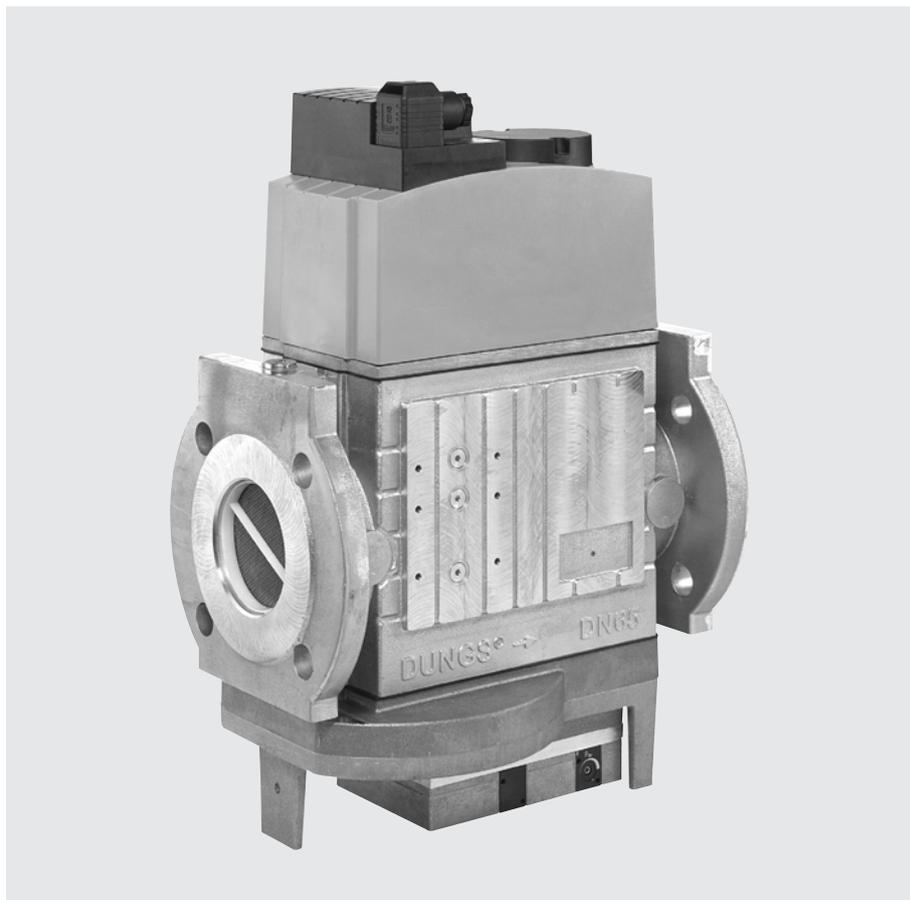


Double solenoid valve Combined pressure regulator and safety valves Servo pressure regulator

DUNGS[®]
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

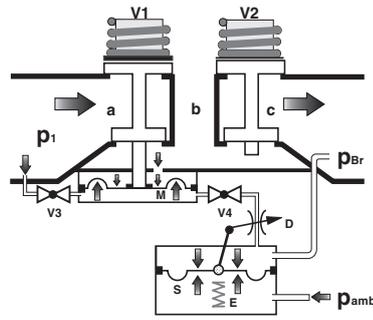
A regulator (pressure regulator unit) with admission pressure compensation is integrated in valve V1. The plunger V1 is not connected to the valve disc unit. When the plunger opens, it preloads the compression spring and releases the regulator unit. When the plunger closes, the closing pressure is applied 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.

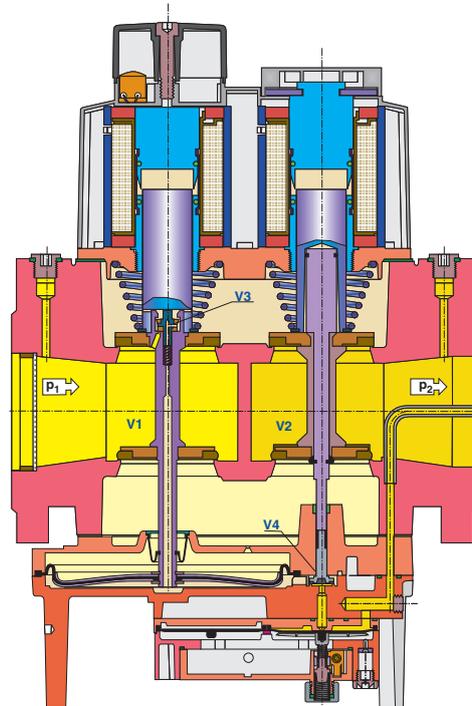
Functional description valve V2

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

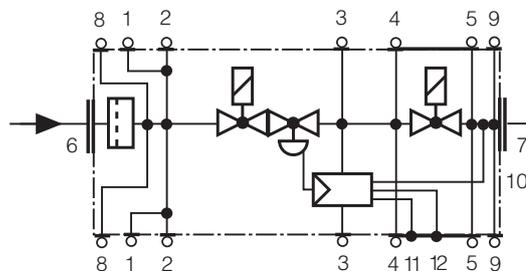


| | | | |
|----|---|------------|-------------------------------------|
| V1 | Main valve 1 | a, b, c | Pressure chambers in flow direction |
| V2 | Main valve 2 | | |
| V3 | Control valve 3 | p_1 | Inlet pressure |
| V4 | Control valve 4 | p_{Br} | Burner pressure, outlet pressure |
| | | p_{amb} | 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



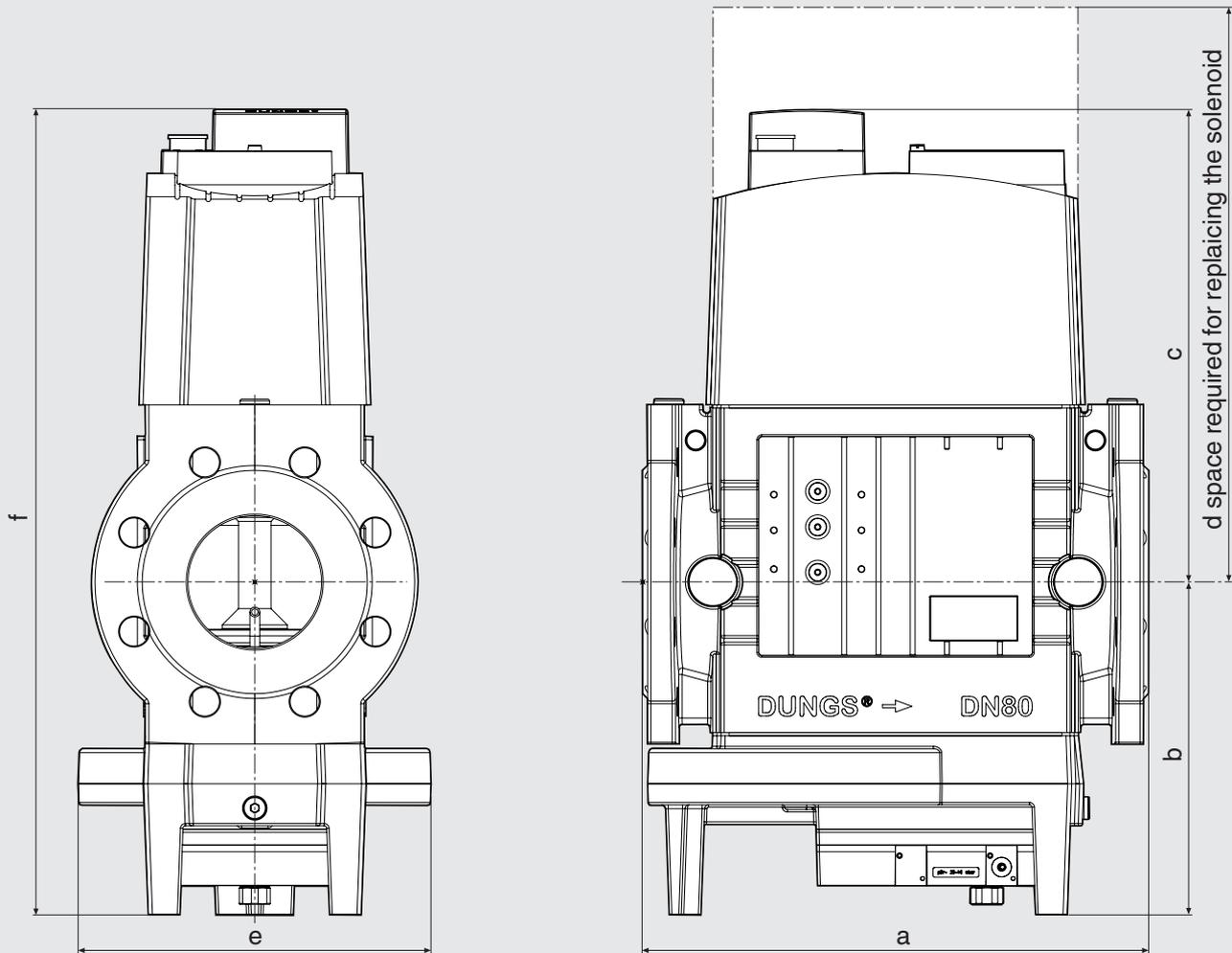
Closing function

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. | | | | | | | | | | | | | | | | | | | | |
|---|--|---------------------------|---------------------------------|---------------------------|---------------------------------|---------------------|-----------------|--------|--------|----------|----------|-----------------|---------|--------|----------|----------|------------------|---------|--------|----------|----------|
| Max. operating overpressure Inlet pressure ranges | 500 mbar (50 kPa) $p_e = 15 - 500 \text{ mbar (1.5 - 50 kPa)}$ | | | | | | | | | | | | | | | | | | | | |
| Burner pressure ranges | Standard: $p_{Br} : 20 - 40 \text{ mbar (2 - 4 kPa)}$ Option: See spring table, page 4 | | | | | | | | | | | | | | | | | | | | |
| 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 A suitable gas filter must be connected upstream. 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) 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. | | | | | | | | | | | | | | | | | | | | |
| 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 cast aluminium Diaphragms, seals NBR-based, Silopren (silicone rubber) Solenoid drive 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



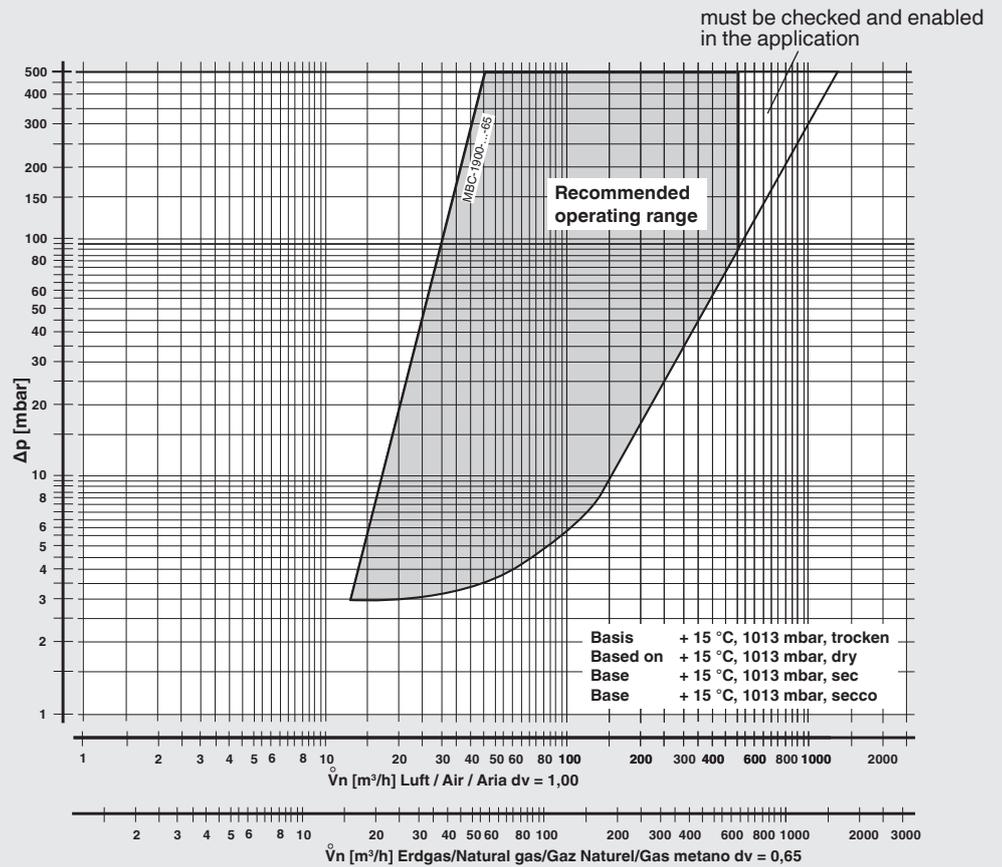
| Type | Ordering No. 230 VAC | DN | P _{max.} [W] | I _{max.} ~[A] | Opening time | Dimensions [mm] | | | | | Solenoid No. | Switching operations/h | Weight [kg] |
|-----------------|-------------------------|--------|--------------------------|---------------------------|--------------|--------------------|-----|-----|-----|-----|-----------------|---------------------------|----------------|
| | | | | | | 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

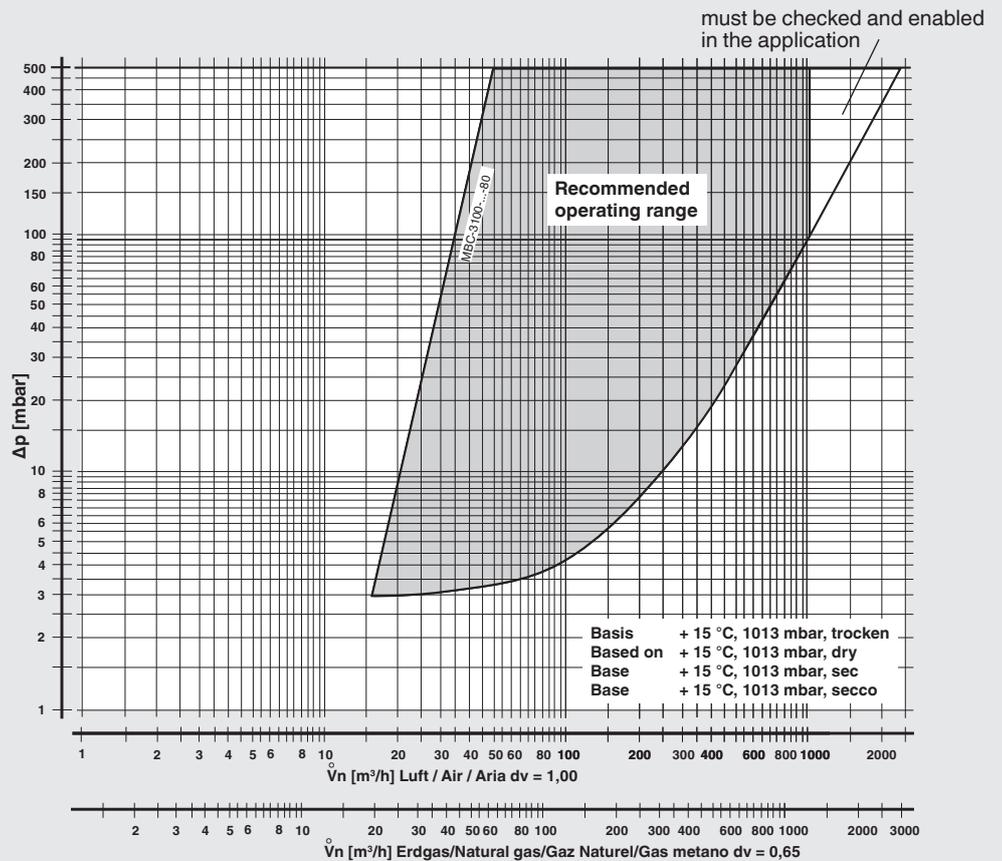
| | | | | |
|-------------------------|---------|---------|---------|----------|
| Control range [mbar] | 4 - 20 | 20 - 40 | 40 - 80 | 80 - 150 |
| Colour of the spring | --- | red | black | green |
| Ordering-Nr. | 246 021 | 246 022 | 246 023 | 246 024 |

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



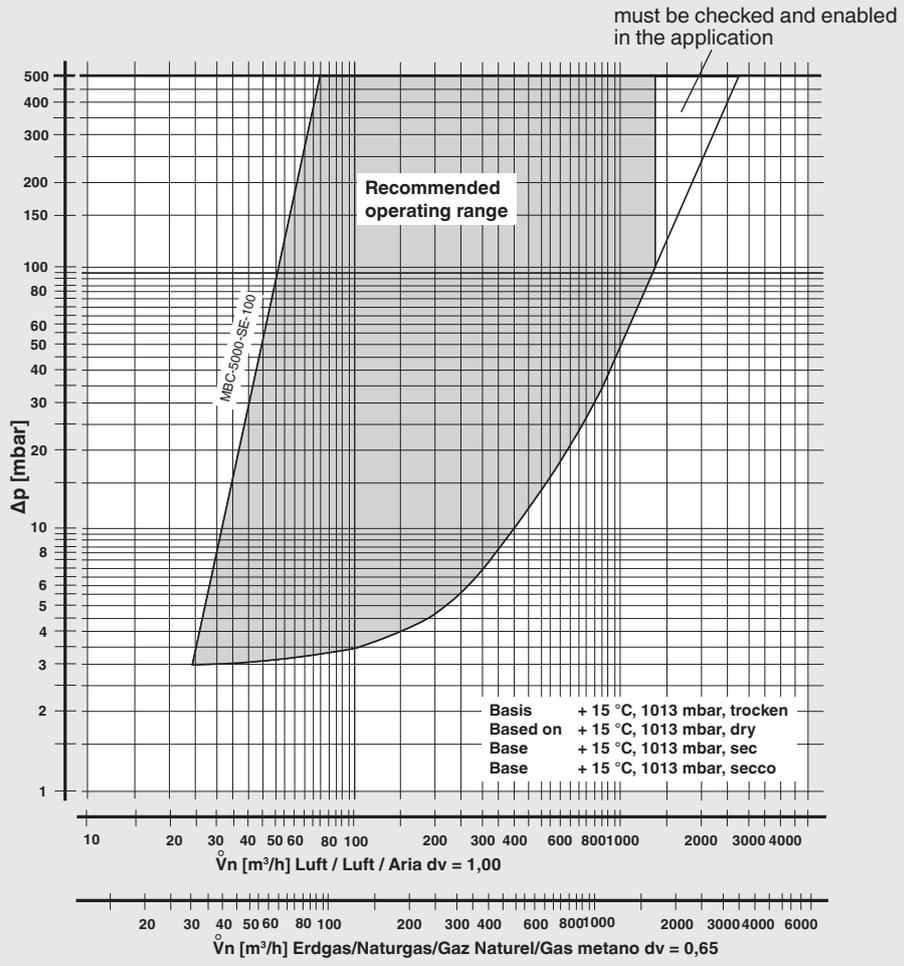
$$f = \sqrt{\frac{\text{Air density}}{\text{Density of the gas used}}}$$

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

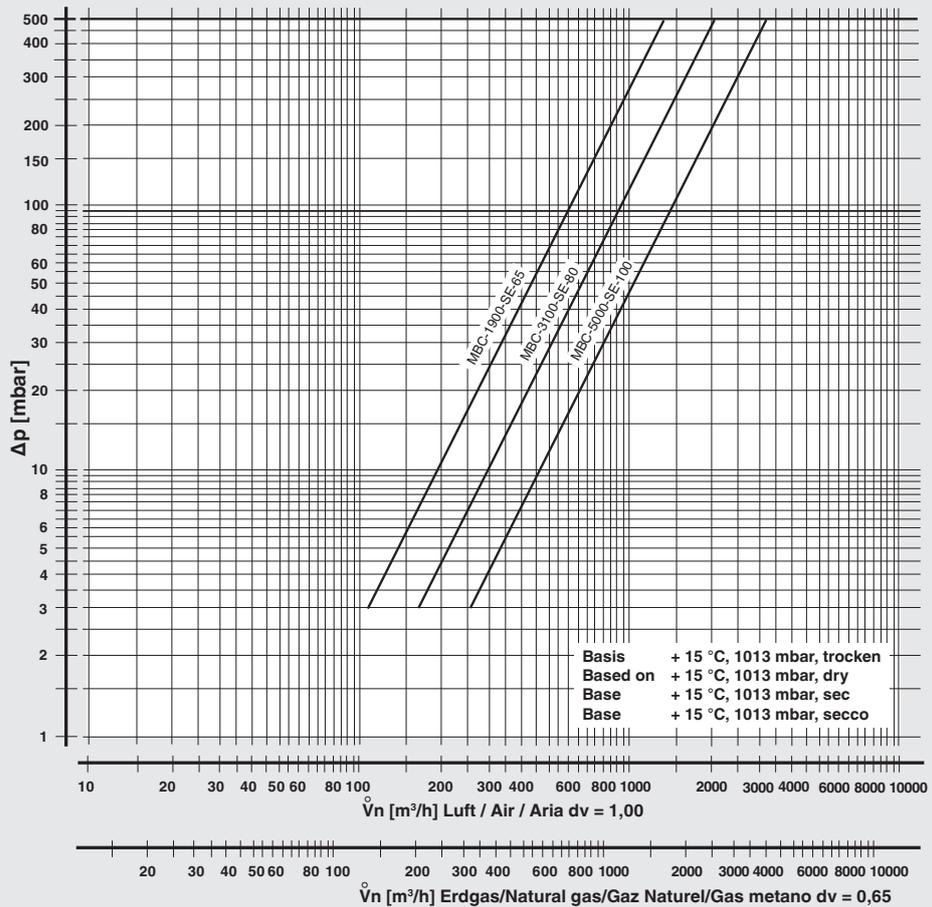
| Gas type | Density [kg/m³] | f |
|---------------|-----------------|------|
| Natural gas | 0.81 | 1.24 |
| Town gas | 0.58 | 1.46 |
| Liquefied gas | 2.08 | 0.77 |
| Air | 1.24 | 1.00 |

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 |
|---|------------------------------------|
| Pressure switch ÜB...A2, NB...A2 GW...A5 | Data sheet 5.07 Data sheet 5.02 |
| Gas filter GF/1, GF/3, GF | Data sheet 11.02 |
| Valve testing system VPS 504 S04 | Data sheet 8.10 |
| Motorised butterfly valve DMK DN... | Data sheet 11.11 |

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

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

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