GasMultiBloc® Combined regulator and safety valve Gas-air-ratio-control

MBC-300-VEF MBC-700-VEF MBC-1200-VEF DUNGS®

7.03



- Max. operating pressure 360 mbar (36 kPa)
- Compact design
- · High flow values
- · Low weight
- Low power consumption
- Modulating mode
- Adjustable outlet pressure up to 300 mbar (30 kPa)
- Other available servo pressure regulator models:
 - zero pressure
 - constant pressure
- Mountable accessories
 - Pressure switch
 - VPS
- Ratio $V = p_{Br} / p_{L} = 0.4:1...3:1$
- Zero point correction possible
- Internal pulse line p_p



Technical Description

The DUNGS multiple actuator MBC...VEF offers filter, valves and servo pressure regulator in one compact unit:

- Dirt trap: microfilter
- 2 solenoid valves up to 360 mbar (36 kPa) as per DIN EN 161 class A group 2
- Servo pressure regulator as per DIN EN 88 class A group 2; EN 12067-1
- Fine setting of gas and air pressure ratio
- Flange connections with pipe threads as per ISO 7/1 or NPT
- Easy to install
- Low weight

As this system has a modular design, we can offer individual solutions with valve inspection system, pressure switches mini/maxi and pressure limiters. High flow values at low pressure difference.

Application

The servo pressure regulator permits optimum mixture formation in forced air burners and premix burners; this applies to modulating and multi-stage variable operating modes.

Suitable for gases of gas families 1, 2, 3 and other neutral gaseous media.

Approvals

EU type test approval as per EU Gas Appliance Directive:

MBC...VEF CE-0085 BM 0345

EU type test approval as per EU Pressure Equipment Directive:

MBC...VEF CE0036

Approvals in other important gas-consuming countries.

Functional Description

Gas flow

- 1. If the V1 and V2 valves are closed, chamber a is under inlet pressure.
- 2. The min. pressure switch (option) is connected to chamber a via a borehole.
 - If the inlet pressure exceeds the reference value set in the pressure switch, the switch switches through to the automatic burner control.
- 3. The V1 and V2 valves open after they are enabled by the automatic burner control.
 - Gas flow through the chambers a and b is enabled.

Functional description of the valveregulator combination

Valves V1 and V2 can be controlled electrically and independent of each other. Each valve pretensions its own pressure spring when the plunger opens. If both valves are open, a pressure pulse is sent under the working diaphragm M. The intensity of this pressure pulse changes depending on the adjustable restrictor point D.

The comparison diaphragms S_1 for burner pressure p_{Br} and S_2 for blower pressure p_L are connected with each other via a rod. The ratio V can be set by shifting the bearing point.

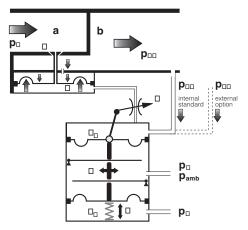
Zero point correction N acts on this rod mechanism via the air diaphragm S_2 . Ambient pressure p_{amb} or firing chamber pressure p_{F} must be applied to the area between the comparison diaphragms. The firing chamber pressure reduces the burner pressure at a ratio of V > 1. Changes in the equilibrium of forces result in a change in the flow cross-section

The pressure under the working diaphragm is re-adjusted. The regulator unit adapts the free valve cross-section depending on the new flow requirement.

Closing function

If the supply voltage of the solenoid coils of V1 and V2 valves is interrupted, the pressure springs close the valves in <1s.

Block diagram MBC...VEF



Pressure chambers

in flow direction

Burner pressure,

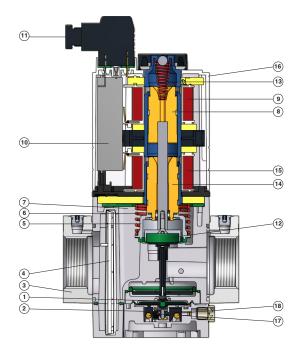
Ambient pressure

Blower pressure

outlet pressure:

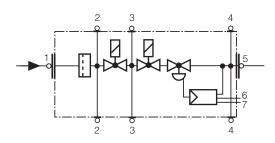
Inlet pressure

M	Working diaphragm	a, b
D	Restrictor	
S1	Servo diaphragm for burn-	p_1
	er pressure p _{BR}	p_{Br}
S2	Servo diaphragm for blow-	
	er pressure p	P_{amb}
R	Regulator disc	p _L



1	Pressure regulator unit	8	Plunger V1	15	Solenoid V2
2	Regulator spring	9	Solenoid V1	16	Solenoid housing
3	Connecting flange	10	Printed circuit board		Setting:
4	Micro-filter	11	Electrical connection	17	Gas-air ratio
5	Valve V1	12	Valve V2	18	Zero point
6	Closing spring V1	13	Closing spring V2		correction
7	Housing	14	Plunger V2		

Pressure taps, gas train diagram MBC...VEF



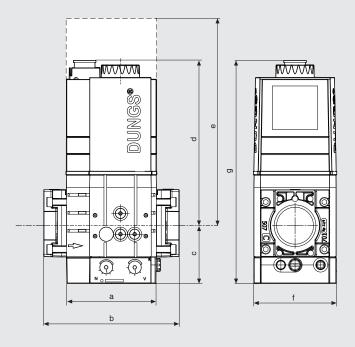
1, 2, 3, 4, 5 Screw plug G 1/8 6, 7 Seal plug G 1/8

Technical Data

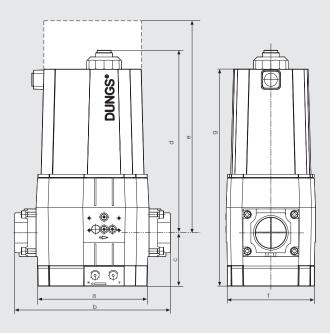
Nominal widths Flanges with pipe threads according to ISO 7/1 (DIN 2999)	MBC-300-VEF Rp 1/2, 3/4, 1, 1 1/4 and their combinations MBC-700-VEF Rp 1, 1 1/4, 1 1/2, 2 and their combinations Rp 1, 1 1/4, 1 1/2, 2 and their combinations
Max. operating pressure Inlet pressure range Guiding range Burner pressure range	360 mbar (36 kPa) p _e :15 mbar (1.5 kPa) to 360 mbar (36 kPa) p _L :0.4 mbar (0.04 kPa) to 100 mbar (10 kPa) p _{Br} :0.5 mbar (0.05 kPa) to 100 mbar (10 kPa)
Media	Gases of gas families 1, 2, 3 and other neutral gaseous media.
Ambient temperature	-15 °C to +70 °C (do not operate MBCVEF below 0 °C in liquefied gas systems. Only suitable for gaseous LPG; liquid hydrocarbons destroy the seal materials)
Dirt trap device	Micro-filter made of chopped-strand nonwoven fabric. Filter replaceable without removing fitting
Pressure switch	The system can be equipped with pressure switch types GW A5, NB A2, ÜB A2 as per DIN EN 1854. For further information, refer to data sheets "Pressure switch for DUNGS multiple actuators" 5.02
Servo pressure regulator	Servo pressure regulator with adjustable burner pressure, as per DIN EN 88 class A, group 2; EN 12067-1 Gas-air ratio control with adjustable ratio V as well as correction of zero point N and firing chamber pressure connection
Ratio setting range V	Ratio V = $p_{Br}/p_L = 0.4:13:1$, other ratios on request
Zero point correction N	possible
Solenoid valve V1, V2	Valves as per DIN EN 161 class A group 2; fast closing, fast opening
Measuring gas connection	G 1/8 DIN ISO 228, at inlet and outlet flanges, on both sides downstream of filter, between V1 and V2, downstream of V2 (fitting the pressure switch may partially exclude measuring gas connection)
Burner pressure monitor p _{Br}	Downstream of valve V2, pressure switch can be mounted on the side of the adapter
Pulse and connection lines	G 1/8 connection as per DIN ISO 228 for burner pressure (pBr; GAS), blower pressure (pL; AIR), firing chamber pressure (pF; combustion, atmosphere) Pulse and connection lines must be made of steel and conform to PN1, DN4. Condensate of pulse and connection lines may not enter the fitting. Strictly follow the operating and mounting instructions.
Voltage/frequency	~(AC) 50 - 60 Hz 230 V -15 % +10 %, other voltages on request. Other preferred voltages: ~(AC) 100 V - 120 V, =(DC) 24 V - 28 V
Electrical connection	Plug-in connection as per DIN EN 175301-803 for valves
Rating / power consumption Switch-on duration Switching cycles Degree of protection Radio interference suppression	at ~ (AC) 230 V; +20 °C: see type overview 100 % duty 60 per hour (30 s on/off) IP 54 as per IEC 529 (EN 60529) Interference level N
Materials of gas-conveying parts	Housing die-cast aluminium Diaphragms NBR basis Solenoid drive steel, aluminium
Installation position	Vertical with upright solenoid or horizontal with horizontal solenoid, as well as

Dimensions [mm]

MBC-300/700...VEF



MBC-1200...VEF



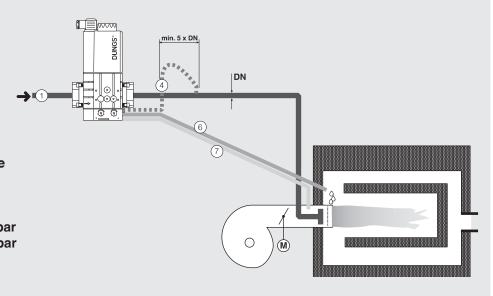
e = space required for replacing the solenoid

Mounting the pulse lines MBC...VEF

- 1 p_e: gas inlet pressure 15 -360 mbar
- 4 p_{Br}: burner pressure, gas 0.5 -100 mbar optional: external pulse standard: internal pulse
- 6 p_F: firing chamber pressure
 -20 mbar ... +50 mbar
 or atmosphere

 Δp_L max. = p_L - p_F = 100 mbar Δp_{B_F} max. = p_{B_F} - p_F = 100 mbar

7 p_L: blower pressure, air 0.4 -100 mbar



Pulse lines

Pulse lines 4, 6, 7 must be made of steel and correspond to ≥ DN 4 (diameter 4 mm), PN 1. Other pulse lines materials are permissible as per type test together with the burner.

Route pulse lines in such a way that **no condensate** can flow into the MBC...VEF.

Route pulse lines in such a way that they are protected against cracks and deformation. **Keep pulse lines short.**

Туре	Order no.	DN (Opening		Di	imer	nsion	ıs [m	m]		Solenoid	Switch- \	Weight
Version	230 VAC	Rp	time	а	b	С	d	е	f	g	no.	ing ops/h	[kg]
MBC-300-VEF	261 653	1/2 - 1 1/4	<1s	95	143	61	175	297	87	236	032/P	60	3.6
MBC-700-VEF	261 654	1 - 2	< 1 s	126	176	80	187	310	114	267	042/P	60	5.1
MBC-1200-VEF	243 413	1 - 2	<1s	204	281	96	328	530	161	424	052/P	60	16.8

	$P_{\text{max.}}$ [VA] for t = 3 s	P _{max.} [VA] operation
MBC-300-VEF	120	15
MBC-700-VEF	180	20
MBC-1200-VEF	200	30

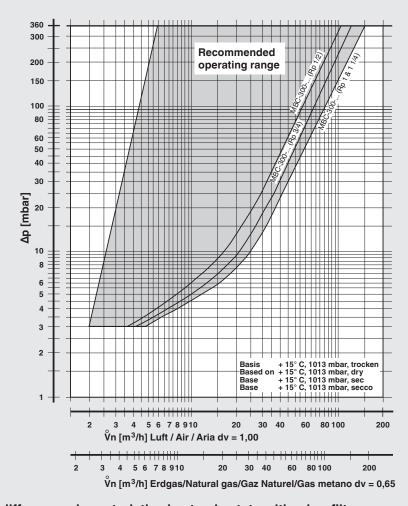
Flange for	Rp/NPT	Order no.			Order no.
MBC-300-VEF MBC-300-VEF MBC-300-VEF MBC-300-VEF	Rp 1/2 Rp 3/4 Rp 1 Rp 1 1/4	222 341 222 342 222 001 240 506	Line socket	3 pole + PE	210 319
MBC-700/1200-VEF MBC-700/1200-VEF MBC-700/1200-VEF MBC-700/1200-VEF	Rp 1 Rp 1 1/4 Rp 1 1/2 Rp 2	222 343 222 344 221 884 221 926	Adapter, pressure gaug Adapter GW A with (Adapter p _{Br} Adapter GW A on fla	G1/4	216 675 222 982 214 975 221 630
MBC-300-VEF MBC-300-VEF MBC-300-VEF MBC-300-VEF	NPT 1/2 NPT 3/4 NPT 1 NPT 1 1/4	222 371 222 368 221 999 231 718		in connection and s at be ordered separa	
MBC-700/1200-VEF MBC-700/1200-VEF MBC-700/1200-VEF MBC-700/1200-VEF	NPT 1 NPT 1 1/4 NPT 1 1/2 NPT 2	222 369 222 370 222 003 221 997			

MBCVEF key data	Application 1	Application 2
Gas Type of gas / specific density [kg/m³]		
Volumetric flow V [m³/h] V _{min.} V _{max.}		
Inlet 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, output range		
Time taken to re-adjust air volume restrictors from small load to large load [s]		
Starting load [m³/h]		
Company / address		1
Name / contact person		
Telephone		

Air density	Gas type	Density [kg/m³]	dv	f
Density of gas used	Natural gas City gas	0.81 0.58	0.65 0.47	1.24 1.46
$\mathring{V}_{used Gas} = \mathring{V}_{Air} x f$	Liquefied gas Air	2.08 1.24	1.67 1.00	0.77

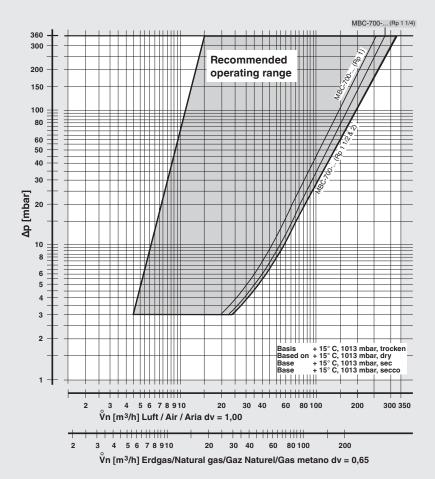
Volume flow pressure difference characteristics in steady state with microfilter.

MBC-300-VEF



Volume flow pressure difference characteristics in steady state with microfilter.

MBC-700-VEF



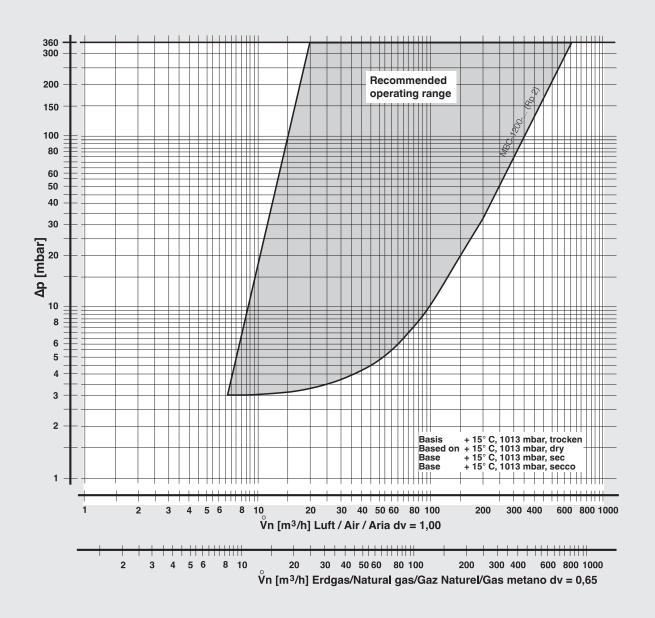
GasMultiBloc®
Combined regulator and safety valve
Infinitely variable air/gas ratio control mode

MBC-300-VEF MBC-700-VEF MBC-1200-VEF



Volume flow pressure difference characteristics in steady state with microfilter.

MBC-1200-VEF



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



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