Pietro Fiorentini

VLM

Control Valve

TECHNICAL BROCHURE

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vlm_technicalbrochure_ENG_revA

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Who we are

We are a leading company in designing and manufacturing technologically advanced devices and systems for natural gas treatment, transmission and distribution.

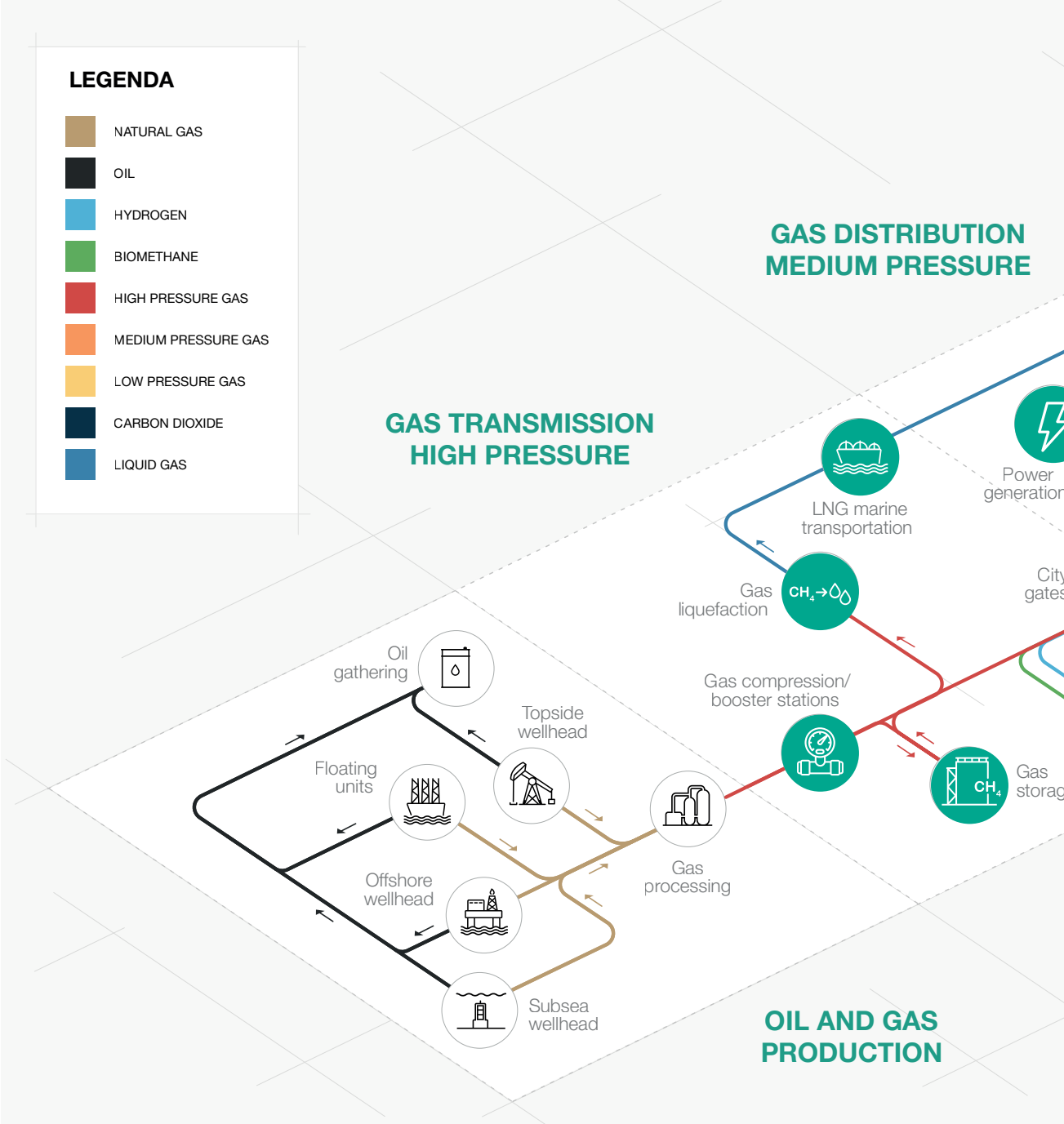
We are the ideal partner for operators in the Oil & Gas sector, with a business offer that goes across the whole natural gas chain.

We are in constant evolution to meet our customers' highest expectations in terms of quality and reliability.

Pietro Fiorentini advantages

- Local technical support
- Since 1940
- Active in more than 100 countries

Application area



The green icon indicates the application for which this product is recommended

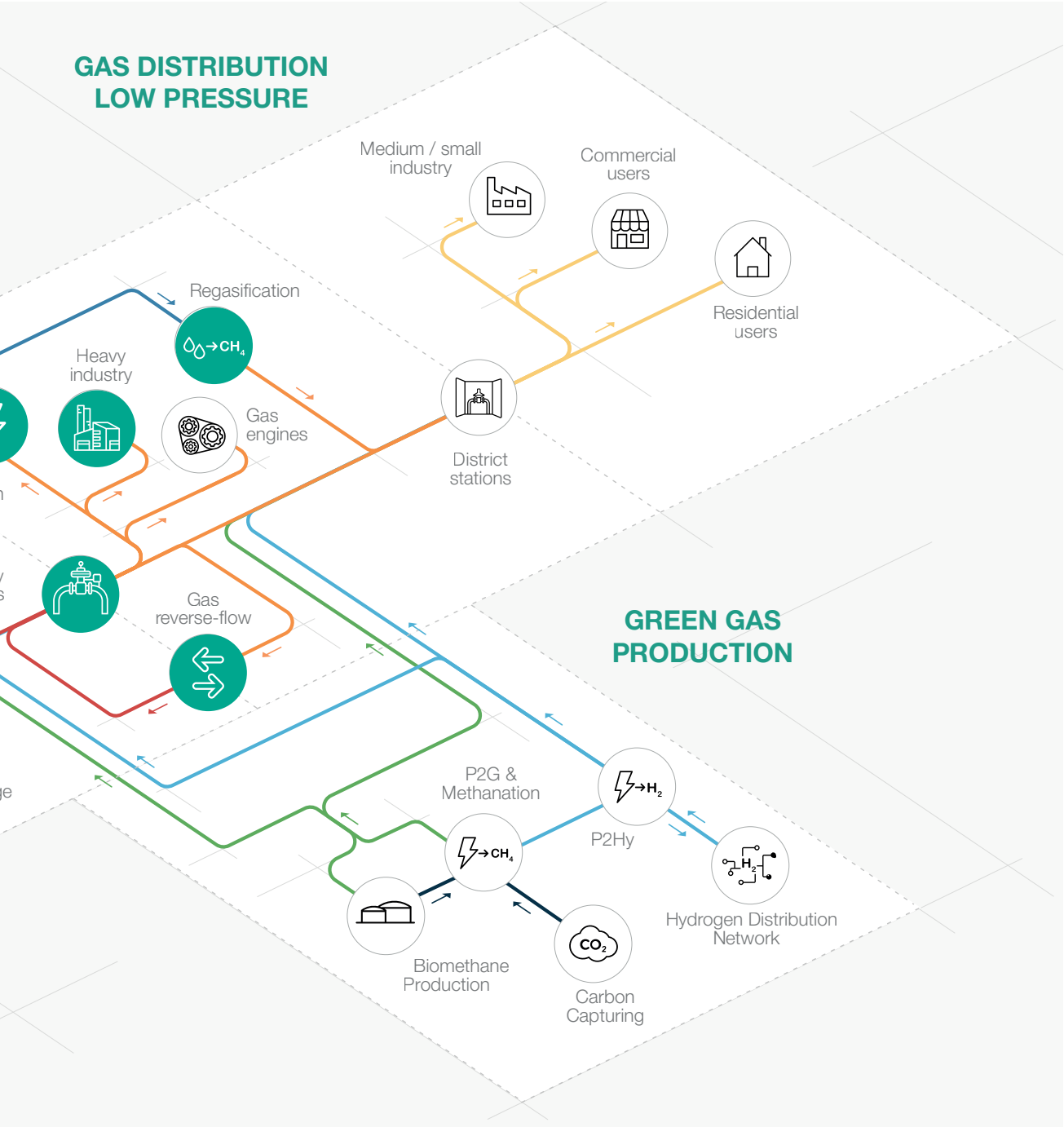


Figure 1 Application area map

Introduction

VLM valves are shut-off and lamination devices particularly suitable for use within the field of installations for the distribution of natural gas, as well as for supply networks for civil and industrial use. The main features of these valves are:

- body in top-entry execution suitable for flanged coupling;
- soft insert on the seat for a better seal;
- balanced plug for easier opening and closing;
- possibility of incorporating the silencer; the slam-shut valve, the second plug in series with the main one.

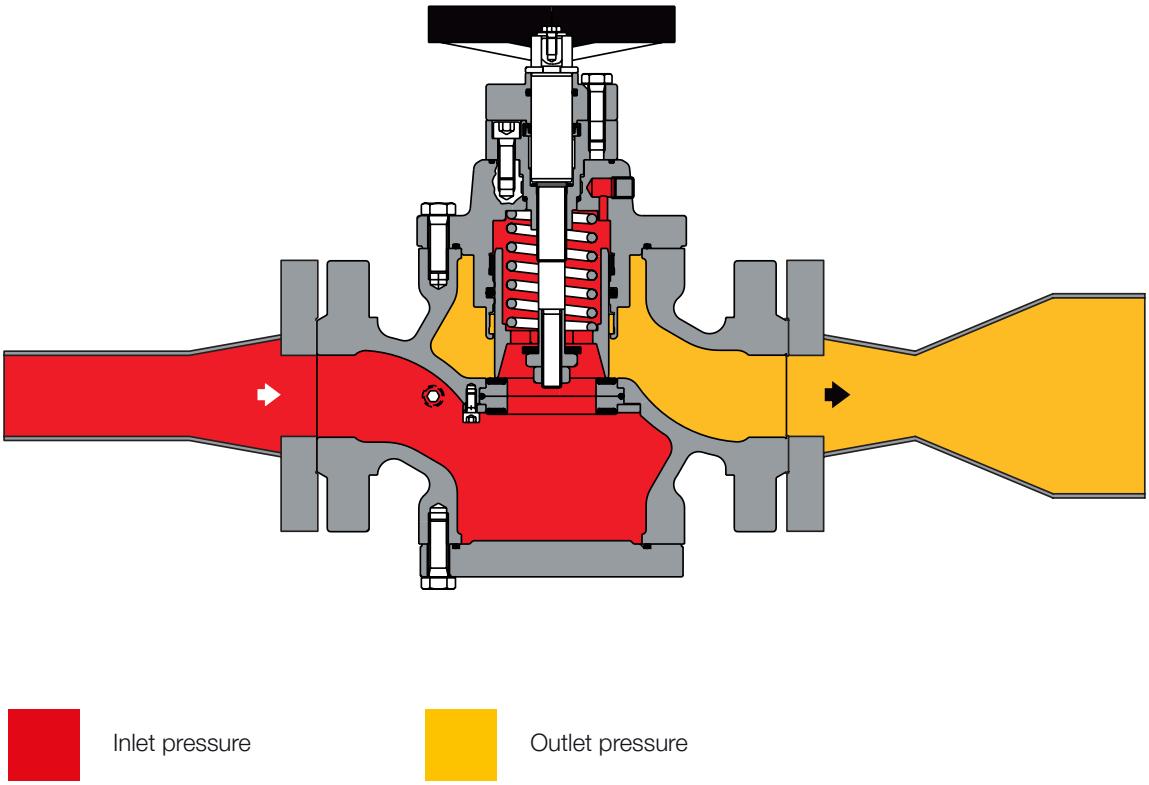


Figure 2 VLM

Features and Field of application

The **VLM** valve is a manually operated lamination device. This valve is suitable for use with previously treated non-corrosive gases.

It is truly a TOP ENTRY design, which confers important advantages to the valve, for example the ability to perform full maintenance without removing it from the connecting pipes.

The VLM valve has been designed with a high degree of modularity in order to make it possible to incorporate additional devices and accessories.
These can also be added to the basic valve at a later date without having to modify the existing assembly piping.

Figure 3 VLM

VLM competitive advantages

- Compact design
- Top entry
- Easy Maintenance
- Low noise level
- Built-in accessories
- Available in special versions for pure or blended hydrogen

Features

Features	Values
Maximum inlet pressure	Up to 100 barg
Room temperature	from -20 °C to +60 °C from -4 °F to +140 °F
Inlet gas temperature	from -20°C to + 60°C from -4 °F to +140 °F
Nominal dimensions DN	DN 25 / 1”; DN 50 / 2”; DN 80 / 3”; DN 100 / 4”; DN 150 / 6”; DN 200 / 8”;
Connections	Class 150-300-600 RF or RTJ, complies with ANSI B16.5 and PN 16 as per EN 1092, ISO 7005.
NOTE: Different operating features available on request.	

Table 1 Features

Materials and Certifications

Part	Materials
Body	ASTM A 352 LCB steel for ANSI 600 and 300 classes; ASTM A 216 WCB steel and ductile iron GS 400-18 ISO 1083 for ANSI 150 and PN 16 classes.
Control	ASTM A 350 LF2 steel
Stem	AISI 416 stainless steel
Plug	ASTM A 350 LF2 Nikel coated
Seat	Vulcanised Nitrile Rubber on metal support,
O-rings	Nitrile rubber
NOTE: The above materials refer to standard versions. Different materials can be provided for specific needs.	

Table 2 Materials

Construction Standards and Certifications

The product is certified according to European Directive 2014/68/EU (PED).
Tightness class: class VI as per ANSI/FCI 70-2.

PED-CE

Accessories

VLM valve accessories:

- PM Incorporated monitor
- DB/819 silencer
- SB/82 Slam-Shut device

PM monitor

The monitor is a safety accessory that performs the functions of the service valve when the main valve fails.

In the case of the VLM valve, the PM Monitor consists of a second VLM valve which is installed on the same body as the main one. The functional characteristics of the PM Monitor are the same as those of the main valve.

The valve's Cg coefficient is 5% lower than the corresponding standard version.

Compact dimensions

Fully independent

Easy maintenance

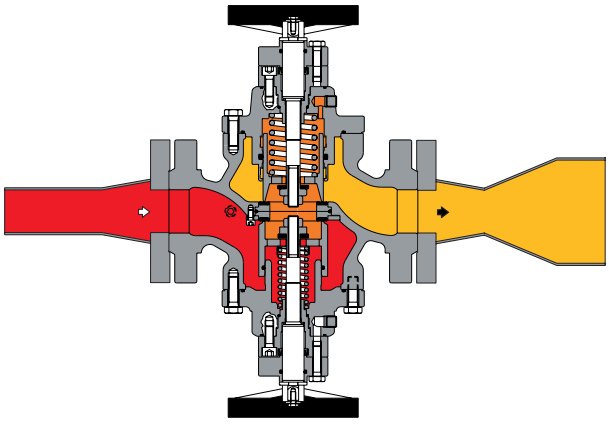


Figure 4 VLM with incorporated monitor

Outlet pressure

Inlet pressure

Incorporated silencer DB/819

If a certain noise limit is desired, an additional silencer can significantly reduce the noise level (dBA).

The VLM control valve can be supplied with a **built-in silencer**. The high efficiency of this solution is due to the fact that the absorption of the noise takes place at the same point where the noise is generated, thus preventing it from propagating.

With the built-in silencer, the valve's Cg coefficient is 5% lower than the corresponding version without a silencer.

Due to the modular design of the valve, the silencer can be retrofitted **without having to modify the existing pipes**.

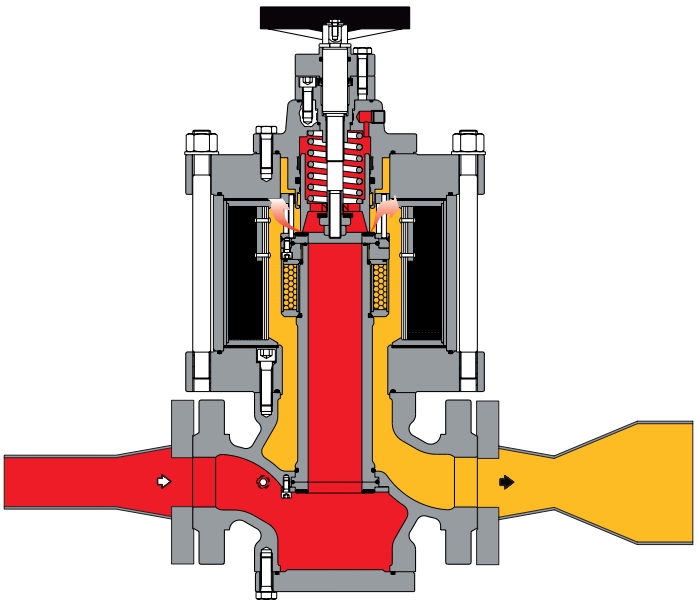


Figure 5 VLM with DB/819 silencer

Outlet pressure

Inlet pressure

SB/82 Slam-Shut Device

SB/82 is a **Safety Device** that interrupts the gas flow in case of irregular pressure conditions compared to those set in the pressure switch device.

The VLM control valve offers the possibility of installing the SB/82 slam-shut device, which can be done either during the manufacturing process **or later directly in the field**.
SB/82 is available for all gauges of the VLM control valve; with the built-in slam-shut device, the Cg coefficient of the valve is 5% lower than the corresponding version without.

The main characteristics of this device are:

- OPSO — Overpressure slam-shut device
- UPSO — Underpressure slam-shut device
- Internal by-pass
- Tripping test button
- Compact dimensions
- Easy Maintenance
- Optional tripping control
- Optional limit switch

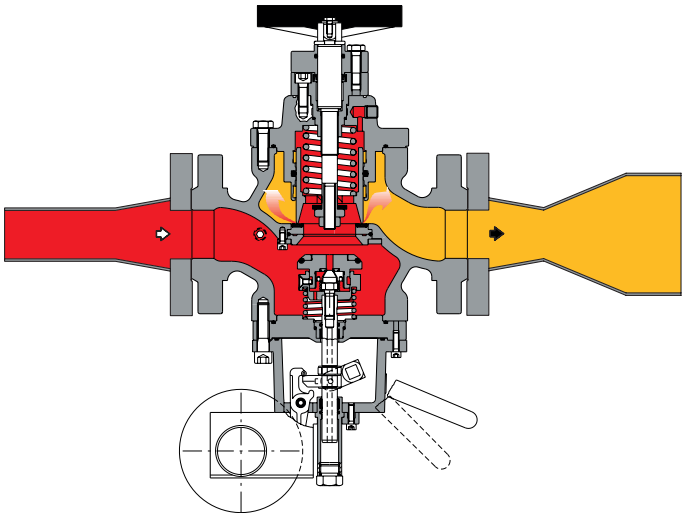


Figure 6 VLM with slam-shut device SB/82

The shut-off device can be calibrated **for pressure increase, overpressure shut-off (OPSO)** and/**or for pressure reduction, underpressure shut-off (UPSO)**. The two modes of action can be adjusted independently by means of special calibration springs: one spring for overpressure intervention and a second spring for underpressure intervention.

Spring range **pressure switches**					
Device	**Model**	**Function**	**Wh Range**		**Web link spring tables**
			MPa	**barg**	
SB/82	102M	OPSO	0.02 - 0.55	0.2 - 5.5	TT 1331
		UPSO	0.02 - 0.28	0.2 - 2.8	
SB/82	102MH	OPSO	0.02 - 0.55	0.2 - 5.5	TT 1331
		UPSO	0.28 - 0.55	2.8 - 5.5	
SB/82	103M	OPSO	0.2 - 2.2	2 - 22	TT 1331
		UPSO	0.02 - 0.8	0.2 - 8	
SB/82	103MH	OPSO	0.2 - 2.2	2 - 22	TT 1331
		UPSO	0.02 - 0.8	0.2 - 8	
SB/82	104M	OPSO	1.5 - 4.5	15 - 45	TT 1331
		UPSO	0.16 - 1.8	1.6 - 18	
SB/82	104MH	OPSO	1.5 - 4.5	15 - 45	TT 1331
		UPSO	1.8 - 4.1	18 - 41	
SB/82	105M	OPSO	3 - 9	30 - 90	TT 1331
		UPSO	0.3 -4.4	3 - 44	
SB/82	105MH	OPSO	3 - 9	30 - 90	TT 1331
		UPSO	4.4 - 9	44 - 90	

Table 3 Adjustment table

VLM

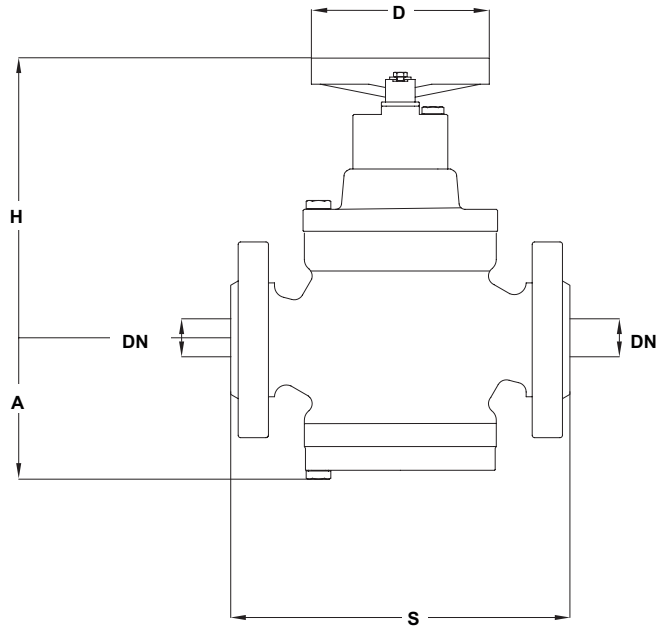


Figure 7 VLM dimensions

Weights and Dimensions (for other connections please contact your nearest Pietro Fiorentini sales outlet)							
	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches
Dimensions (DN)	25 | 1”	50 | 2”	65 | 2”1/2	80 | 3”	100 | 4”	150 | 6”	200 | 8”
S - ANSI 150/PN16	183 | 7.20”	254 | 10”	276 | 10.87”	298 | 11.73”	352 | 13.86”	451 | 17.76”	543 | 21.38”
S - ANSI 300	197 | 7.76”	267 | 10.51”	- | -	317 | 12.48”	368 | 14.49”	473 | 18.62”	568 | 22.36”
S - ANSI 600	210 | 8.27”	286 | 11.26”	- | -	336 | 13.23”	394 | 13.23”	508 | 20”	609 | 23.98”
A	95 | 3.74”	130 | 5.12”	135 | 5.31”	150 | 1.97”	190 | 7.48”	250 | 9.84”	310 | 12.20”
D	150 | 1.97”	150 | 1.97”	150 | 1.97”	150 | 1.97”	150 | 1.97”	250 | 9.84”	250 | 9.84”
H	205 | 8.07”	240 | 9.45”	265 | 10.43”	270 | 10.63”	305 | 12.00”	420 | 16.54”	460 | 18.11”
Tubing connections	eØ 10 x iØ 8 (on request imperial sizing)						

Weight	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs
ANSI150/PN 16	17 | 37	32 | 70	44 | 97	56 | 123	82 | 180	175 | 385	265 | 584
ANSI 300	19 | 42	34 | 75	- | -	57 | 125	103 | 227	185 | 408	280 | 617
ANSI 600	20 | 44	36 | 79	- | -	61 | 134	109 | 240	207 | 456	315 | 694

Table 4 Weights and dimensions

VLM + DB/819

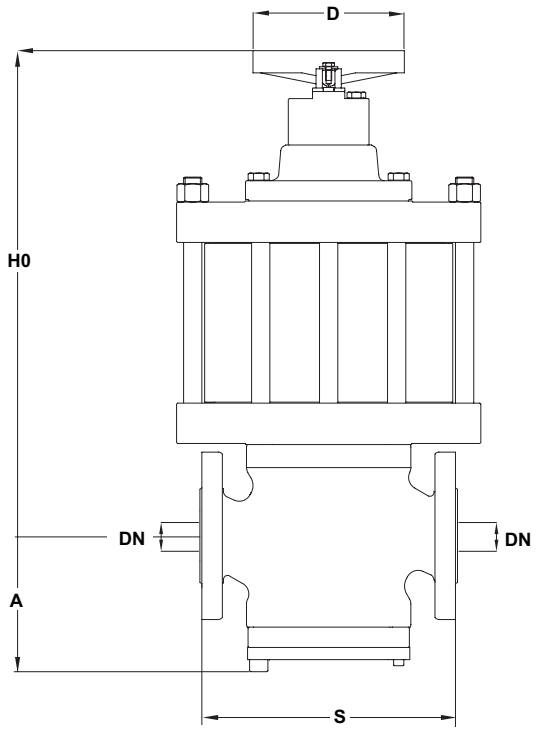


Figure 8 VLM + DB/819 dimensions

Weights and Dimensions (for other connections please contact your nearest Pietro Fiorentini sales outlet)							
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H	205 | 8.07”	240 | 9.45”	265 | 10.43”	270 | 10.63”	305 | 12.00”	420 | 16.54”	460 | 18.11”
H0	290 | 11.42”	480 | 18.90”	- | -	550 | 21.65”	620 | 24.41”	800| 31.50”	900 | 35.43”
Tubing connections	eØ 10 x iØ 8 (on request imperial sizing)						

Weight	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs
ANSI150/PN 16	43 | 95	97 | 214	74 | 163	146 | 322	196| 432	432| 952	692 | 1525
ANSI 300	46 | 101	100 | 220	- | -	152 | 335	236 | 520	448| 987	735 | 1620
ANSI 600	47 | 103	102 | 225	- | -	156 | 344	242 | 533	487 | 1073	780 | 1720

Table 5 Weights and dimensions

VLM + PM

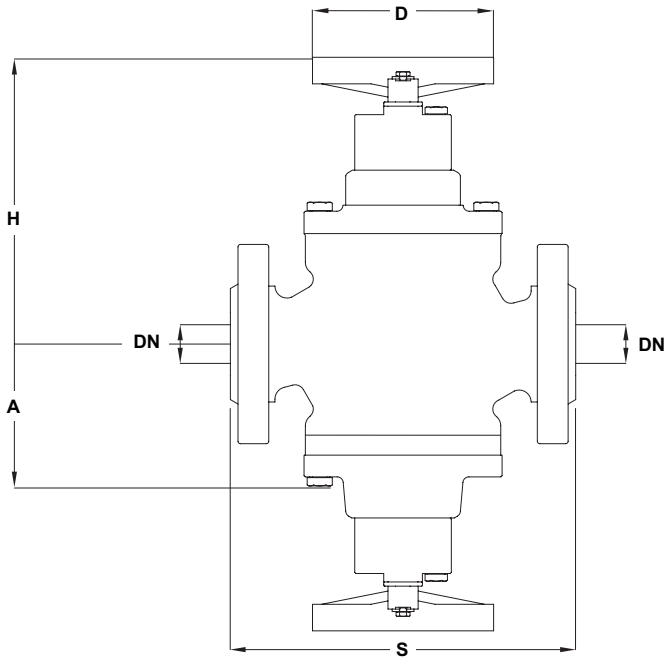

Figure 9 VLM + PM dimensions

Weights and Dimensions (for other connections please contact your nearest Pietro Fiorentini sales outlet)							
	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches
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Tubing connections	eØ 10 x iØ 8 (on request imperial sizing)						

Weight	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs
ANSI150/PN 16	20 | 43	38 | 83	- | -	64 | 140	96 | 211	202 | 445	304 | 670
ANSI 300	22 | 47	40 | 87	- | -	65 | 142	116 | 255	212 | 467	319 | 703
ANSI 600	23 | 50	42 | 91	- | -	69 | 151	122 | 269	234 | 516	354 | 780

Table 6 Weights and dimensions

VLM + DB/819 + PM

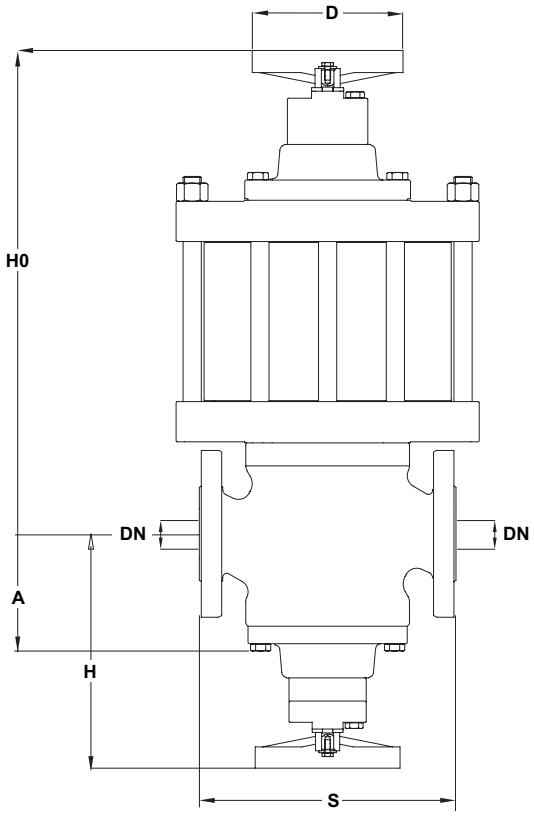

Figure 10 VLM + DB/819 + PM dimensions

Weights and Dimensions (for other connections please contact your nearest Pietro Fiorentini sales outlet)							
	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches
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H	205 | 8.07”	240 | 9.45”	265 | 10.43”	270 | 10.63”	305 | 12.00”	420 | 16.54”	460 | 18.11”
H0	290 | 8.07”	480 | 9.45”	- | -	550 | 10.63”	620 | 12.00”	800| 16.54”	900 | 18.11”
Tubing connections	eØ 10 x iØ 8 (on request imperial sizing)						

Weight	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs
ANSI150/PN 16	46| 100	103 | 226	- | -	154 | 338	210| 463	459| 1012	732 | 1613
ANSI 300	49 | 107	106 | 233	- | -	160 | 352	250 | 551	475| 1047	775 | 1709
ANSI 600	50 | 109	108 | 237	- | -	164 | 360	256 | 564	514 | 1133	820 | 1808

Table 7 Weights and dimensions

VLM + SB/82

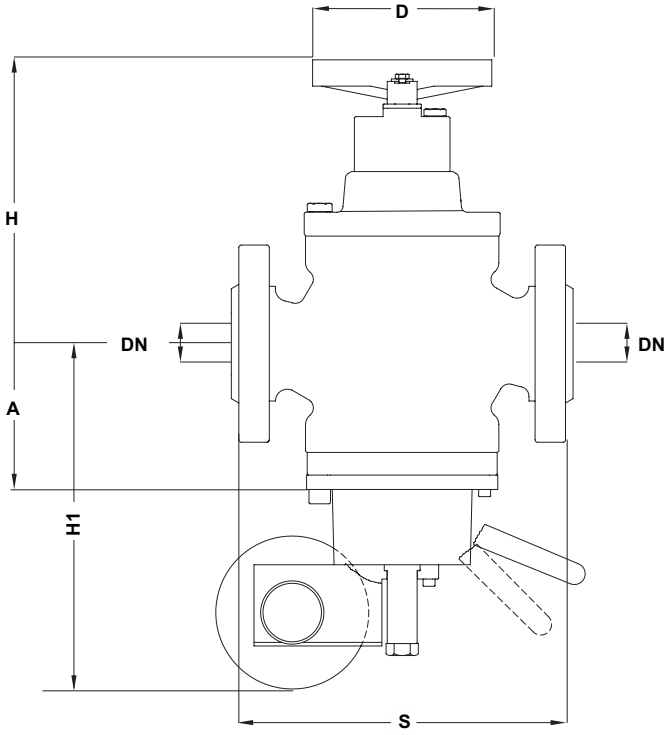

Figure 11 VLM + SB/82 dimensions

Weights and Dimensions (for other connections please contact your nearest Pietro Fiorentini sales outlet)							
	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches
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H	205 | 8.07”	240 | 9.45”	265 | 10.43”	270 | 10.63”	305 | 12.00”	420 | 16.54”	460 | 18.11”
H1	215 | 8.46”	240 | 9.45”	- | -	270 | 10.63”	300 | 11.8”	400 | 15.7”	450 | 17.72”
Tubing connections	eØ 10 x iØ 8 (on request imperial sizing)						

Weight	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs
ANSI150/PN 16	26 | 57	42 | 92	56 | 123	66 | 145	96 | 211	187| 412	317 | 699
ANSI 300	29 | 64	45 | 99	- | -	70 | 154	118 | 260	205| 452	335 | 738
ANSI 600	30 | 66	47 | 103	- | -	74 | 163	124 | 273	227 | 500	370 | 816

Table 8 Weights and dimensions

VLM + DB/819 + SB/82

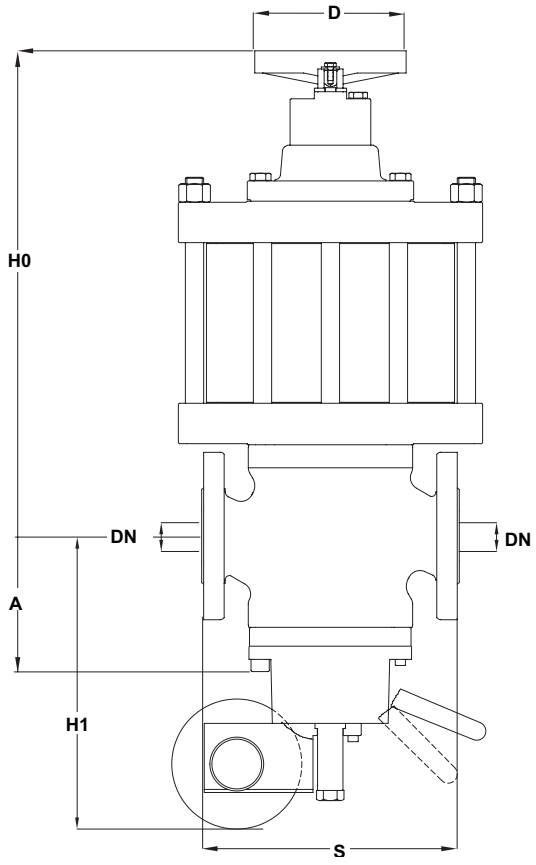

Figure 12 VLM + DB/819 + SB/82 dimensions

Weights and Dimensions (for other connections please contact your nearest Pietro Fiorentini sales outlet)							
	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches	[mm] | inches
Dimensions (DN)	25 | 1”	50 | 2”	65 | 2”1/2	80 | 3”	100 | 4”	150 | 6”	200 | 8”
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D	150 | 1.97”	150 | 1.97”	150 | 1.97”	150 | 1.97”	150 | 1.97”	250 | 9.84”	250 | 9.84”
H0	290 | 11.42”	480 | 18.90”	- | -	550 | 21.65”	620 | 24.41”	800| 31.50”	900 | 35.43”
H1	215 | 8.46”	240 | 9.45”	- | -	270 | 10.63”	300 | 11.8”	400 | 15.7”	450 | 17.72”
Tubing connections	eØ 10 x iØ 8 (on request imperial sizing)						

Weight	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs	Kg | lbs
ANSI150/PN 16	52 | 114	107 | 236	86 | 189	156 | 344	210 | 463	444 | 979	744 | 1640
ANSI 300	56 | 123	111 | 245	- | -	165 | 364	251 | 553	468 | 1032	790 | 1741
ANSI 600	57 | 125	113 | 249	- | -	169 | 372	257 | 566	507 | 1118	825 | 1819

Table 9 Weights and dimensions

Sizing and Cg

The regulator is usually chosen on the basis of the flow rate calculation determined through use of formulas and flow rate coefficients (Cg or KG), as indicated by Standard EN 334.

Flow coefficients							
Nominal dimensions	25	50	80	100	150	200	250
Inches	1”	2”	3”	4”	6”	8”	10”
Cg	575	2220	4937	8000	16607	25933	36525
K1	106.78	106.78	106.78	106.78	106.78	106.78	106.78

Table 10 Flow coefficients

For sizing **CLICK HERE** or scan the QR code:

Note: If you do not already have access credentials, do not hesitate to contact your nearest Pietro Fiorentini representative.

In general, online sizing considers more variables as the valve is installed in a system, allowing a better, multi-perspective approach to sizing.

For gases other than natural gas; for natural gases with density other than 0.61, please apply the correction coefficients resulting from the following formula:

$$F_c = \sqrt{\frac{175.8}{S \times (273.16 + T)}}$$

S = Relative density at the air (see tab. 11)
T = gas temperature (°C)

Corrective factors Fc		
Gas type	**Relative Density S**	**Corrective Factors Fc**
Air	1.00	0.78
Propane	1.53	0.63
Butane	2.00	0.55
Nitrogen	0.97	0.79
Oxygen	1.14	0.73
Carbon dioxide	1.52	0.63
Note: The table indicates the Fc corrective factors valid for gas, calculated at a temperature of 15 °C and at the Declared relative density.		

Table 11 Corrective factors Fc

Conversion of flow rates
Stm^3/h x 0.94795 = Nm^3/h

Nm^3/h reference conditions T= 0 °C; P= 1 barg
Stm^3/h reference conditions T= 15 °C; P= 1 barg

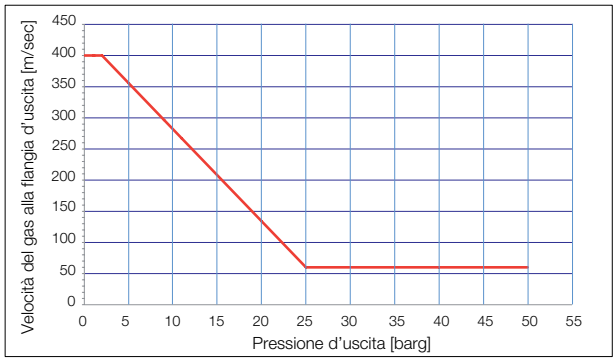
Table 12 Conversion of flow rates

ATTENTION:

For the purpose of obtaining optimal performance, preventing erosion phenomena and limiting the level of emitted noise, it is recommended that the velocity at the regulator outlet flange does not exceed the velocity indicated in the diagram provided below.
Gas velocity at the outlet flange can be determined with the following relation:

$$V = 345.92 \times \frac{Q}{DN^2} \times \frac{1 - 0.002 \times Pd}{1 + Pd}$$

V = gas speed in m/sec
Q = gas flow rate in Stm^3/h
DN = nominal size of regular in mm
Pd = outlet pressure in barg.



The choice of valve size is simplified by the use of the valve coefficient for gas Cg (table 10).

Flow coefficients at fully open position and various operating conditions are related by the following formulae where:

Q = gas flow rate in Stm^3/h
Pu = inlet pressure in bar (abs)
Pd = regulator outlet pressure in bar (abs).

- **A** > when both the Cg value of the valve and Pu and Pd are known, the flow coefficient can be calculated as follows:

- **A-1** under non critical conditions: (Pu < 2 x Pd)

$$Q = 0.526 \times Cg \times Pu \times \sin\left(K1 \times \sqrt{\frac{Pu - Pd}{Pu}}\right)$$

- **A-2** under critical conditions: (Pu ≥ 2 x Pd)

$$Q = 0.526 \times Cg \times Pu$$

- **B** > Vice versa, knowing the values of Pu, Pd and Q, the required value of Cg or KG is calculated and therefore the size of the regulator with:

- **B-1** under non critical conditions: (Pu<2xPd)

$$Cg = \frac{Q}{0.526 \times Pu \times \sin\left(K1 \times \sqrt{\frac{Pu - Pd}{Pu}}\right)}$$

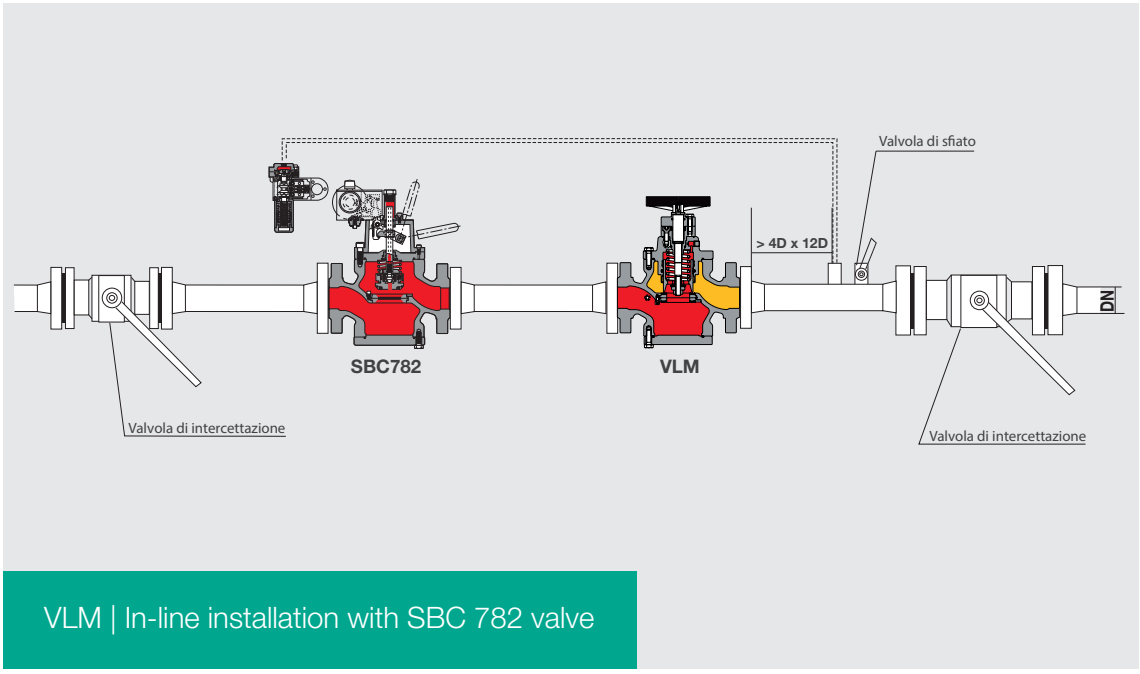
- **B-2** under critical conditions (Pu ≥ 2 x Pd)

$$Cg = \frac{Q}{0.526 \times Pu}$$

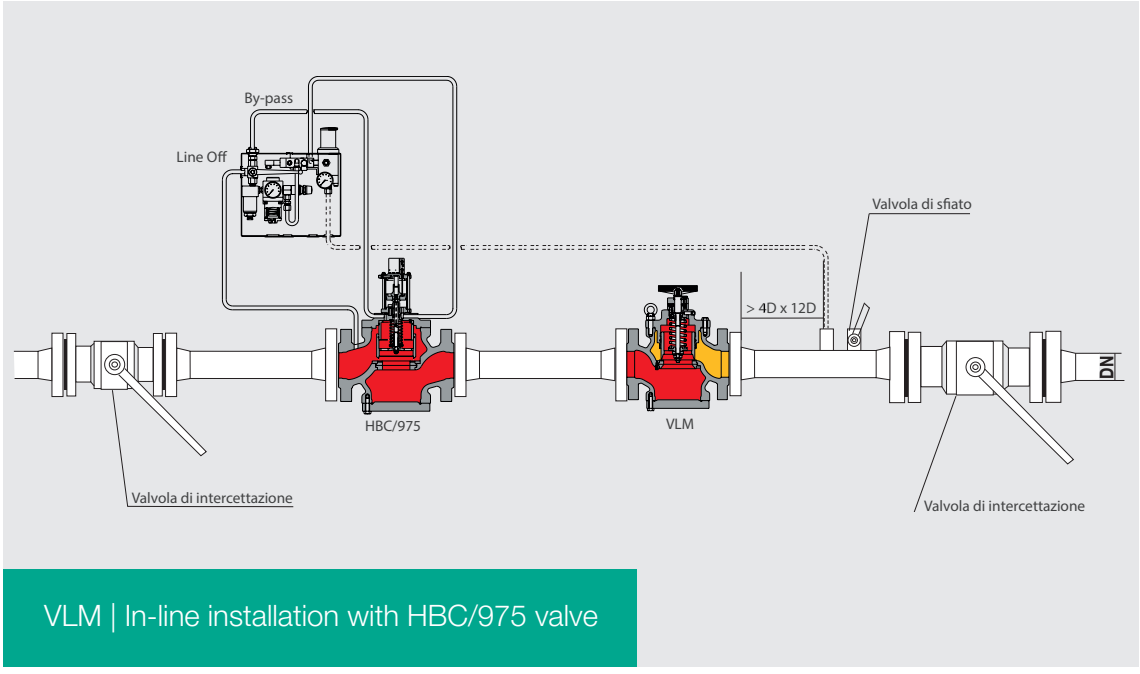
NOTES: The subject of the sen is in DEG.

Installation

Below are some typical installations. On demand we are available to supply a more comprehensive experience list and/or references.



VLM | In-line installation with SBC 782 valve



VLM | In-line installation with HBC/975 valve

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TB0038ENG

The data are approximate and not binding.
We reserve the right to make changes without prior notice.

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