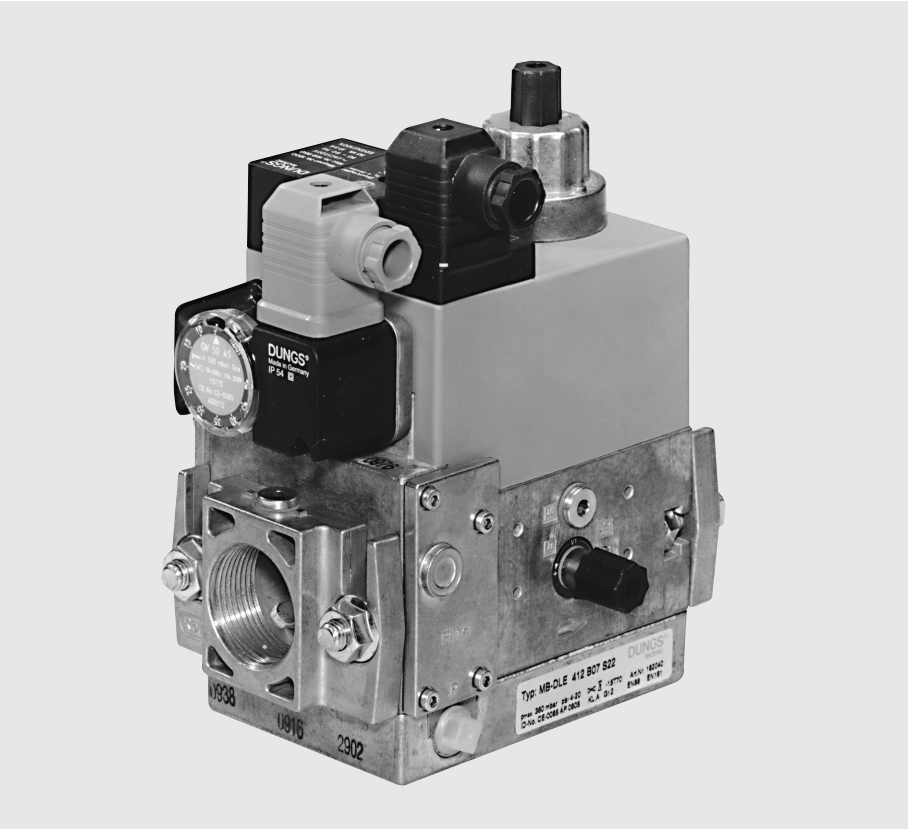
GasMultiBloc®
Combined regulator and safety shut-off valves
Single-stage function
Integrated bypass valve

DUNGS®
Combustion Controls

MB-D(LE) 405 - 412 B07

7.22



Technical description

The DUNGS GasMultiBloc® integrates filter, regulator, valves and pressure switches in one compact fitting.

- Dirt trap unit: microfilter
- One regulator, two main valves and one bypass valve: B07
- Two valves are fast opening, one valve is slow opening
- Solenoid valves up to 360 mbar (36 kPa) as per DIN EN 161 Class A Group 2
- Sensitive setting of output pressure by proportional regulator as per DIN EN 88 Class A Group 2
- High flow rates with low pressure drop
- DC solenoid drive interference degree N
- Main volume restrictor at valve V2, bypass restrictor at valve V3
- Hydraulic opening delay
- Flange connections with pipe threads as per ISO 7/1
- Simple mounting, compact, lightweight

The modular system permits individual solutions by using an internal bypass valve in connection with separately controlled valves, by adding a valve proving system, mini/maxi pressure switches, pressure limiters, limit switches at valve V2.

Application

The modular system permits individual solutions in gas safety and regulator engineering. Suitable for gases of families 1, 2, 3 and other neutral gaseous media.

Approvals

EC type test approval as per EC Gas Appliance Directive:
MB-...405-412 B07 CE-0085 AP 3156
EC type test approval as per EC Pressure Equipment Directive:

MB-...405-412 B07 CE0036

Approvals in other important gas consuming countries.

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Functional description of gas flow

1. When the valves V1 and V2 are closed, chamber A is under inlet pressure.
2. A hole D in the filter housing connects min. pressure switch with chamber A. If the inlet pressure applied to the pressure switch exceeds the incoming reference value, it switches through to the automatic burner control.
3. After release by the automatic burner control, valves V1 and V3 open.
   The gas flows through chambers A, B and via bypass valve V3 in C of the GasMultiBloc. The ignition gas volume is adjusted by using the bypass restrictor. The pressure regulator controls the pressure upstream of valves V2 and V3.
4. When valve V2 is released, the gas flows directly into chamber C, the bypass valve V3 remains open.

Operating method of valve-regulator combination on valve V1

A regulator, compensating for residual pressure is integrated in valve V1 (pressure regulating part).
Armature 7 is not connected to the valve plate unit 3. When it opens, armature 7 pretensions compression spring (V1) 5 and releases the valve plate unit.
When the valve closes, the armature acts directly on the valve plate unit.
The output pressure upstream of valve V2 is defined by pretensioning the regulating spring 8 (tension spring) via setting screw 17. The output pressure acts via opening E on the working diaphragm 26 of the regulator. In regulated state, setting spring inlet pressure and pressure of working diaphragm are in force equilibrium. The compensating diaphragm ensures the fast closing function of valve V1 and a high regulating quality.

Operating method of bypass valve V3

The bypass valve V3 opens at the same time as valve V1. Ignition gas flow is set by using bypass restrictor 21.

Operating method of valve V2

Armature 14 of valve V2 is connected to valve plate unit 12. When it opens, armature 14 pretensions compression spring 13. The maximum valve opening can be set by limiting the armature stroke by means of the main volume restrictor 18.

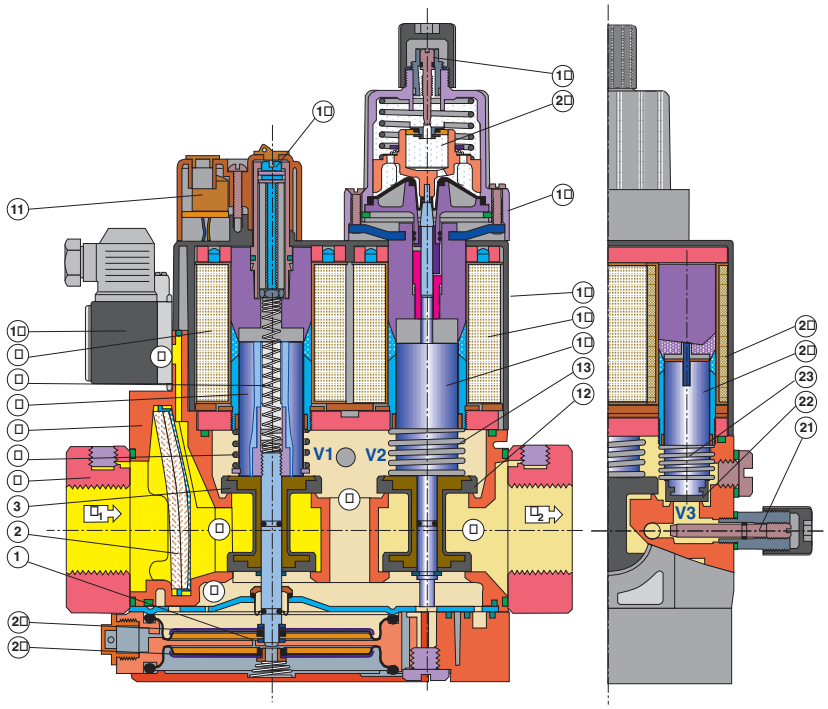
Min. opening (residual stroke) of valve (0.5 to 1.0 mm)

The main volume restrictor is set by rotating the adjusting plate or the hydraulic brake. The fast and/or slow opening characteristic is influenced by setting fast stroke 19 at the hydraulic brake under the cover.

Closing function

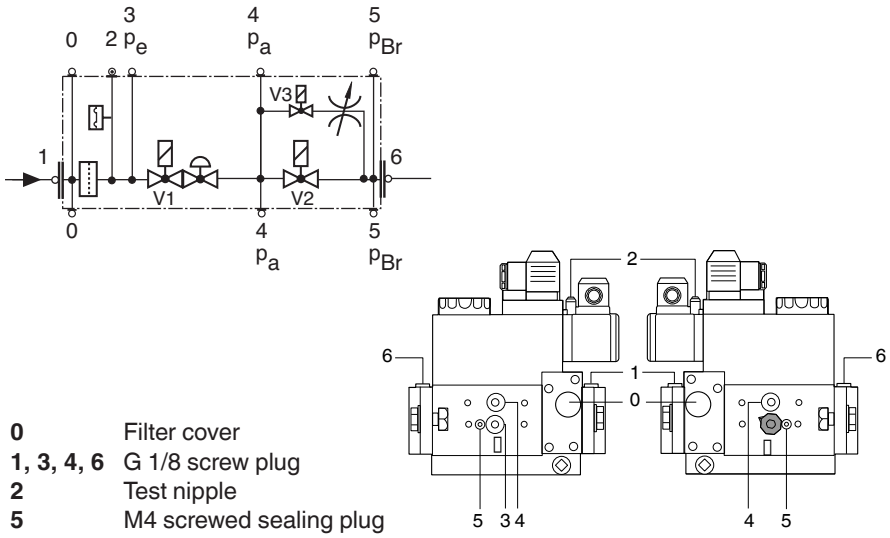
When the supply voltage to the main valve solenoid coils is interrupted, valves V1, V3 and V2 are closed within < 1 s by the compression springs.

Sectional drawing of MB-DLE...B07



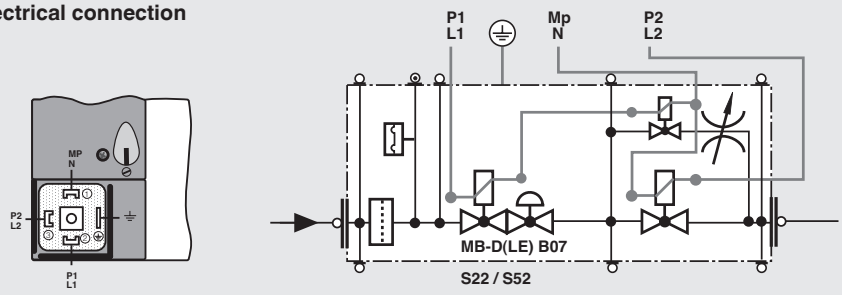
1	Pressure regulator	11	Electrical connection	21	Bypass restrictor
2	Microfilter	12	Valve V2	22	Valve V3
3	Valve V1	13	Closing spring V2	23	Closing spring V3
4	Connection flange	14	Armature V2	24	Armature V3
5	Closing spring V1	15	Solenoid V2	25	Solenoid V3
6	Housing	16	Solenoid housing	26	Working diaphragm
7	Armature V1		Setting:		
8	Regulating spring	17	- Gas pressure p_a	27	Compensation diaphragm
9	Solenoid V1	18	- Main volume		
10	Gas pressure switch (optional)	19	- Fast stroke		
		20	Hydraulic brake		

Pressure taps



0	Filter cover
1, 3, 4, 6	G 1/8 screw plug
2	Test nipple
5	M4 screwed sealing plug

Electrical connection



Specifications

Nominal diameters Flange with pipe threads as per ISO 7/1 (DIN 2999)	MB-…405/407 B07 Rp 1/2, 3/4 and their combinations	MB-…410/412 B07 Rp 3/4, 1, 1 1/4 and their combinations
Max. operating pressure	**360 mbar (36 kPa)**	
Output pressure ranges	**MB-… S22 p_a: 4 mbar (0.4 kPa) to 20 mbar (2 kPa)** **MB-… S52 p_a: 4 mbar (0.4 kPa) to 50 mbar (5 kPa)**	
Media	Gases of families 1, 2, 3 and other neutral gaseous media	
Ambient temperature	-15 °C to +70 °C (Do not operate MB-D below 0 °C in liquid gas systems. Only suitable for gaseous liquid gas, liquid hydrocarbons destroy sealing materials.)	
Dirt trap	Sieve, microfilter, changing the filter is possible without removing the valve.	
Pressure switches	Types GW A5, GW A2, NB A2, ÜB A2 mountable as per DIN EN 1854. For further information, refer to Datasheet GW A2 No. 215 183 and Datasheet GW A5 No. 225 901.	
Pressure regulator	Pressure regulator compensated for residual pressure, leakproof seal when switched off by means of valve V1 as per DIN EN 88 Class A. Setpoint spring permanently installed (no spring exchange possible). A vent line above roof is not required. Internal pulse tap provided.	
Solenoid valve V1	Valve as per DIN EN 161 Class A Group 2, fast closing, fast opening	
Solenoid valve V2	Valve as per DIN EN 161 Class A Group 2	

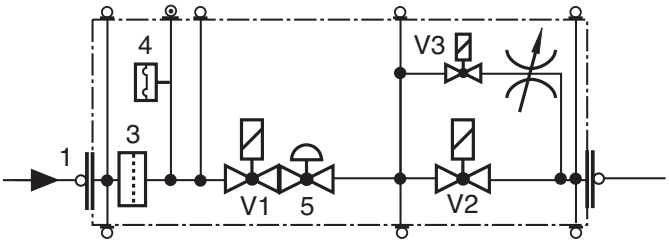
	Valve V2 design		Main volume restrictor
MB	fast closing	fast opening	without
MB-D	fast closing	fast opening	with
MB-DLE	fast closing	slow opening	with
MB-LE	fast closing	slow opening	without

Solenoid valve V3 (bypass)	Valve as per DIN EN 161 Class A Group 2, with volume restrictor	
Measuring/ignition gas connection	For G 1/8 as per DIN ISO 228, refer to Pressure taps on page 2	
Burner pressure monitor p_{Br}	Connection downstream of valve V2, pressure switch mountable on adapter laterally	
Voltage / frequency	50-60 Hz ,220 - 230 V AC, -15% +10% Other preferred voltages: 240 VAC, 110-120 VAC, 48 VDC, 24-28 VDC	
Electrical connection	Plug connection as per DIN EN 175301-803 for valves and pressure switches	
Rating/power consumption Switch-on duration Degree of protection Radio interference	Refer to Dimensions on page 5 100% IP 54 as per IEC 529 (EN 60529) Interference degree N	
Materials of gas conveying parts	Housing Diaphragms, seals Solenoid drive	aluminium die casting NBR basis, Silopren (silicone rubber) steel, brass, aluminium
Installation position	Solenoid vertically upright or lying horizontally as well as its intermediate positions.	
Closed position signal contact	Closed position signal contact, type K01/1 (DIN-tested), mountable on V2	

Equipment variants GasMultiBloc®...B07 Single-stage function	405 B07	407 B07	410 B07	412 B07	
MB	•	•	•	•	
MB-D	•	•	•	•	
MB-DLE	•	•	•	•	
MB-LE	•	•	•	•	
Microfilter (standard) with sieve	•	•	•	•	
Gas pressure switch					
downstream of filter	•	•	•	•	
downstream of valve V2 on adapter	•	•	•	•	
Pressure regulator	•	•	•	•	
Valve V1, double seat	•	•	•	•	
Valve V2, single seat	•	–	•	–	
Valve V2, double seat	–	•	–	•	
Valve V3, single seat with restrictor	•	•	•	•	
Valve opening separately	•	•	•	•	S...2 version
Flange Rp 1/2	•	•	–	–	
Rp 3/4	•	•	•	•	• = possible
Rp 1	–	–	•	•	(•) = on request
Rp 1 1/4	–	–	•	•	- = not possible

MB-...B07 version

V1 = Valve 1
V2 = Valve 2
V3 = Valve 3
3 = Filter
4 = Pressure switch, optional
5 = Regulator



Mounting of VPS 504 valve proving system possible
Mounting of K01/1 closed position signal contact possible

Type key of MultiBloc®

MB- XX XXX XX BOX SXX

Control of V1 and V2
0 = common
2 = separated

Outlet pressure / **Inlet pressure**
2 = 4 - 20 mbar / up to 360 mbar
5 = 4 - 50 mbar / up to 360 mbar

S = Series (type-independent)

Gas train schematic diagram
1 = two A valves for main gas + regulator
7 = two A valves for main gas, one A valve together with V1 as internal bypass around V2 + regulator

Design type (generation) B

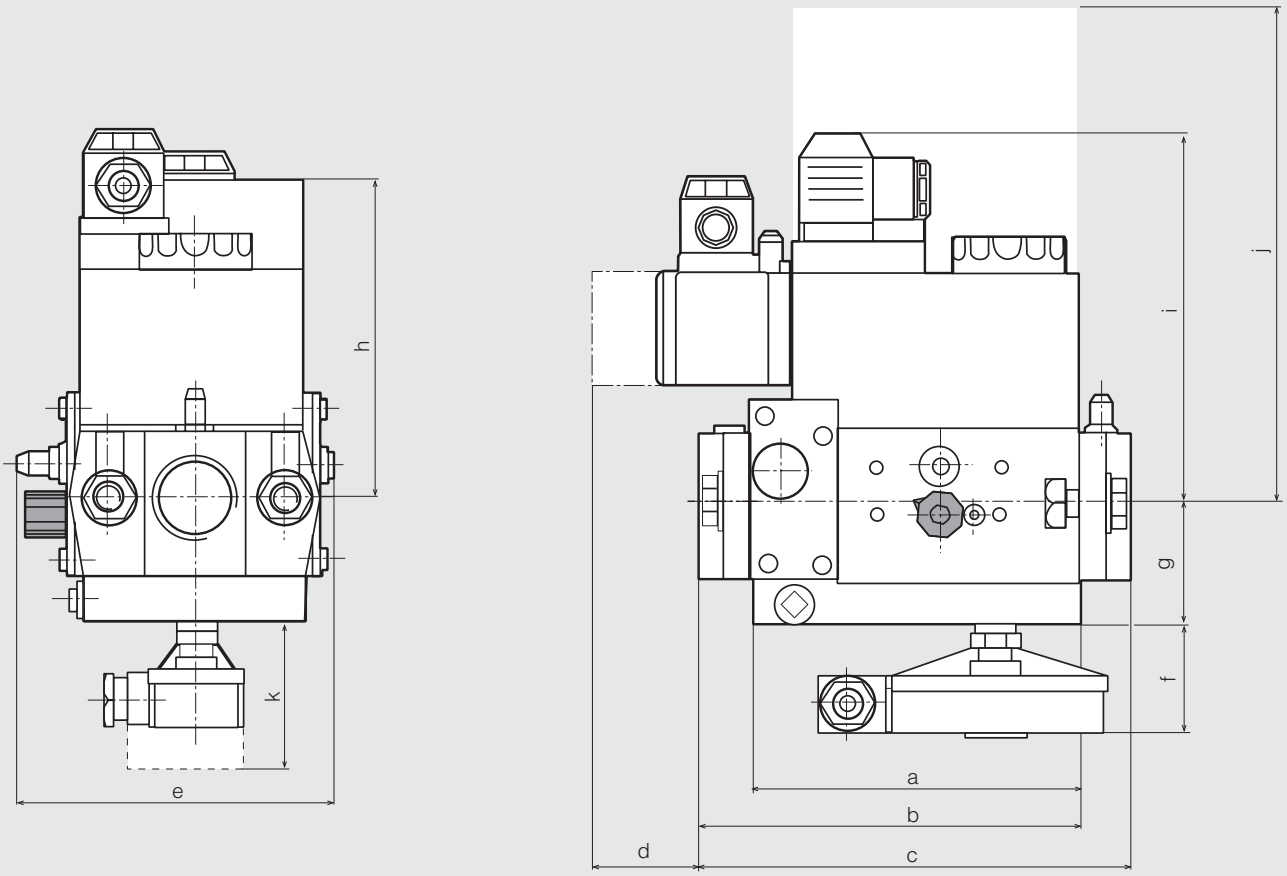
Construction size, nominal diameter
403 = DN 10, V2 = Single-seat valve
405 = DN 15, V2 = Single-seat valve
407 = DN 20, V2 = Double-seat valve
410 = DN 25, V2 = Single-seat valve
412 = DN 32, V2 = Double-seat valve
415 = DN 40, V2 = Double-seat valve
420 = DN 50, V2 = Double-seat valve

Opening behaviour + main volume restrictor
without = (MB or MB-ZR)
-D = Main volume restrictor
-LE = adjustable opening behaviour
-DLE = D + LE combination

without = single stage
ZR = double-stage with partial volume setting first stage

MultiBloc

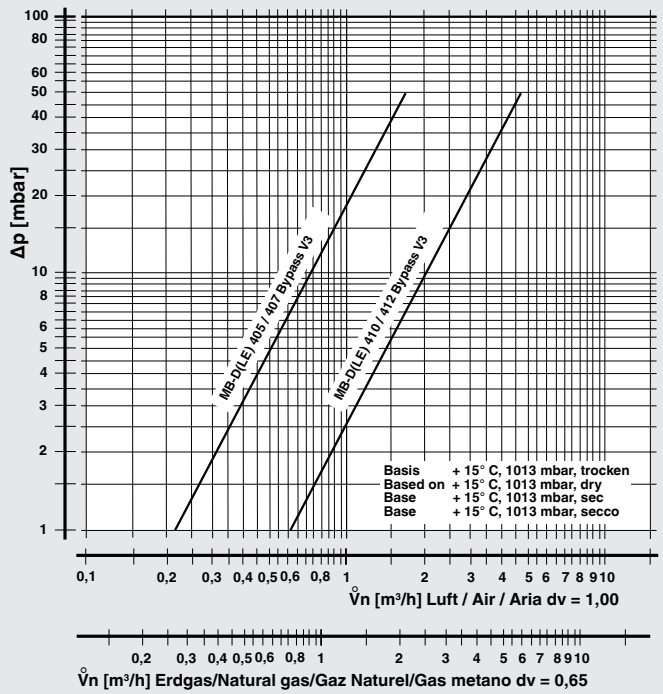
Dimensions [mm]



d = Space requirement for cover of pressure switch
j = Space requirement for exchanging the solenoid
k = Space requirement for K01/1 closed position signal contact

Type	Nominal rating [VA] 230 V AC; +20 °C		Dimensions [mm]										Weight [kg]
	S22	S52	a	b	c	d	e	f	g	h	i	j	k	
MB-D 405/407 B07	46	46	110	130.5	151	40	120	50	46	115	100	185	80	2.5
MB-DLE 405/407 B07	46	46	110	130.5	151	40	120	50	46	115	140	185	80	2.6
MB-D 410/412 B07	110	110	140	162.5	185	40	145	50	55	135	125	245	80	4.8
MB-DLE 410/412 B07	110	110	140	162.5	185	40	145	50	55	135	160	245	80	4.9

Volumetric flow pressure loss characteristic via bypass valve V3, restrictor open



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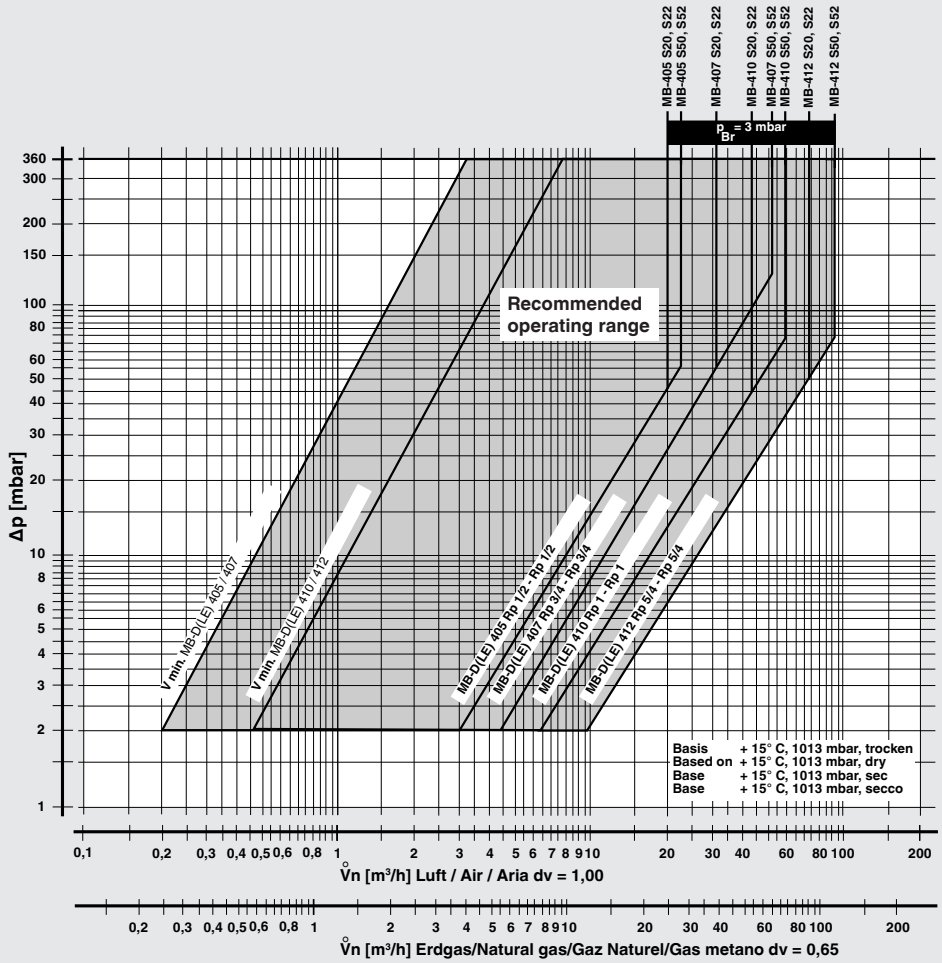
Volumetric flow pressure loss characteristics in regulated state with microfilter



$$f = \sqrt{\frac{\text{Dichte Luft / Spec. weight air / poids spécifique de l'air / peso specifico aria}}{\text{Dichte des verwendeten Gases / Spec. weight of gas used / poids spécifique du gaz utilisé / peso specifico del gas utilizzato}}}$$

Gas type	Density [kg/m³]	dv	f
Nat. gas	0.81	0.65	1.24
City gas	0.58	0.47	1.46
LPG	2.08	1.67	0.77
Air	1.24	1.00	1.00

$$\dot{V}_{\text{verwendetes Gas/gas used/ gaz utilisé/gas utilizzato}} = \dot{V}_{\text{Luft/air/aria}} \times f$$

We reserve the right to make any changes in the interest of technical progress.

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