# VMH

## Safety shut off valves for gas with hydraulic actuator

## DN65 … DN300

**EE175** -0124

# VMH

## Contents



## Description

The VMH type valve is a safety shut off valve for gas with hydraulic actuator. It is suitable for air or gas blocking and releasing controls, required in the main pipe of gas power burners, atmospheric gas boilers, industrial kilns and others gas consuming appliances. See Tab. 2 for maximum operative pressure for every model.

## Features

The valves are made of aluminum alloy with a range for connections from DN 65 up to DN 300.

Pipe connections meet group 2.

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

Special versions for aggressive gases.

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

Qualified for continuous service (100% ED).

Size DN65-80 is 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 G1/4 pressure gauge on two sides in both inlet and outlet chamber to connect manometers, pressure switches, leakage tester or other gas equipment.

The actuator is provided with ISO 4400 plug for easy cabling. The protection class is IP65 (EN 60529).

The actuator is provided with a led to visualize when it is energized.

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 and fully warranted.

**WARNING**

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

## Functioning and application

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

When it is de-energized, the spring pushes on the seal disc, keeping the gas passage closed. In this condition the inlet chamber is filled with pressurized gas that forces on the disc, improving the seal.

When the actuator is powered, the relief valve closes, the pumps starts and the pressurized oil pushes the piston. The disc opens slowly against the combined force of spring and gas pressure.

When the disc reaches the end stop, the pump is turned off and only the relief valve is consuming power.

If the power supply is shut off, the relief valve opens and the disc closes rapidly, interrupting the gas flow.

Fig. 1 shows a sketch of a VMH valve.

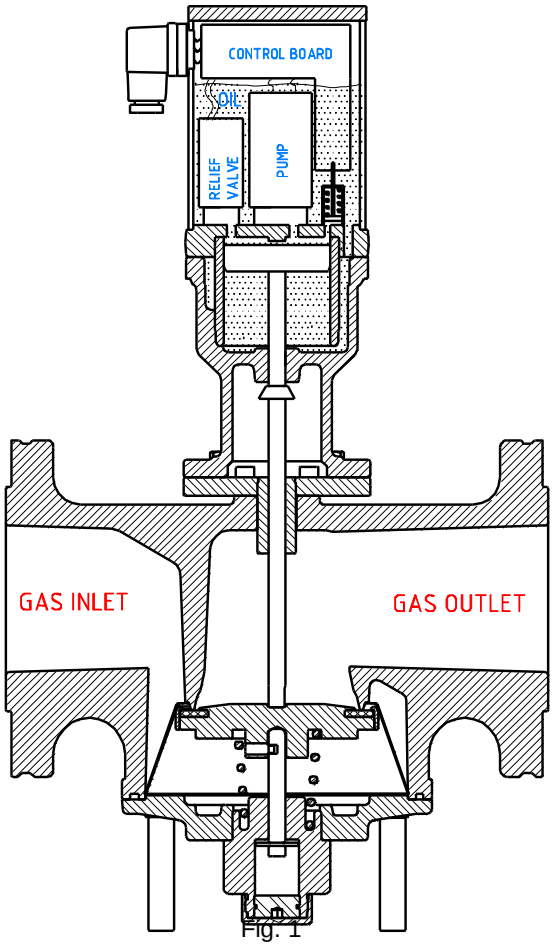


Fig. 1

This kind of valve is normally installed as safety and regulating device in gas trains, for industrial applications and gas firing systems. Fig. 2 shows an example of installation, in combination with other Elektrogas devices.

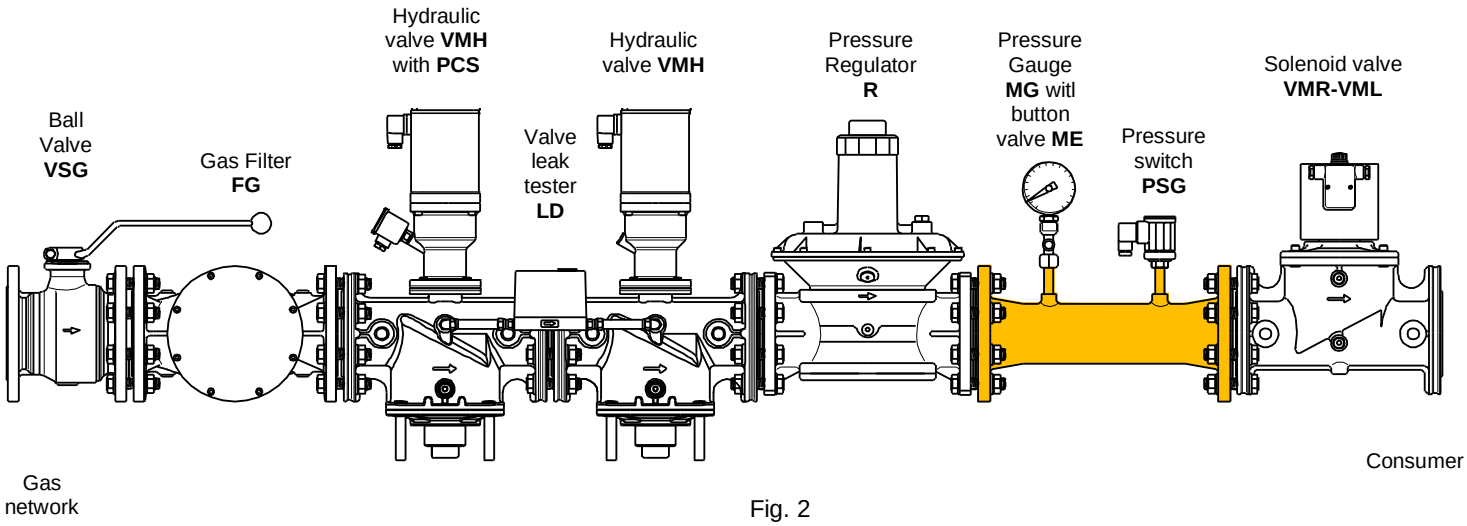


Fig. 2

**WARNING**

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

## Technical specifications

Tab. 1

| | |
|---|---|
| **Connections** | Flanged PN16 – ISO 7005 from DN65 to DN300 |
| **Voltage rating (-15%/+10%)** | 230 VAC or 110 VAC 50/60 Hz |
| **Power consumption** | 20VA (START 110 W)<br>Only for DN 250–300: 25VA (START 115W) |
| **Ambient temperature** | -15°C / +60°C |
| **Max. operating pressure** | see Tab. 2 |
| **Flow capacity** | see Tab. 2 |
| **Opening time** | see Tab. 2 |
| **Filter** | 600 µm, metal mesh |
| **Protection class** | IP65 (EN 60529) |
| **Cable gland** | Plug ISO 4400 with cable gland PG9 |
| **Materials in contact with gas** | Aluminum alloy<br>Brass<br>Stainless steel<br>Plated steel<br>Anaerobic adhesive<br>Nitrile rubber (NBR)<br>Fluoroelastomer (FPM)<br>Polytetrafluoroethylene (PTFE) |

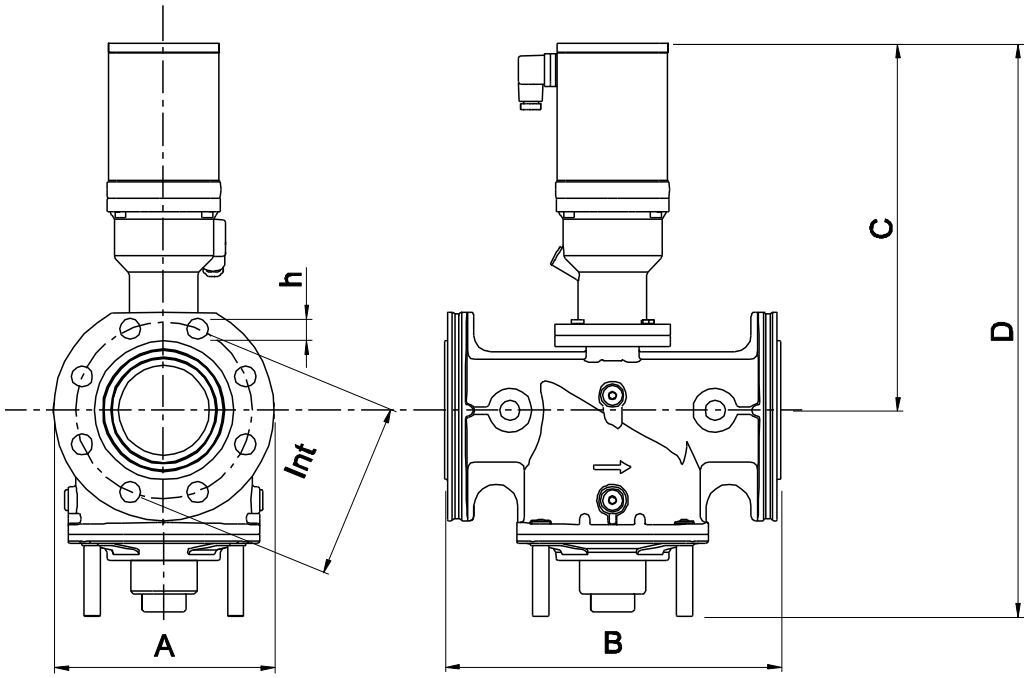


Fig. 3

Tab. 2

| Model | Conn. | Pmax [bar] | Opening time *3 [sec] | Flow Kvs [m³/h] | Max cycles per hour *4 | Overall dimensions [mm] | | | | | | Weight [Kg] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | A | B | C | D | Int | h | |
| VMH7 *1 *2 | DN 65 | 1,6 | 10..15 | 83,0 | 60 | 200 | 305 | 350 | 536 | 145 | 4x18 | 14 |
| VMH8 *1 *2 | DN 80 | 1,6 | 10..15 | 92,0 | 60 | 200 | 305 | 350 | 536 | 160 | 8x18 | 14 |
| VMH9 *1 *2 | DN 100 | 1,3 | 15..25 | 152,0 | 40 | 250 | 350 | 366 | 571 | 180 | 8x18 | 18 |
| VMH93 *1 | DN 125 | 0,5 | 25..40 | 250,0 | 30 | 310 | 460 | 461 | 671 | 210 | 8x18 | 34 |
| VMH93U *2 | DN 125 | 1,3 | 25..40 | 250,0 | 20 | 310 | 460 | 461 | 671 | 210 | 8x18 | 34 |
| VMH95 *1 | DN 150 | 0,5 | 25..40 | 315,0 | 30 | 310 | 460 | 461 | 671 | 240 | 8x23 | 36 |
| VMH95U *2 | DN 150 | 1,3 | 25..40 | 315,0 | 20 | 310 | 460 | 461 | 671 | 240 | 8x23 | 36 |
| VMH98 *1 | DN 200 | 0,2 | 35..50 | 476,0 | 20 | 370 | 546 | 494 | 730 | 295 | 12x23 | 52 |
| VMH98U *2 | DN 200 | 1,3 | 35..50 | 476,0 | 15 | 370 | 546 | 494 | 730 | 295 | 12x23 | 52 |
| VMH910U *2 | DN 250 | 1,3 | 40..60 | 660,0 | 15 | 405 | 600 | 560 | 852 | 355 | 12x28 | 59 |
| VMH912U *2 | DN 300 | 0,6 | 45..75 | 970,0 | 15 | 460 | 700 | 596 | 923 | 410 | 12x28 | 106 |

***1** models with certificate GAR - 0063CO1798

***2** models with certificate PED - 0497/2638-2664/13

***3** opening time depends on ambient temperature, real voltage, frequency and inlet pressure

***4** VMH valves are not suitable for very high number of cycles, as used in *pulse firing*.

## Gas flow chart

(Pressure drop)

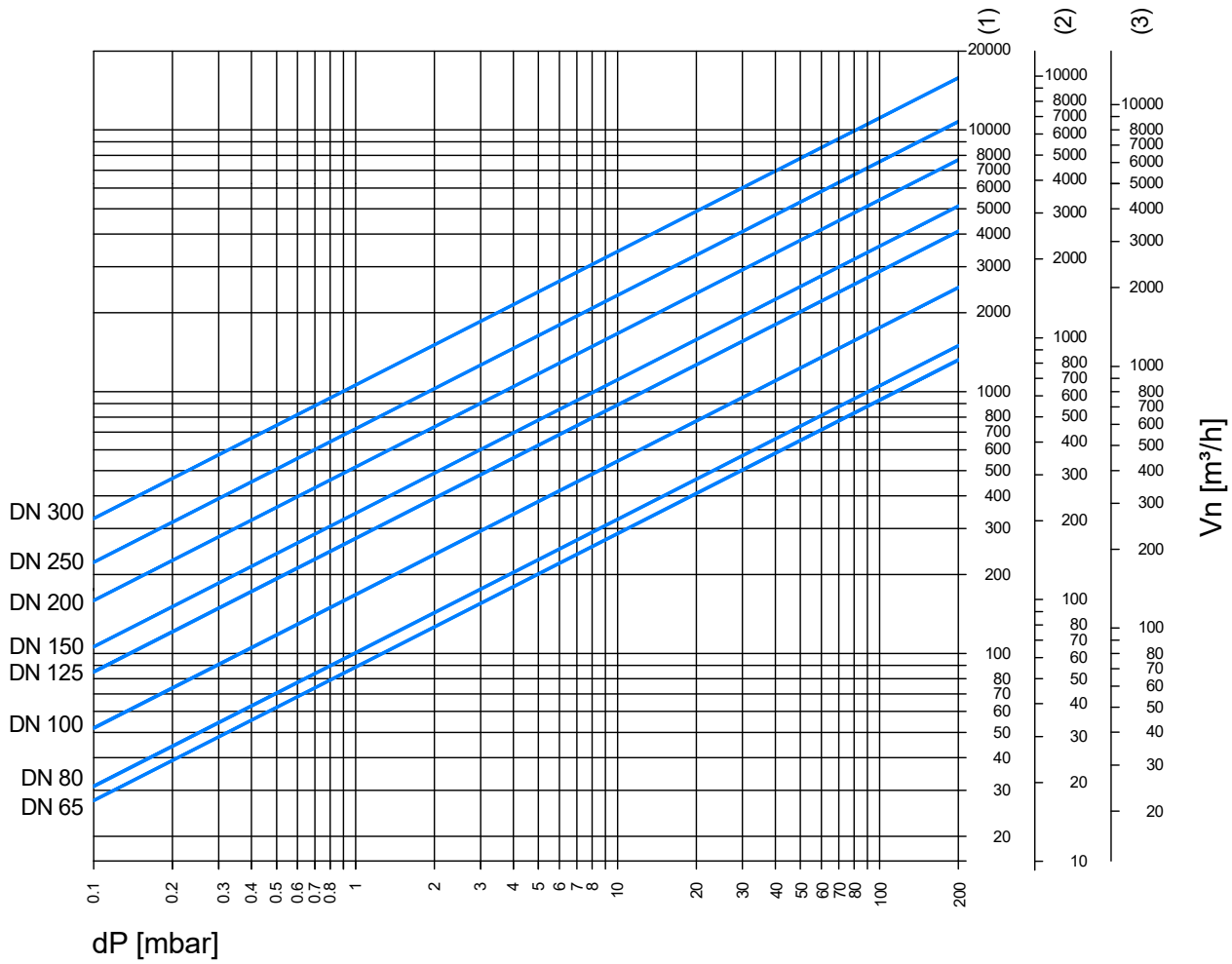


Fig. 4

## Formula of conversion from air to other gases

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

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

Tab. 3

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

15°C, 1013 mbar, dry

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+ relative pressure in bar)

*Example:*

In the flow chart we read that in a VMH8 - DN80 valve with a Natural Gas flow of 200 $m^3/h$ at standard conditions, there is a pressure drop $\Delta p$ = 4,0 mbar.

If we consider that 200 $m^3/h$ is the flow at 1,5 bar of inlet pressure, then the pressure drop to be consider is:

$\Delta p = 4,0x(1+1,5) = 10,0$ mbar

Besides reading the flow chart, the valves can be chosen in accordance with the characteristic "Kvs value" as shown in table 2.

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 [$m^3/h$]
$\rho$ = density [$Kg/m^3$]
$p_1$ = absolute inlet pressure [bar]
$p_2$ = absolute outlet pressure [bar]
$\Delta p$ = 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%: valve selected should have Kvs higher than Kv calculated and allowance added.

**Kvs > 1,2 Kv**

Valve must be selected considering the following:

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

## Ordering information

Tab. 4

| | VMH | 8 | - | - |
|---|---|---|---|---|

**Valve type**

**Connections size and max. pressure**

| | |
|---|---|
| **7** | DN65 1.6bar |
| **8** | DN80 1.6bar |
| **9** | DN100 1.3bar |
| **93** | DN125 0.5bar |
| **93U** | DN125 1.3bar |
| **95** | DN150 0.5bar |
| **95U** | DN150 1.3bar |
| **98** | DN200 0.2bar |
| **98U** | DN200 1.3bar |
| **910U** | DN250 1.3bar |
| **912U** | DN300 0.6bar |

**Supply voltage**

| | |
|---|---|
| None | 230V 50/60Hz |
| B | 110V 50/60Hz |

**Special versions**

| | |
|---|---|
| **J** | Version for bio gas |
| **K** | Version for coke gas |
| **HF** | Hydrogen |
| **X** | Ex execution for zone 2 and 22 |
| **Z** | Anodization of housing and external aluminum parts |
| **Z1** | Epoxy body coating and anodization of inner aluminum parts |

*Example:* **VMH93.BK** : valve DN125, 110V suitable for bio and coke gas

## Special versions and options

- **J**: valves can be supplied in special version for aggressive gases such as biogas. They are free of brass and NBR. In this case customer shall check compatibility between valve materials and gas contents.
- **K**: valves can be supplied in special version for aggressive and dirty gases such as COG. They are free of brass and NBR and have additional protection of internal mechanism. As these gases usually have high content of hydrogen, tightness test is performed with helium. In this case customer shall check compatibility between valve materials and gas contents.
- **HF**: valves can be manufactured with additional treatment and tightness test with helium, so that they are suitable to be used with hydrogen
- **X**: valves can be provided with EX execution for use in Zones 2 and 22, according to 2014/34/EU Directive (ATEX):

| | |
|---|---|
| category | II 3 G,D |
| protection mode | Ex nR IIA T4 Gc X<br>Ex tc IIIC T135°C Dc X |
| ambient temperature | -15 / +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 aluminum inner components, to withstand aggressive gases.

- Option: PCS (closed position indicator switch), must be ordered separately with its own code.

## 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. Actuator may be oriented 360 degrees in any direction.
- ✓ In the event of vertical pipe, the flow direction should be from bottom to top, and the actuator must face with the ISO connector upwards.
- ✓ 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.
- ✓ The continuous service (100% ED) causes inevitable actuator heating, depending on working environment. Never install the valve close to walls or other equipment. To improve the 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.

For more details see the Installation and Service Instructions.

## Standards and approvals

The valves are designed and manufactured according to European Regulation on Gas appliances 2016/426/UE (GAR) and the certification has been issued by the notified body Kiwa Nederland B.V. – reg. n° 0063CO1798 (not applicable to all models, see Tab. 2).

The products with operating pressure superior 0.5 bar comply with the Pressure Equipment Directive 2014/68/UE (PED) and the certification has been issued by the notified body:

CSI Spa – reg. n° PED/0497/2638/13 and 2664/13.

The following standards/technical specifications have been fulfilled:

- Electromagnetic Compatibility (2014/30/UE)
- Low Voltage Directive (2014/35/UE)
- Rohs II (2011/65/UE)
- Atex (2014/34/UE) when shown upon the product.

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 n°: **UEE № RU Д-IT.PA01.B.08271/18**

The product is approved for Australia by IAPMO R&T Oceana on the basis of norm AS 4629 (sizes from 2”½ to 6”).

Certificate No.: **GMK 10744**

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.

Certificate No.: **TUV IT 22 SIL 0135**

**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.
Visit Elektrogas website for updates and further details.

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