

MEDENUS

Gas Pressure Regulation



Safety shut-off valve S 100



Product information

EN

Table of Contents

Application, Characteristics, Technical Data	4
Application	4
Characteristics	4
Type of model (options)	4
Technical Data	5
Design and function	6
Options	7
KG* value	8
Setpoint spring table - SSV	9
Setpoint spring table - SSV	10
Dimensions, Connection and Weight	11
Dimensions and weight	11
Dimensional drawing	11
Connection of the measuring lines and breather lines	12
Installation situation	12
Order data	14
Notes	15
Contact	16
Notes	18

List of abbreviations and formula symbols

AG_o	Upper response pressure group	PS	Maximum allowable pressure	Δp_{wo}	Min. re-engagement difference between upper response pressure and normal operating pressure
AG_u	Lower response pressure group	p_u	Inlet pressure	Δp_{wu}	Min. re-engagement difference between lower response pressure and normal operating pressure
K_G	value	Q_n	Standard volumetric flow rate		
p_d	Outlet pressure	SSV	Safety shut-off valve	ρ_n	Gas density
p_{ds}	Setpoint of the response pressure	t_{Gas}	Gas inlet temperature		
p_{ds_o}	Upper SSV response pressure	VS	Valve seat		
p_{ds_u}	Lower SSV response pressure	w_d	Outlet gas velocity		
$p_{f,max}$	Maximum closing pressure	w_u	Inlet gas velocity		
BV	Breather valve	W_{dso}	Upper adjustment range (SSV)		
		W_{dsu}	Lower adjustment range (SSV)		

*) KG value for natural gas: $d = 0,64$ ($\rho_n = 0,83 \text{ kg/m}^3$), $t_u = 15^\circ \text{ C}$

Application, Characteristics, Technical Data

Application

Safety shut-off valve (SSV), direct-acting (operating without auxiliary power), for systems acc. to DVGW - work sheet G 491 (A) and G 600 (A) (TRGI)

Can be used as an equipment component on gas consumption facilities as defined in EC Directive (2009/142/EEC)

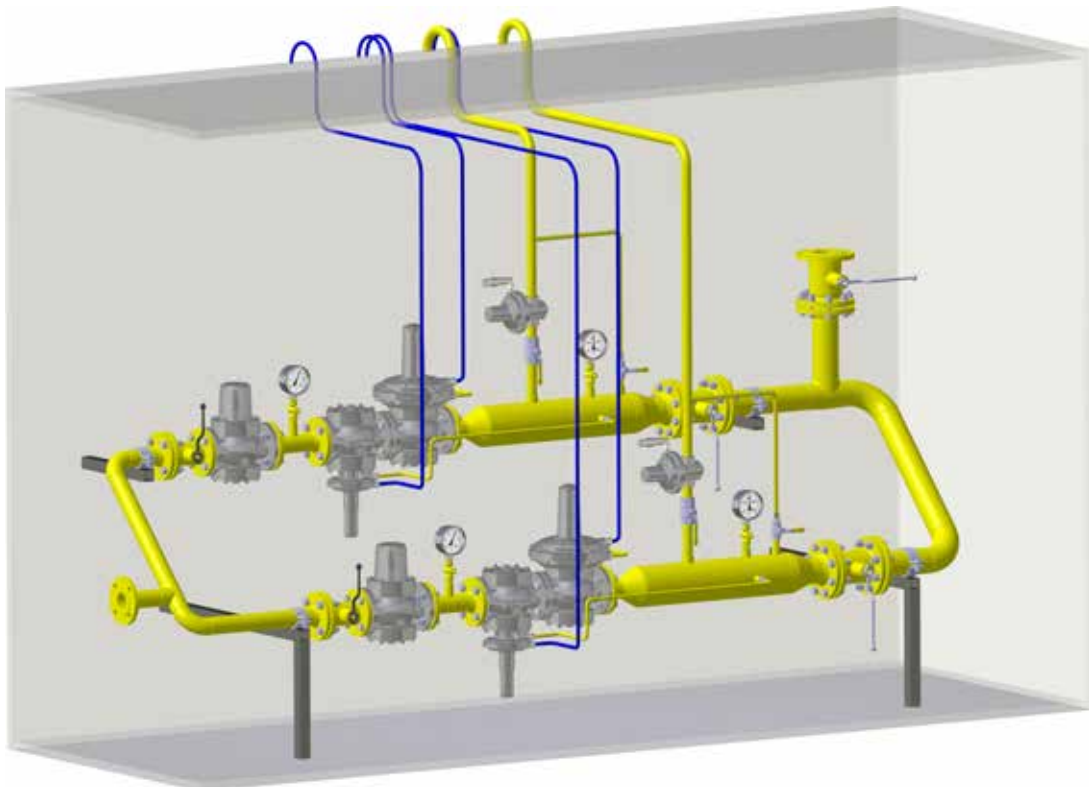
Can be used for the gases defined in DVGW - work sheet G 260 / G 262 and neutral non-aggressive gases. (other gases on request)

Characteristics

- Integral pressure-tight model (IS)
- High flow rate capacity
- outdoor version as standard

Type of model (options)

- with BV breather valve
- with electric position indicator SSV 'Closed' via inductive proximity initiator or via Reed contact
- with SSV manual release
- with SSV electromagnetic remote release when power is applied or in case of power failure
- Oxygen model



double gas train

Technical Data

Type	S 100
Model	Integral pressure-tight (IS)
Max. allowable pressure PS	8 bar
Max. inlet pressure $p_{u,max}$	8 bar
Nominal size	DN 25, DN 40, DN 50, DN 65, DN 80, DN 100, DN 125, DN 150, DN 200
Connection type	DIN EN PN 16* flanges ASME - B16.5 -Flange Class 150 RF
Material	
Housing / actuator housing/ control device housing	Al - cast alloy**
Temperature range, Class 2 (operating/ambient temperature)	-20°C to +60°C

Response pressure groups

Upper response pressure group AG_o in command area w_{dso}	AG_o	Lower response pressure AG_u in command area w_{dsu}	AG_u
50 mbar to 100 mbar	10	10 mbar to 30 mbar	20
> 100 mbar to 500 mbar	5	> 30 mbar to 50 mbar	10
> 500 mbar	2.5	> 50 mbar	5

Function, Strength and Tightness to DIN EN 14382

CE mark acc. to PED/ PIN number CE-0085-AQ0880

Ex protection The mechanical parts of the device do not have any potential ignition sources of their own and therefore do not fall within the scope of ATEX 95 (94/9/EC). Electrical components fitted to the device comply with the ATEX requirements.

*) DN 200 flange - DIN EN 1092 PN 10

**) Corrosivity category according to DIN EN ISO 12944-2.

The categories C1 to C5-I including guaranteed without additional coatings.
For the category C5-M a coating with epoxy resin is recommended.



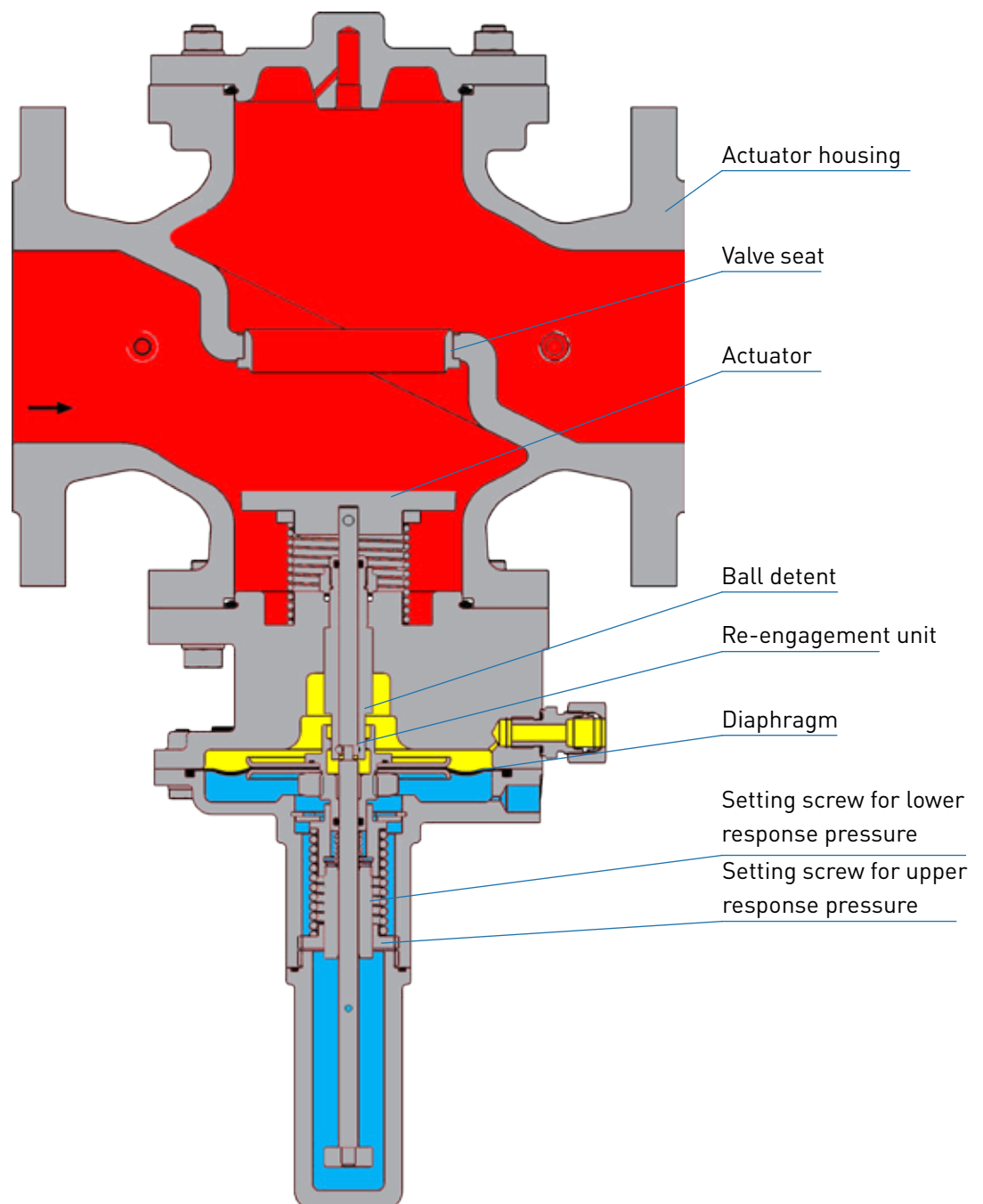
Application, Characteristics, Technical Data

Design and function

The safety shut-off valve S 100 shuts off the gas flow when the outlet pressure in the regulating section exceeds or falls below a certain response pressure. To this end, the outlet pressure to be monitored is passed on to the SSV control device via a separate measurement line. As a function of the change in pressure, the main diaphragm in the controller is raised or lowered. When the outlet pressure in the regulating section falls below the lower switch-off point or exceeds the upper switch-off point, the switch socket connected to the SSV diaphragm will move to the corresponding disengaging position, the balls of the engaging mechanism will release the SSV screw spindle, and the closing spring will press the SSV valve plate against the valve seat. The SSV actuator shuts off the gas flow gas-tight. The SSV can only be opened by hand and engaged in the open position. To do so, the outlet pressure at the measuring point must be lowered below the upper response pressure or raised above the lower response pressure by at least the re-engaging differential amount (Δp).

The SSV can, except where otherwise stipulated in national legislation, be used in either function class A (with diaphragm rupture protection) and B (without diaphragm rupture protection).

There is also the option of using a remote display for SSV position 'CLOSED' and a manual and remote release when power is applied or in case of power failure.

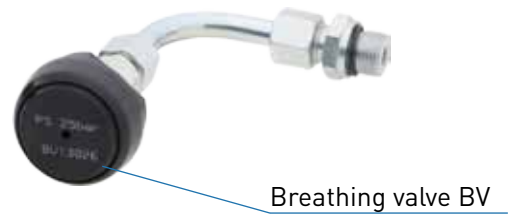


Options

Breathing valve BV

The breathing valve BV serves to protect the room of installation against inadmissible gas leakage from the venting space of safety shut-off valves.

It is also an alternative to the cost- and work intensive installation of breathing pipes.



Signal transmitter / Inductive Sensor

Signal and inductive sensors are used to monitor the position (closed or open position) of the safety shut-off valve by remote display.



SAV remote release

The direct-acting solenoid valve serves as an electromagnetic remote release for closing the safety shut-off valve in case of power flow and power failure.



K_G* value

Nominal size ∅ Valve seat	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200
32.5 mm	450	550							
52.5 mm			1,350	1,650					
80.0 mm					3,300	3,900	4,500		
125.0 mm								8,000	
160.0 mm									14,000
Connection	DIN EN 1092 - PN16**								

*) KG value for natural gas: $d = 0.64$ ($\rho_n = 0.83 \text{ kg/m}^3$), $t_u = 15^\circ\text{C}$

***) DN 200 flange - DIN EN 1092 PN10

Setpoint spring table - SSV

Type	Upper response pressure		Lower response pressure		Spring data		
	w_{dso} [mbar]	Δp_{wo}^{**} [mbar]	w_{dsu} [mbar]	Δp_{wu}^{**} [mbar]	Spring no.	Colour [RAL]	
MD* small ball lock S100: DN 25 - 125			1 - 8	15	FE 900	1028	
			6 - 17	15	FE 901	2002	
			12 - 24	20	FE 902	6010	
			22 - 40	30	FE 903	5015	
			30 - 50	30	FE 904	9005	
			45 - 70	40	FE 905	9010	
			65 - 100	50	FE 906	4002	
	20 - 40	20			FD 910	1028	
	35 - 70	20			FD 911	2002	
	65 - 110	30			FD 912	6010	
	100 - 160	30			FD 913	5015	
	150 - 235	40			FD 914	9005	
	225 - 355	60			FD 915	9010	
	345 - 510	80			FD 916	3020	
	500 - 710	80			FD 917	5010	
	655 - 1205	100			FD 918	9006	
	760 - 1550	200			FD 919	4002	
	MD-R small ball lock S100: DN 25 - 125			30 - 55	30	FE 900	1028
				50 - 80	40	FE 901	2002
			70 - 105	50	FE 902	6010	
			100 - 140	80	FE 903	5015	
			110 - 160	80	FE 904	9005	
			150 - 205	100	FE 905	9010	
			200 - 300	100	FE 906	4002	
90 - 125		30			FD 910	1028	
120 - 210		40			FD 911	2002	
200 - 330		60			FD 912	6010	
285 - 460		80			FD 913	5015	
450 - 680		80			FD 914	9005	
640 - 1040		100			FD 915	9010	
1030 - 1480		200			FD 916	3020	
1450 - 2200		200			FD 917	5010	
1900 - 3500		200			FD 918	9006	
2200 - 4500		200			FD 919	4002	

Setpoint spring table - SSV

Type	Upper response pressure		Lower response pressure		Spring data	
	w_{dso} [mbar]	Δp_{wo}^{**} [mbar]	w_{dsu} [mbar]	Δp_{wu}^{**} [mbar]	Spring no.	Colour [RAL]
MD large ball lock			10 - 40	15	FM 400	1028
			35 - 115	30	FM 402	6010
			60 - 245	60	FM 404	9005
		20			FL 412	6010
		40 - 180			FL 413	5015
S100: DN 150 - 200	70 - 340	50			FL 415	9010
	330 - 1100	80				
MD-R large ball lock			10 - 180	50	FM 400	1028
			155 - 380	100	FM 402	6010
			200 - 950	150	FM 404	9005
		100			FL 412	6010
		145 - 670			FL 413	5015
S100: DN 150 - 200	270 - 1230	200			FL 415	9010
	1200 - 4500	200				

Determining the upper response pressure

Outlet pressure P_d (mbar)	Upper response pressure w_{dso} ***
≤ 200	$P_d + 100$ mbar
$> 200 - \leq 800$	$P_d \times 1.5$
$> 800 - \leq 1600$	$P_d \times 1.3$
> 1600	$P_d + 500$ mbar

*) if possible not greater than 450 mbar

**) If the control device is set up for simultaneous monitoring of upper and lower response pressure, the difference between the setpoints for the upper and lower response pressure (p_{dso} and p_{dsu}) should be at least 10% greater than the total of values given for Δp_{wo} and Δp_{wu} .

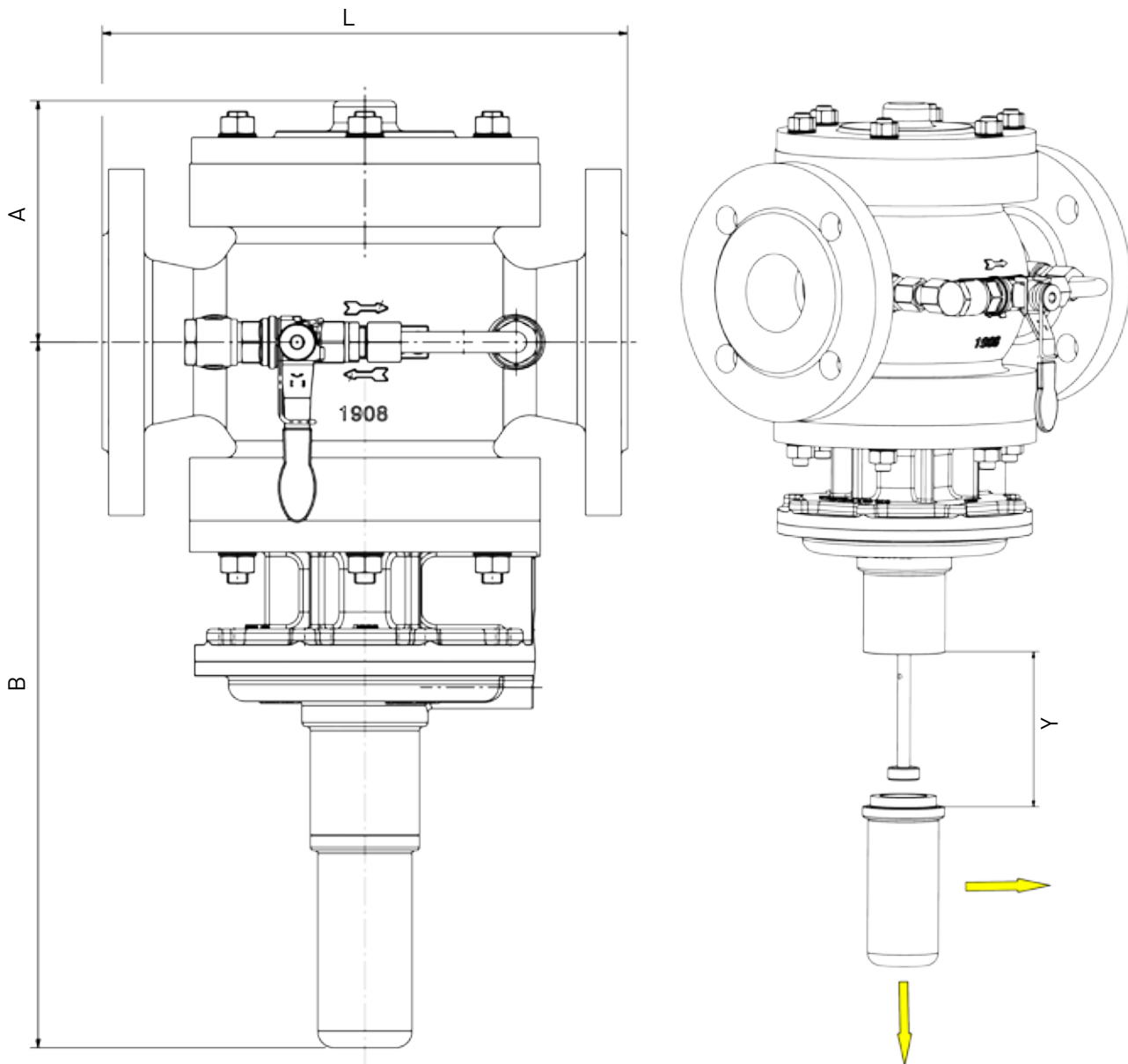
***) The upper response pressure is rounded up to full tens, for example 251 mbar -> 260 mbar

Dimensions, Connection and Weight

Dimensions and weight

Dimensions	Nominal size	DN 25	DN 40	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200
	A [mm]		105	98	115	116	139	150	150	195
B [mm]		286	314	336	342	360	360	371	371	475
L [mm]		160	160	250	220	280	300	260	380	420
Y [mm]		100	100	100	100	100	100	100	150	150
Weight [kg]		3.5	5.0	8.5	7.0	13.0	15.0	32.0	32.0	49.0
Connection		DIN EN 1092 - PN16*								

Dimensional drawing



*) DN 200 flange - DIN EN 1092 PN10

Connection of the measuring lines and breather lines

Nominal size	Measuring line	Breather line
DN 025	Connection* for: pipe 12 x 1.5 (thread G 1/4)	
DN 040		
DN 050		
DN 065		
DN 080		
DN 100		
DN 125		
DN 150	Connection* for: pipe 12 x 1.5 (thread G 3/8)	
DN 200		

Note

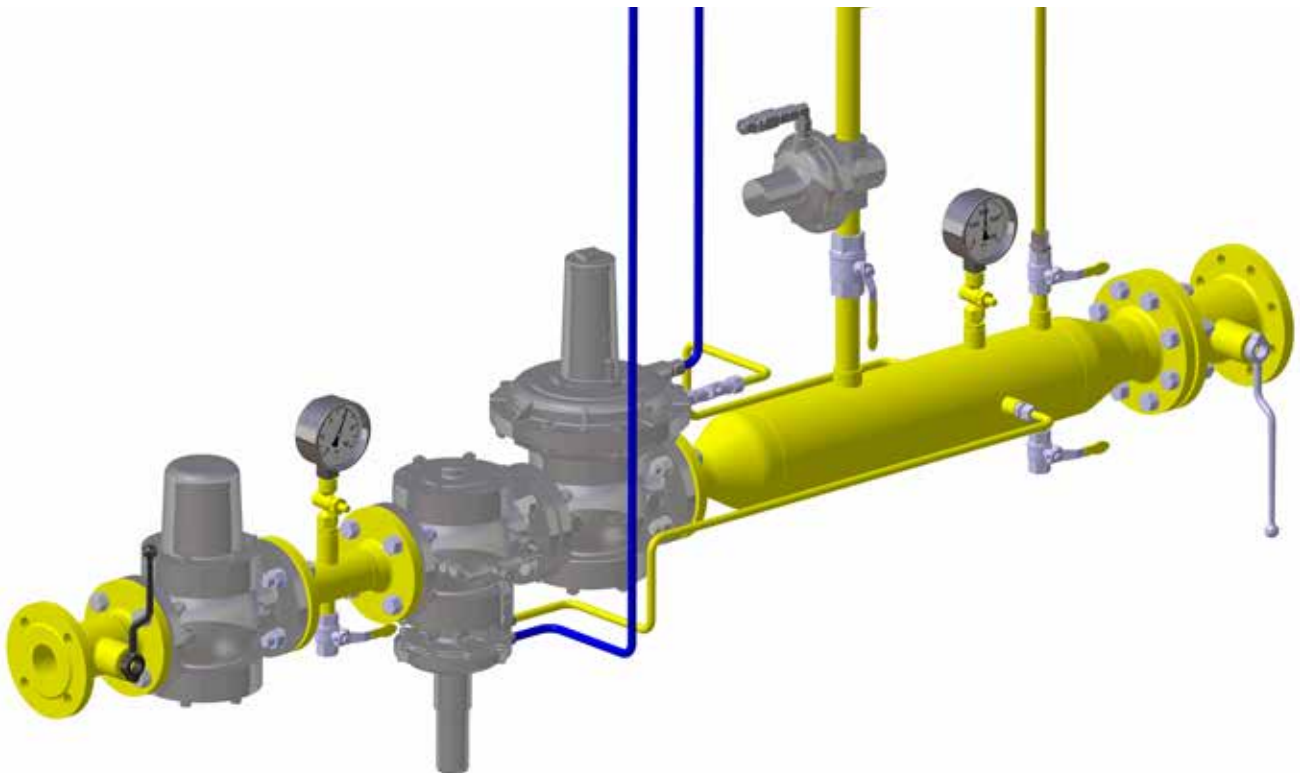
Observe the following publications in relation to installation, start-up and maintenance:

DVGW - work sheets G 491 and G 600

Operating and Maintenance Instructions S 100

The safety shut-off valve S 100 shall be installed in the pipeline preferably in horizontal position with vertical position of the safety shut-off spring cap. For all nominal sizes, the direction of flow is indicated by an arrow on the housing.

Installation situation



Selection

Device selection

Selection of the SSV from the SSV setpoint spring table (page 7)

Note: Recommended upper SSV response pressure $p_{ds\ o} < 500 \text{ mbar} + p_{ds}$

Note: When selecting springs, AG_o and AG_u must be observed. The possible minimum and maximum response pressures are calculated as follows:

$$p_{dso\ min/max} = p_{ds\ o} \cdot (1 \pm AG_o / 100)$$

$$p_{dsu\ min/max} = p_{ds\ u} \cdot (1 \pm AG_u / 100)$$

Checking the gas velocities

$$w = 380 \cdot Q_n / (DN^2 \cdot p_{abs})$$

Note: The factor 380 refers to an operating gas temperature from approx. 15°C to 20°C. For other temperatures, the velocity must be corrected as follows: $w_{corr} = w \cdot (t_{gas} + 273.15) / 290$

Recommended max. gas velocity at the inlet flange:
50 - 70 m/s Lower value for redirections upstream of the SSV

Example:

MDR with FD 914 (440-770 mbar)
 AG_o 10
set to $p_{ds\ o} = 700 \text{ mbar}$
and FE 904 (110-150 mbar) AG_u 5
set to $p_{ds\ u} = 130 \text{ mbar}$

$$p_{dso\ max} = 700 \cdot (1 + 10 / 100) = 770 \text{ mbar}$$
$$p_{dso\ min} = 700 \cdot (1 - 10 / 100) = 630 \text{ mbar}$$
$$p_{dsu\ max} = 130 \cdot (1 + 5 / 100) = 136.5 \text{ mbar}$$
$$p_{dsu\ min} = 130 \cdot (1 - 5 / 100) = 123.5 \text{ mbar}$$

Inlet and outlet nominal size of the pipeline according to the selected device: 80 mm
Selected widening of outlet pipeline: 200 mm

$$w_u = 380 \cdot 2500 / (80^2 \cdot 6) = 24.7 \text{ m/s}$$

The device selected in the example of nominal size DN 80 can be operated under these conditions.

Order data

Example:

Safety shut-off valve: S100/050/MD-R/links/BV/N/H/WAZ/So

Order selection	Designation	Order code:											
		S100	050	-	MD-R	-	links	BV	N	H	WAZ	So	
Type													
S100	S100	S100											
DN - Nominal size	Table p.14		050										
Flange model													
PN 16	-			-									
Class 150	C												
SSV													
with MD control device	MD												
with MD-R control device	MD-R				MD-R								
SSV function class													
A	-					-							
B	B												
Direction of flow													
Right (from left to right)	-												
Left (from right to left)	links						links						
SSV valve accessories													
without	-												
Breather valve	BV							BV					
Electrical position indicator, SSV 'Closed'													
without	-												
with ... , via proximity switch	N								N				
with ... , via Reed contact	R												
SSV release													
without	-												
with manual release	H									H			
with electromagnetic remote release, when power is supplied	SG												
with electromagnetic remote release, in case of power failure	SA												
Acceptance test certificate to EN 10204/3.1													
without	-												
with acceptance test certificate	WAZ											WAZ	
Special model	So*												So

In every selection group, only one option can be selected.

DN - Nominal size

Type	025	040	050	065	080	100	125	150	200
S100	X	X	X	X	X	X	X	X	X

- So*)
- Combination of manual and remote release
 - Oxygen model
 - Coating with epoxy resin in RAL colours

Contact

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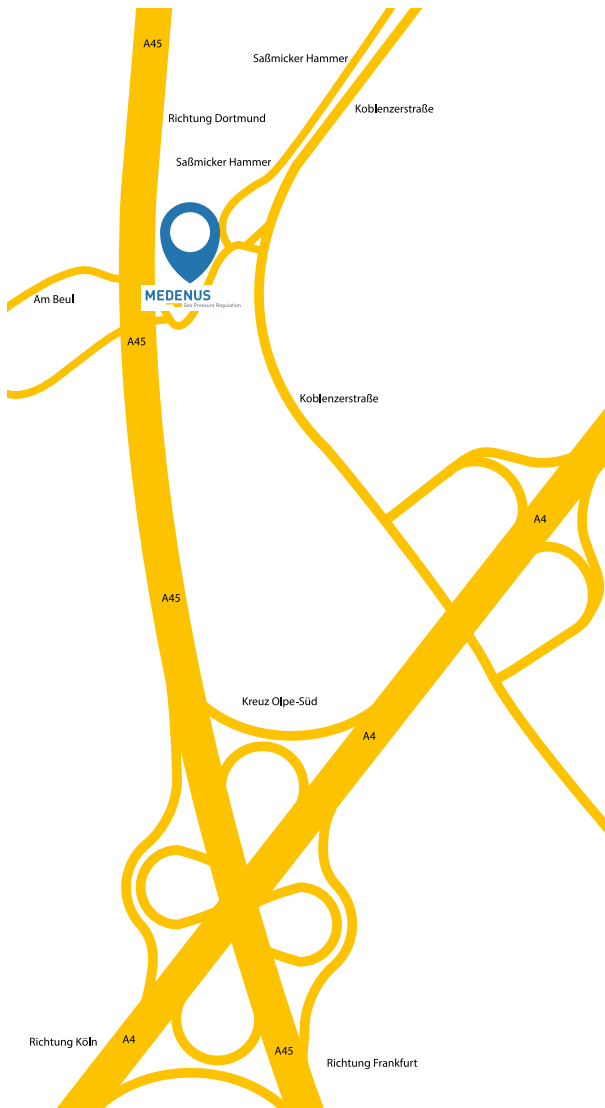
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Notes

A series of horizontal dotted lines for taking notes, consisting of 25 rows.

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