



**LMV**  
**Linear control valves**

**DN20-DN80**

# LMV

## Linear control valves

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### Description

Modulating valves LMV are used in combustion processes that require linear adjustment of air or gas flow. The flow varies proportionally to the opening angle of inner mechanism, therefore flowrate is very predictable. The valve can be operated with stage control (3-point, MZ3 servomotor) or with continuous modulation (analogue signals, MZ5 servomotor)..

### Features

Valve housing is made of aluminum alloy, with range of pipe connections from 3/4" to 3".

Suitable for use with air and non-aggressive gases included in the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> families (EN 437). Special versions for aggressive gases (Biogas or COG).

Linear ratio of opening angle to flow capacity.

Working ratio till 25:1, low pressure drop and limited gas leakage when mechanism is in minimum position.

Full gas orifice and reduced gas orifice are available for each size, to meet specific plant requirements.

Maximum flow regulation is available as standard and easily adjustable.

Metal mesh in the inlet prevents contamination of the inner mechanism.

On request, an adjustable bypass can be installed to set up precisely the flow rate in minimum position.

Suitable to be driven by servomotors MZ3 and MZ5.

Combined system LMV + MZ is designed to reduce overall dimensions.



MZ servomotors can be supplied in Ex-proof version, suitable for installation in Zone 2 and 22, according to Directive 2014/34/UE (ATEX). Please refer to MZ tech data for further details.

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.

## Functioning and application

LMV works by means of a 2-cylinder mechanism, allowing a linear variation of the flow according to mechanism position, thanks to specifically shaped gas orifices. Outer cylinder is fixed while inner cylinder can be rotated by the actuator, opening or closing the resulting gas passage. A flow adjustment is present and can be regulated acting on an external screw to set up easily the optimal working condition of the valve. Materials and mechanical tolerances are designed to assure low leakage, repeatability of the performance and reliability.

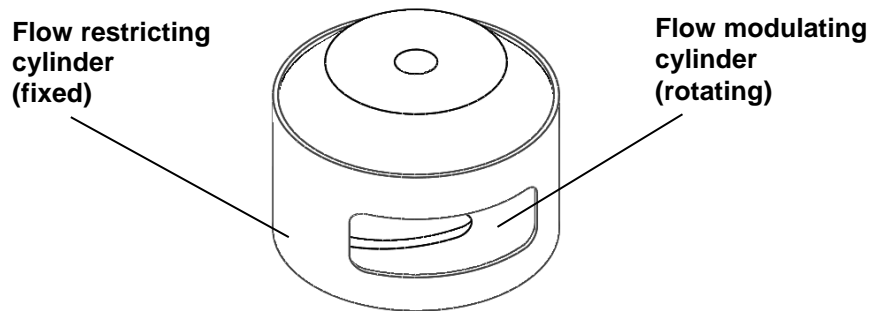


Fig.1

Fig. 2 shows an example of installation.

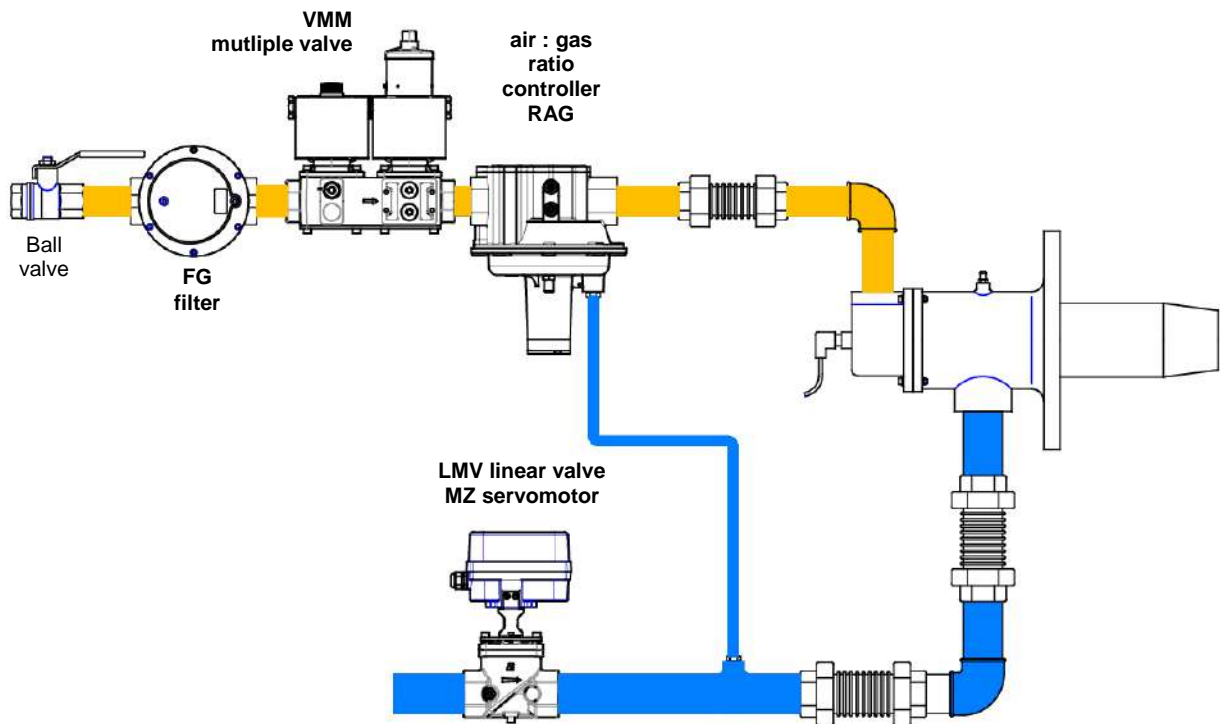


Fig.2

## Technical specifications

Tab. 1

<b>Connections</b>	Threaded f/f ISO 7-1 from Rp3/4 to Rp2½ Flanged PN16 ISO 7005 DN40 to DN80
<b>Working ratio</b>	25:1
<b>Ambient temperature</b>	-15°C... +60°C
<b>Max working pressure</b>	500 mbar (50 kPa)
<b>Flow capacity</b>	See flow chart
<b>Filtering element</b>	600 µm
<b>Materials in contact with gas</b>	Aluminum alloy Brass Stainless steel Plated steel Anaerobic adhesive Nitrile rubber (NBR) Fluoro elastomer (FPM) Polytetrafluoroethylene (PTFE) Acetal resin (POM)
<b>Voltage rate Servomotor MZ</b>	230 VAC 50/60 Hz 110 VAC 50/60 Hz 24 VAC/DC (depending on servomotor type)
<b>90° opening / closing time</b>	7,5...120 sec (depending on servomotor type)

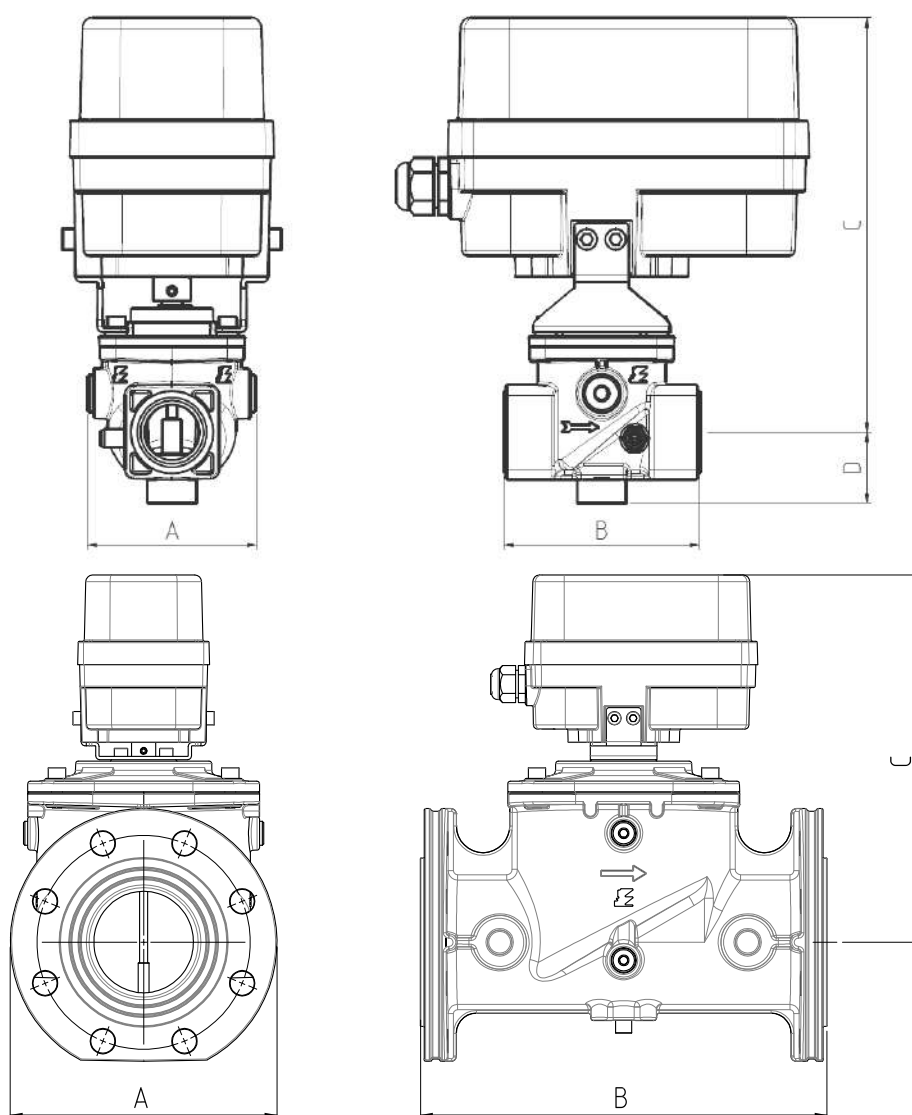


Fig.3

Tab. 2

Conn.	Overall dimensions [mm]						
	A	B	C <sup>(1)</sup>	D	Int	h	E <sup>(2)</sup>
Rp 3/4	88	96	200	34	-	-	-
Rp 1	88	96	200	34	-	-	-
Rp 1¼	120	153	235	43	-	-	62.5
Rp 1½	120	153	235	43	-	-	62.5
Rp 2	106	156	240	47	-	-	62.5
Rp 2½	179	218	261	55	-	-	101.5
DN 40 <sup>(3)</sup>	150	193	240	75	110	4x18	62.5
DN 50 <sup>(3)</sup>	165	196	240	82.5	125	4x18	62.5
DN65	180	305	275	89.5	145	4x18	101.5
DN80	180	305	275	89.5	160	8x18	101.5

<sup>(1)</sup> when a lever joint is installed, add 28mm.

<sup>(2)</sup> Dimension with bypass installed

<sup>(3)</sup> Option kit for flanged connection

# Gas Flow Chart

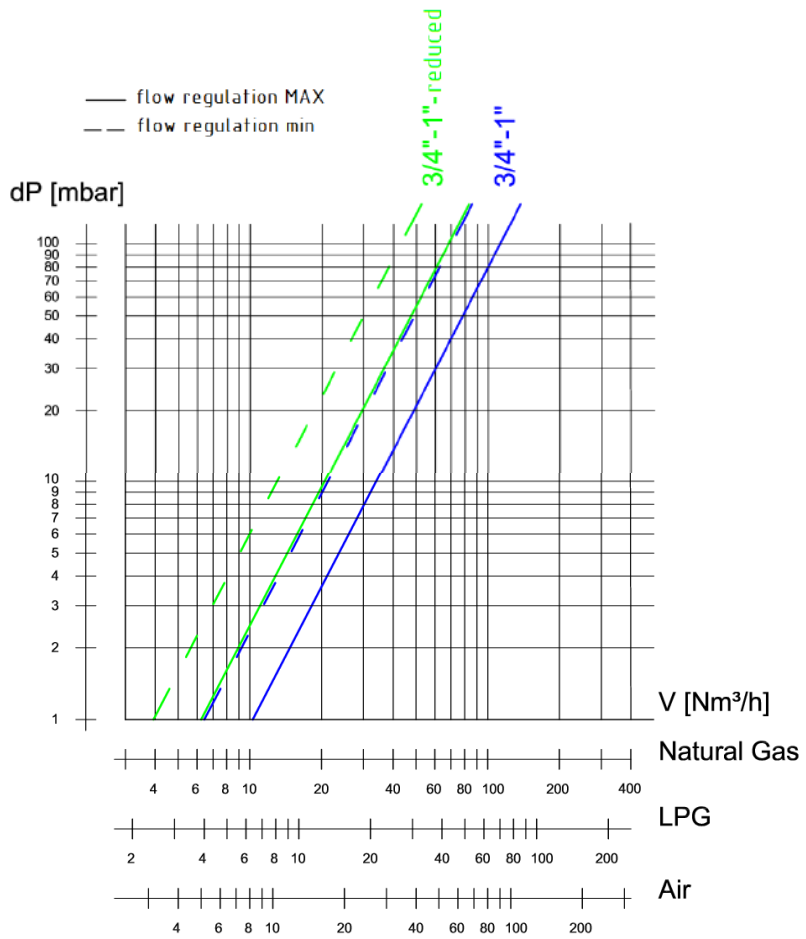


Fig.4

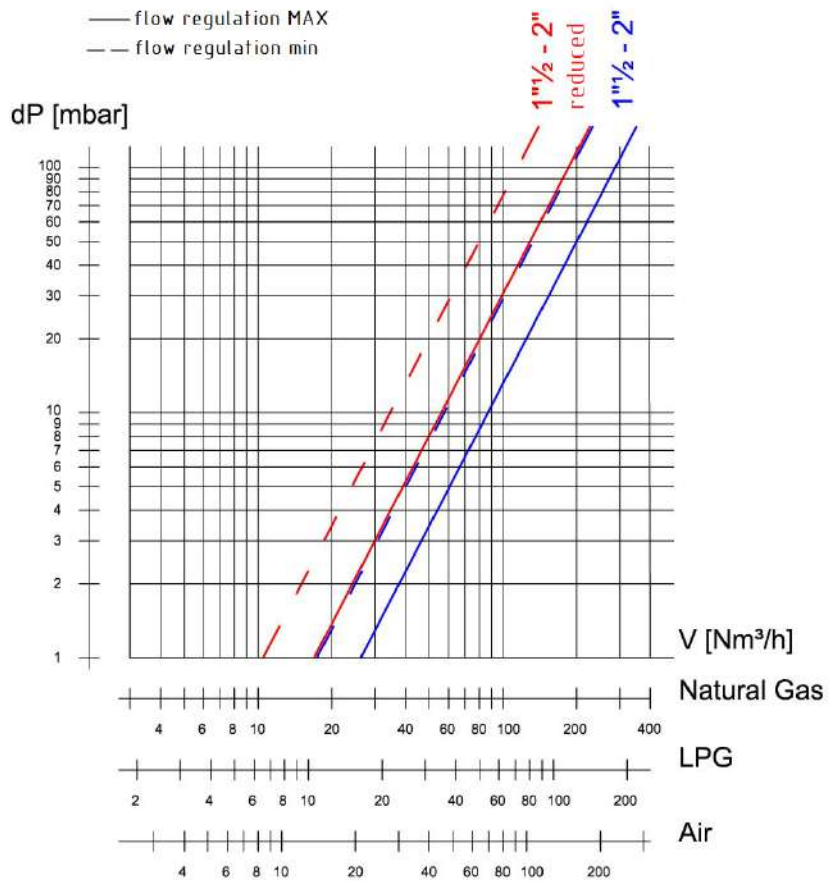


Fig.5

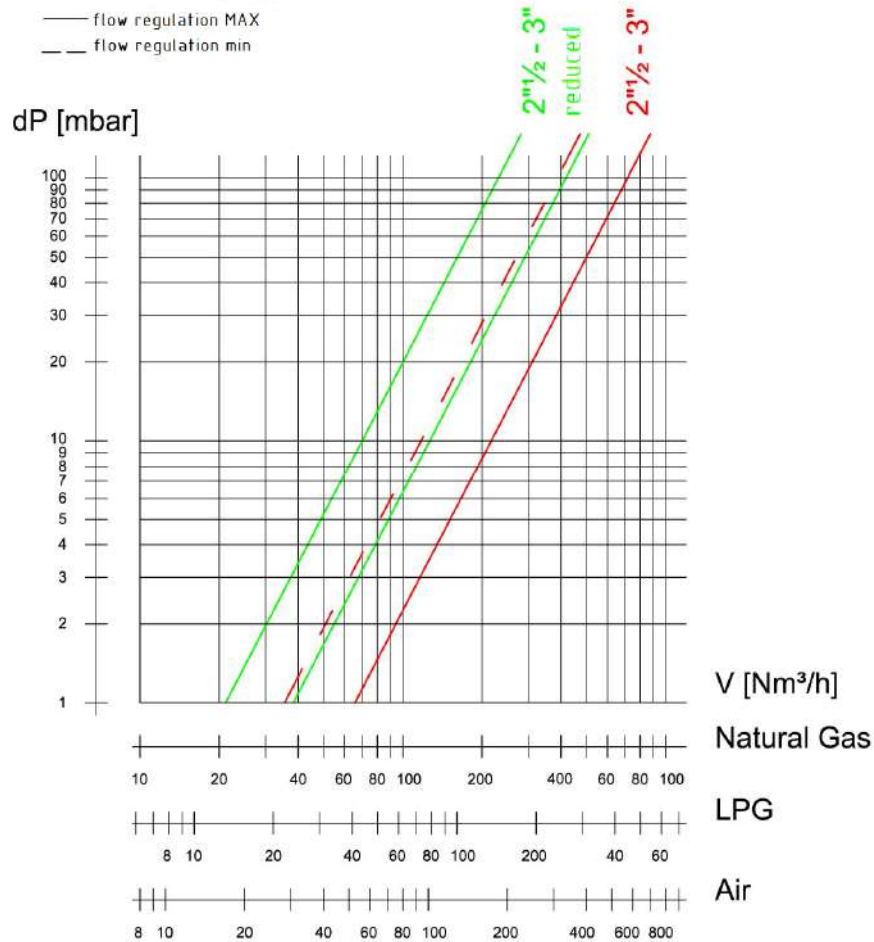


Fig.6

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

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

Tab. 3

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

15°C, 1013 mbar, dry

For optimal flow control and a linear characteristic, it is advisable to maintain the pressure drop  $\Delta p$  close to 30% of the inlet pressure  $p_1$ .

*Example:*

Select a valve for a gas flow of  $Q_n = 60 \text{ Nm}^3/\text{h}$  and a pressure  $p_2 = 70 \text{ mbar}$ .

$$\Delta p = \left( \frac{0,3}{1 - 0,3} \right) p_2 = 30 \text{ mbar}$$

From the diagrams of the LMV type valves, the size that can guarantee the required flow rate is the 3/4 "-1" with full passage (Fig.4).

## Ordering Information

	<b>LMV</b>	<b>3</b>	<b>1</b>	<b>M</b>	<b>C</b>
<b>Model</b>	LMV Linear valve (actuator not included)				
<b>Connection</b>	<p>2 3/4"</p> <p>3 1"</p> <p>35 1" 1/4</p> <p>4 1" 1/2</p> <p>6 2"</p> <p>7 2" 1/2</p> <p>4F DN40</p> <p>6F DN50</p> <p>7F DN65</p> <p>8F DN80</p> <p>NPT threads available on request (N version)</p> <p>ANSI flanges available on request (N version)</p>				
<b>Gas orifice</b>	<p>_ Full gas orifice</p> <p>1 Reduced gas orifice</p>				
<b>Pressure test points and bypass</b>	<p>_ Pressure test point at the inlet</p> <p>A Additional pressure points at the outlet (not applicable to DN20-25)</p> <p>M Adjustable bypass</p>				
<b>Actuator connection</b>	<p>_ without joint, □8 square shaft</p> <p>C compact joint (standard)</p> <p>L joint with lever</p> <p>R joint with special lever to connect remote actuators or manual lever</p>				

When LMV is coupled to a servomotor, complete product code adding model of servomotor (see MZ tech sheets).

## Special versions and options

- Additional test points G1/4 at the outlet (not applicable to DN20-25).
- Adjustable by-pass suitable for setting up a very low minimum flow rate.
- Joint with lever to connect multiple LMV to the same servomotor (Notice: C dimension must be increased of 28 mm).
- Special joint to connect remote actuator.
- Threaded versions Rp1½ and Rp2 can be supplied with flanged connection by mounting a dedicated kit (F version).
- Special versions for aggressive gas (J version), manufactured without non-ferrous metals and supplied with special sealing.



Elettromeccanica Delta Spa reserves the right to update or make any technical changes without prior notice.

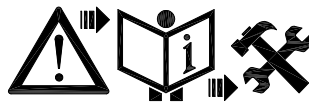


## Design, installation and servicing

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.
- ✓ 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.
- ✓ Gas transiting through the valve must be clean and dry.
- ✓ Ensure that installing area is protected from rain and water splashes or drops.
- ✓ Perform leak and functional tests after mounting (max pressure test 1,5 Pmax).
- ✓ Never install the valve close to walls or other equipment. 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. The heavy cycle operation may reduce the expected lifetime.
- ✓ 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

LMV valves are designed according to EN13611.

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

Kiwa Cermet Italia S.p.a.

