GasMultiBloc
Combined regulation and safety valve
Infinitely variable air/gas ratio control mode

DUNGS®
Combustion Controls

MB-VEF 415 - 425 B01

7.28



Flange, line sockets, pulse lines and screw unions are **not** contained in the scope of supply

Technical description

The DUNGS GasMultiBloc MB-VEF…B01 integrates filter, gas-air ratio controls, valves and pressure switches in one compact fitting:

- Dirt trap
  MB-VEF 415/420: pre-mount filter (microfilter)
  MB-VEF 425: sieve
- Solenoid valves up to 360 mbar (36 kPa) as per DIN EN 161 Class A Group 2
- Sensitive adjustment of gas and air pressure ratio
- Servo pressure regulator as per DIN EN 88-1 Class A Group 2; EN 12067-1
- High flow values at low pressure drop
- Ratio V = p_{Br} / p_L 0.75 : 1 ... 3 : 1
- Zero point correction N possible
- External pulse lines, pulse flange
- Interference degree N possible
- Flange connections with pipe threads as per ISO 7/1

The modular system permits individual solutions using valve proving system, min./max. pressure switch, pressure limiter.

Application

The gas-air ratio control enables the optimum mixture formation for forced air burners and premix burners; this applies to the modulating and two-stage variable operating modes. Suitable for gases of families 1, 2, 3 and other neutral gaseous media.

Approvals

EU type testing certificate as per:
- EU-Gas Appliances Regulation
- EU-Pressure Equipment Directive

Approvals in other important gas consuming countries.

Printed in Germany • Edition 04.19 • Nr. 225 658

Functional description

Gas flow

1. If the valves V1 and V2 are closed, chamber a is under input pressure up to the double seat of valve V1.
2. A hole in the filter housing of MB-...415/420 connects min. pressure switch with chamber a. If the input 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 V2 open.
   The gas flow through chambers a, b and c of the MultiBloc is then released.

Operating method of valve-regulator combination on valve V1

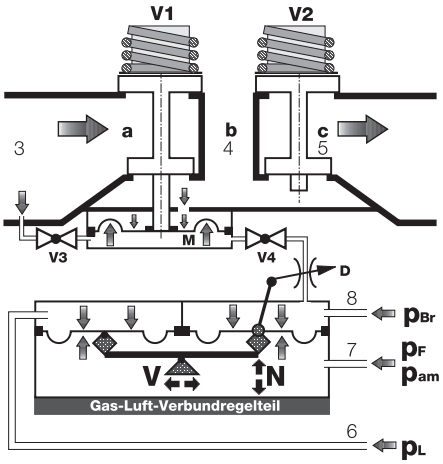
A regulator compensated for residual pressure is integrated in valve V1 (pressure regulating part).
Anchor V1 is not connected with the valve plate unit. When it opens, the anchor pretensions the pressure spring and releases the valve plate unit.
When the valve closes, the anchor acts directly on the valve plate unit.
Valves V1 and V2 are released at the same time.
In closed position valve V3 blocks the pressure chamber under working diaphragm M against input pressure P_e in chamber a.

The pressure under working diaphragm M is defined by a variable flow cross-section D. The comparison diaphragms for burner pressure p_{Br} and blower pressure p_L are interconnected via a rod. Moving the bearing point sets the ratio V.
Zero point correction N acts on this rod. The ambient pressure p_{amb} or the firing chamber pressure p_F must be applied to the opposite side of the comparison diaphragms. Firing chamber pressure has a reducing effect on the burner pressure at a ratio of V > 1.
Changes resulting from the force equilibrium lead to a modification of the flow cross-section D downstream of valve V4. Pressure under the working diaphragm is re-adjusted and the valve plate unit V1 changes the free cross-section.

Operating method of valve V2

The anchor of valve V2 is connected with the valve plate unit. When it opens, the anchor pretensions the pressure spring.
Valve V2 opens completely and without delay.

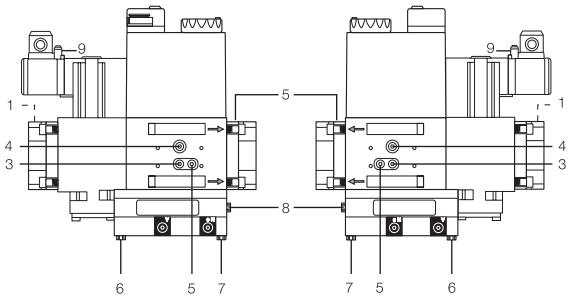
Block diagram MB-VEF



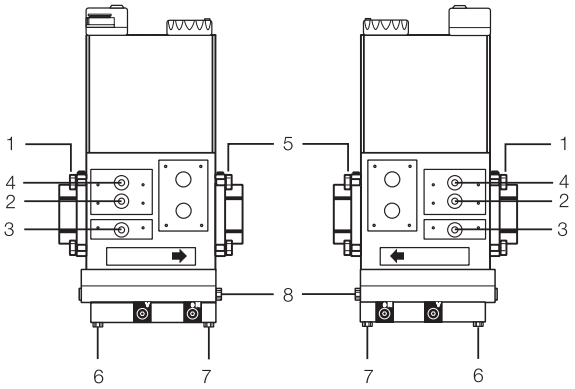
V1	Main valve 1	a, b, c	Pressure chambers in flow direction
V2	Main valve 2		
V3	Control valve 3	p_{Br}	Burner pressure
V4	Control valve 4	p_F	Firing chamber pressure
		p_{amb}	Ambient pressure
M	Working diaphragm	p_L	Blower pressure
D	Throttling point		
		1, 2, 3, 4, 5	G 1/8 screw plug
V	Ratio setting	9	test nipples
N	Zero point correction	6, 7, 8	Pulse lines p_L, p_F, p_{Br}

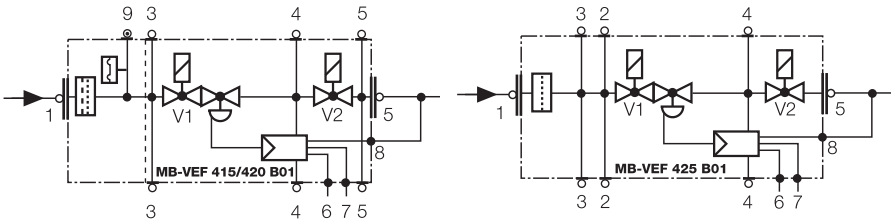
Pressure taps, gas train diagram

MB-VEF 415/420



MB-VEF 425





Valve V4 is activated by valve V2. In closed position, valve V4 blocks the chamber under the working diaphragm M from the burner pressure.

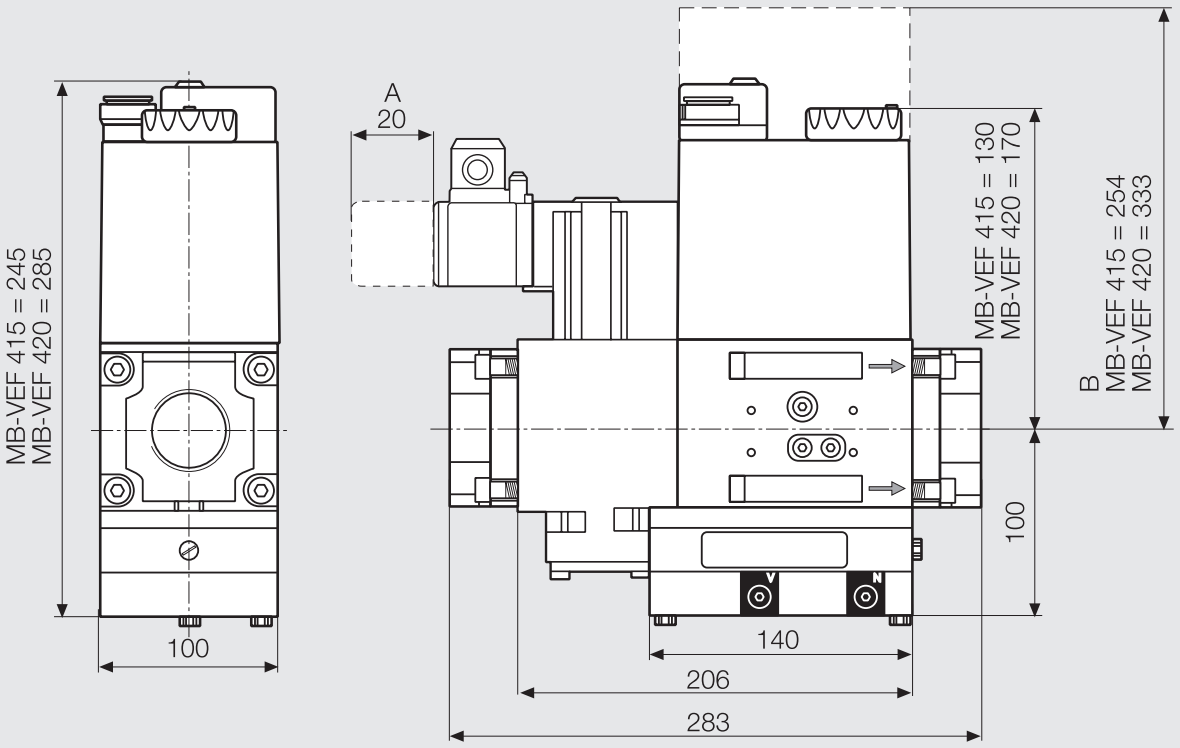
Closing function

If the supply voltage to the solenoid coils is interrupted, the pressure spring closes the main valves within < 1 s.

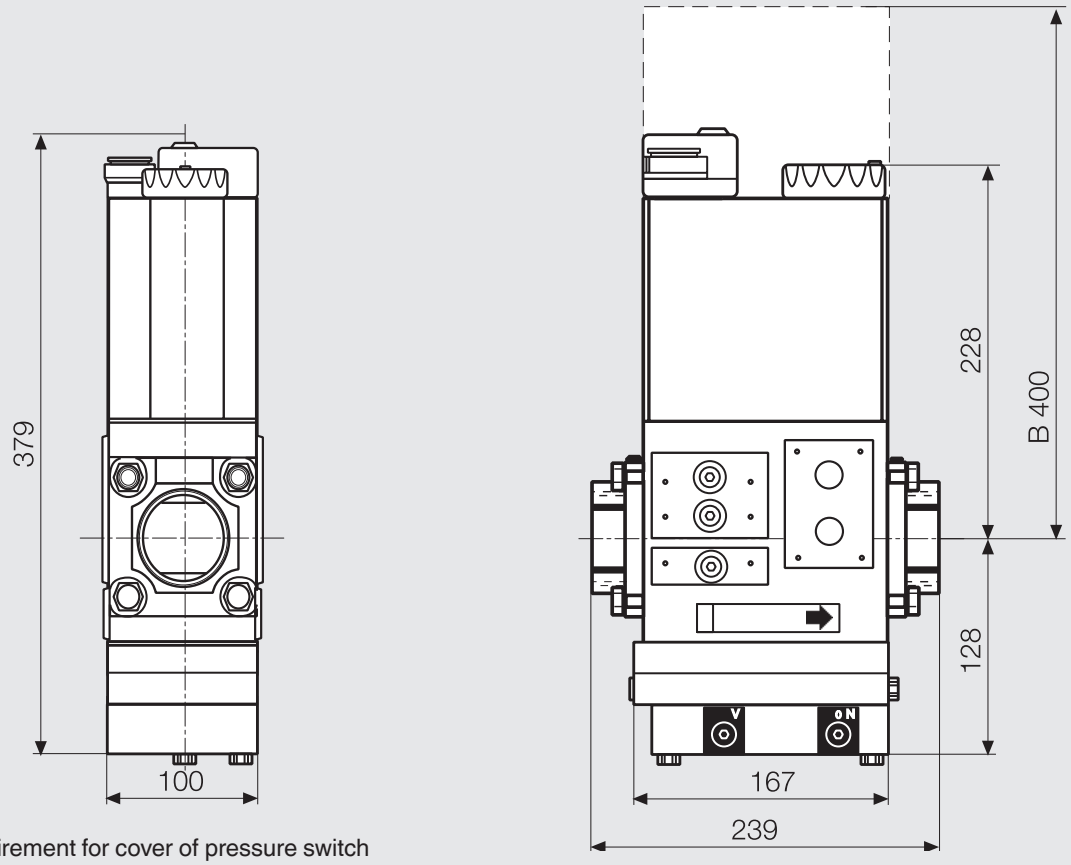
Specifications

Nominal diameters Flange with pipe threads as per ISO 7/1 (DIN 2999)	MB-VEF 415 B01, MB-VEF 420 B01 Rp 1, 1 1/4, 1 1/2, 2 and their combinations	MB-VEF 425 B01 Rp 2
Max. operating pressure **Input pressure ranges** **Guiding range** **Burner pressure range**	**360 mbar** **MB-…VEF S10/12** **p_e : 5 mbar to 100 mbar** **MB-…VEF S30/32** **p_e : 100 mbar to 360 mbar** **p_L : 0.4 to 100 mbar** **p_{Br} : 0.5 to 100 mbar**	
Media	Gases of families 1, 2, 3 and other neutral gaseous media	
Ambient temperature	-15 °C to +70 °C (Do not operate MB-VEF below 0 °C in liquid gas systems. Only suitable for gaseous liquid gas, liquid hydrocarbons destroy sealing materials)	
Dirt trap unit	Suitable gas filter must be installed upstream for safety reasons. Filter housing with microfilter, for MB-VEF 415/420. For MB-VEF 425, insert gas filter, e.g. type GF 520/1. Datasheet pre-mount filter	
Pressure switch	Types GW…A5, ÜB…A2 / NB…A2 to DIN EN 1854 may be attached. For further information, refer to Datasheets 5.02 and 5.07 “Pressure Switches for DUNGS Multiple Actuators”	
Servo pressure regulator	Pressure regulator compensated for residual pressure, leakproof seal when switched off by means of valve V1 as per DIN EN 88-1 Class A and EN 12067-1. Gas-air ratio control with adjustable ratio V as well as zero point correction N and firing chamber pressure connection.	
Ratio setting range V	Ratio V = p_{Br} / p_L 0.75 : 1 ... 3 : 1; other ratios on request	
Zero point correction N	Possible	
Solenoid valve V1 Solenoid valve V2	Valve as per DIN EN 161 Class A Group 2, fast closing, fast opening Valve as per DIN EN 161 Class A Group 2, fast closing, fast opening	
Measuring	G 1/8 DIN ISO 228, on inlet and outlet flange, on both sides downstream of dirt trap, on both sides between valves (pressure switch mounting can partly exclude measuring)	
Burner pressure monitor p_{Br}	Downstream of valve V2, pressure switch mountable laterally to adapter Pressure tap on outlet flange	
Pulse and connection lines	G 1/8 connection as specified to DIN ISO 228 for burner pressure (p_{Br}; GAS), blower pressure (p_L; AIR), firing chamber pressure (p_F ; combustion, atmosphere) **Pulse and connection lines must be made of steel to PN1, DN4. Condensate of pulse and connection lines must not enter into fitting. Strictly follow the operating and mounting instructions.**	
Voltage/frequency	MB-VEF 415/420 B01: 50 - 60 Hz, 230 V AC, -15% +10 % MB-VEF 425 B01: 50 - 60 Hz, 230 V AC, -15% +10 %	
Electrical connection	Plug connection as per DIN EN 175301-803 for valves and pressure switches	
Rating/power consumption Switch-on duration Protection type/interference suppression	see type overview 100 % IP 54 as per IEC 529 (EN 60529)/interference degree N	
Materials of gas-wetted parts	Housing Diaphragms, seals Solenoid drive	aluminium diecasting NBR basis, Silopren (silicon rubber) Steel, brass, aluminium
Installation position	Vertical with solenoid pointing upward	

Dimensions
MB-VEF 415/420



MB-VEF 425



A = Space requirement for cover of pressure switch
B = Space requirement for changing solenoid

Type	Rp	Opening time	$P_{max.}$ [VA]	$I_{max.}$ [A] ~(AC) 220 V …240V	Weight [kg]
MB-VEF 415 B01	Rp 1 1/2	< 1 s	50	0,37	6,7
MB-VEF 420 B01	Rp 2	< 1 s	90	0,37	7,9
MB-VEF 425 B01	Rp 2	< 1 s	110	0,46	12,6

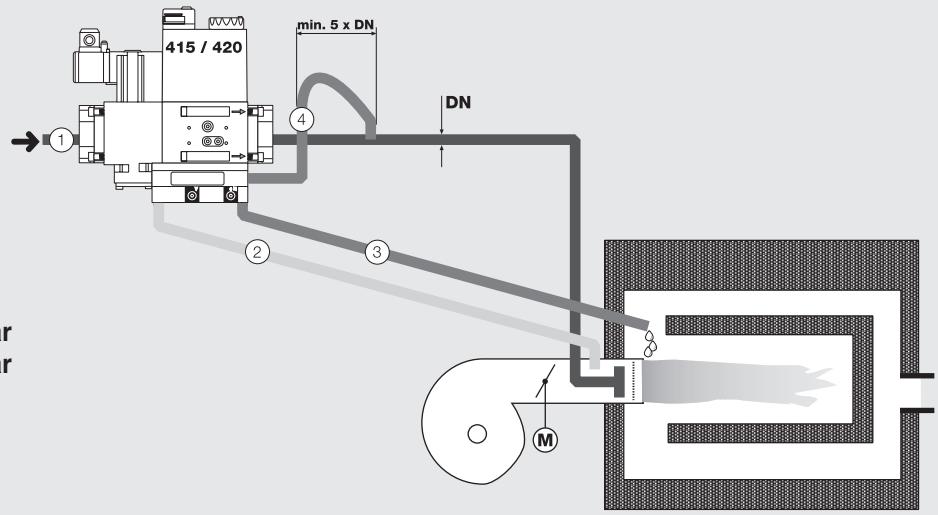
Installation of pulse lines
MB-VEF 415 / 420 / 425

1 p_e: gas input pressure
S10/12: 5 - 100 mbar
S30/32: 100 - 360 mbar

2 p_L: blower pressure, air
0.4 - 100 mbar

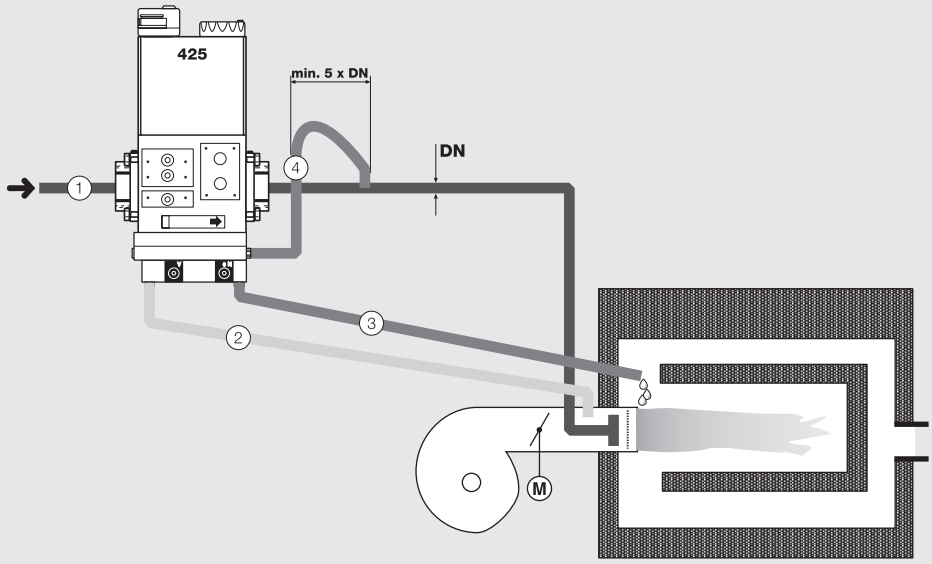
3 p_F: firing chamber pressure
-20 mbar … +50 mbar
or atmosphere
Δp_L max. = p_L - p_F = 100 mbar
Δp_{Br} max. = p_{Br} - p_F = 100 mbar

4 p_{Br}: Burner pressure, gas
0.5 - 100 mbar



Pulse flange set
Pulse line 4 can be replaced by a pulse flange. The pulse flange permits an internal pulse tap p_{Br} in connection with the output flange.





Pulse lines

⚠ Pulse lines 2, 3, 4 must correspond to ≥ DN 4 (4 mm dia.), PN 1 and be made of steel. **Other materials of pulse lines are only permissible as per the type test together with the burner.**

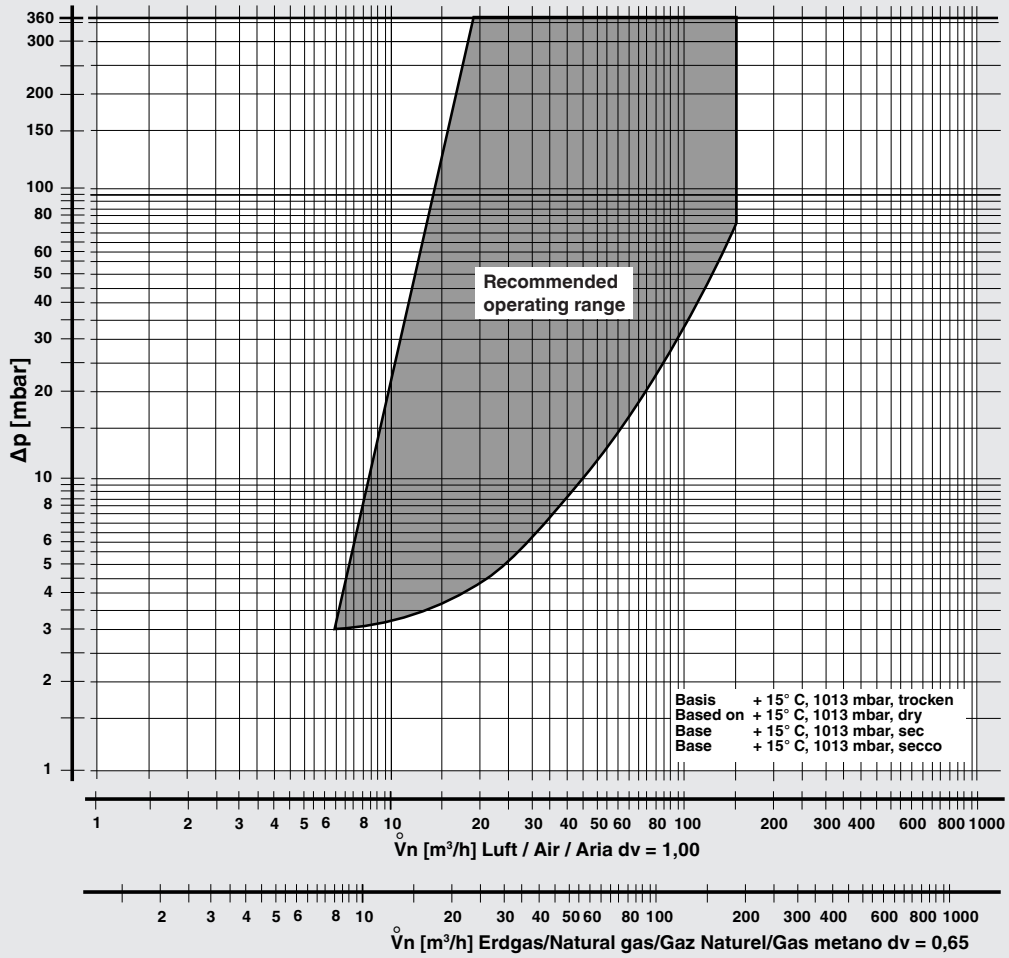
⚠ Route pulse lines so that **no condensate** can flow into the MB-VEF.

⚠ Route pulse lines resistant to cracks and deformation.
Keep pulse lines short.

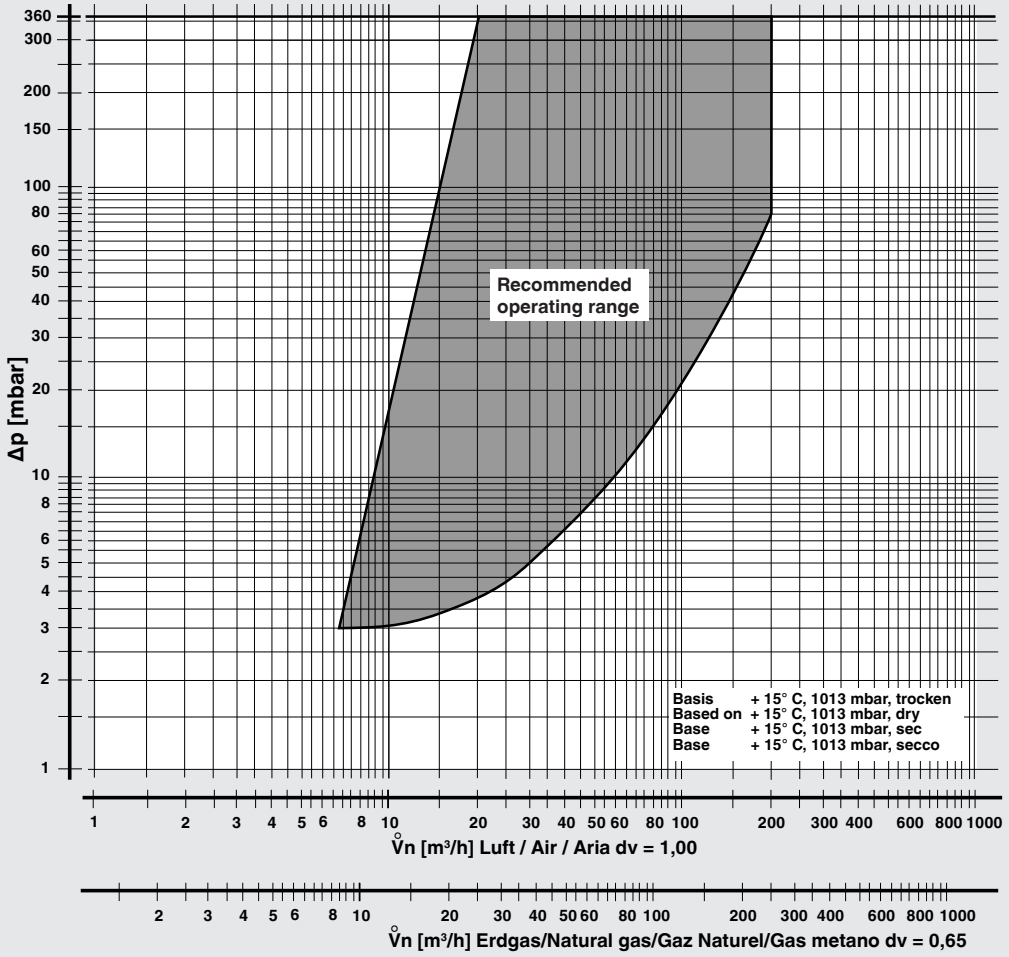
Selection of pulse flange and threaded flange

Pulse flange set	Order No.	Ø [mm]	Length [mm]	Order No. Threaded flange Rp 1 1/2	Order No. Threaded flange Rp 2
MB-VEF 415/420	**227 517**	43	20	**221 884**	**221 926**
MB-VEF 415/420	**228 140**	53	20	**–**	**221 926**
MB-VEF 425	**227 518**	55	20	**–**	**215 384**

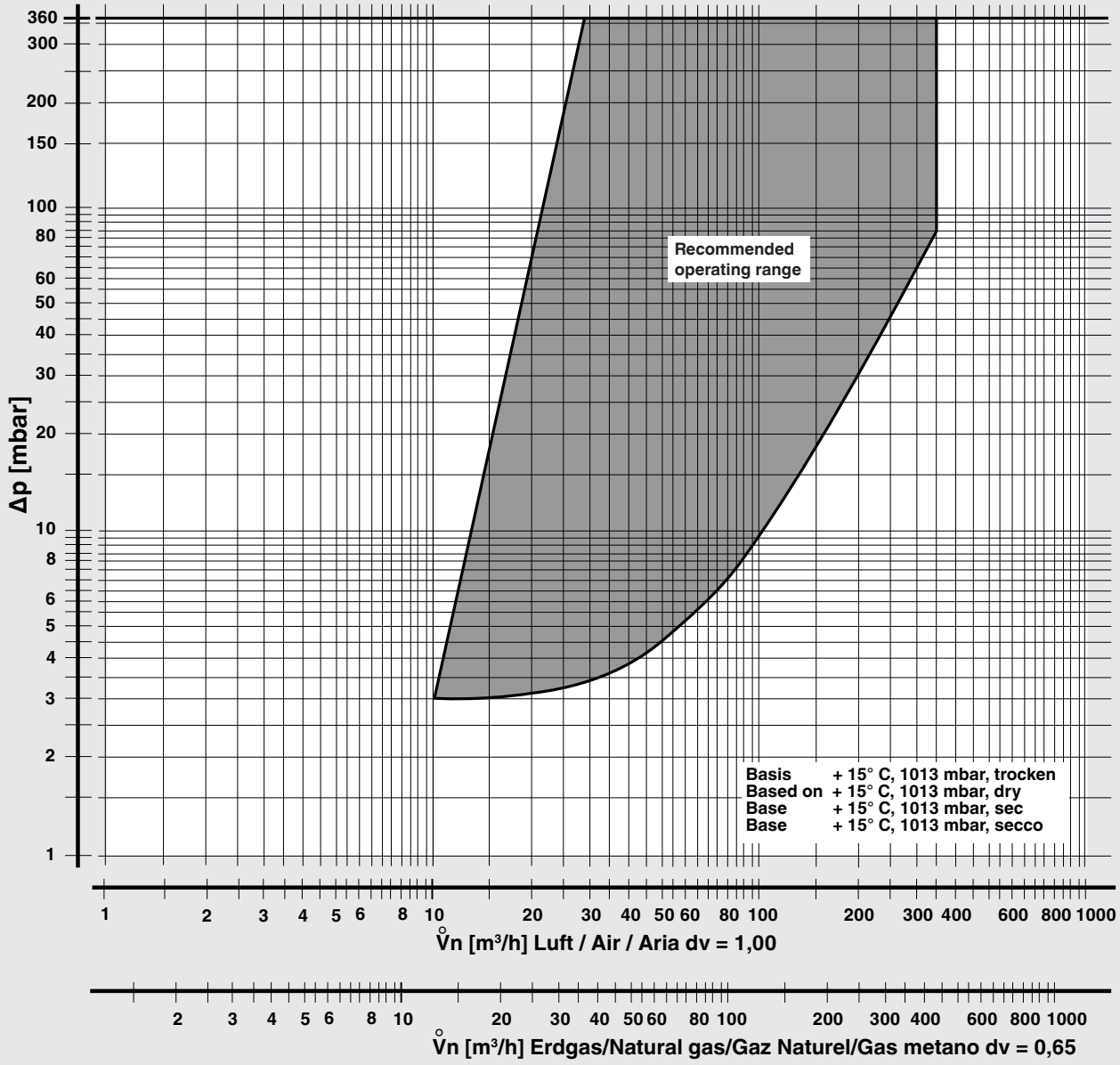
Flow diagram MB-VEF 415 B01 Rp 1 1/2, with microfilter



Flow diagram MB-VEF 420 B01 Rp 2, with microfilter



Flow diagram MB-VEF 425 B01 Rp 2, with microfilter



$$f = \sqrt{\frac{\text{Air density}}{\text{Density of gas used}}}$$

$$\dot{V}_{\text{gas used}} = \dot{V}_{\text{Air}} \times f$$

Type of gas	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

GasMultiBloc
Combined regulator and safety valve
Infinitely variable air/gas ratio control mode

MB-VEF 415 - 425 B01

DUNGS®
Combustion Controls

Characteristic design data of MB-VEF layout	Application 1	Application 2
Gas Type of gas/spec. density [kg/m³]		
Volumetric flow V [m³/h] $V_{min.}$ $V_{max.}$		
Input pressure p_e [mbar] $p_{e,min.}$ $p_{e,max.}$		
Burner pressure p_{Br} [mbar] at $V_{min.}$ at $V_{max.}$		
Blower pressure p_L [mbar] at $V_{min.}$ at $V_{max.}$		
Firing chamber pressure p_F [mbar] at $V_{min.}$ at $V_{max.}$		
Control range, performance range		
Adjustment time of air volume throttle from small load to large load [s]		
Starting load [m³/h]		
Company/Address		
Name/Contact person		
Telephone No.		

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

Karl Dungs Ltd.
18 Liberty Way
Attleborough Fields Ind Est
Nuneaton CV11 6RZ
Telefon: +44 24 7637-5733
Telefax: +44 24 7634-2852
E-Mail: info.gb@dungs.com

Karl Dungs GmbH & Co. KG
Karl-Dungs-Platz 1
D-73660 Urbach, Germany
Téléphone +49 7181-804-0
Téléfax +49 7181-804-166
e-mail info@dungs.com
Internet www.dungs.com