

Gas Pressure Regulator RMG 408



PRODUCT INFORMATION

**Serving the Gas Industry
Worldwide**



Gas Pressure Regulator RMG 408

Application, Characteristics, Technical Data


Application

- for gas supply to municipal distribution systems, industrial and power plants
- suitable for outlet pressure control, inlet pressure control, outlet and differential pressure control (flow control)
- for natural gas acc. to DVGW G 260, for further gases on request.

Characteristics

- regulator with integrated noise attenuating device
- easy maintenance due to interchangeable cartridge (plug-in arrangement)
- large inlet pressure range
- different valve seat diameters possible

| TECHNICAL DATA | | | |
|---|--------------------------------|--------|-------|
| max. inlet pressure PS | 16 bar | | |
| Set range W_d | 0,020 to 0,500 bar | | |
| with pilot RMG 610, measuring unit „N“ (RS10d, version „MN“) | 0,100 to 3,500 bar | | |
| with pilot RMG 610, measuring unit „M“ (RS10d, version „MM“) | 1,000 to 15,00 bar | | |
| with pilot RMG 650 | 0,02 to 0,03 bar | AC 10 | SG 30 |
| accuracy class (AC) and lock-up pressure class (SG) | >0,03 to 0,10 bar | AC 10 | SG 20 |
| | >0,10 to 0,50 bar | AC 5 | SG 10 |
| | >0,50 to 2,50 bar | AC 2,5 | SG 10 |
| | >2,50 to 15,0 bar | AC 1 | SG 5 |
| | class of lock-up pressure zone | SZ 2,5 | |
| minimum pressure drop Δp_{min} | 0,20 to 1,00 bar | | |
| Anschlussart | flange PN 16 | | |

| TECHNICAL DATA | | | | | | | | | | | |
|----------------------------------|---|-----------------|-----------------|---------------------------|-------------------------|-------|------------------------|------------|--------------------------------|----------|--------------------------------|
| material | <table border="0"> <tr> <td>main valve body</td> <td>aluminium alloy</td> </tr> <tr> <td>main valve internal parts</td> <td>steel, aluminium, brass</td> </tr> <tr> <td>pilot</td> <td>aluminium alloy, steel</td> </tr> <tr> <td>diaphragms</td> <td>Perbunan (rubber-like-plastic)</td> </tr> <tr> <td>sealings</td> <td>Perbunan (rubber-like-plastic)</td> </tr> </table> | main valve body | aluminium alloy | main valve internal parts | steel, aluminium, brass | pilot | aluminium alloy, steel | diaphragms | Perbunan (rubber-like-plastic) | sealings | Perbunan (rubber-like-plastic) |
| main valve body | aluminium alloy | | | | | | | | | | |
| main valve internal parts | steel, aluminium, brass | | | | | | | | | | |
| pilot | aluminium alloy, steel | | | | | | | | | | |
| diaphragms | Perbunan (rubber-like-plastic) | | | | | | | | | | |
| sealings | Perbunan (rubber-like-plastic) | | | | | | | | | | |
| temperature range class 2 | -20 °C to +60 °C | | | | | | | | | | |
| function and strength | acc. to DIN EN 334 respectively DIN EN 14382 | | | | | | | | | | |
| ex-zone | Mechanical components of regulator do not contain a potential ignition source, thus do not fall in limits of ATEX 95 (94/9/EG). (Used electronic accessories comply with ATEX-demands.) | | | | | | | | | | |
| DIN-DVGW-reg.-no. | NG - 4101 AS 0161 | | | | | | | | | | |
| CE mark acc. to PED |  | | | | | | | | | | |

| GERÄTEKENNGRÖSSE | | | | | | |
|------------------|------------------------------|--|--|---|---------|---------|
| size | valve seat diameter in mm | K _G value in m ³ /h | KG value with metal sponge in m ³ /h | max. inlet pressure p _{umax} for actuator* | | |
| | | | | Größe 1 | Größe 2 | Größe 3 |
| DN 50/100 | 30 | 450 | | 16 | 16 | |
| | 37 | 650 | | 16 | 16 | |
| | 52 | 1150 | 800 | 10 (16) | 16 | |
| DN 80/100 | 37 | 750 | | | 16 | |
| | 52 | 1400 | 1000 | | 16 | |
| | 81 | 2400 | 1900 | | 16 | |
| DN 100/200 | 52 | 1700 | 1200 | | 16 | 16 |
| | 81 | 3400 | 2650 | | 16 | 16 |
| | 102 | 3800 | 3300 | | 10 (16) | 16 |

*) IMPORTANT: The restriction of the inlet pressure p_{umax} is not due to reasons of strength, but serves for control accuracy. The regulating and closing precision categories are stipulated in DVGW type tests. The values are guaranteed under the following conditions:
 „The inlet pressure may exceed the p_{umax}-figure stated in the table twice its value, at the most limited by nominal pressure level, provided that the inlet pressure changes Δp_u are not higher than the p_{umax}-figure stated in the table.“

Example for DN 50/100 with valve seat diameter 52 mm:

The max. inlet pressure p_{umax} is 10 bar acc. to the table. The highest value is calculated as twice its value of inlet pressure p_{umax} = 20 bar, but the pressure rating reduces this value to 16 bar (this value is given in brackets).

The permissible inlet pressure deviation of Δp_u = 10 bar can be used as follows:

The inlet pressure may deviate e.g. from p_{u1} = 2 bar to p_{u2} = 12 bar, or e.g. from p_{u1} = 6 bar to p_{u2} = 16 bar in compliance with the stipulated regulating and closing precision categories.

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Safety cut-off valve

A safety cut-off valve type RMG 720 or RMG 721 can be incorporated in the main valve body optionally and even afterwards.

Depending on the required cut-off setpoints the following safety cut-off actuators can be used:

| CONTROL DEVICE K4, K5 AND K6 (SAFETY CUT-OFF ACTUATOR TYPE RMG 720) | | | | | | | | |
|---|-----------------|------------|--------------------|--|---|--|--|--------------------------------------|
| measuring unit | setpoint spring | | | overpressure cut-off* | | underpressure cut-off* | | response precision category ** AG |
| | No. | colour | wire dia. in mm | specific setpoint range W_{dso} (bar) | min. differential between response pressure and normal service pressure* Δp_{wo} (bar) | specific setpoint range W_{dsu} (bar) | min. differential between response pressure and normal service pressure Δp_{wu} (bar) | |
| | | | | | | | | |
| K4 | 2 | bright red | 3,2 | 0,040 ... 0,100 | 0,020 | | | 5/2,5 |
| | 3 | dark red | 3,6 | 0,080 ... 0,250 | 0,030 | | | 2,5 |
| | 4 | black | 4,5 | 0,200 ... 0,500 | 0,060 | | | 2,5/1 |
| | 5 | light blue | 1,1 | | | 0,005 ... 0,020 | 0,010 | 20/5 |
| | 6 | black | 1,4 | | | 0,015 ... 0,060 | 0,020 | 5 |
| K5 | 3 | dark red | 3,6 | 0,200 ... 0,800 | 0,100 | | | 2,5 |
| | 4 | black | 4,5 | 0,600 ... 1,500 | 0,200 | | | 2,5/1 |
| | 5 | light blue | 1,1 | | | 0,015 ... 0,050 | 0,030 | 20/5 |
| | 6 | black | 1,4 | | | 0,040 ... 0,120 | 0,060 | 5 |
| K6 | 3 | dark red | 3,6 | 0,600 ... 2,000 | 0,200 | | | 2,5 |
| | 4 | black | 4,5 | 1,500 ... 4,500 | 0,400 | | | 2,5/1 |
| | 5 | light blue | 1,1 | | | 0,040 ... 0,120 | 0,060 | 20/5 |
| | 6 | black | 1,4 | | | 0,120 ... 0,300 | 0,120 | 5 |

*) Note: if control devices are used with both overpressure and underpressure release, then the min. gap between the two setpoints p_{dso} and p_{dsu} has to be at least 10% larger than the sum of the two differential values ($\Delta p_{wo} + \Delta p_{wu}$).

$$p_{dso} - p_{dsu} \geq 1.1 (\Delta p_{wo} + \Delta p_{wu})$$

**) The higher response precision category is valid for the first half, the lower response precision category is valid for the second half of the setting range.

| SAFETY CUT-OFF ACTUATORS K10A, K12, K13, K16 AND K17 (SAFETY CUT-OFF VALVE TYPE RMG 721) | | | | | | | | |
|--|-----------------|-------------|--------------------|-------------------------|--|-------------------------|---|--------------------------------------|
| measuring unit | setpoint spring | | | overpressure cut-off* | | underpressure cut-off* | | response precision category ** AG |
| | No. | colour | wire dia. in mm | specific setpoint range | min. differential between response pressure and normal service pressure* | specific setpoint range | min. differential between response pressure and normal service pressure | |
| | | | | W_{dso} (bar) | Δp_{wo} (bar) | W_{dsu} (bar) | Δp_{wu} (bar) | |
| K10a | 1 | yellow | 3,2 | 0,050 ... 0,100 | 0,030 | | | 10/5 |
| | 2 | light red | 3,6 | 0,080 ... 0,250 | 0,050 | | | 10/5 |
| | 3 | dark red | 4,5 | 0,200 ... 0,500 | 0,100 | | | 5/2,5 |
| | 4 | white | 4,75 | 0,400 ... 1,500 | 0,250 | | | 5/2,5 |
| | 5 | light blue | 1,1 | | | 0,010 ... 0,015 | 0,012 | 20 |
| | 6 | white | 1,2 | | | 0,014 ... 0,040 | 0,030 | 20/5 |
| | 7 | black | 1,4 | | | 0,035 ... 0,120 | 0,060 | 5 |
| K12 | 1 | light green | 5,0 | 0,500 ... 1,500 | 0,250 | | | 5/2,5 |
| | 2 | yellow | 6,3 | 1,000 ... 3,000 | 0,500 | | | 2,5/1 |
| | 3 | light red | 8,0 | 2,000 ... 8,000 | 1,000 | | | 2,5/1 |
| | 4 | white | 2,0 | | | 0,100 ... 0,200 | 0,200 | 20 |
| | 5 | light blue | 2,8 | | | 0,150 ... 0,800 | 0,400 | 10/5 |
| | 6 | black | 3,6 | | | 0,500 ... 2,000 | 0,800 | 10/5 |
| K13 | 2 | yellow | 6,3 | 4,000 ... 14,00 | 2,000 | | | 2,5/1 |
| | 3 | light red | 8,0 | 7,000 ... 30,00 | 4,000 | | | 2,5/1 |
| | 4 | white | 2,0 | | | 0,500 ... 1,200 | 0,800 | 10 |
| | 5 | light blue | 2,8 | | | 0,700 ... 3,500 | 1,500 | 10/5 |
| | 6 | black | 3,6 | | | 1,500 ... 6,000 | 3,500 | 10/5 |
| | K16 | 0 | blue | 3,2 | 0,800 ... 1,500 | 0,100 | | |
| 1 | | black | 4,5 | 1,000 ... 5,000 | 0,200 | | | 2,5/1 |
| 2 | | grey | 5,0 | 2,000 ... 10,00 | 0,400 | | | 1 |
| 3 | | brown | 6,3 | 5,000 ... 20,00 | 0,800 | | | 1 |
| 4 | | red | 7,0 | 10,00 ... 40,00 | 1,200 | | | 1 |
| K17 | 2 | grey | 5,0 | | | 4,000 ... 10,00 | 0,400 | 5 |
| | 3 | brown | 6,3 | | | 5,000 ... 20,00 | 0,800 | 5 |
| | 4 | red | 7,0 | | | 10,00 ... 40,00 | 1,200 | 5 |

*) Note: if control devices are used with both overpressure and underpressure release, then the min. gap between the two setpoints p_{dso} and p_{dsu} has to be at least 10% larger than the sum of the two differential values ($\Delta p_{wo} + \Delta p_{wu}$).

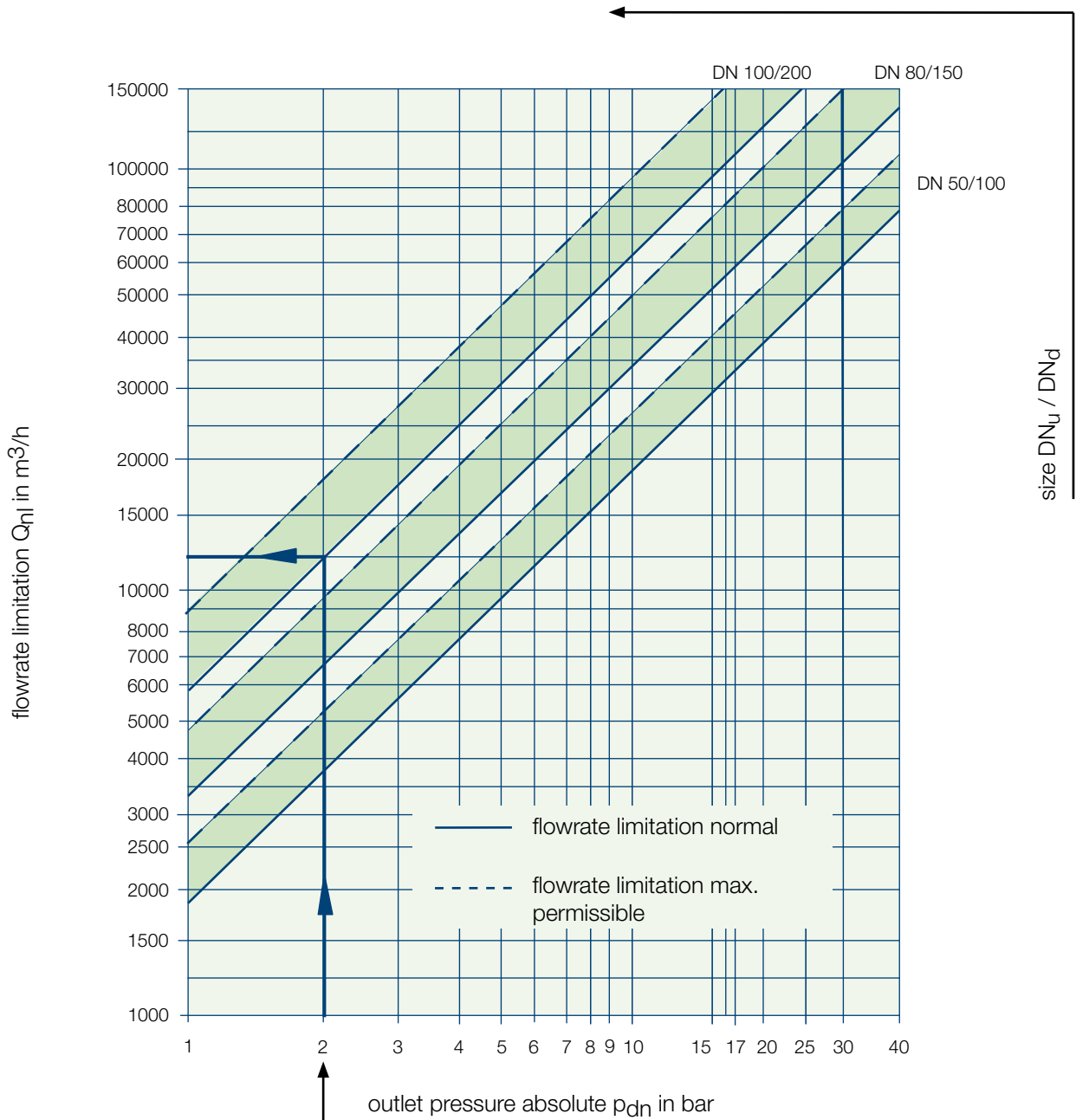
$$p_{dso} - p_{dsu} \geq 1.1 (\Delta p_{wo} + \Delta p_{wu})$$

**) The higher response precision category is valid for the first half, the lower response precision category is valid for the second half of the setting range.

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Diagram showing flowrate limitation for best noise reduction



Example: RMG 408 - 100/200 $p_{dn} = 2$ bar \rightarrow flowrate limitation $Q_{nlimit} = 12500$ m^3/h

To achieve best results for the noise reducing outlet duct, a certain expansion value in the last expansion stage (at the flow straightener) should be guaranteed. The diagram shows the the permissible flowrate limitation in relation to valve size and absolute outlet pressure p_{dn} .

The gas pressure regulator RMG 408 was designed to keep the outlet pressure constant in the main and independent from disturbing influences like inlet pressure and flow rate changes.

The RMG 408 consists of a main body and the units „regulator“ and „safety cut-off valve“ (SAV). The regulator-unit consists of actuator assembly with actuator and main valve and an added pilot with filter. Dissolve fasteners first to remove units of main valve body. By doing this maintenance is easy to perform. The outlet pressure is taken at the measuring point and fed to the pilot regulator. In the pilot regulator the outlet pressure is compared to the adjustable spring loading across the pilot diaphragm, so that any variation in outlet pressure will cause a corresponding change of loading pressure to adjust the valve position accordingly and restore the outlet pressure to the setpoint. The regulator gives tight shut-off on zero flow.

The main valve can be equipped with orifices of various sizes. From valve seat \varnothing 52 mm on a compensation diaphragm ensures inlet pressure ballance of the main valve of the regulator to a large extend.

In order to avoid high noise emission the main valve is equipped with a perforated expansion piece which splits the gas steam up into many thin partial streams moving against one another. For further noise attenuation three concentric perforated plates are located around the outlet of the main valve control element, thus causing a pressure cut of several stages and again dividing the gas steam into a great number of partial streams. A rectifying cone and filling material are installed in the outlet duct of the main valve to achieve additional noise suppression. Optionally, the perforated expansion piece can be fitted with an internal layer of metal foam material, with which an additional noise reduction of at least 10 dB(A) can be achieved. The usual perforated expansion piece can be replaced off-hand by a perforated expansion piece with internal layer of metal foam material. Please note that when using the metal foam insert the KG-value (flowrate coefficient) is reduced accordingly (see page 3, table of valve data).

The valve plate of the safety cut-off valve (SAV) installed in the inlet side of the body cuts off the gas flow if the outlet pressure rises above or falls below preset limits. The RMG 408 can be equipped with the cut-off units RMG 720 or RMG 721.

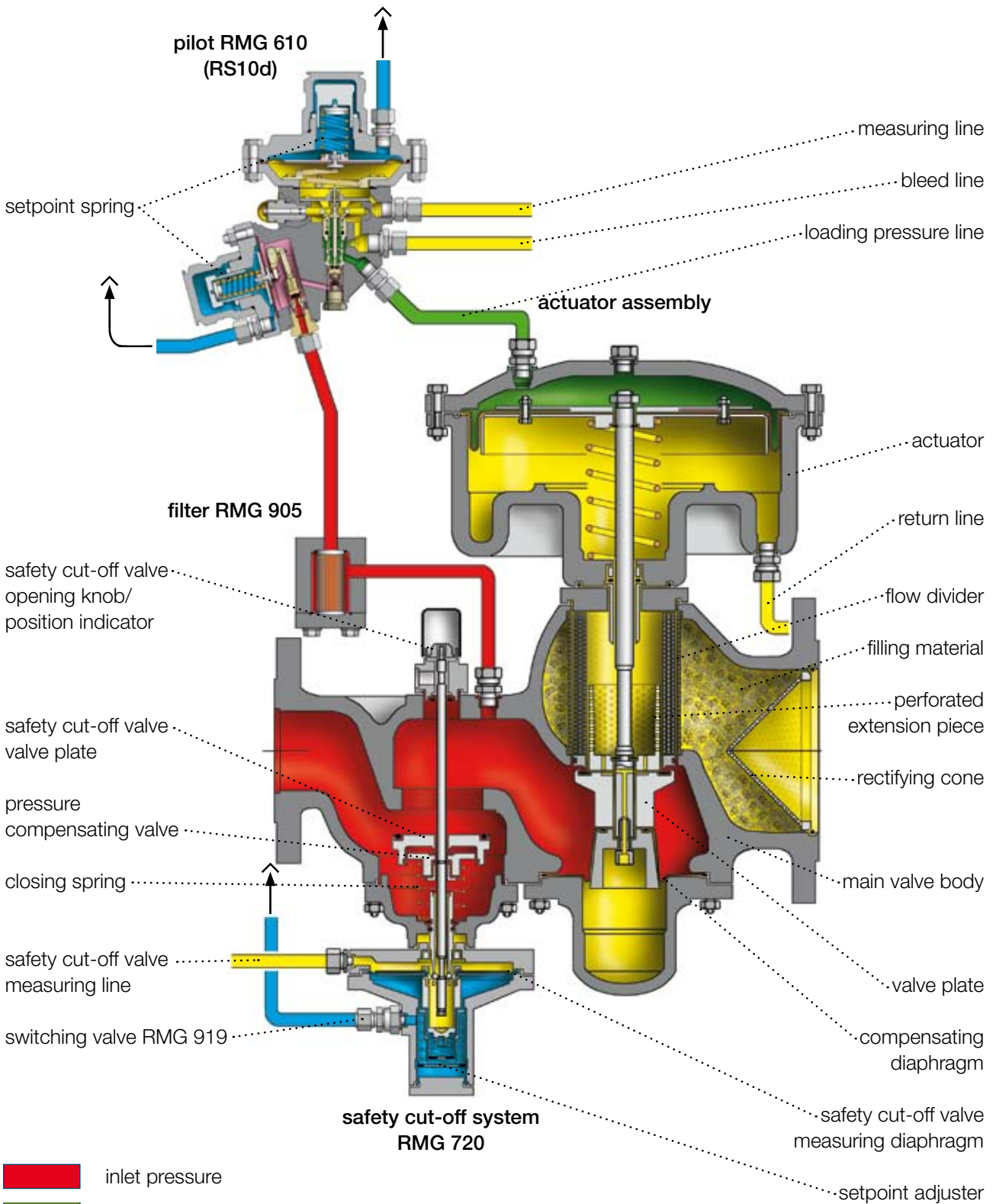
The safety cut-off valve can be opened manually if the outlet pressure at measuring point is below (in case of exceeding pressure) or above (in case of undercutting pressure) the re-engagement differential (note that the min. differential between response pressure and normal service pressure is observed, see tables on page 4 and page 5).

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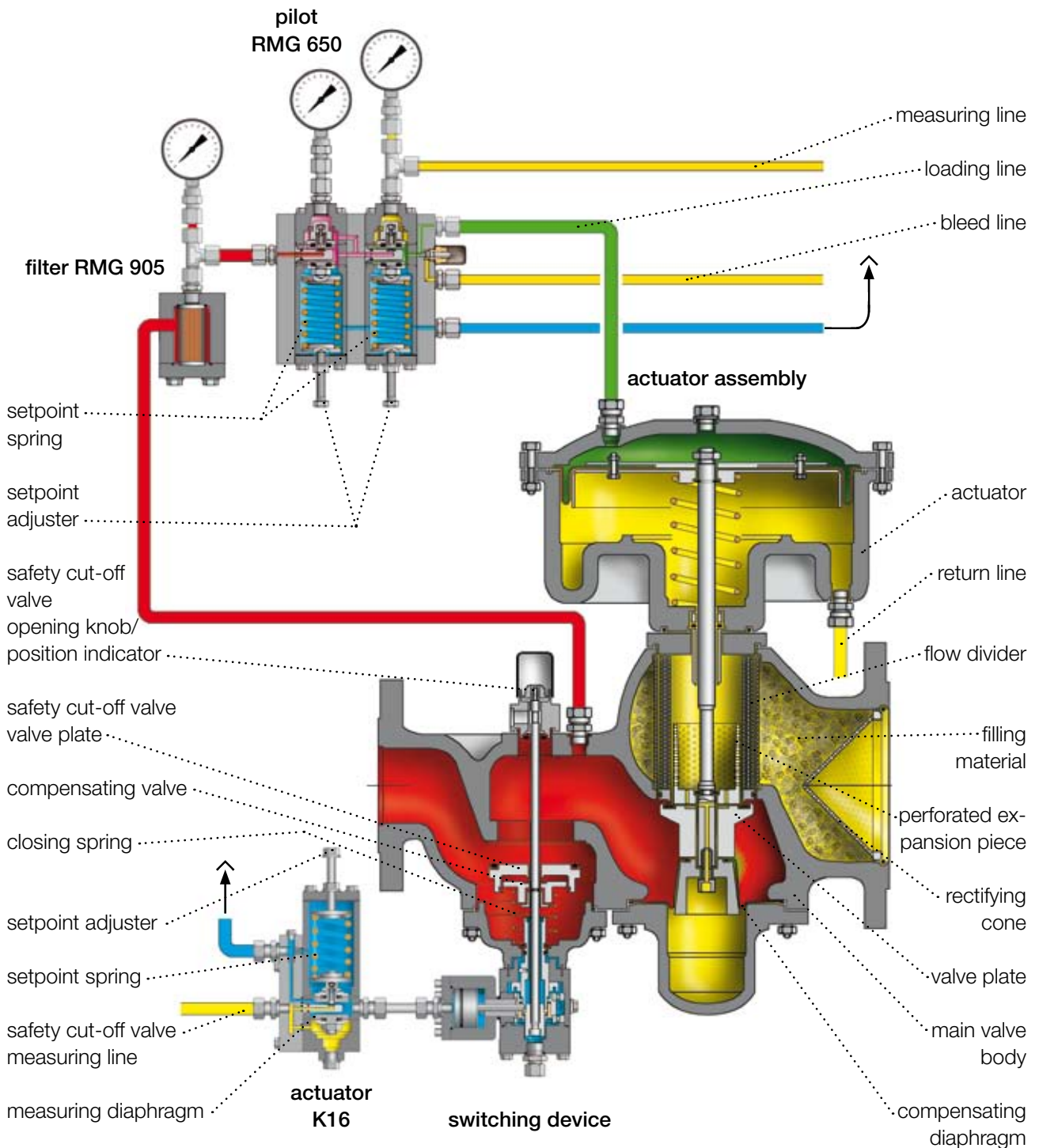
Design and Function

RMG 408 with pilot RMG 610 and SSV-system RMG 720

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RMG 408 with pilot RMG 610 and safety cut-off valve system RMG 720

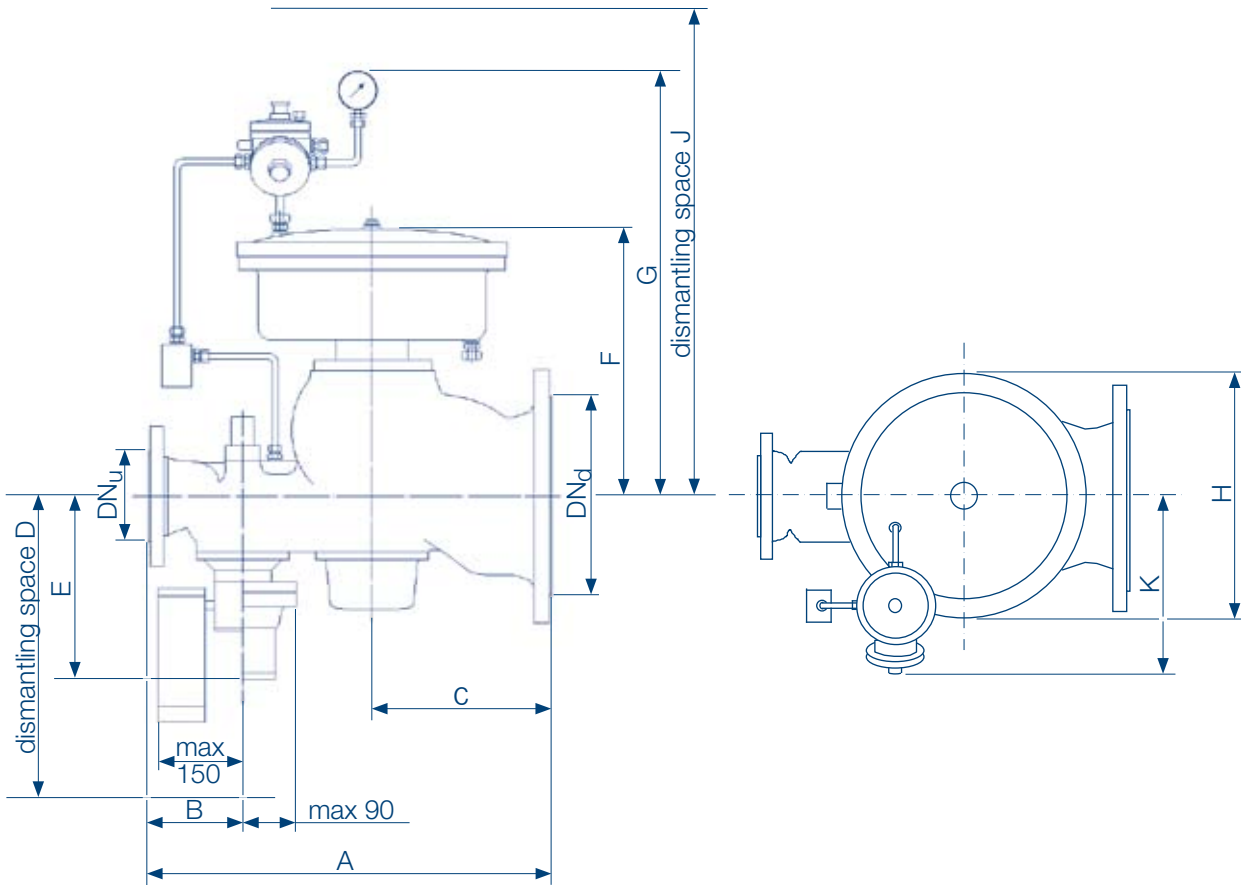


safety cut-off valve -system
RMG 721

- inlet pressure
- outlet pressure
- loading pressure
- loading limiting pressure
- atmosphere

Gas Pressure Regulator RMG 408

Dimensions and Weights



| DIMENSIONS IN MM | | | | | | | | | | | | | | | | | | | | |
|------------------|----------------------------------|-----|-----|-----|-----|----------------------|-----|----------|--------|-----|-----|--------|-----|-----|--------|-----|-----|-----|-----|-----|
| size | main valve body | | | | | safety cut-off valve | | actuator | | | | | | | | | | | | |
| | DN _u /DN _d | A | B | C | D | E | F | G | size 1 | | | size 2 | | | size 3 | | | | | |
| | | | | | | | | | H | J | K | F | G | H | J | K | F | G | H | J |
| 50/100 | 450 | 125 | 175 | 410 | 315 | 360 | 600 | 308 | 560 | 300 | 420 | 660 | 380 | 680 | 300 | | | | | |
| 80/150 | 500 | 165 | 165 | 450 | 360 | | | | | | 380 | 620 | 380 | 650 | 300 | | | | | |
| 100/200 | 650 | 175 | 245 | 475 | 330 | | | | | | 445 | 685 | 380 | 750 | 300 | 500 | 750 | 545 | 850 | 300 |

| APPROX. WEIGHTS IN KG | | | | | | | |
|-----------------------|----------------------------------|---------|----------|---------|----------|---------|----------|
| size | regulator with actuator | | | | | | |
| | DN _u /DN _d | size 1 | | size 2 | | size 3 | |
| | | mit SAV | ohne SAV | mit SAV | ohne SAV | mit SAV | ohne SAV |
| 50/100 | 51 | 46 | 80 | 75 | | | |
| 80/150 | | | 81 | 74 | | | |
| 100/200 | | | 95 | 84 | 102 | 91 | |

example: RMG 408 - 50/10 - K4 / E1/HA / F - 30 / 1 - 10d M N - So

| SIZE | | inlet/outlet | DN | | | |
|--|--|---|--------------------|---------------|--------------|----------|
| | | DN 50/100 | 50/100 | | | |
| | | DN 80/150 | 80/150 | | | |
| | | DN 100/200 | 100/200 | | | |
| SAFETY CUT-OFF VALVE | | | | | | |
| type | overpressure cut-off setpoint range in bar | underpressure cut-off setpoint range in bar | actuator type | | | |
| RMG 720 | 0,040 ... 0,500 | 0,005 ... 0,060 | K4 | | | |
| | 0,200 ... 1,500 | 0,015 ... 0,120 | K5 | | | |
| | 0,600 ... 4,500 | 0,040 ... 0,300 | K6 | | | |
| RMG 721 | 0,050 ... 1,500 | 0,010 ... 0,120 | K10a | | | |
| | 0,500 ... 8,000 | 0,100 ... 2,000 | K12 | | | |
| | 4,000 ... 17,60 | 0,500 ... 6,000 | K13 | | | |
| | 0,800 ... 17,60 | | K16 | | | |
| | | 4,000 ... 16,00 | K17 | | | |
| RELEASE AND REMOTE | | | | | | |
| optional: remote safety cut-off release | | release: - upon current supply - upon current failure (only with RMG721) | E1 E2 | | | |
| optional: manual release of safety cut-off | | for RMG 720: push-button valve RMG 912 for RMG 721: included in system | HA | | | |
| optional: electric remote signalling of safety cut-off valve | | | F | | | |
| VALVE SEAT DIAMETER AND ACTUATOR SIZE | | | | | | |
| size DN | K _G -value in m ³ /h | max. inlet pressure* in bar | valve seat-Ø in mm | actuator size | valve | actuator |
| 50/100 | 450 | 16 | 30 | 1 | 30 | 1 |
| | 650 | 16 | 37 | 1 | 37 | 1 |
| | 1150 | 10 (16) | 52 | 1 | 52 | 1 |
| 80/150 | 450 | 16 | 30 | 2 | 30 | 2 |
| | 650 | 16 | 37 | 2 | 37 | 2 |
| | 1150 | 16 | 52 | 2 | 52 | 2 |
| 100/200 | 750 | 16 | 37 | 2 | 37 | 2 |
| | 1400 | 16 | 52 | 2 | 52 | 2 |
| | 2400 | 16 | 81 | 2 | 81 | 2 |
| 100/200 | 1700 | 16 | 52 | 2 | 52 | 2 |
| | 3400 | 16 | 81 | 2 | 81 | 2 |
| | 3800 | 10 (16) | 102 | 2 | 102 | 2 |
| | 1700 | 16 | 52 | 3 | 52 | 3 |
| | 3400 | 16 | 81 | 3 | 81 | 3 |
| | 3800 | 16 | 102 | 3 | 102 | 3 |
| PILOT | | | | | | |
| type | version | setpoint range W _d in bar | | | denomination | |
| RMG 650 | | 1,000 ... 15,00 | | | 650 | |
| RMG 610 (RS10d) | N (M/N) | 0,020 ... 0,500 | | | 10d | M/N |
| | M (M/M) | 0,500 ... 3,500 | | | | M/M |
| SPECIAL VERSION | | | | | | |
| ... to be specified | | | | | | So |

*) see table page 3

For More Information

To learn more about RMG's Advanced Gas Solutions, contact your RMG account manager or visit www.rmg.com

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