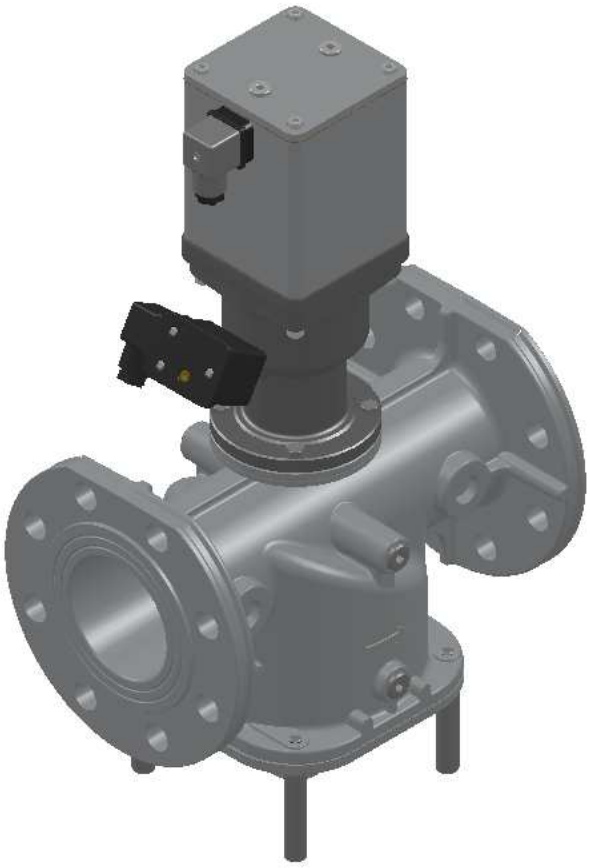

VMH

Safety shut off valves for gas with hydraulic actuator

DN65 … DN200

VMH

Contents

Elektrogas® is a brand name of

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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. Depending on series, VMH valves can be used in pipeline with pressure from 3.2 to 0.2bar (see Tab. 2).

Features

The valves are made of aluminum alloy with a range for connections from DN 65 up to DN 200.

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

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 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 equipments.

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

If compressed air is available, the hydraulic actuator can be replaced with a pneumatic one (VMP series). For further information see VMP datasheet.

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 and the disc opens 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.

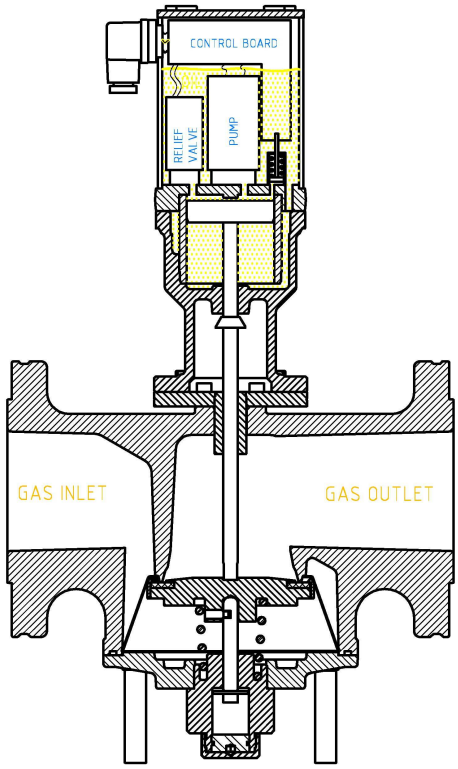

Fig. 1

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.

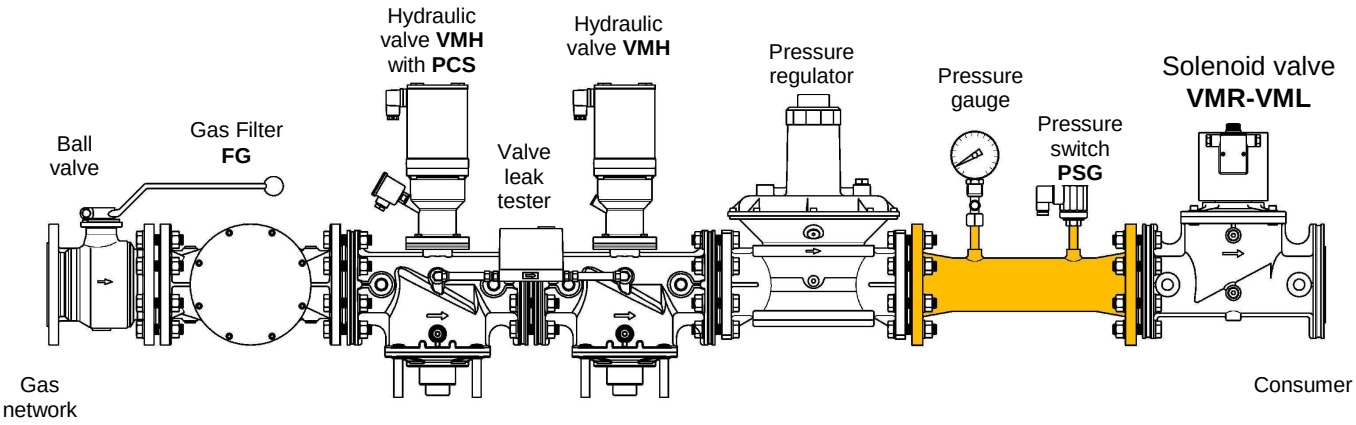

Fig. 2

WARNING

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

Special versions and optionals

A switch can be installed as a closed position indicator (see PCS).

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

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

Technical specifications

Tab. 1

Connections	Flanged PN16 – ISO 7005 from DN65 to DN200
Voltage rating (-15%/+10%)	230 VAC 50/60 Hz 110 VAC 50/60 Hz
Power consumption	see Tab. 2
Ambient temperature	-15℃ / +60℃
Max. operating pressure	see Tab. 2
Flow capacity	see Tab. 2
Closing time	< 1 second
Opening time	see Tab. 2
Filter	600 µm, metal mesh
Protection class	IP65 (EN 60529)
Cable gland	Plug ISO 4400 (EN 50262)
Materials in contact with gas	Aluminium alloy Brass Stainless steel Plated steel Anaerobic adhesive Nitrile rubber (NBR) Fluoro elastomer (FPM) Polytetrafluoroethylene (PTFE)

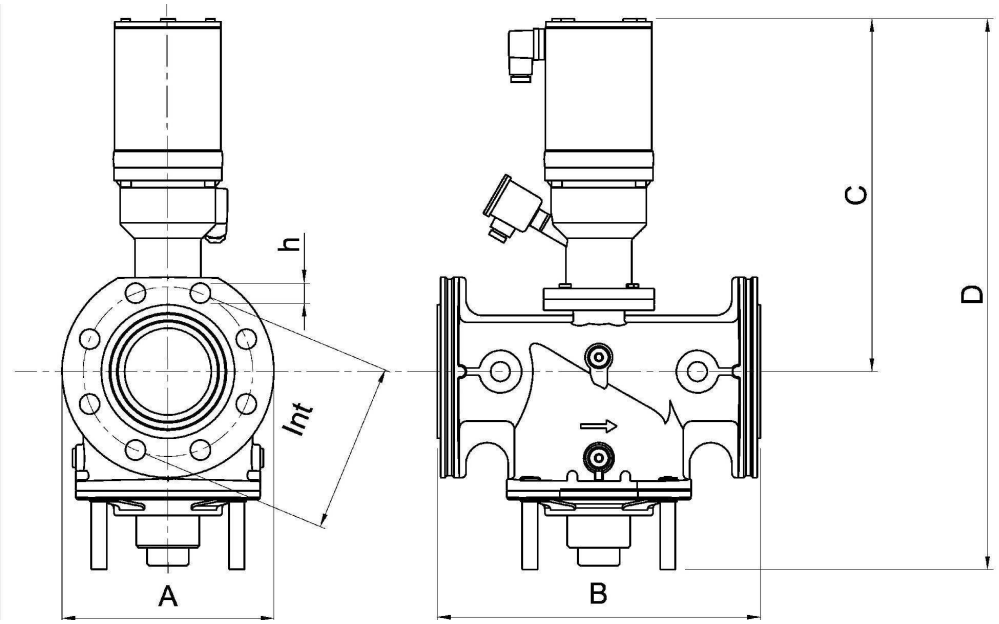

Fig. 3

Tab. 2

Model	Conn.	Pmax [mbar]	Power [W]	Opening time [sec]	Flow Kvs [m³/h]	Overall dimensions [mm]						Weight [Kg]
						A	B	C	D	Int	h	
VMH7	DN 65	1600	20 VA (START 110 W)	12	80,0	200	305	350	536	145	4x18	14
VMH8	DN 80	1600	20 VA (START 110 W)	12	100,0	200	305	350	536	160	8x18	14
VMH9	DN 100	1300	20 VA (START 110 W)	16	155,0	252	350	365	572	180	8x18	18
VMH93	DN 125	500	20 VA (START 110 W)	20	250,0	310	460	461	671	210	8x18	36
VMH95	DN 150	500	20 VA (START 110 W)	20	315,0	310	460	461	671	240	8x23	36
VMH98	DN 200	200	20 VA (START 110 W)	25	516,0	370	546	494	740	295	12x23	52

Gas flow chart
(Pressure drop)

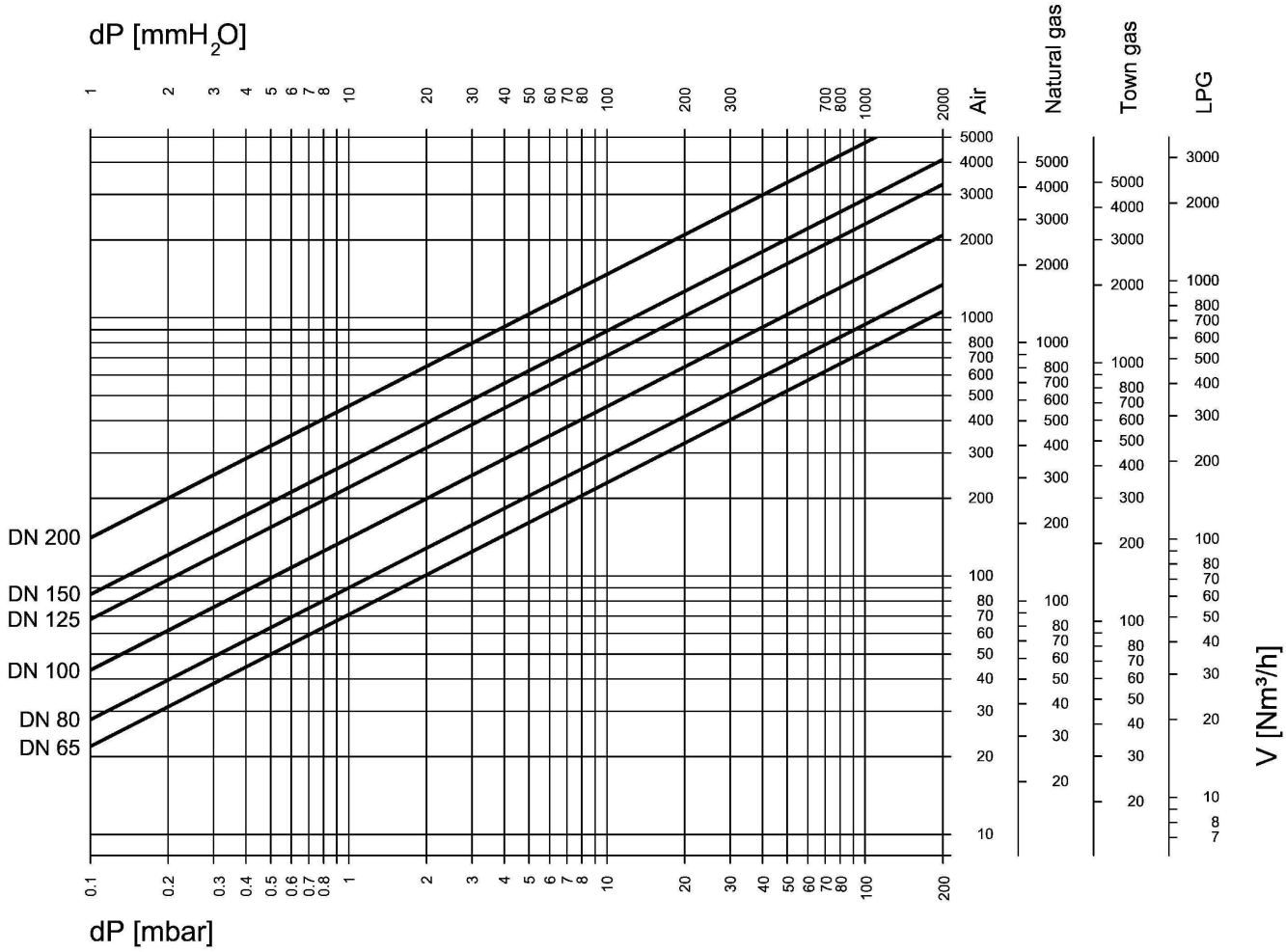

Fig. 4

Formula of conversion from air to other gases

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

Tab. 3

Gas type	Specific gravity ρ [Kg/m³]	$k = \sqrt{\frac{125}{\rho_{GAS}}}$
Air	1,25	1,00
Natural gas	0,80	1,25
Town gas	0,57	1,48
LPG	2,08	0,77

15℃, 1013 mbar, dry

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

Example:

In the DN80 valve with an air flow of 200 Nm^3/h there is a pressure drop ∆p = 7.5 mbar.

If we consider that 200 m^3/h is the flow at 1500 mbar of inlet pressure, then the pressure drop to be consider is:

$\Delta p = 7,5x(1+1,5) = 18.75$ mbar

Usually 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" 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:

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

where

V = flow rate [Nm^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 [℃]

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 ≤ 15 m/s are recommended and w > 50 m/s are always unadvisable.

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).

The products conform with the Pressure Equipment Directive (97/23/CE) .

The following standards/technical specifications have been fulfilled:

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

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
31020 San Vendemiano (TV) - Italy

Ordering Information

Tab. 4

	VMH	8	-	-
Valve type **VMH**				
Connections size 7 = DN65 8 = DN80 9 = DN100 93 = DN125 95 = DN150 98 = DN200				
Supply voltage - = 230V 50/60Hz B = 110V 50/60Hz				
Special version - K = version for bio and coke gas				

Example:

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

- Optionals available: explosion-proof execution, plug with led indicator, others on request. They must be ordered with their code.

Installation, adjustment and servicing

To assure a proper and safe operation, as well as a long life of the valve, installation procedure and periodical servicing are very important topics and the following instructions should be always fulfilled.

IMPORTANT: before proceeding with the installation, 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.).

CAUTION

Shut off the gas supply at the main manual shut-off valve and disconnect electrical power to the valve before proceeding installation or servicing.

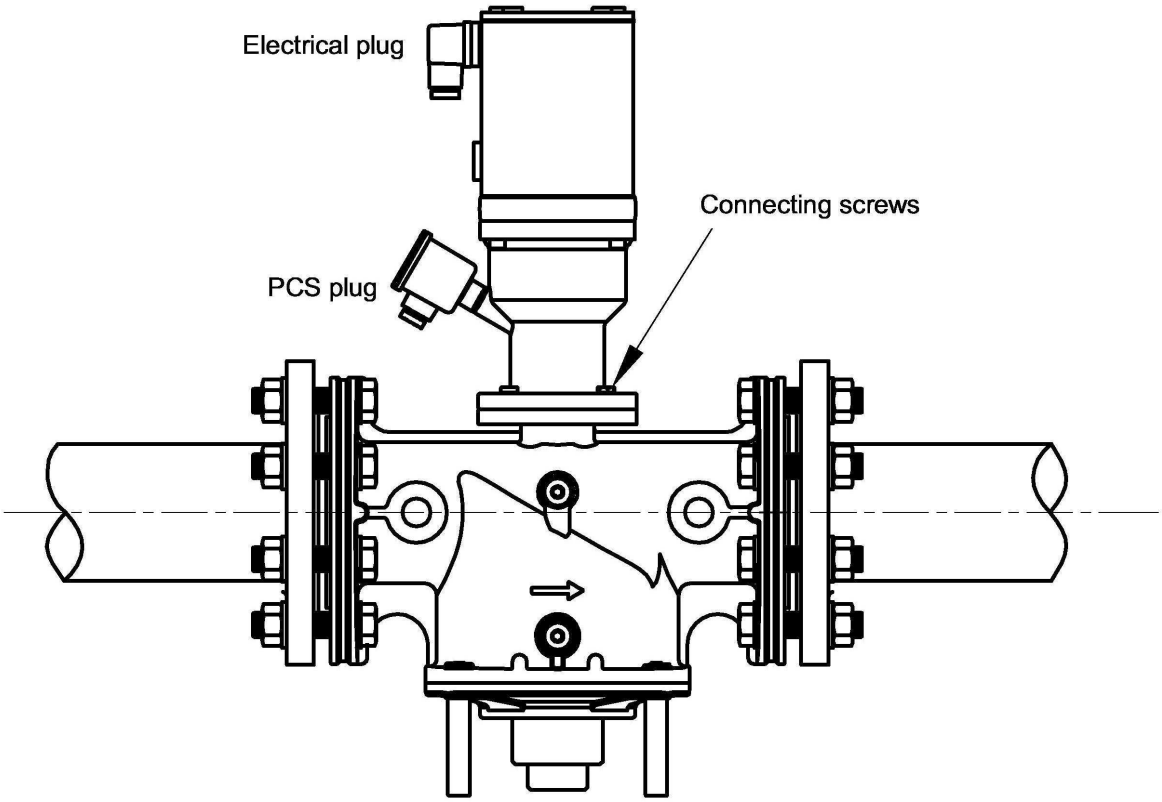

Fig. 5

PIPING CONNECTION

For an easier handling the actuator can be removed from the valve body (unscrew the hex head screws at the base of the actuator and pay attention to the O-ring between actuator and valve)

- Check correspondence of flow direction with arrow printed on valve body. Pay attention:
    - o valve may be mounted in horizontal or vertical position; in case of vertical pipe, the flow direction should be from bottom to top
    - o in case of vertical pipe the actuator must be oriented with the plug upward.
- Check correct alignment of connecting pipes.
- Ensure that installing area is protected from rain and water splashes or drops.
- Remove the end caps and make sure no foreign body is entered into the valve during handling.
- Position the gasket or sealing agent on the flanges and insert the bolts with washers.

- Screw the nuts tightening them crosswise and using proper tools only. Avoid overtightening and mount tension free.
- If the actuator has been removed, check the correct position of the O-ring and position the actuator on its connection flange. (in case of vertical pipe the actuator must be oriented with the plug upward).
- Fit all the screws with washers and then screw them crosswise using a proper tool. Avoid overtightening (max 10Nm).

Tab. 5

Tab. 5 shows the maximum values of bending moment (Fmax) and screws driving torque (Cmax), according to EN161.

Connections	Fmax (Nm) t<10 s	Cmax (Nm)
DN65	1600	50
DN80	2400	50
DN100	5000	80
DN125	6000	160
DN150	7600	160
DN200	7600	160

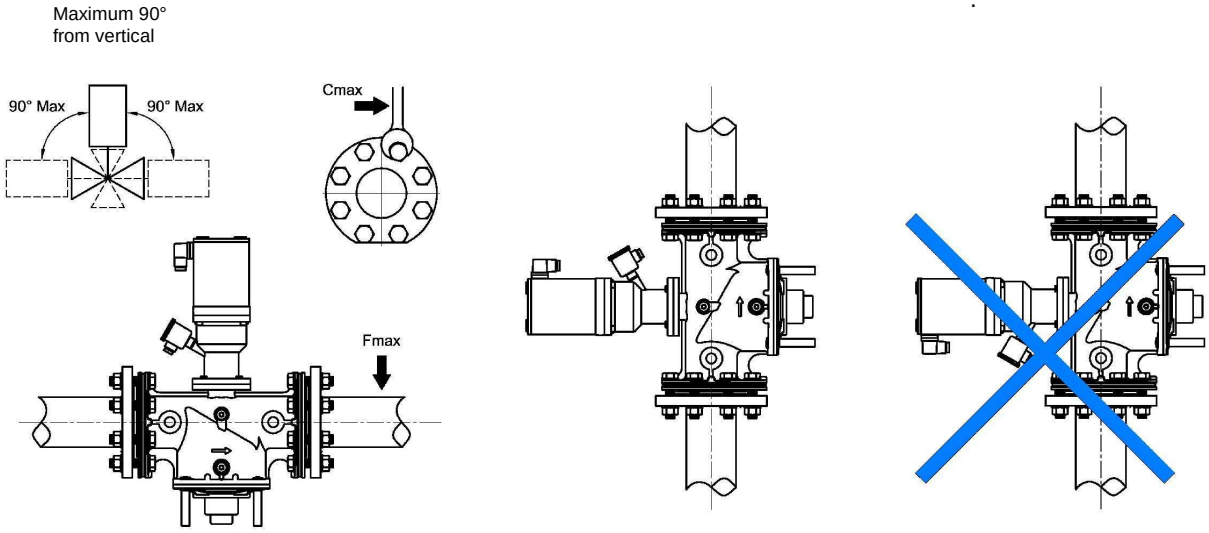

Fig. 6

ELECTRICAL CONNECTION (IEC 730-1)

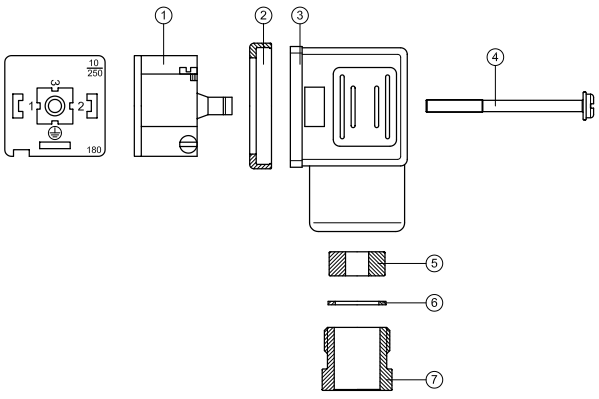

Fig. 7

- Using a screwdriver remove the plug from the coil.
- Unscrew the gland-nut (7) and remove the washer (6) and grommet (5).
- To remove the terminal block (1) from the plug housing (3), remove the gasket (2) and extract the screw (4) completely, then insert a flat screwdriver into the slot located on edge and pull it.
- Insert the cable in to the gland-nut, washer, grommet and then into the plug housing.
- Connect power cables to the terminal block according to printed designation.
- Pull back the cable and insert the terminal block into the housing.
- Screw back the gland-nut, make sure that the grommet is locked on the cable.
- Insert the screw and gasket into the housing and screw back the plug on the coil.
- it is reccomended not to power the actuator before it is correctly install on the valve, because serious damage can result.

The continuous service (100% ED) causes inevitable actuator heating, depending of working environment. This situation is absolutely normal and does not have to worry. To improve the actuator cooling, install the valve allowing free air circulation.

WARNING

Make sure all gaskets are used properly.

After mounting perform a leak test with the valve open (max. testing pressure: 1.5 Pmax) and a functional test (at normal working pressure).

In order to avoid injury, after a prolonged period of operation, avoid direct contact with the actuator.

FLOW RATE ADJUSTMENT (Vmax – only VMH 7-8 DN65 - DN80)

Flow rate may be adjusted from 0 cubic meters/h to the maximum (only 2"½-3").

1) Remove the cap on the bottom of the valve.
2) Using a 6 mm Allen wrench, set the flow regulation screw. Turn wrench clockwise to decrease or counter-clockwise to increase flow rate (factory setting is max. flow rate).
3) When adjustment is completed, screw back the cap.

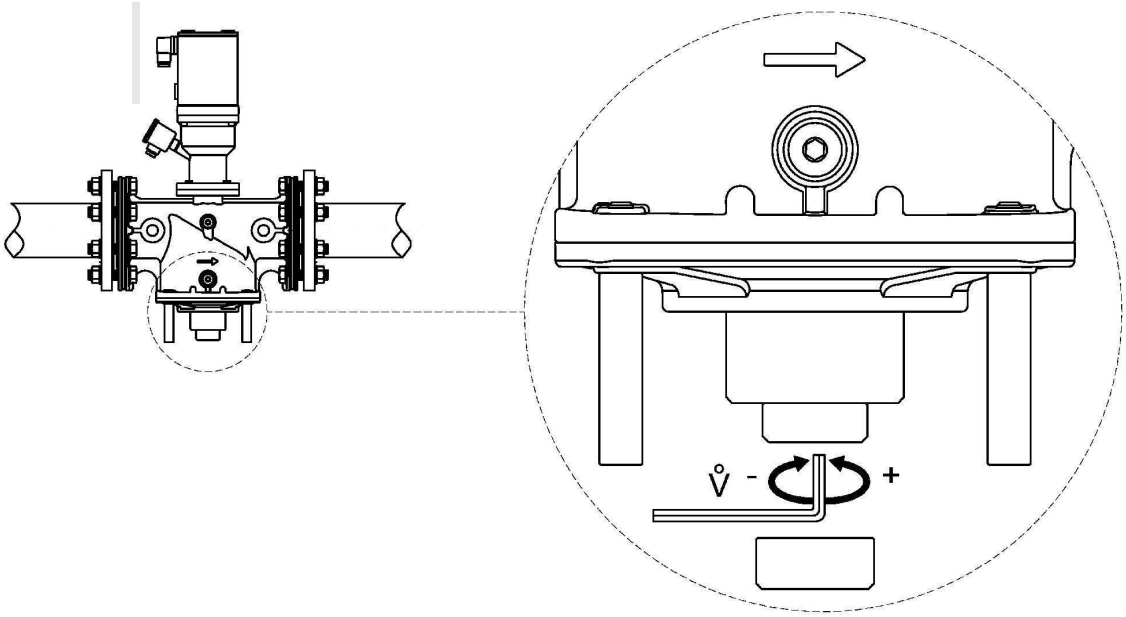

Fig. 8

WARNING

Adjustments below 40% of capacity are unadvisable because they may cause turbulence.

To maintain a good performance of the system, almost once a year, an external inspection of the valve is recommended.

Due to seals aging, to ensure safe operation, we recommend valve replacement after 10 years from the date of manufacture stamped on the product.

EXTERNAL INSPECTION

- Turn off all power before servicing any part of the system.
- Check the conditions of the plug. If gasket is deteriorated, replace it with a new one.
- Check the electrical connections are clean, dry and correctly tightened.
- Check the conditions of pipe connections: cover them with a soap solution and check for leakages.
- Check the proper operation of the valve: power the actuator and verify that valve opens, then, turn off power and check the closing function.
- Power the actuator, when valve is open, the pump stops (noise reduction). In normal condition the pump doesn't restart more than 3 times in 20 minutes. If the pumps restarts more frequently, it is necessary to replace the actuator.

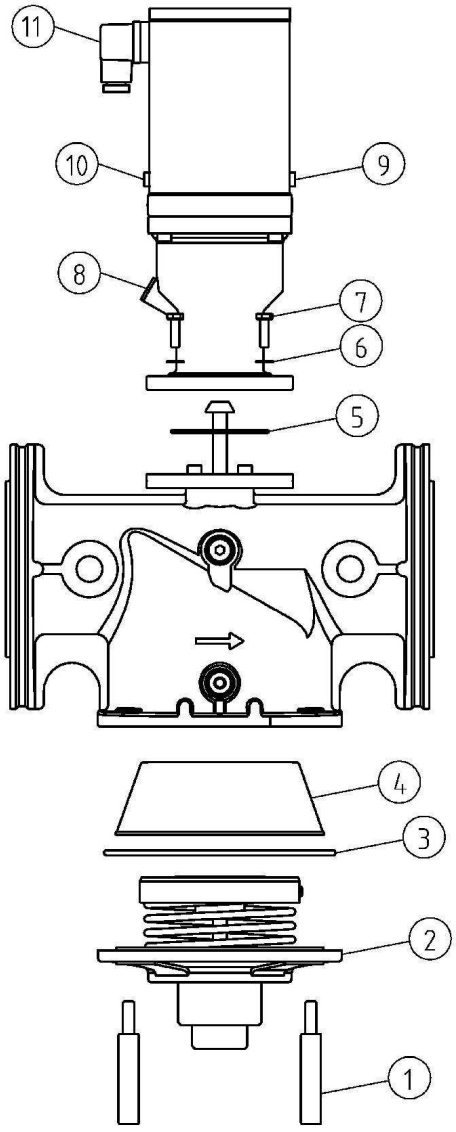

Fig. 9

INTERNAL INSPECTION

Make this inspection when the valve does not work properly only.

To make an internal inspection of the valve, do the following:

- Shut ball valve upstream the system and make sure no pressure is inside the valve.
- Using an Allen key, remove the screws (1) on the counter flange (2), in cross way. The gas in the valve will come out during this step.
- Check the main O-ring(3). If it's necessary, replace it with an identical one.
- Blow the assembly of counter flange – sping – disc (2) with compressed air. Check the spring is corrosion free. Don't try to disassemble it: this operation can be very dangerous.
- Check the conditions of the sealing gasket. If gasket is deteriorated, replace it with a new one.
- Clean the sealing lip with a clean cloth. Do not use tools, because a lip damage could result.
- Remove the filter (4) and blow it with compressed air.
- Reassemble the valve following the inverse sequence.

When the reassembly is finished, verify the correct sealing between the counter flange and the valve body:

- Open ball valve to restore pressure into the valve.
- Apply a soap solution between the counter flange and the valve body and check for leakages.

ACTUATOR REPLACEMENT

Before starting with actuator replacement, make sure it is the cause of failure.
To replace the actuator do the following:

- Make sure an identical one spare part is available.
- Switch off power supply and remove the plug (11).
- Remove the connecting screws at the base of the actuator and remove the damaged actuator. Pay attention to the O-ring between actuator and valve (5).
- Reassemble the new one with inverse sequence. If necessary, replace the plug also.

WARNING

To prevent product damage and dangerous situations, read the Installation and Service Instructions carefully.

Turn off all power before servicing any part of the system.

Perform leak and functional tests after mounting.

Use all gaskets properly (void warranty).

All wiring must be in compliance with local and national codes.

Make sure all works are performed by qualified technicians only and in compliance with local and national codes.