

GasMultiBloc®

Combined servo pressure regulator and safety shut-off valves

MBC-300-SE
MBC-700-SE
MBC-1200-SE
MBC-300-N
MBC-700-N

DUNGS®
Combustion Controls

7.01

- Max. operating pressure 360 mbar (36 kPa)
- Compact design
- High flow rates
- Low weight
- Low power consumption
- Modulating mode
- Adjustable outlet pressure up to 300 mbar (30 kPa)
- Other servo pressure regulator variants:
 - zero pressure
 - constant pressure
- Mountable accessories
 - Pressure switch
 - VPS



Technical Description

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

- Dirt trap: Microfilter
- 2 Solenoid valves up to 360 mbar (36 kPa) to DIN EN 161 Class A Group 2, fast opening
- Servo pressure regulator unit to DIN EN 88 Class A Group 2
- Outlet pressure: 0 - 300 mbar (0 - 30 kPa)
- Precision regulation of outlet pressure
- For optimal outlet pressure stability
- Flanged joints with pipe threads to ISO 7/1 or NPT
- Easy to install
- Low weight

The modular system permits individual solutions with valve proving system, min./max. pressure switches and pressure limiters. High flow rates at low pressure differences.

Application

The servo pressure regulator permits optimal mixture formation in forced air burners and premix burners in conjunction with mechanical or electronic integrated gas-air regulation units; this applies to modulating and multi-stage floating operating mode. Suitable for gases of gas families 1,2,3 and other inert gaseous media.

Approvals

EC type testing certificate as per:

- EC-Gas Appliances Regulation
- EC-Pressure Equipment Directive

Approvals in other important gas consuming countries.

Functional Description

Gas flow

- 1.If valves V1 and V2 are closed, chamber a is subjected to inlet pressure.
- 2.The min. pressure switch (option) is connected to chamber a via a boring.

If the inlet pressure drops below the desired value set on the pressure switch, the switch opens in the direction of the gas burner control system.

- 3.After they are enabled by the gas burner control system, valves V1 and V2 open.

Gas flow is released through chambers a and b.

Functional description of the combined valve-regulator unit

Valves V1 and V2 can be controlled electrically and separately. Each valve preloads its own compression spring when the plunger opens. When the two valves are open, a pressure pulse runs below the working diaphragm. The size of the pressure pulse changes as a factor of the variable restrictor position D. The outlet pressure p_{br} acts against the setting spring force via the servo diaphragm until a force equilibrium is attained.

The opposite side of the servo diaphragm is subjected to ambient pressure p_{amb} .

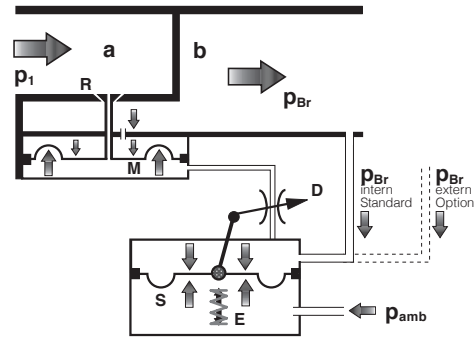
Changes in the equilibrium of forces lead to a change in flow cross-section.

The pressure under the working diaphragm re-adjusts itself. The regulator unit adapts the free valve cross-section to the new flow requirement.

Closing function

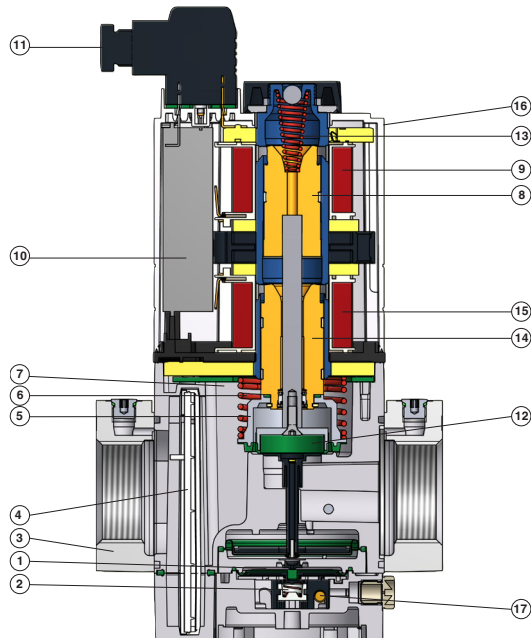
If there is an interruption in power supply to the solenoids of valves V1 and V2, they are closed by the compression springs within <1s.

Schematic diagram MBC...SE/N



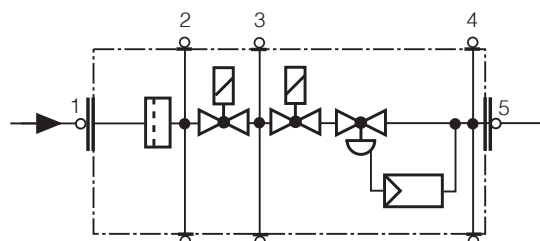
- | | |
|---|---|
| M | Working diaphragm |
| D | Restrictor |
| S | Servo diaphragm |
| E | Setting spring for outlet pressure p_{br} |
| R | Regulator disc |

- | | |
|-----------|-------------------------------------|
| a, b | Pressure chambers in flow direction |
| p_1 | Inlet pressure |
| p_{br} | Burner pressure, outlet pressure |
| p_{amb} | Ambient pressure |



- | | | | | | |
|---|-------------------------|----|-----------------------|----|-------------------------|
| 1 | Pressure regulator unit | 8 | Plunger V1 | 15 | Solenoid V2 |
| 2 | Regulator spring | 9 | Solenoid V1 | 16 | Solenoid housing |
| 3 | Connecting flange | 10 | PCB | 17 | Adjustment: |
| 4 | Micro-filter | 11 | Electrical connection | | - Gas pressure p_{br} |
| 5 | Valve V1 | 12 | Valve V2 | | |
| 6 | Closing spring V1 | 13 | Closing spring V2 | | |
| 7 | Housing | 14 | Plunger V2 | | |

Pressure taps, gas train diagram MBC...SE/N



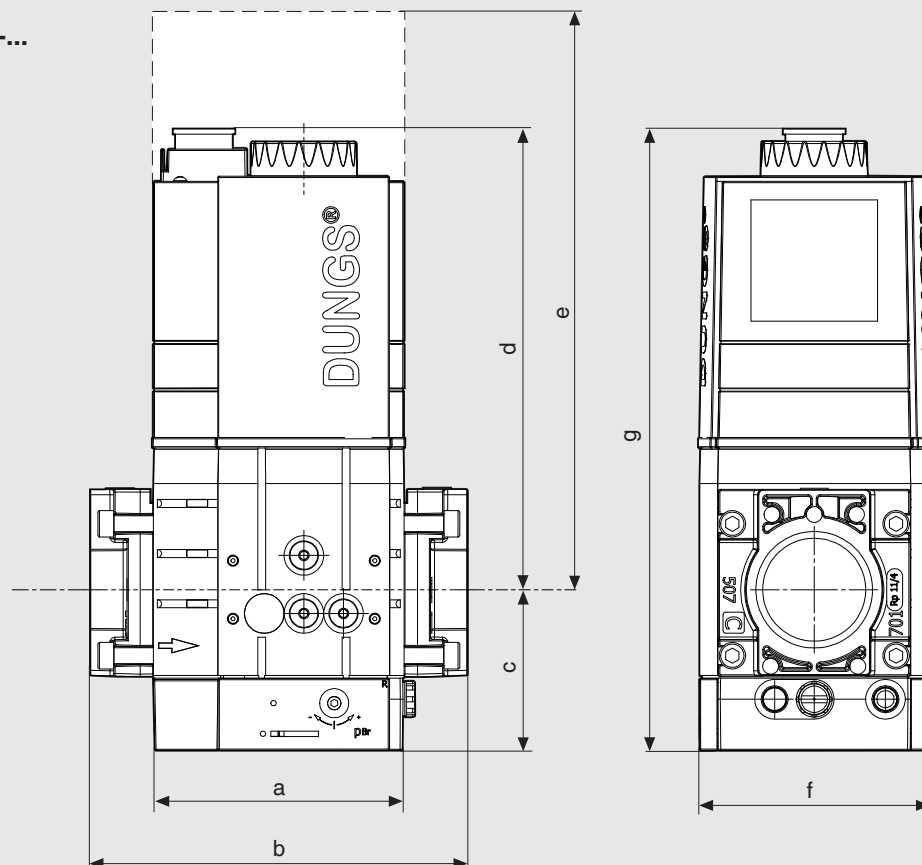
1, 2, 3, 4, 5 Screw plug G 1/8

Technical Data

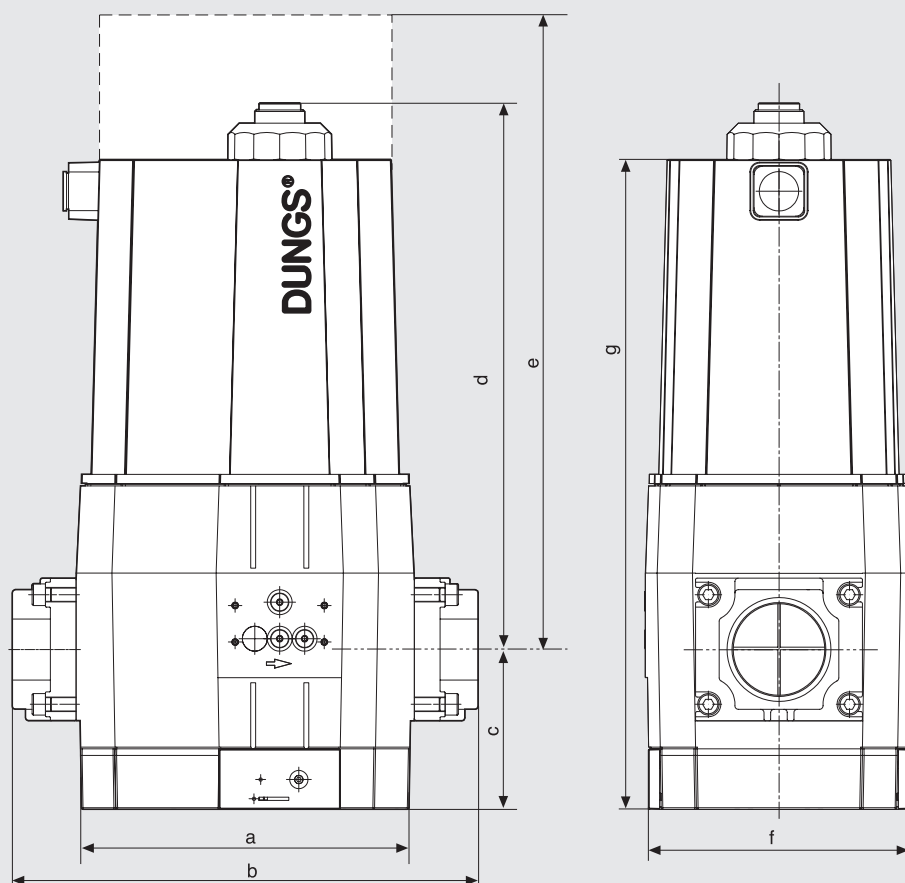
Nominal widths Flanges with pipe threads to ISO 7/1 (DIN 2999)	MBC-300-SE Rp 1/2, 3/4, 1, 1 1/4 and their combinations	MBC-700-SE Rp 1, 1 1/4, 1 1/2, 2 and their combinations	MBC-1200-SE Rp 1, 1 1/4, 1 1/2, 2 and their combinations
Max. operating pressure Inlet pressure ranges	360 mbar (36 kPa) S22/S82: $p_e = 15 - 360 \text{ mbar (1.5 - 36 kPa)}$ S302: $p_e = 35 - 360 \text{ mbar (3.5 - 36 kPa)}$ S02/N: $p_e = 15 - 100 \text{ mbar (1.5 - 10 kPa)}$		
Burner pressure ranges	S22: $p_{Br}: 4 - 20 \text{ mbar (0.4 - 2 kPa)}$ S82: $p_{Br}: 5 - 80 \text{ mbar (0.5 - 8 kPa)}$ S302: $p_{Br}: 30 - 300 \text{ mbar (3 - 30 kPa)}$ S02/N: $p_{Br}: 0 \pm 1 \text{ mbar (0} \pm 0.1 \text{ kPa)}$		
Media	Gases of gas families 1, 2, 3 and other inert gaseous media		
Ambient temperature	-15 °C up to +70 °C (in LPG plants, do not operate MBC...SE below 0 °C. 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	Types GW A5, NB A2, ÜB A2 as per DIN EN 1854 retrofitable. For further information refer to Data Sheets „Pressure switch for DUNGS multiple actuators“ 5.03 and 5.12		
Servo pressure regulator	Servo pressure regulator with adjustable burner pressure, as per DIN EN 88 Class A, Group 2 Versions for constant pressure and zero pressure available		
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 pressure switch may partially exclude measuring gas connection)		
Voltage/frequency	~(AC) 50 - 60 Hz 230 V -15 % +10 %, other voltages on request. Standard voltages: ~(AC) 100 V - 120 V, =(DC) 24 V - 28 V		
Electrical connection	Plug-in connection as per DIN EN 175301-803		
Rating/power consumption Switch-on duration Switching cycles Degree of protection Radio interference suppression	at ~ (AC) 230 V; +20 °C: see type summary 100 % ED 60 per hour (30 s on/off) IP 54 as per IEC 529 (EN 60529) Interference level N		
Materials of gas-conveying parts	Housing Diaphragms, seals Solenoid drive	die-cast aluminium on NBR base steel, aluminium	
Installation position	S22/S82/S302: Vertical with upright solenoid or horizontal with horizontal solenoid, as well as their spacers. S02/N: Vertical with upright solenoid		

Mounting dimensions [mm]

MBC-300/700-...



MBC-1200-...



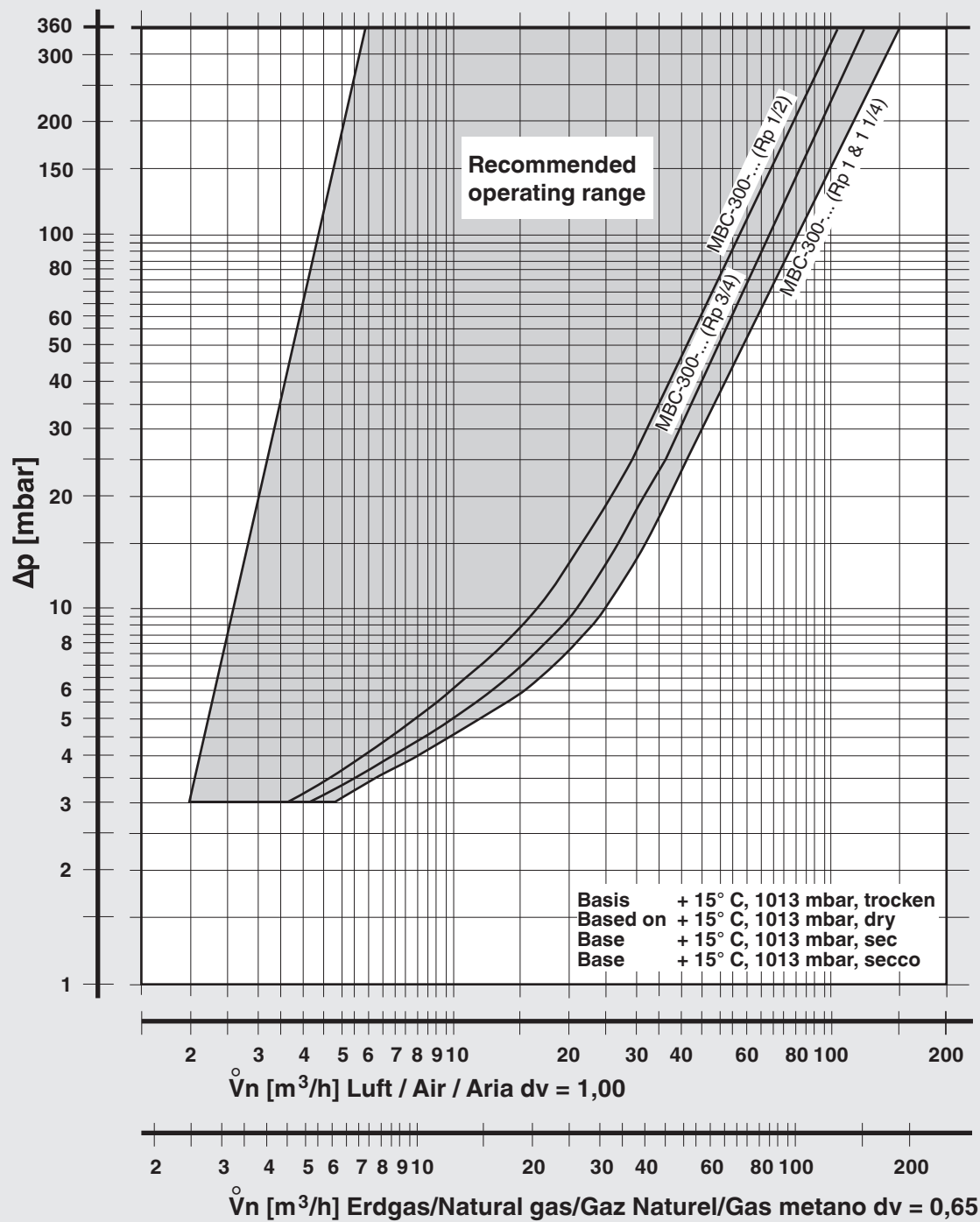
e = space requirement for solenoid replacement

Type Version	Order No. 230 VAC	DN Rp	Opening time	Mounting dimensions [mm]								Solenoid No.	Switch- ing ops/h	Weight [kg]
	a	b	c	d	e	f	g							
MBC-300-SE S22	261 645	1/2 - 11/4	< 1 s	95	143	61	175	297	87	236	032/2P	60	3.6	
MBC-300-SE S82	261 644	1/2 - 11/4	< 1 s	95	143	61	175	297	87	236	032/2P	60	3.6	
MBC-300-SE S302	261 647	1/2 - 11/4	< 1 s	95	143	61	175	297	87	236	032/2P	60	3.6	
MBC-300-N	on request	1/2 - 11/4	< 1 s	95	143	61	175	297	87	236	032/2P	60	3.6	
MBC-700-SE S22	261 646	1 - 2	< 1 s	126	176	80	187	310	114	267	042/2P	60	5.1	
MBC-700-SE S82	261 652	1 - 2	< 1 s	126	176	80	187	310	114	267	042/2P	60	5.1	
MBC-700-SE S302	261 648	1 - 2	< 1 s	126	176	80	187	310	114	267	042/2P	60	5.1	
MBC-700-N	on request	1 - 2	< 1 s	126	176	80	187	310	114	267	042/2P	60	5.1	
MBC-1200-SE S22	245 623	1 - 2	< 1 s	204	281	96	328	530	161	424	052/P	60	16.8	
MBC-1200-SE S82	243 408	1 - 2	< 1 s	204	281	96	328	530	161	424	052/P	60	16.8	
MBC-1200-SE S302	243 409	1 - 2	< 1 s	204	281	96	328	530	161	424	052/P	60	16.8	

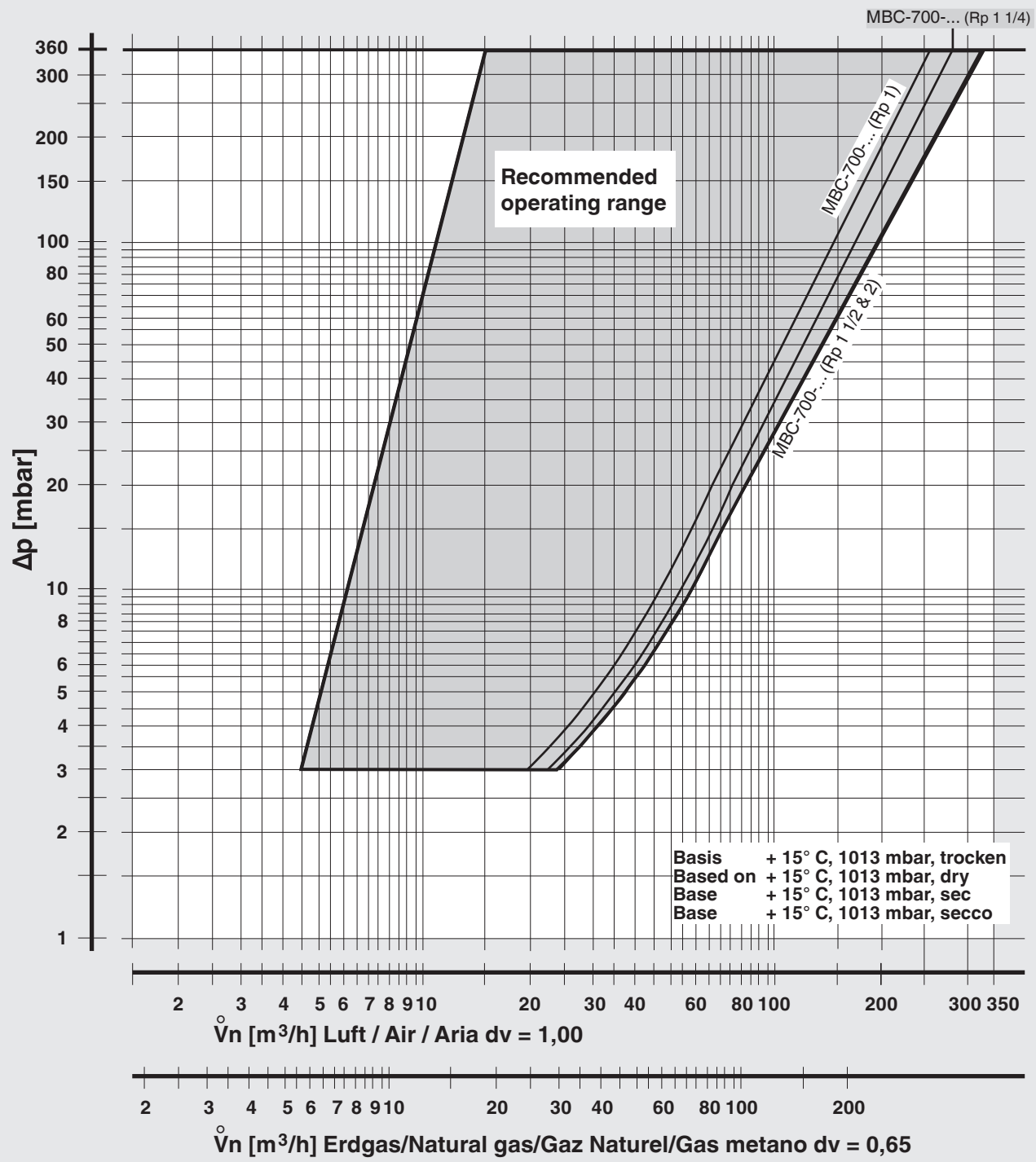
	P _{max.} [VA] for t = 3 s	P _{max.} [VA] Operation
MBC-300-...	120	15
MBC-700-...	180	20
MBC-1200-...	200	30

Flange for	Rp/NPT	Order No.	Order No.	
MBC-300-...	Rp 1/2	222 341	Line socket	3 pole + PE
MBC-300-...	Rp 3/4	222 342		
MBC-300-...	Rp 1	222 001		
MBC-300-...	Rp 1 1/4	240 506		
MBC 700/1200-...	Rp 1	222 343	Adapter, pressure gauge flange set G1/2	216 675
MBC 700/1200-...	Rp 1 1/4	222 344		
MBC 700/1200-...	Rp 1 1/2	221 884		
MBC 700/1200-...	Rp 2	221 926		
MBC-300-...	NPT 1/2	222 371	 Flanges, plug-in connection and system accessories must be ordered separately.	
MBC-300-...	NPT 3/4	222 368		
MBC-300-...	NPT 1	221 999		
MBC-300-...	NPT 1 1/4	231 718		
MBC 700/1200-...	NPT 1	222 369		
MBC 700/1200-...	NPT 1 1/4	222 370		
MBC 700/1200-...	NPT 1 1/2	222 003		
MBC 700/1200-...	NPT 2	221 997		

MBC-300-...



MBC-700-...



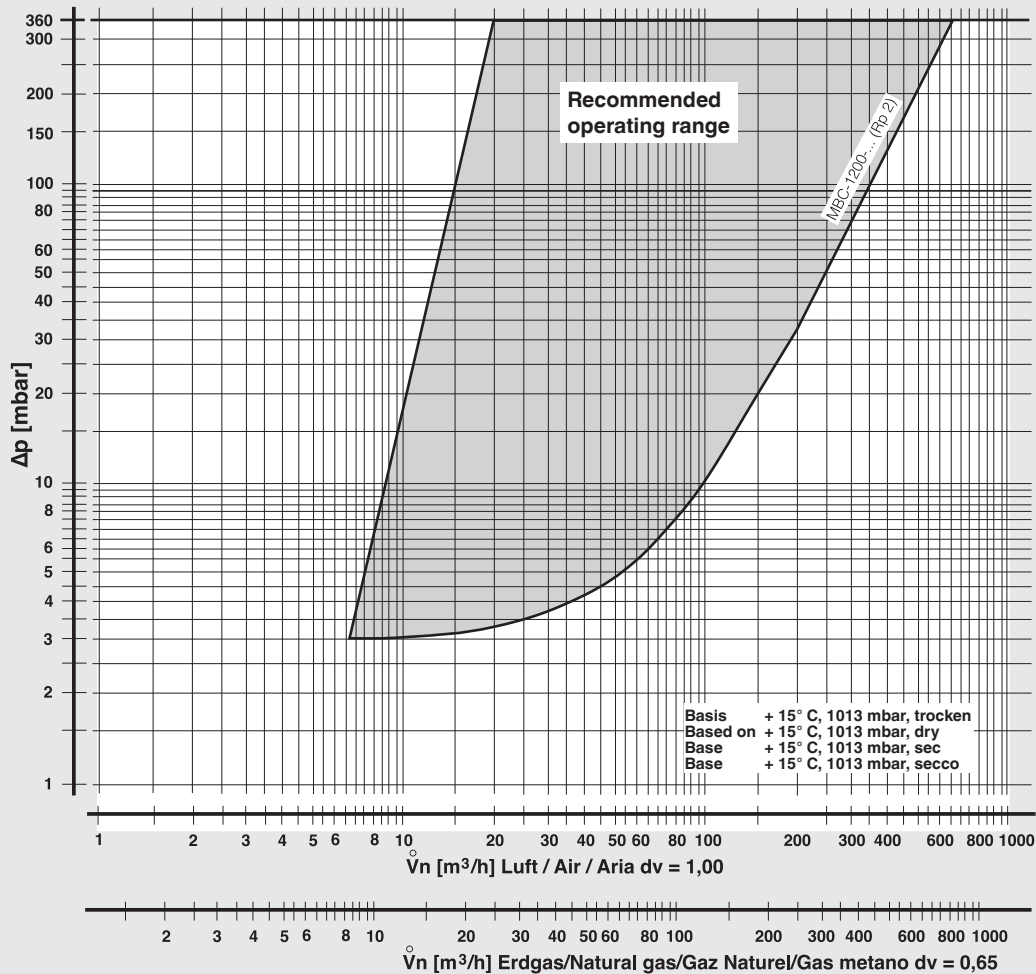
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Volume flow pressure difference characteristics in steady state with microfilter.

MBC-1200-...



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

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

Gas type	Density [kg/m³]	dv	f
Natural gas	0.81	0.65	1.24
Town gas	0.58	0.47	1.46
Liquid gas	2.08	1.67	0.77
Air	1.24	1.00	1.00

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

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