

## VML

**Safety solenoid valves for air and gas**  
**Slow opening and fast closing type**  
**DN10 ... DN80**

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VML2 - VML4

# VML

## Slow safety solenoid valve Class A – Group 2

The VML type valve is a slow opening single-stage solenoid valve, normally closed.

This type of device is suitable for air or gas blocking and releasing controls, required in gas power burners, atmospheric gas boilers, furnaces and others gas consuming appliances.

The VML type valves are made in accordance with EN161 standard.

(EC type examination certificate no. 0063AQ1350).

### 1- Features

- ❑ Wide range for inlet/outlet connections, from 3/8" to 3" pipes sizing.
- ❑ Provided with G1/4" pressure gauge on two sides in the inlet pressure chamber. Others gauge points on request.
- ❑ Optional G1/8" connection for closed position indicator micro switch (on request from 3/4" to 3").
- ❑ Fine mesh filter incorporated prevents dirty contamination of the seal seat.
- ❑ Maximum operating pressure 200 mbar or 360 mbar.
- ❑ Suitable for air and non-aggressive gases (EN 437, 1, 2 and 3 families).
- ❑ Easy adjustable flow rate, rapid stroke and opening time.
- ❑ Qualified for continuous service (100% ED) and endless ON/OFF cycles.
- ❑ Coil insulation is class H (180°C).
- ❑ Terminal box with PG connector.
- ❑ The large models are provided with a power saving electronic device, to reduce power consumption and working temperature.
- ❑ Valves are 100% tested by computerized testing machineries and are fully warranted.
- ❑ For valve identification see the following charts.



### WARNING:

This control must be installed in compliance with the laws in force.

Read instructions before use.

Elettromeccanica Delta S.p.a. reserves the right to update or make technical changes without prior notice.

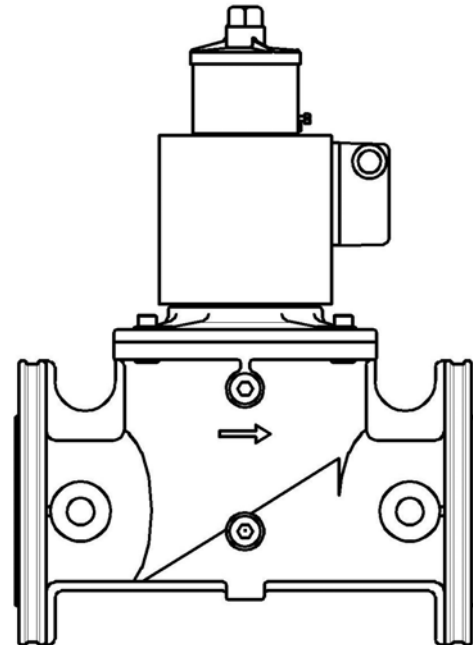


Fig. 1

### 2- Technical specifications

<i>Connections</i> .....	Gas threaded ISO 7/1 from Rp3/8 to Rp2 Flanged PN16 - ISO 7005 from DN40 to DN80
<i>Voltage rating</i> .....	230 VAC 50/60 Hz
<i>Voltage on request</i> .....	110 VAC 50/60 Hz
<i>Voltage tolerance</i> .....	-15% / +10%
<i>Power consumption</i> .....	see charts
<i>Environment temperature</i> ...	-15°C / +60°C
<i>Max. working pressure</i> .....	200 / 360 mbar
<i>Flow capacity</i> .....	see charts
<i>Disc sealing</i> .....	NBR
<i>Closing time</i> .....	< 1 second
<i>Opening time</i> .....	adjustable from 4 to 25 s
<i>Protection class</i> .....	IP 54 (EN 60529)
<i>Cable gland</i> .....	PG09
<i>Overall dimensions</i> .....	see charts

### 3- Operation

The VML 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. 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 or slowly, against the strength of the spring and gas pressure. The rapid stroke may be adjusted using the regulating screw on the top (see the *Service Instruction Section*), to adjust the initial gas flow. Main flow and opening time can be adjusted also.

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

### 4- Accessories

A fine mesh filter is provided, to prevent dirty contamination of the seal seat. However, an external strainer must be installed upstream of the valve.

Inlet pressure area is provided with bilateral G1/4" gauges, to connect min/max adjustable pressure switches, leakage tester or other gas equipments. Flanged models are provided with gauges in the outlet chamber too

On request, valves are supplied with a G1/8" connection on the bottom, to installed a closed position indicator micro switch (from 3/4" to 3"). An adapting rod is provided too.

### 5- Coil features

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

The models from 1"¼ up to 3" are provided with a power saving electronic device. It has two stages of operation: full power is supplied to the coil while the valve is opening; low power is supplied while the valve is opened.

Coil and terminal box are provided with suitable gaskets, to avoid water and dirty contamination (see the *Service Instruction Section*).

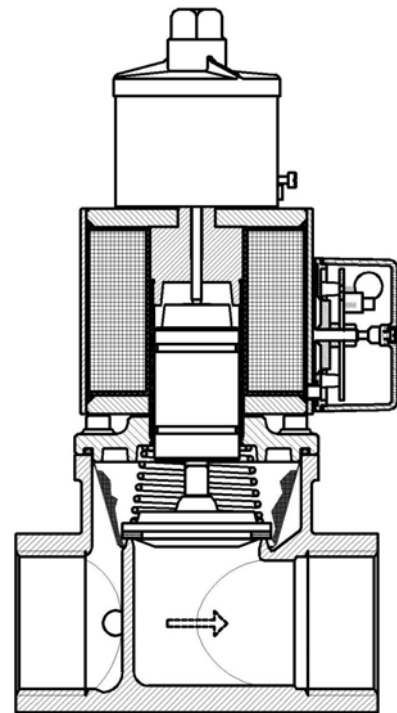


Fig. 2

### 6- General information

- ❑ Testing pressure must not exceed 1,5 bar.
- ❑ Backpressure sealing is compliant with the *Class A*: the maximum backpressure admitted, with leakage within the EN161 requirements, is 150mbar.
- ❑ Maximum torsional stresses admitted are compliant with the *Group 2* of the EN161 standard.
- ❑ All components are design to withstand any mechanical, chemical and thermal condition occurring during typical service.
- ❑ Effective impregnation and surface treatments has been used to improve mechanical sturdiness, sealing and resistance to corrosion of the components.
- ❑ Valves are suitable for use with air and non-aggressive gases included in the 1, 2 and 3 families (EN 437).
- ❑ Materials in contact with gas:
  - Aluminium
  - Brass
  - Stainless steel
  - Plated steel
  - Anaerobic adhesive
  - Nitrile rubber (NBR)
  - Polytetrafluoroethylene (PTFE)
  - Fluoroelastomer (FPM)

## 7-Valve identification

Connections type		230V AC		110V AC		24V AC/DC		12V AC/DC	
Threaded	Flanged	360 mbar	200 mbar	360 mbar	200 mbar	200 mbar	130 mbar	200 mbar	130 mbar
Rp 3/8		VML0		VML0.B					
Rp 1/2		VML1		VML1.B					
Rp 3/4		VML2		VML2.B					
Rp 1		VML3		VML3.B					
Rp 1¼		VML35.L		VML35.B					
Rp 1½		VML4.L		VML4.B					
Rp 2		VML6.L		VML6.B					
	DN 40 <sup>(1)</sup>	VML4F.L		VML4F.B					
	DN 50 <sup>(1)</sup>	VML6F.L		VML6F.B					
	DN 65 <sup>(2)</sup>	VML7	VML72	VML7.B	VML72.B				
	DN 80 <sup>(2)</sup>	VML8	VML82	VML8.B	VML82.B				

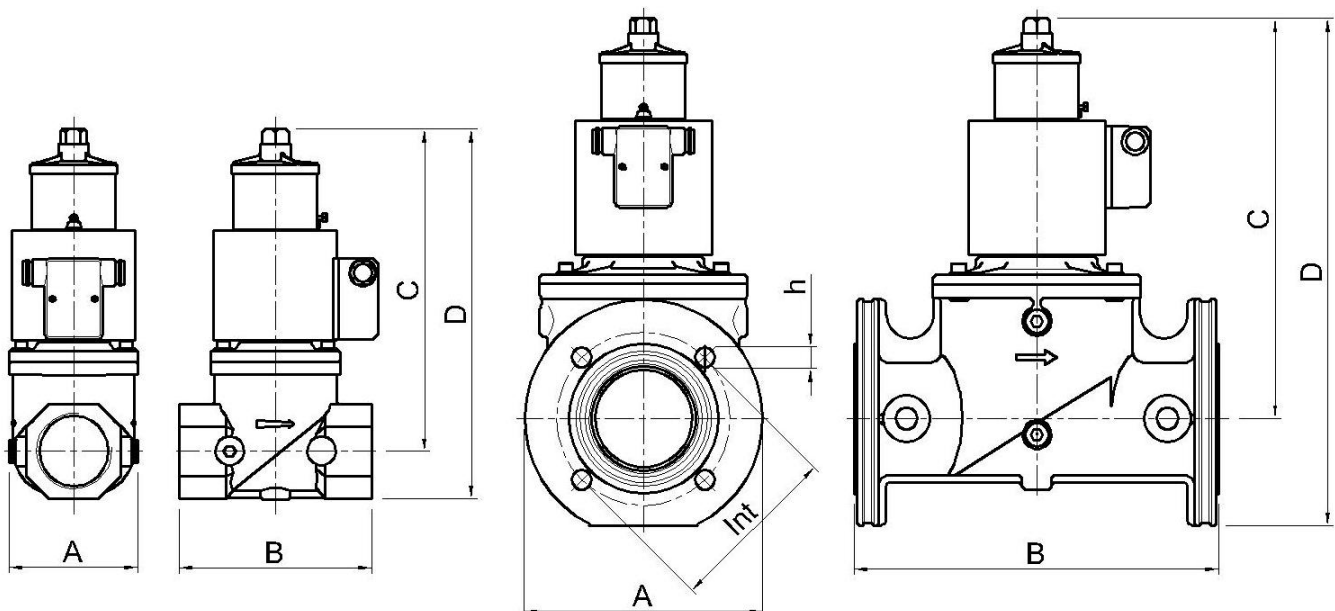
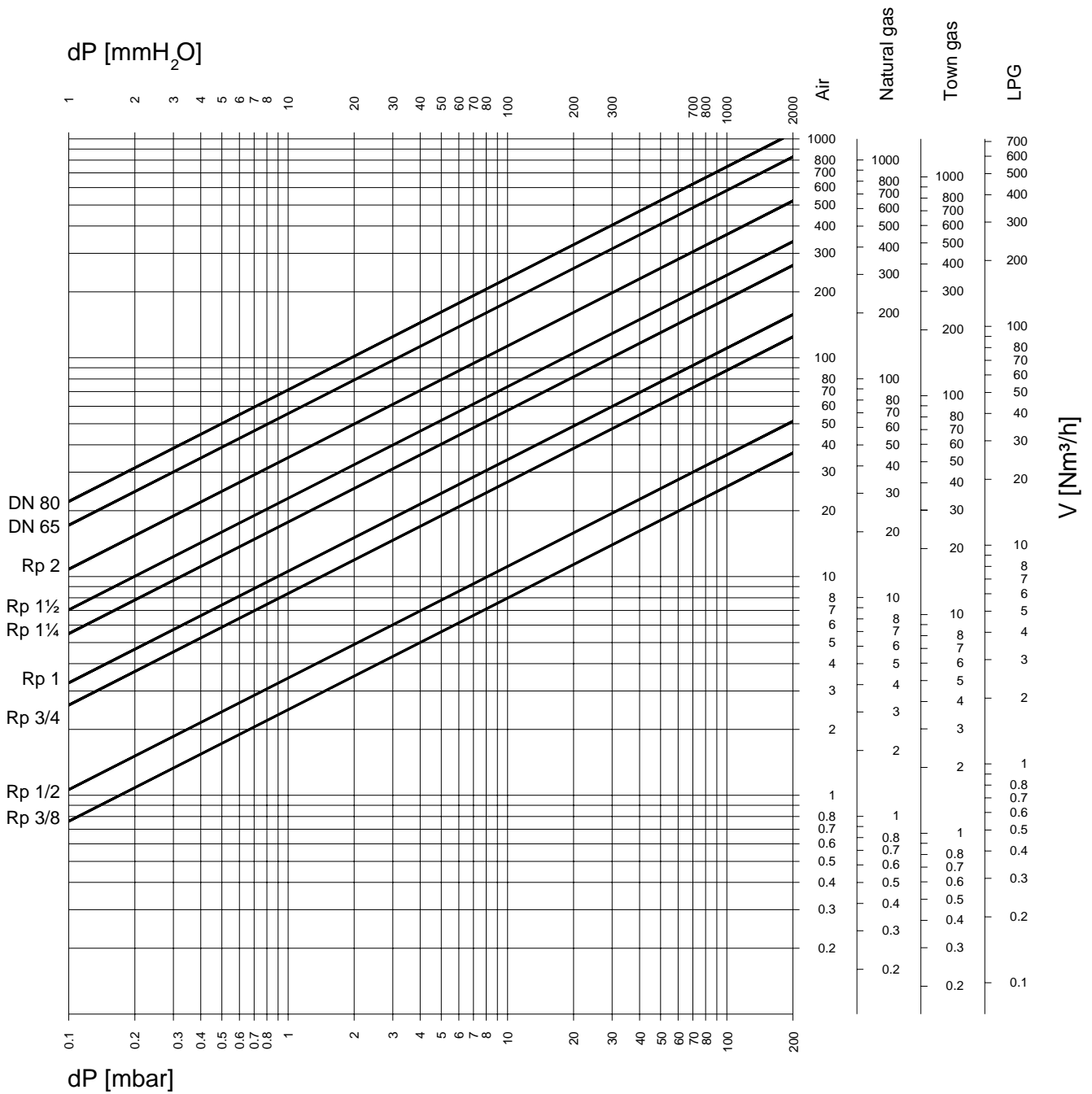


Fig. 3

Model	Connections		Maximum Pressure (mbar)	Power Consump. @230VAC (W)	Overall Dimensions (mm)						Weight (Kg)
	Threaded	Flanged			A	B	C	D	Int	h	
VML0	Rp 3/8		360	20	88	77	180	196	-	-	1,8
VML1	Rp 1/2		360	20	88	77	180	196	-	-	1,8
VML2	Rp 3/4		360	45	88	96	200	222	-	-	2,7
VML3	Rp 1		360	45	88	96	200	222	-	-	2,7
VML35	Rp 1¼		360	45/180 <sup>(3)</sup>	120	153	258	290	-	-	6
VML4	Rp 1½		360	45/180 <sup>(3)</sup>	120	153	258	290	-	-	6
VML6	Rp 2		360	45/180 <sup>(3)</sup>	106	156	264	302	-	-	6,3
VML4F		DN 40 <sup>(1)</sup>	360	45/180 <sup>(3)</sup>	150	193	258	332	110	4x18	7,7
VML6F		DN 50 <sup>(1)</sup>	360	45/180 <sup>(3)</sup>	165	196	264	346	125	4x18	8,3
VML7		DN 65 <sup>(2)</sup>	200/360	60/240 <sup>(3)</sup>	200	305	335	424	145	4x18	14,5
VML8		DN 80 <sup>(2)</sup>	200/360	60/240 <sup>(3)</sup>	200	305	335	424	160	8x18	14,5

<sup>(1)</sup> Optional kit <sup>(2)</sup> V<sub>start</sub>=3 mm minimum <sup>(3)</sup> Working/Opening

## 8- Loss of pressure



### Formula of conversion from air to other gases

Gas type	Specific gravity (kg/m <sup>3</sup> )	K
Air	1,25	1,00
Natural gas	0,80	1,25
Town gas	0,57	1,48
LPG	2,08	0,77

+15°C, 1013 mbar, dry

$$V_{\text{AIR}} = \frac{V_{\text{GAS TO BE USED}}}{K}$$

$$K = \sqrt{\frac{\text{AIR SPECIFIC GRAVITY}}{\text{GAS SPECIFIC GRAVITY}}}$$

## 9- Valve installation

Verify the line pressure is lower of the maximum working pressure admitted to the valve.

Check correspondence of flow direction with arrow printed on valve body.

Check correct alignment of connecting pipes and allow enough space from the walls to allow free air circulation.

**Remove the end caps and make sure no foreign body is entered into the valve during handling.**

**Install in an area that is protected from rain and water splashes or drops.**

### Threaded models:

1. Put sealing agent onto the pipe thread (avoid excessive quantities of fittings glue which could enter in the valve and damage the seal seat).
2. Screw the pipes using proper tools only. Do not use unit as lever because damage to the valve stem could result.

### Flanged models:

1. Position the gasket and insert the bolts.
2. Screw the nuts tightening them crosswise and using proper tools only.

**Avoid overtightening and mount tension free.**

Following chart shows the maximum values of bending moment ( $F_{max}$ ), torque ( $T_{max}$ ) and screws driving torque ( $C_{max}$ ), according with EN161.

Connections	$F_{max}$ (Nm) $t < 10$ s	$T_{max}$ (Nm)	$C_{max}$ (Nm)
Rp3/8	70	35	-
Rp1/2	105	50	-
Rp3/4	225	85	-
Rp1	340	125	-
Rp1¼	475	160	-
Rp1½ DN40	610	200	50
Rp 2 DN50	1100	250	50
DN 65	1600	-	50
DN 80	2400	-	50

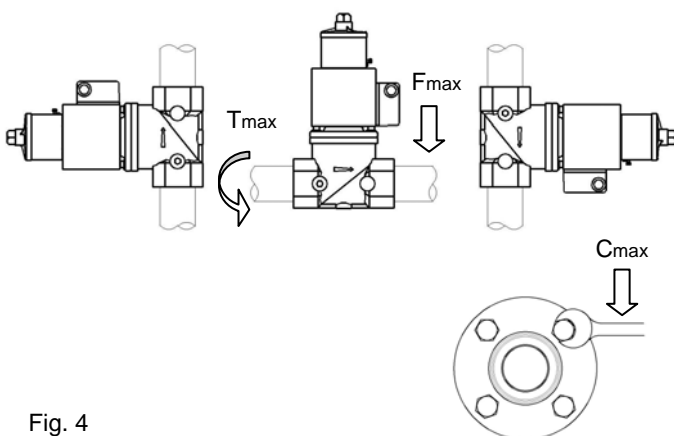


Fig. 4

Valve may be mounted with coil in horizontal or vertical position. Coil may be oriented 360 degrees in any direction.

## 10- Electrical connections (IEC 730-1)

Check correspondence between valve voltage rating and line power supply, before making any electrical connections.

1. Switch off power supply and remove protection cover.
2. Connect power cables to rectifier circuit terminal board.
3. Should cables pass through originally closed opening, use the rubber disc placed underneath the box plug to close any other opening.
4. Screw back the box cover, taking care to use all gaskets properly, because this could condition the valve life duration.

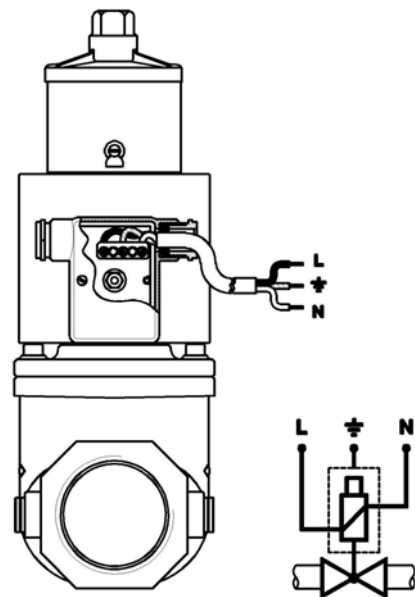


Fig. 5



### **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. A gas leak detection spray may be used also.

Coil and terminal box must be replaced with identical spare parts only.

If the coil is turned, make sure the brake is properly tightened and the coil is locked.

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.

### 11- Fast stroke adjustment ( $V_{start}$ )

Fast flow section may be adjusted:

1. Remove plastic cap.
2. Using an hexagonal wrench, turn the outer screw clockwise to decrease or counter-clockwise to increase the initial fast stroke.
3. When adjustment is completed, screw back the plastic cap.

NOTE: in the DN65 and DN80 models the minimum adjustable stroke is 3 mm.

### 12- Flow rate adjustment ( $V_{max}$ )

Flow rate may be adjusted from 0 cubic meters/h up to the maximum admitted:

1. Remove plastic cap.
2. Keeping the outer screw fixed, use a screw driver to turn the internal screw clockwise to decrease or counter-clockwise to increase flow rate (factory setting is max. flow rate).
3. When adjustment is completed, screw back the plastic cap.

NOTE: the flow rate regulation can not be lower than the fast flow section.

### 13- Opening time adjustment (T)

To regulate opening time, turn the screw located on the side of the brake. One fourth of a turn clockwise increases opening time by 2÷3 s, up to a maximum of about 25 s (slow run).

Factory setting is about 12÷14 s.



#### WARNING:

Perform the fast stroke adjustment before of the flow rate adjustment.

Make sure that capacity adjustments are made while burner is working.

Check the regulation is not changed during reassembly.

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

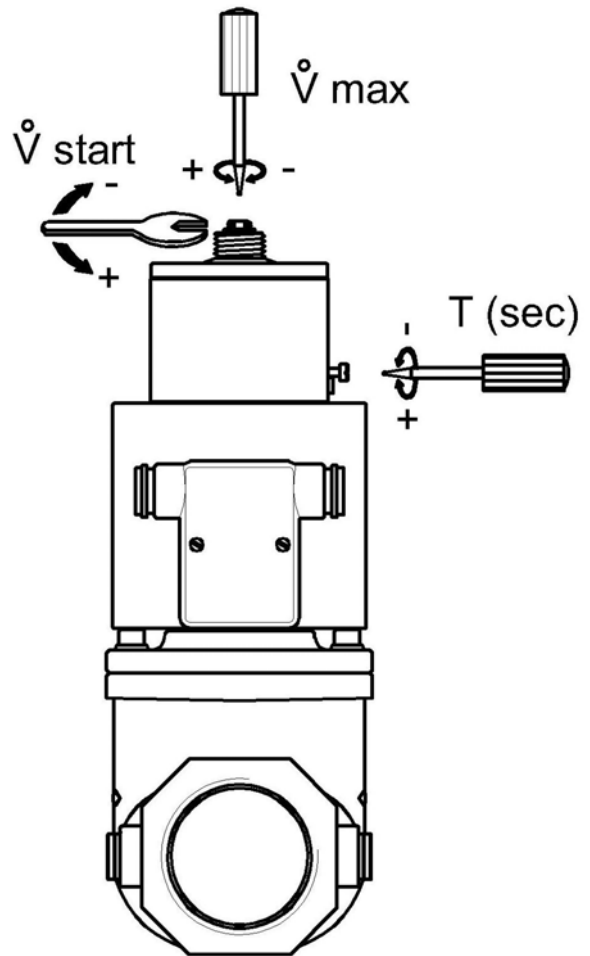


Fig. 6

### 14- Coil replacement

Before to start with coil replacement, make sure it is the cause of failure.

To perform coil replacement do the following:

1. Make sure an identical one spare part is available.
2. Switch off power supply and remove the box cover.
3. Disconnect the wires from terminal board.
4. To remove brake, turn it counter clockwise.
5. Extract and replace coil.
6. Reassemble following the inverse sequence.



#### WARNING:

When reassemble, use all gaskets properly.

Perform functional test after mounting.

All works must be executed by qualified technicians only and in compliance with local and national codes.

## 15- Maintenance

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

### External inspection

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

Check the conditions of the terminal board gasket. 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.

### Internal inspection

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

1. Close ball valve upstream the system.
2. Remove the coil like shown in the section 14.
3. Using an Allen key, remove the screws on the upper flange, in cross way. The gas in the valve will come out during this step.
4. Check the hydraulic brake is free of oil leakages (small leakages are admitted). If it's necessary, replace it with a new one.
5. Check the main O-ring and, if it's necessary, replace it with a new one.
6. Clean the internal side of the stem with a clean cloth and compressed air.
7. Remove the spring and blow it with compressed air. Check the spring is corrosion free. Take attention to the assembly direction of the spring.
8. Check the wear conditions of the sliding rings and, if it's necessary, replace them.
9. Clean the sealing disc assembly with a clean cloth and compressed air.
10. Check the conditions of the sealing gasket. If gasket is deteriorated, replace it with a new one.
11. Clean the sealing lip with a clean cloth. Do not use tools, because a lip damage could result.
12. Remove the filter and blow it with compressed air.
13. Check the O-ring on the top of stem and, if it's necessary, replace it.
14. Reassemble the valve following the inverse sequence.

To assemble the sliding rings, wind them onto a lower diameter (ex. Screw driver), then insert them from the top.

When reassembling, take attention to the correct position of the sliding rings and spring.

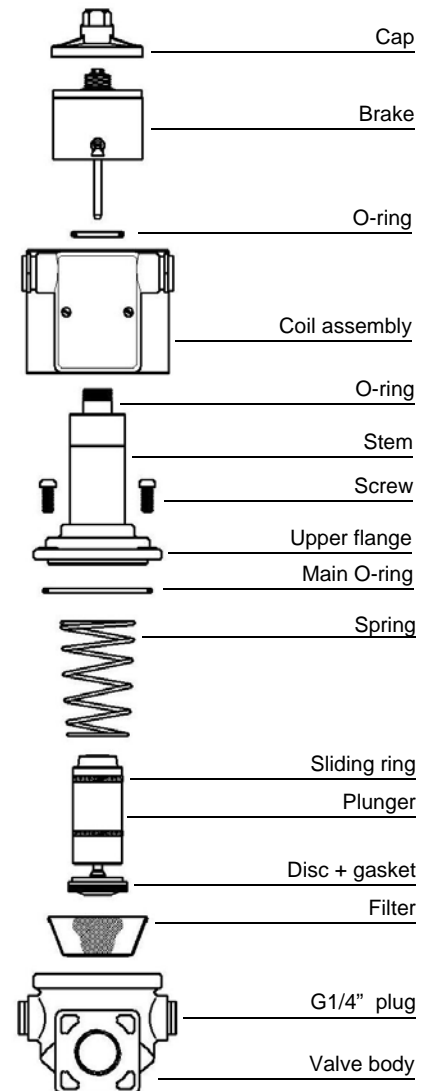


Fig. 8

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

1. Open ball valve to restore pressure into the valve.
2. Apply a soap solution between the upper flange and the valve body and check for leakages.
3. Remove the soap solution with a clean cloth, before to reassemble the coil.



### WARNING:

When reassemble, use all gaskets properly.

Perform functional test after mounting.

All works must be executed by qualified technicians only and in compliance with local and national codes.