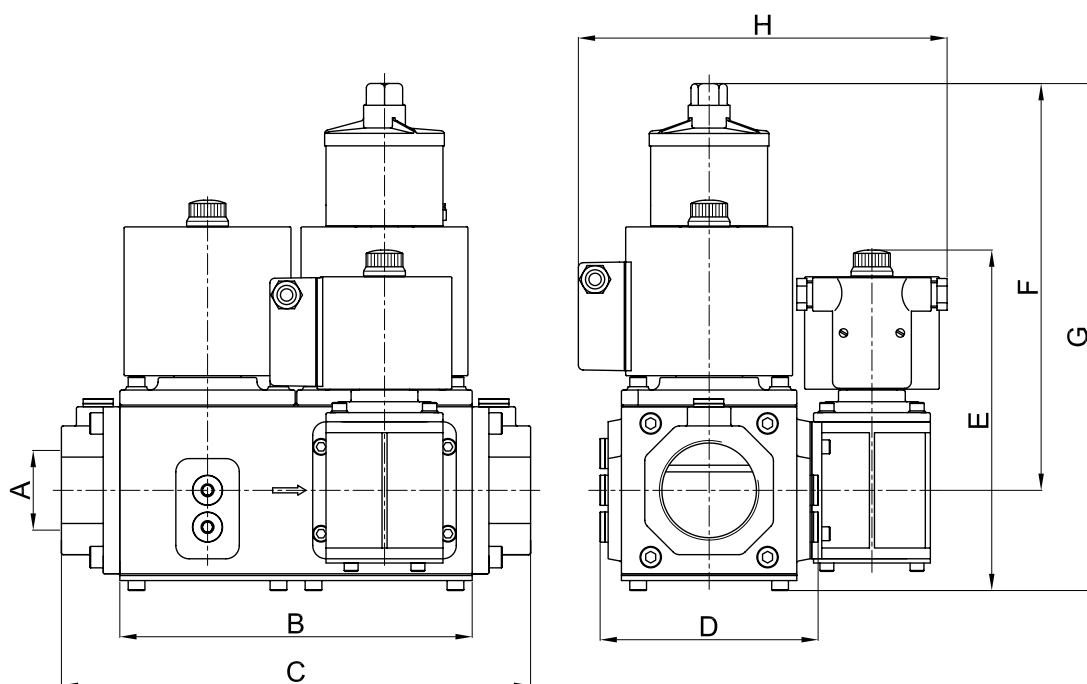


Fig.3

Tab. 2

Model	Overall dimensions (mm)								Weight (Kg)
	A	B	C	D	E	F	G	H	
VMM...F00		154	185	78	-	130	165	112	5,4
VMM...S00	Rp3/4 Rp1	154	185	78	-	186	221	112	5,8
VMM...S10		154	185	78	156	186	221	194	7,1
VMM...S20		154	185	78	210	186	221	194	7,5
VMM...F00		211	280	127	-	170	230	148	13,0
VMM...S00	Rp1¼ Rp1½ Rp2	211	280	127	-	245	305	148	13,7
VMM...S10		211	280	127	192	245	305	200	15,3
VMM...S20		211	280	127	246	245	305	200	15,5
VMM...S30		211	280	127	200	245	305	220	16,3
VMM...S40		211	280	127	254	245	305	220	16,5
VMM...F00		-	310	200	-	213	317	200	17,0
VMM...S00		-	310	200	-	288	388	200	18,2
VMM...S10	DN65 DN80	-	310	200	278	288	388	250	19,8
VMM...S20		-	310	200	332	288	388	250	20,0
VMM...S30		-	310	200	285	288	388	250	20,8
VMM...S40		-	310	200	339	288	388	250	21,0

Gas flow chart
(Pressure drop)

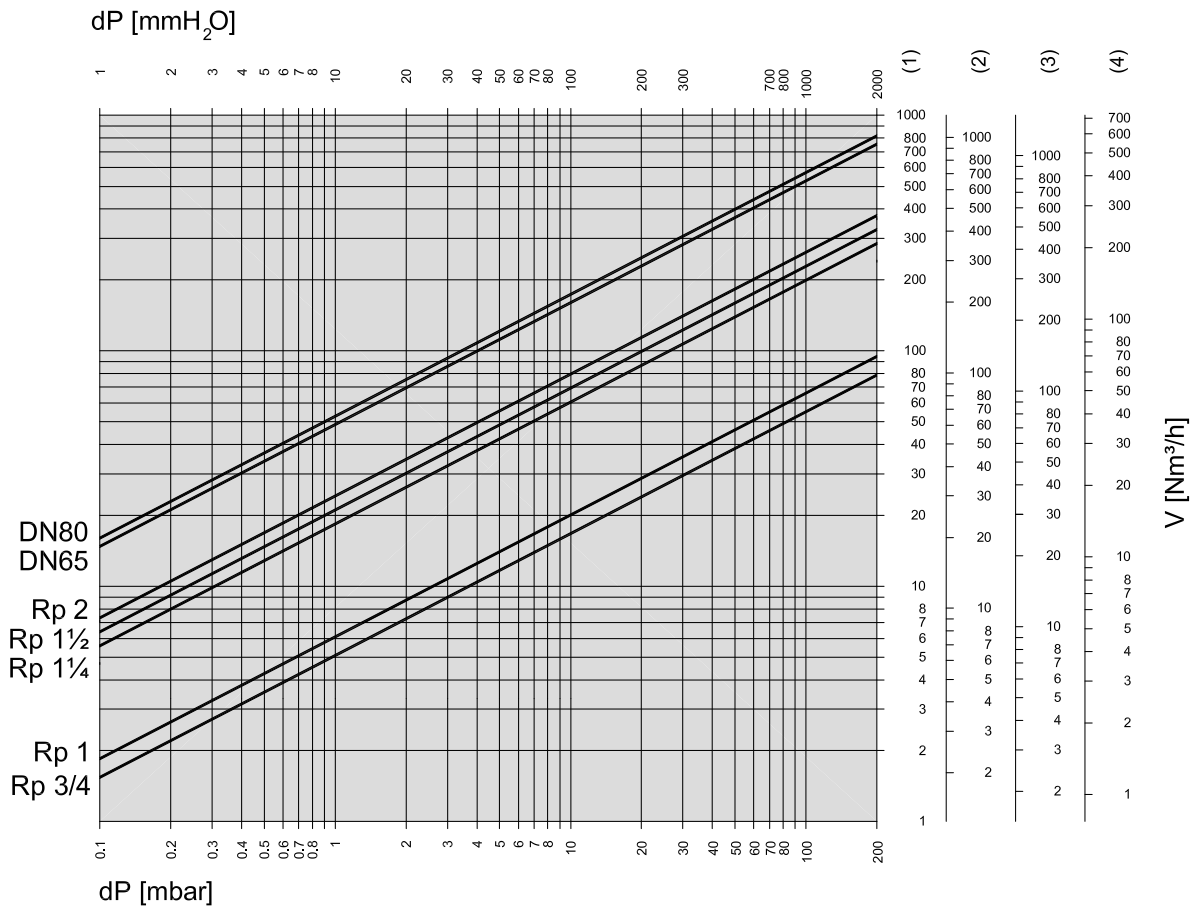


Fig. 4

**Formula of conversion
from air to other gases**

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

Tab. 3

Gas type	Specific gravity ρ [Kg/m ³]	$k = \sqrt{\frac{1,25}{\rho_{GAS}}}$
(1) Air	1,25	1,00
(2) Natural gas	0,80	1,25
(3) Town gas	0,57	1,48
(4) LPG	2,08	0,77

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 60 Nm³/h there is a pressure drop $\Delta p = 6$ mbar. If we consider that 60 m³/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 gas flow diagram. However, the valves can also be chosen in accordance with the characteristic "Kvs value" which is shown below:

Tab. 4

	Kvs [m ³ /h]		
	Main valve	Bypass 1/2"	Bypass 1"
Rp 3/4	6,0	4,6	-
Rp 1	7,0	4,6	-
Rp 1¼	21,5	6,0	9,0
Rp 1½	25,0	6,0	9,0
Rp 2	27,4	6,0	9,0
DN65	59,0	6,0	9,0
DN80	61,0	6,0	9,0

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



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

	VMM	50	2	A	S	1	0
Valve type							
Connections size							
20 = Rp3/4							
25 = Rp1							
32 = Rp1¼							
40 = Rp1½ DN40 ⁽¹⁾							
50 = Rp2 DN50 ⁽¹⁾							
65 = DN65							
80 = DN80							
Max. Operating pressure							
2 = 200 mbar							
5 = 500 mbar							
Supply voltage							
A = 230V 50/60Hz							
B = 110V 50/60Hz							
C = 24V AC/DC							
Second valve type							
F = fast							
S = slow							
By-pass valve on the Right side							
(seen from the inlet)							
0 = none							
1 = ½" (DN15) Fast							
2 = ½" (DN15) Slow							
3 = 1" (DN25) Fast							
4 = 1" (DN25) Slow							
By-pass valve on the Left side (special execution)							
(seen from the inlet)							
0 = none							
1 = ½" (DN15) Fast							
2 = ½" (DN15) Slow							
3 = 1" (DN25) Fast							
4 = 1" (DN25) Slow							

⁽¹⁾ Optional kit : extension code "FL"

Tab.5

Special versions and optionals

The valve can be provided with G1/8 connection on the bottom for closed position indicator micro-switch (PCS). To install the micro-switch the installing kit must be required.

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

Whole range can be provided with Ex-proof marking for use in Zone 2 and 22, according to 94/9/EC Directive (ATEX).

The valve can be provided with electrical connection made by standard plug ISO 4400.

The threaded models Rp1½ and Rp2 can be provided with flanged connections using an optional kit.

The valve can be supplied in the special version suitable for aggressive gases (i.e. biogas, COG). This version is free of nonferrous metals and equipped with special seals.



- The special version suitable for aggressive gases may be order adding to the standard designation the additional code "J" for biogas or "K" for COG.
- Other optionals (i.e. standard plug, IP65 version) must be order with their ordering code.

Example:

VMM502AS10 for a valve with Rp2 threaded connections, 200 mbar, 230VAC, with a slow opening second valve and a DN15 by-pass valve with fast opening connected on the right side.



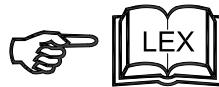
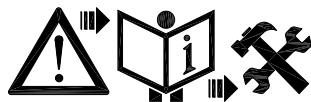
Manufacturer reserves the right to update or make technical changes without prior notice.

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. 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).
- ✓ A gas filter should be always installed upstream the valve.
- ✓ Ensure that installing area is protected from rain and water splashes or drops.
- ✓ Perform leak and functional tests after mounting (max. testing pressure 1,5 Pmax).
- ✓ 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 (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.



Standards and approvals

The valve design meets current European approval requirements regarding safety shut-off functions on gaseous fuels.

These products conform with the Gas Appliances Directive (2009/142/CE) and the certification has been issued by the notified body:

GASTEC CERTIFICATION B.V.
Wilmersdorf, 50
NL-7323 AC Apeldoorn



CE Reg.-Nr. 0063AQ1350

The following standards/technical specifications have been fulfilled:

- Electromagnetic Compatibility (2004/108/EC)
- Low Voltage Directive (2006/95/EC)

The valves comply with the Technical Regulation 753 of Russian Federation concerning the security of machinery and equipment and the certification has been issued by the Body

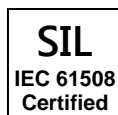
«INTERCERT» Ltd
Str. Profsoyuznaya, 93 A, of. 423
RU-117279 Moscow



Certificate No.: C-IT.AB86.B.04357

The valves meet the requirements of functional safety of electrical systems according to the European standard IEC EN 61508 and are certified for systems up to SIL3 (Safety Integrity Level) by:

TÜV Italia Srl - Gruppo TÜV SÜD
Via Carducci 125
I-20099 Sesto San Giovanni (MI)



Certificate No.: C-IS-248034-01



Italia

Quality Management System is certified according to UNI EN ISO 9001 and the monitoring is carried out by the notified body:

Kiwa Gastec Italia Spa
Via Treviso, 32/34
I- 31020 San Vendemiano (TV)



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