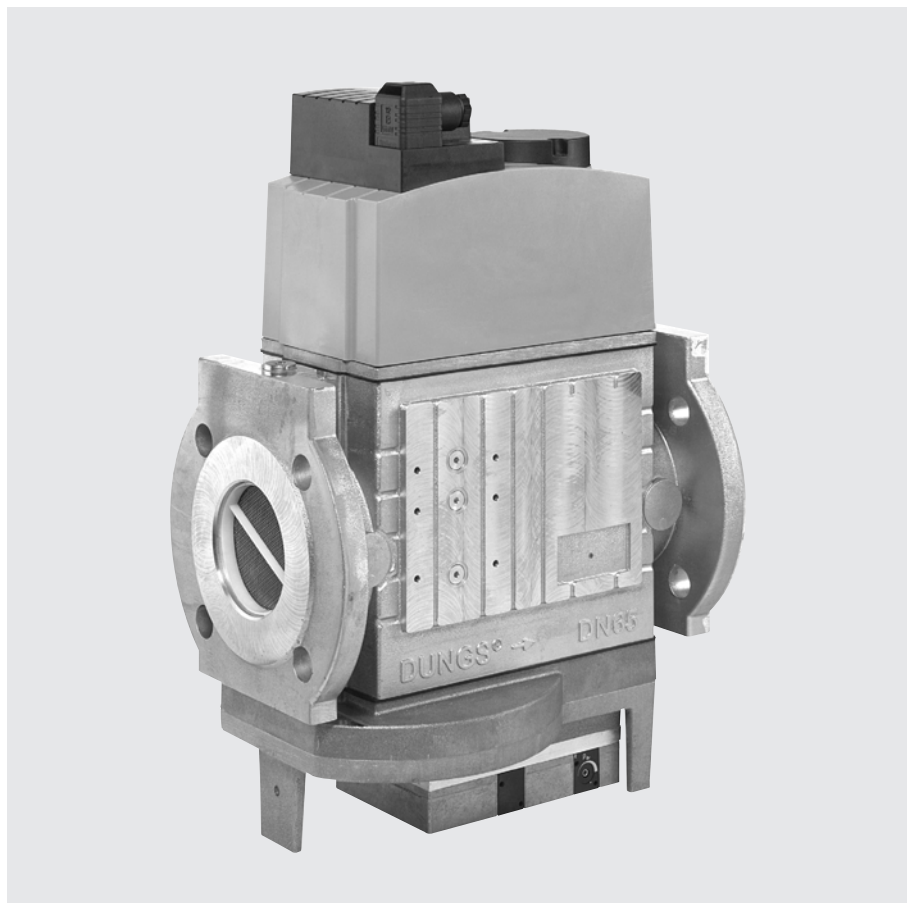


# Double solenoid valve Combined pressure regulator and safety valves Servo pressure regulator

**DUNGS**<sup>®</sup>  
Combustion Controls

**MBC-...-SE**  
**DN 65 - DN 100**

7.34



## Technical Description

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

- Solenoid valves up to 500 mbar (50 kPa) as per DIN EN 161 Class A Group 2
- Fine setting of outlet pressure
- Servo pressure regulator unit as per DIN EN 88 Class A Group 2
- Setpoint spring replaced
- Outlet pressure: 4 - 300 mbar (0.4 - 30 kPa)
- Internal stepping lines for optimised outlet pressure stability, external as an option.
- Flange connection as per EN 1097-1
- Easy to install
- Low weight

As this system has a modular design, we can offer individual solutions with valve testing system, mini/maxi pressure switch and pressure limiter. Despite the compact

design, high flow rates can be achieved at low pressure difference.

## Application

The servo pressure regulator permits optimal mixture formation in forced air burners and premix burners in combination with mechanical or electronic gas/air regulation units. This applies to modulating and multi-stage variable operating modes. Suitable for gases belonging to gas families 1, 2, 3 and other inert gaseous media.

## Approvals

EU type test approval as per EU Gas Appliance Directive:

MBC-...-SE CE-0085 BO 0236

EU type test approval as per EU Pressure Equipment Directive:

MBC-...-SE CE0036

Approvals in other important gas-consuming countries.

## Functional Description

### Gas flow

1. If the valves V1 and V2 are closed, chamber a is subjected to inlet pressure up to the double seat of the valve V1.
2. The min. pressure switch (option) is connected to chamber a via a bore hole. If the inlet pressure exceeds the desired value set on the pressure switch, the pressure switch connects through to the gas burner control system.
3. The valves V1 and V2 open after they are enabled by the gas burner control system. Gas flow through chambers a, b and c is enabled.

### Functional description of the combined valve-regulator unit at valve V1

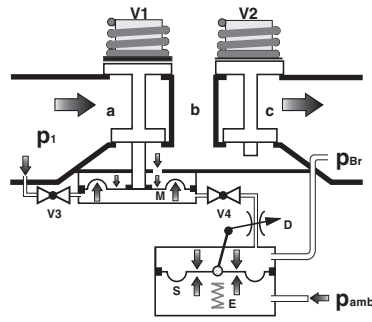
A regulator (pressure regulator unit) with admission pressure compensation is integrated in valve V1. The plunger V1 is not connected to the valve disc unit. When the plunger opens, it preloads the compression spring and releases the regulator unit. When the plunger closes, the closing pressure is applied directly to the valve discs of the regulator unit. Valves V1 and V2 are driven together electrically. When valve V3 is in the closed position, it closes off the pressure chamber under the working diaphragm M so that this chamber is not affected by the inlet pressure  $p_1$  in chamber a. The plunger of valve V1 controls the valve V3. The pressure under the working diaphragm M depends on a variable flow cross-section D. The outlet pressure  $p_{Br}$  counters the force of the setting spring E via the servo diaphragm S until an equilibrium of forces is achieved.

Ambient pressure  $p_{amb}$  is applied to the opposite side of the servo diaphragm. If there are any changes in the equilibrium of forces, the flow cross-section D after the valve V4 is changed. The pressure under the working diaphragm is re-adjusted. The regulator unit V1 adapts the free valve cross-section to the new flow requirement.

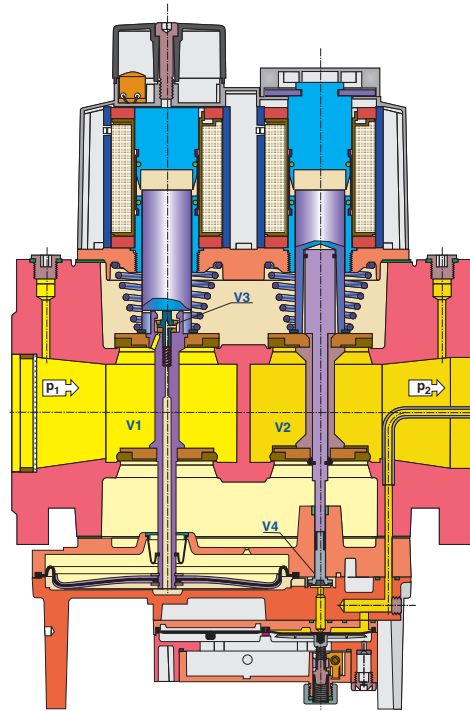
### Functional description valve V2

The plunger of the valve V2 is connected to the valve disc unit. When the plunger opens, it preloads the compression spring. The valve V2 opens completely without any delay. The valve V4 is actuated by the valve V2. When the valve V4 is in the closed position, it closes off the area under the working diaphragm M so that this area is not affected by the burner pressure.

## Schematic diagram MBC-...-SE

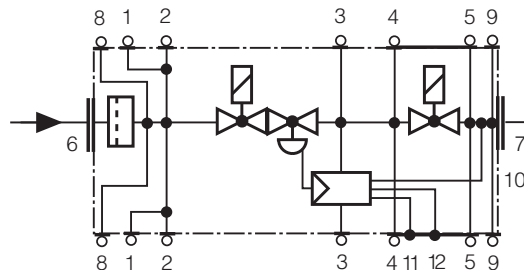


V1	Main valve 1	a, b, c	Pressure chambers in flow direction
V2	Main valve 2		
V3	Control valve 3	$p_1$	Inlet pressure
V4	Control valve 4	$p_{Br}$	Burner pressure, outlet pressure
		$p_{amb}$	Ambient pressure
M	Working diaphragm		
D	Restrictor	2, 3, 4, 5	Screw plug G 1/8
S	Servo diaphragm	1, 6	Screw plug G 1/4
E	Setting spring for outlet pressure $p_{Br}$	7	Stepping line $p_{Br}$



### Pressure taps, gas train diagram

#### MBC-...-SE



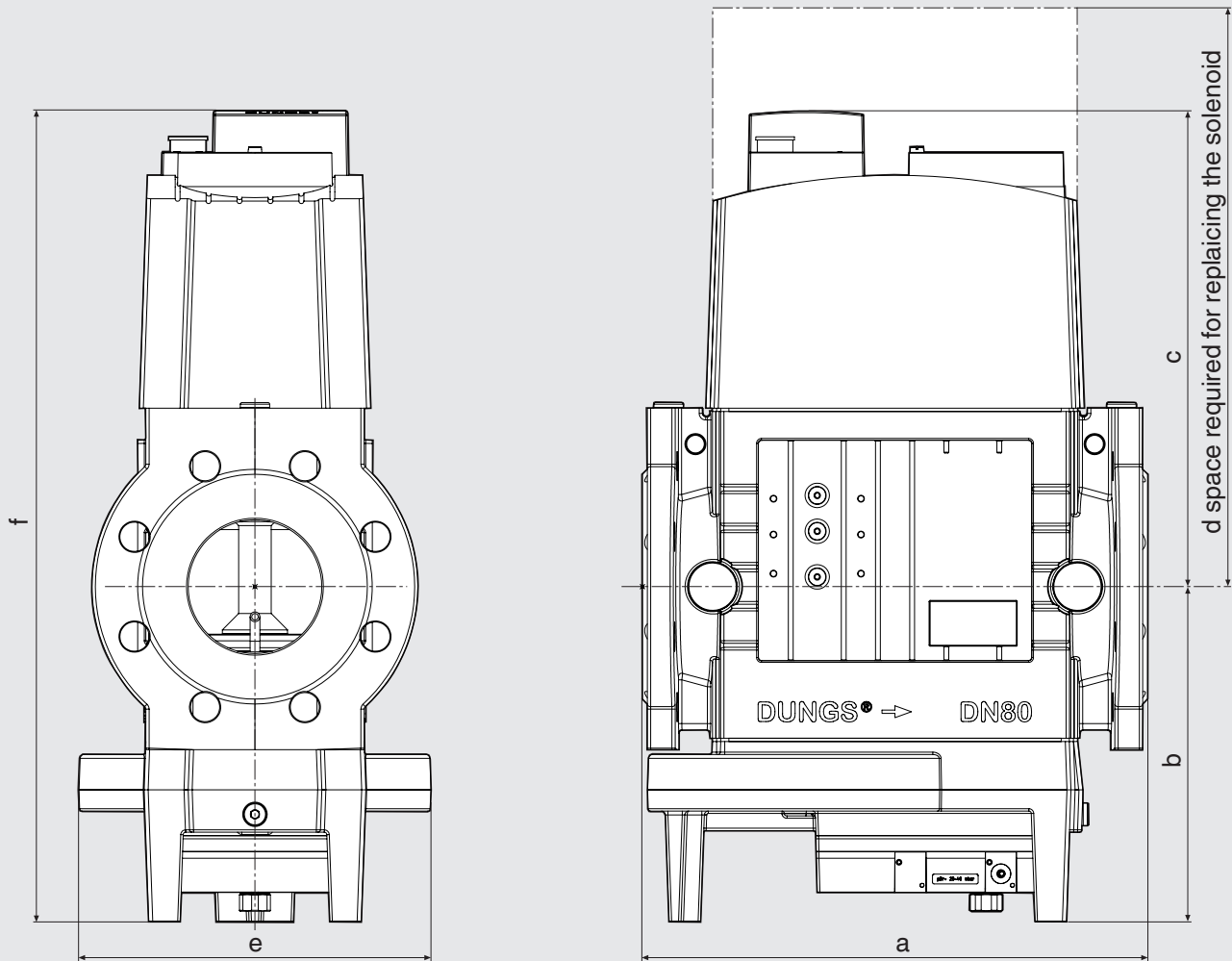
### Closing function

If there is an interruption in the power supply to the solenoid coils of the main valves V1 and V2, they are closed by the compression springs in <math><1\text{s}</math>.

## Technical Data

Nominal widths	DN 65 80 100 Connection flanges as per EN 1092-1 for welding neck flanges as per DIN 2633 (PN16) DN 65 - DN 100 Length as per DIN 3202 part 1, series F1.																				
<b>Max. operating overpressure Inlet pressure ranges</b>	<b>500 mbar (50 kPa)</b> <b><math>p_e = 15 - 500 \text{ mbar (1.5 - 50 kPa)}</math></b>																				
<b>Burner pressure ranges</b>	<b>Standard: <math>p_{Br} : 20 - 40 \text{ mbar (2 - 4 kPa)}</math></b> <b>Option: See spring table, page 4</b>																				
Media	Gases belonging to gas families 1, 2, 3 and other inert gaseous media.																				
Ambient temperature	-15 °C to +60 °C																				
Dirt trap device	Filter <b>A suitable gas filter must be connected upstream.</b> For further information, see data sheet 11.02 "Gas and air filter".																				
Pressure switch	The system can be equipped with pressure switch types GW A5, ÜB A2, NB A2 as per DIN EN 1854. In case of DN 65 GW...A5 cannot be mounted on item 2. For further information, see data sheets 5.07 and 5.02 "Pressure switches for DUNGS multiple actuators".																				
Servo pressure regulator	Pressure regulator with admission pressure compensation, sealed with valve V1 when switched off, as per DIN EN 88 Class A Servo pressure regulator with adjustable burner pressure																				
Solenoid valve V1, V2	Valve as per DIN EN 161 Class A Group 2; fast-closing, fast-opening S..0: driven together; S..2: driven separately																				
Measuring gas connection	G 1/4 DIN ISO 228; at inlet and outlet flanges, G 1/8 on both sides after the filter, on both sides between V1 and V2, after V2 (if the pressure switch is assembled, it may not be possible to install a measuring gas connection in some cases)																				
Stepping line	G 1/8 connection as per DIN ISO 228 for burner pressure ( $p_{Br}$ ; gas) <b>Stepping line for optional, external pulse must be made of steel and conform to PN1, DN4. The condensate from the stepping line may not enter the fitting. The operating and assembly instructions must be strictly followed.</b>																				
Voltage / frequency	~ (AC) 50 - 60 Hz 230 V -15 % +10 % Standard voltages: 110 - 120 VAC, 24 - 28 VDC																				
Electrical connection	Plug-in connection as per DIN EN 175301-803																				
Power / current draw Switch-on duration Degree of protection	at ~ (AC) 230 V; +20 °C: see type overview 100 % ED IP 54 as per IEC 529 (EN 60529)																				
Material used for gas-conveying parts	Housing Diaphragms, seals Solenoid drive	cast aluminium NBR-based, Silopren (silicone rubber) aluminium, steel, brass																			
Installation position	Vertical with upright solenoid																				
Power / current draw at ~(AC) 230 V, + 20 °C all indications are effective values	<table border="1"> <thead> <tr> <th>Type</th> <th>Starting power approx. [W]</th> <th>Holding power approx. [W]</th> <th>Break-away starting current [A]</th> <th>Holding current [A]</th> </tr> </thead> <tbody> <tr> <td>MBC-1900...- 65</td> <td>2 x 95</td> <td>2 x 20</td> <td>2 x 0.54</td> <td>2 x 0.20</td> </tr> <tr> <td>MBC-3100...- 80</td> <td>2 x 125</td> <td>2 x 25</td> <td>2 x 0.54</td> <td>2 x 0.20</td> </tr> <tr> <td>MBC-5000...- 100</td> <td>2 x 125</td> <td>2 x 25</td> <td>2 x 0.54</td> <td>2 x 0.20</td> </tr> </tbody> </table>	Type	Starting power approx. [W]	Holding power approx. [W]	Break-away starting current [A]	Holding current [A]	MBC-1900...- 65	2 x 95	2 x 20	2 x 0.54	2 x 0.20	MBC-3100...- 80	2 x 125	2 x 25	2 x 0.54	2 x 0.20	MBC-5000...- 100	2 x 125	2 x 25	2 x 0.54	2 x 0.20
Type	Starting power approx. [W]	Holding power approx. [W]	Break-away starting current [A]	Holding current [A]																	
MBC-1900...- 65	2 x 95	2 x 20	2 x 0.54	2 x 0.20																	
MBC-3100...- 80	2 x 125	2 x 25	2 x 0.54	2 x 0.20																	
MBC-5000...- 100	2 x 125	2 x 25	2 x 0.54	2 x 0.20																	

**Dimensions MBC-...-SE**  
**DN 65 - DN 100**



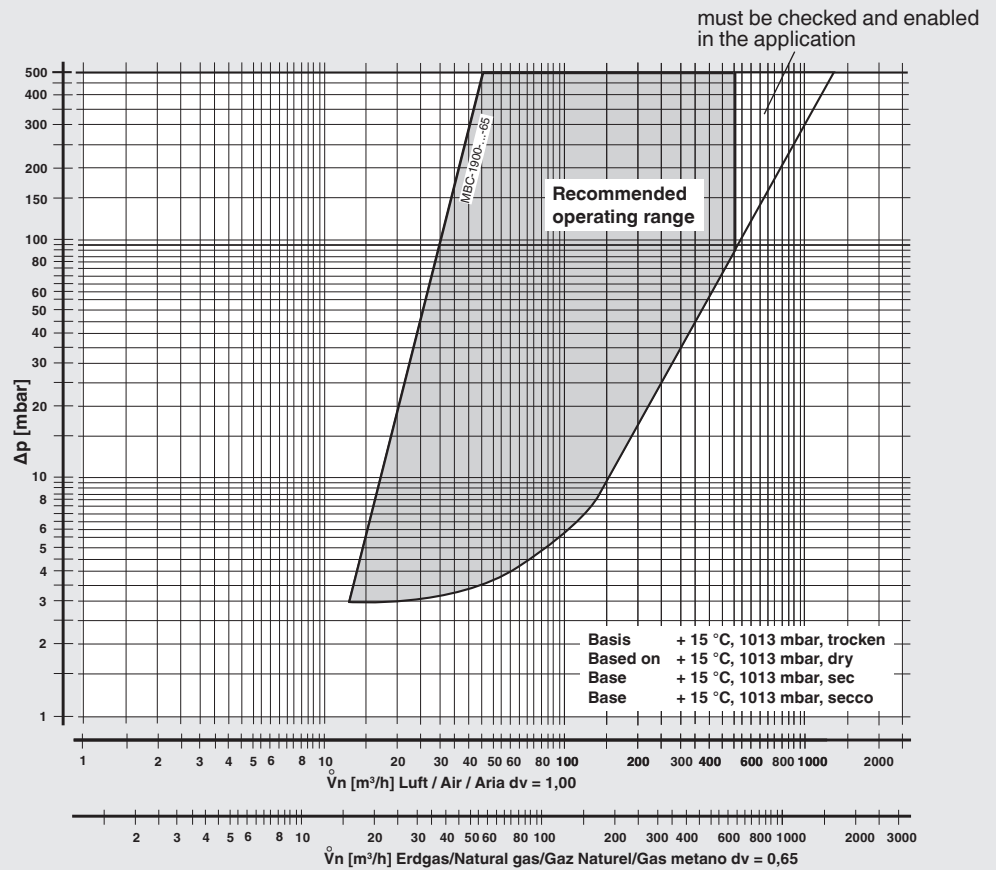
Type	Ordering No. 230 VAC	DN	P <sub>max.</sub> [W]	I <sub>max.</sub> ~[A]	Opening time	Dimensions [mm]					Solenoid No.	Switching operations/h	Weight [kg]
						a	b	c	d	e			
MBC-1900-SE-65	241 741	DN 65	190	1.8	< 1 s	290	168	246	365	196	414 1511/2P	60	18.4
MBC-3100-SE-80	244 295	DN 80	250	1.8	< 1 s	310	190	292	450	216	482 1611/2P	60	26.0
MBC-5000-SE-100	244 298	DN 100	250	1.8	< 1 s	350	235	329	500	250	564 1711/2P	60	33.3

**Spring MBC-...-SE DN 65-100**

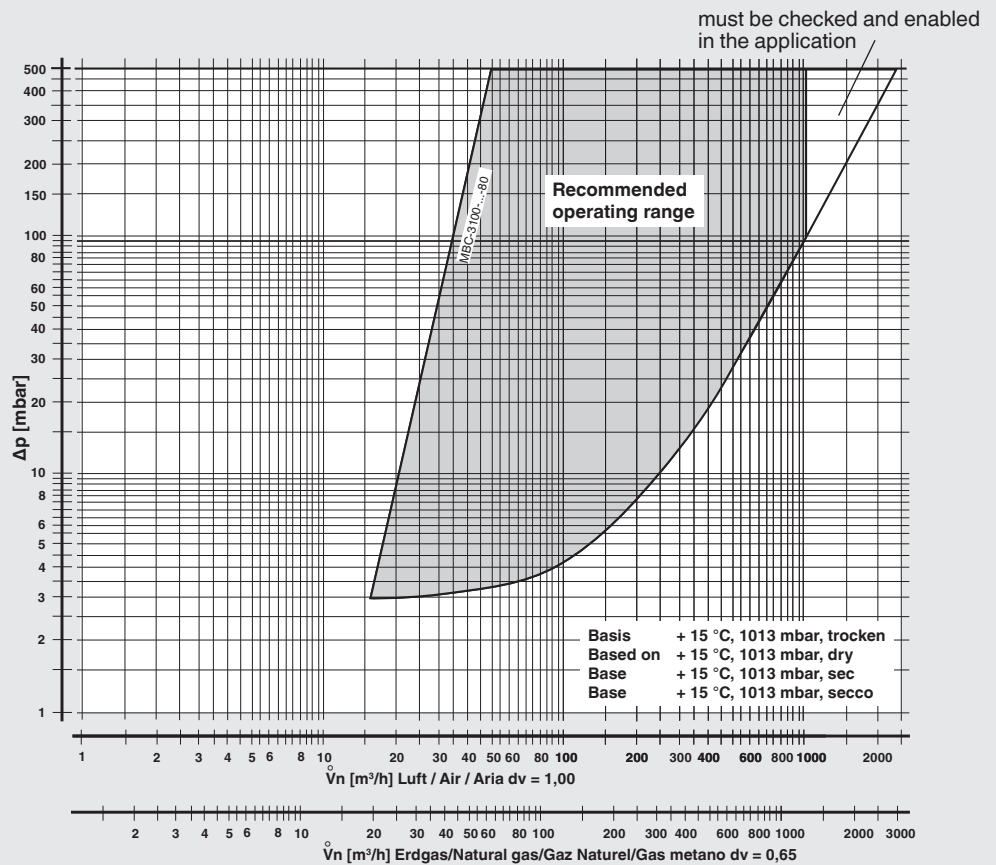
Control range [mbar]	4 - 20	20 - 40	40 - 80	80 - 150
Colour of the spring	---	red	black	green
Ordering-Nr.	246 021	246 022	246 023	246 024

Characteristic curves for volume flow pressure difference in steady state with filter. A suitable gas filter must be used.

### MBC-1900-SE-65



### MBC-3100-SE-80



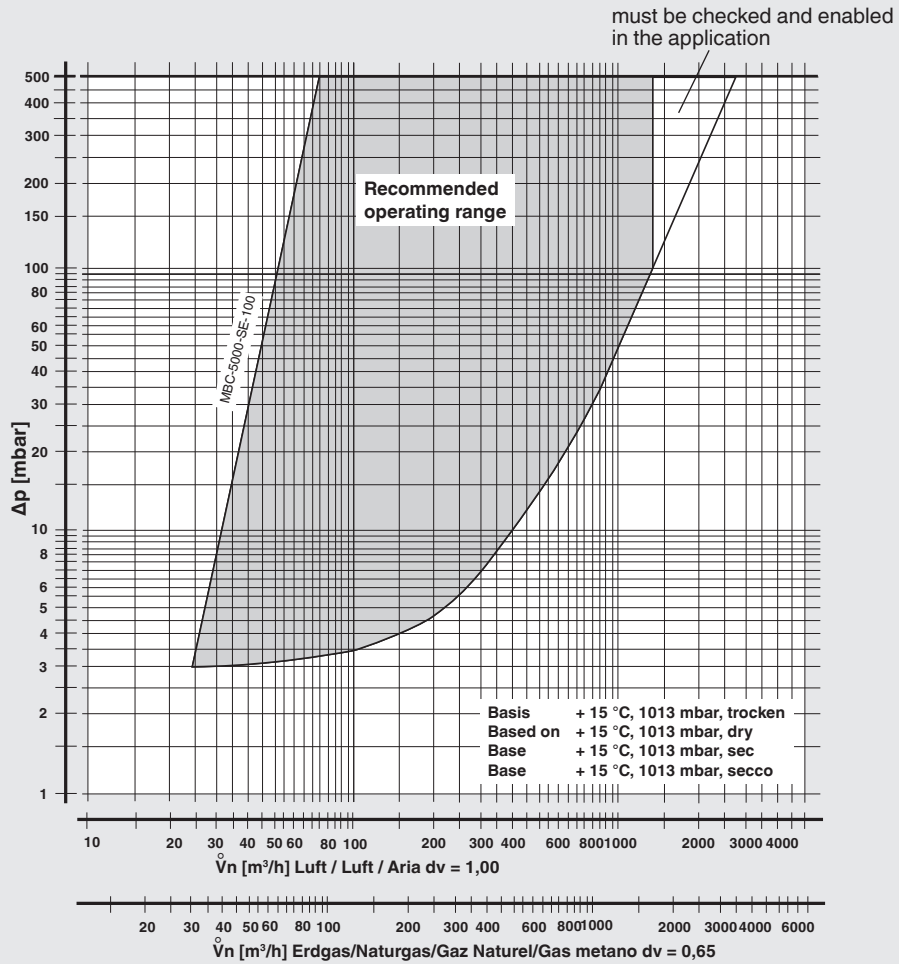
$$f = \sqrt{\frac{\text{Air density}}{\text{Density of the gas used}}}$$

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

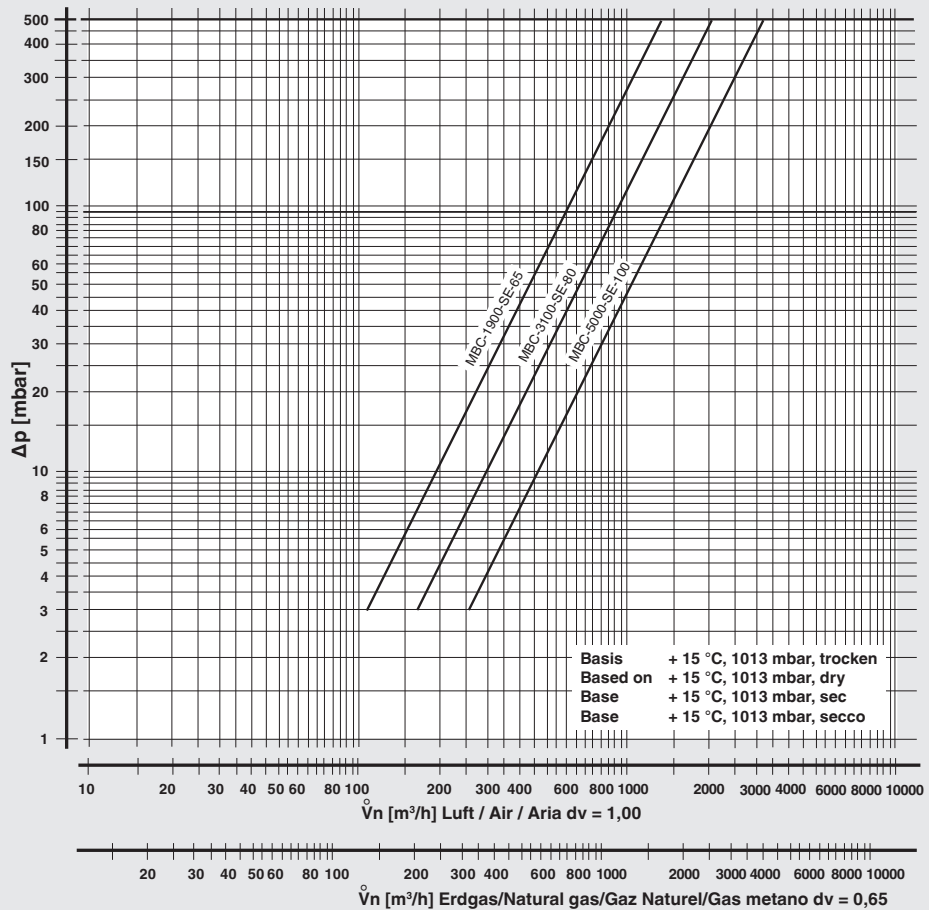
Gas type	Density [kg/m³]	f
Natural gas	0.81	1.24
Town gas	0.58	1.46
Liquefied gas	2.08	0.77
Air	1.24	1.00

Characteristic curves for volume flow pressure difference in steady state with filter. A suitable gas filter must be used.

**MBC-5000-SE-100**



**mechanically open**



System accessories	Further information
<b>Pressure switch</b> ÜB...A2, NB...A2 GW...A5	Data sheet 5.07 Data sheet 5.02
<b>Gas filter</b> GF/1, GF/3, GF	Data sheet 11.02
<b>Valve testing system</b> VPS 504 S04	Data sheet 8.10
<b>Motorised butterfly valve</b> DMK DN...	Data sheet 11.11

 The MBC-SE has been designed for direct assembly of DUNGS system accessories and supplementary equipment.

	Ordering no.
<b>Line socket 3 pole + PE</b>	<b>210 319</b>
<b>Adapter, pressure gauge flange set G1/2</b>	<b>216 675</b>
<b>Ignition gas flange G 3/4</b>	<b>219 006</b>
<b>Cover, on the side</b>	<b>219 005</b>

 Flanges, plug-in connection and system accessories must be ordered separately.

Double solenoid valve  
Regulator and safety combination  
Servo pressure regulator

MBC-...-SE  
DN 65 - DN 100

Key data



Key data	Application 1	Application 2
<b>Gas</b> Type of gas / specific density [kg/m <sup>3</sup> ]		
<b>Volumetric flow V [m<sup>3</sup>/h]</b> V <sub>min.</sub>  V <sub>max.</sub>		
<b>Inlet pressure p<sub>e</sub> [mbar]</b> p <sub>e,min.</sub>  p <sub>e,max.</sub>		
<b>Burner pressure p<sub>Br</sub> [mbar]</b> at V <sub>min.</sub>  at V <sub>max.</sub>		
<b>Control range, power range</b>		
<b>Time taken to re-adjust volume restrictors from small load to large load [s]</b>		
<b>Starting load [m<sup>3</sup>/h]</b>		
<b>Company / address</b>		
<b>Name / person in charge</b>		
<b>Telephone</b>		

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

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