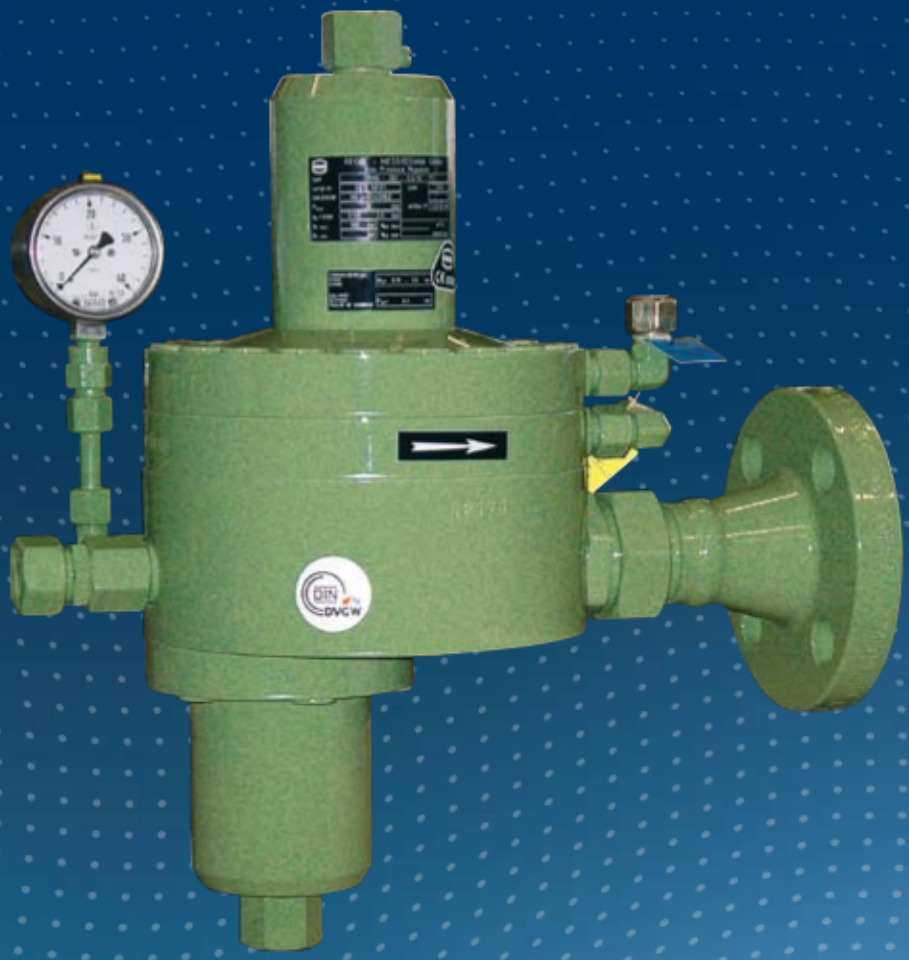
Gas Pressure Regulator RMG 201

CONTROLS SUPPLY CHAIN
VALVES ACTUATORS INSTRUMENTATIONS



PRODUCT INFORMATION

Serving the Gas Industry Worldwide

Gas Pressure Regulator RMG 201

Application, characteristics, technical data

Application

- application in industrial stations
- for small flowrate regulating lines in gas pressure regulating stations
- suitable for natural gas, gases acc. to G260, and all other non-corrosive gases

Characteristics

- direct-acting, two-stage operation
- suitable for high pressure drops
- with safety relief valve for gas leakages in the intermediate pressure stage
- simple operation, check and maintenance

TECHNICAL DATA							
permissible operating pressure p_{zul}	up to 100 bar (depending on connections)						
max. inlet pressure p_{max}	100 bar						
size (type of connection)	**inlet:**				**outlet:**		
	• screw connection without brazing acc. to DIN 2353 for external pipe diameter 12 mm. 16 mm. 18 mm				• screw connection without brazing acc. to DIN 2353 for external pipe diameter 12 mm. 16 mm. 18 mm. 22 mm. 25 mm. 28 mm. 38 mm. 42 mm • flanged to PN 40. ANSI 300 or ANSI 600 in DN 25. DN 40 or DN 50		
valve data							
adjustable intermediate pressure stage	orifice size (valve seat dia.) in mm		2	3.5	5.5	8	
	flow rate coefficient K_G in m^3/h (for natural gas. ρ_n = 0.83 kg/m^3)		4.5	15	35	65	
regulating stage	orifice size (valve seat dia.) in mm		1.5	3.5	6	10	12
	flow rate coefficient K_G in m^3/h (for natural gas)	normal	2.5	12	20	35	40
		max.*)	2.5	14	38	70	80
*) for KG max: proportional deviation exceeds accuracy class and closing pressure category. Use only if the flow does not change. i.e. in front of furnaces with constant consumption							
material	body parts	aluminium alloy					
	internal parts	aluminium alloy. brass. nickle					
	diaphragms. o-rings	NBR (rubber-like plastic material)					
	valve sealing	FPM (rubber-like plastic material)					

TECHNICAL DATA				
temperature range	-20°C to +60°C			
function and strength	acc. to DIN EN 334			
DIN-DVGW reg. no.	NG-4301AS0062			
CE sign acc. to PED	RMG CE 0085			
specific outlet pressure ranges				
	setpoint spring no.	specific outlet pressure range W_a	Safety relief valve default setting	
intermediate pressure stage	F 2 F 3	up to 9 bar above p_a up to 15 bar above p_a	fixed value 12 bar 18 bar	
regulating stage	F 2 F 3 F 4 F 5 F 6 F 7 F 8	0.02 bar to 0.04 bar 0.03 bar to 0.10 bar 0.075 bar to 0.25 bar 0.15 bar to 0.50 bar 0.25 bar to 1.00 bar 0.50 bar to 1.80 bar 0.75 bar to 2.00 bar	p_a + 0.025 bar p_a + 0.050 bar p_a + 0.075 bar p_a + 0.100 bar p_a + 0.150 bar without SBV without SBV	**Attention** safety relief valve can be used only up to spring no. 6 and up to p_a = 0.5 bar
accuracy class and closing pressure class				
outlet pressure range	accuracy class	lock-up pressure class	class of lock-up pressure zone	
$p_a \leq 0.03$ bar 0.03 bar < $p_a \leq 0.10$ bar 0.10 bar < $p_a \leq 0.50$ bar $p_a > 0.5$ bar	AC 20 AC 10 AC 5 AC 2.5	SG 30 SG 20 SG 10 SG 10	SZ 2.5	

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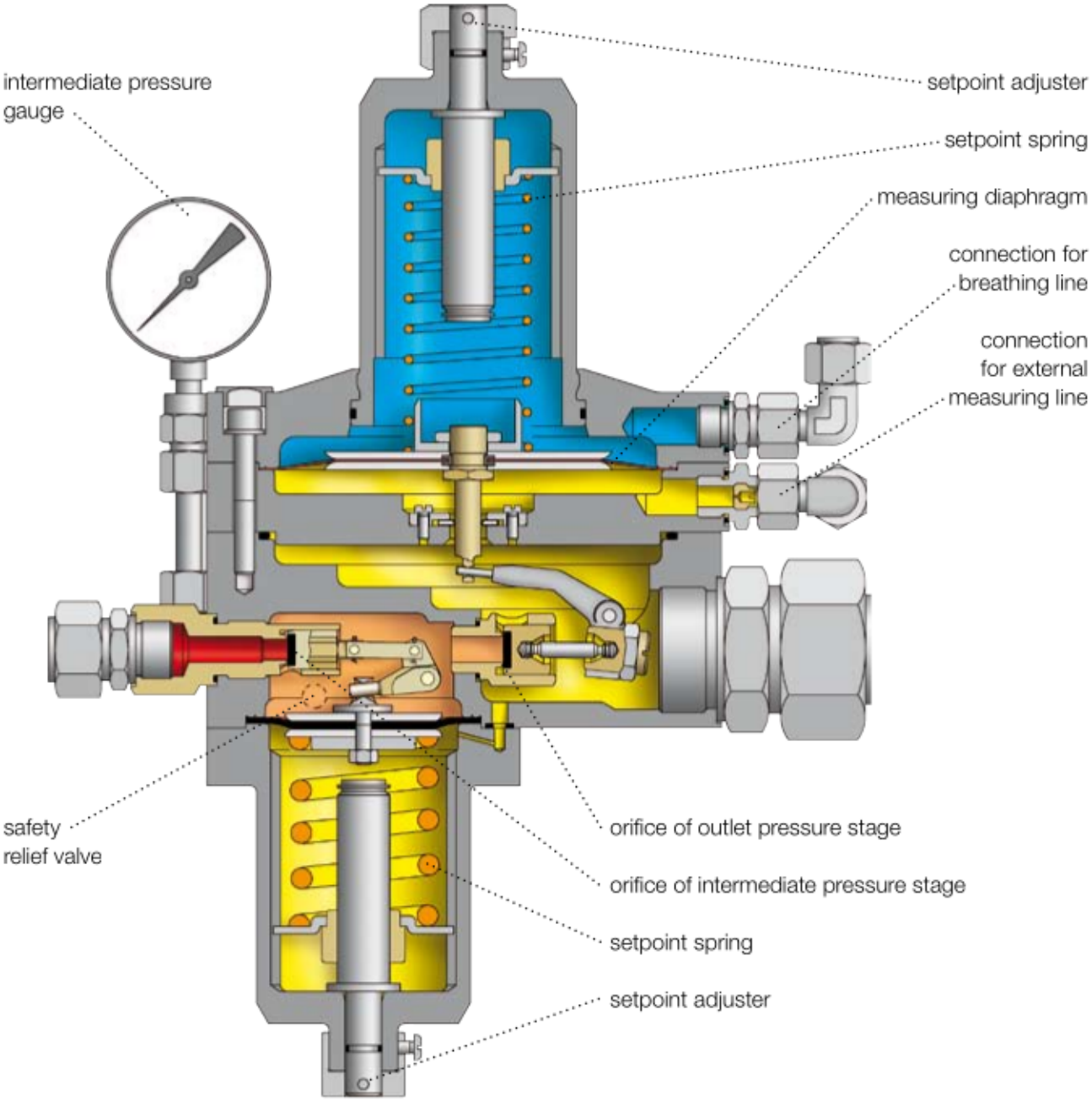
Design and operation



inlet pressure
outlet pressure
intermediate pressure
atmosphere

The gas pressure regulator RMG 201 is designed to keep the outlet pressure constant within given limits, independent of inlet pressure and/or flow deviations.

The gas pressure regulator consists of two expansion stages. The influence of the inlet pressure on the outlet pressure regulating accuracy is largely limited by means of the intermediate pressure stage. The setpoint of the intermediate pressure stage is adjustable. The diaphragm of the intermediate stage is charged with the outlet pressure as follow-up setpoint; thus the intermediate pressure always exceeds the outlet pressure by the value given by the setpoint spring. Therefore the intermediate pressure stage does not require a vent line.
The intermediate pressure stage is also equipped with a safety relief valve, the response pressure is fixed to 12 bar (spring no. 2) or 18 bar (spring no. 3).

The control stage as well as the intermediate pressure stage can be equipped with different orifices. For outlet pressures up to 0.5 bar a safety relief valve for gas leakages is incorporated in the actuator. The setpoint can be adjusted 0.025 bar to 0.150 bar above outlet pressure.

The outlet pressure charge is effected through the external measuring line. The outlet pressure to be controlled is registered at the measuring point and takes direct effect on the measuring diaphragm of the control stage. The resulting force is compared to the force of the setpoint spring. Every control deviation results in a corresponding (proportional) stroke change of the orifice of the outlet pressure stage. The following alteration of flow leads to an adaption of the actual outlet pressure to the setpoint.
In case of zero flow the regulator shuts off bubble-tight.

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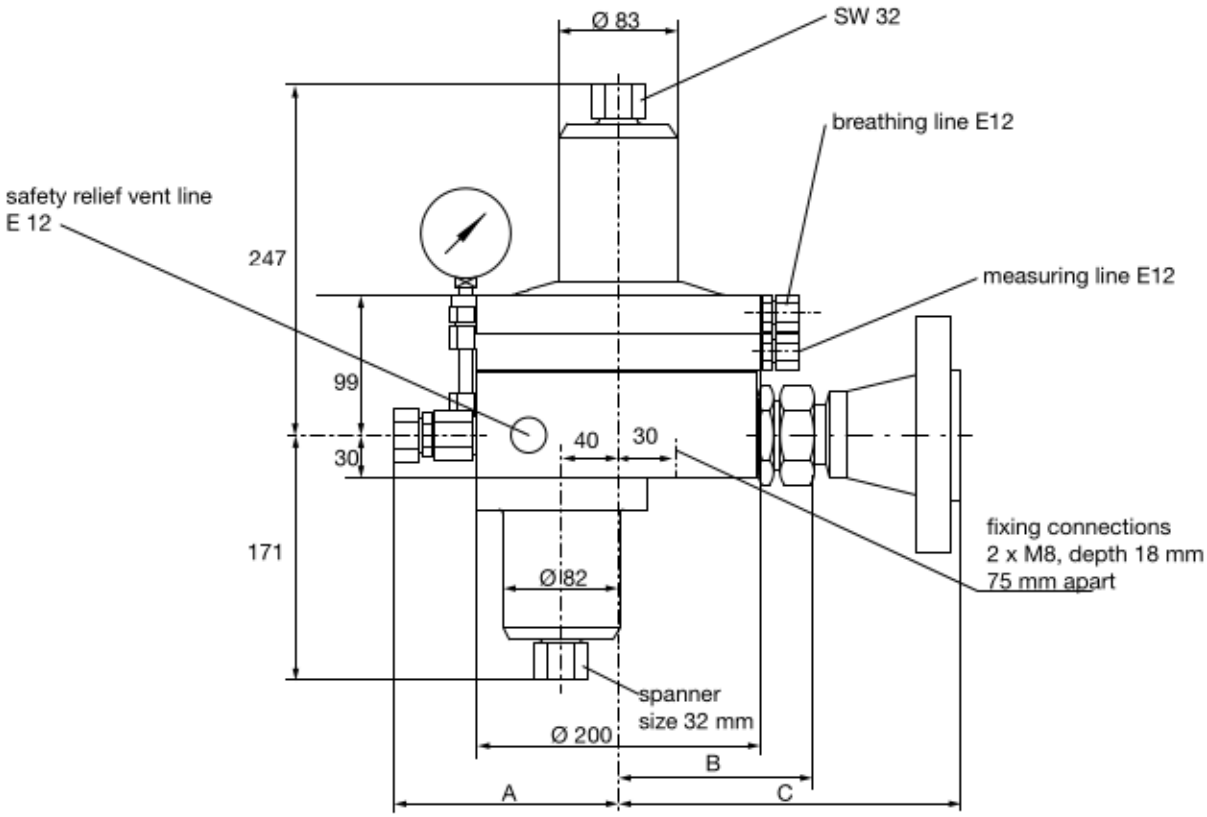
Dimensions and connections



DIMENSIONS AND CONNECTIONS

pipe connections
(screw connection without brazing acc. to DIN 2353)

for pipe size	inlet (A)	outlet (B)
E 12	155	138
E 16	164	148
E 18	158	142
E 22	-	144
E 25	-	158
E 28	-	145
E 38	-	152
E 42	-	137

flanged connections (only on outlet side)
(flanges are connected to the main body via screw connections without brazing acc. to DIN 2353)

pressure rating	(C) for outlet pipe size		
	DN 25	DN 40	DN 50
PN 25/40	210	210	210
ANSI 300 RF	235	234	240
ANSI 300 RJ	235	234	240
ANSI 600 RF	235	240	240
ANSI 600 RJ	235	240	240

determination of the intermediate pressure p_z

(Insert absolute pressure values into the calculation)

setpoint spring 2: p_z up to 9 bar above p_a (approx. 8 bar at max. flow)
setpoint spring 3: p_z up to 15 bar above p_a (approx. 13 bar at max. flow)

The determination starts with setpoint spring 2. Using this spring the intermediate pressure can be set at up to max. 8 bar above pa for max. flow. Should this max. pressure not be sufficient to reach the desired flowrate, then setpoint spring no. 3 is to be used.

determination of the valve seat diameter of the outlet pressure stage

example 1:

p_a = 0.020 bar
q_n max = 125 m^3/h (for natural gas), flowrate varies
p_z = 8 bar

$$K_{G\ req} = \frac{2 \bullet q_n}{p_{z\ abs}} = \frac{2 \bullet 125}{9} = 28\ m^3/h$$

Result: required valve diameter of the outlet pressure stage should be 10 mm, with K_G = 35 m^3/h

Note:
The chosen K_G-value should be approx. 10 % to 20 % above the calculated K_G-value.

example 2:

$$K_G\ erf = \frac{2 \bullet q_n}{p_{z\ abs}} = \frac{2 \bullet 230}{9} = 51\ m^3/h$$

No valve seat diameter with the required KG-value available!
Thus setpoint spring 3 is chosen for the intermediate pressure stage with max. value p_z = 13 bar.

$$K_G\ erf = \frac{2 \bullet q_n}{p_{z\ abs}} = \frac{2 \bullet 230}{14} = 33\ m^3/h$$

Result: required valve diameter of the outlet pressure stage should be 12 mm with K_G = 40 m_3/h

Note:
The chosen K_G-value should be approx. 10 % to 20 % above the calculated K_G-value.

Determining the valve seat diameter of the intermediate pressure stage

Choosing the valve seat diameter of the intermediate pressure stage follows the same rules as a normal valve calculation using:
min. inlet pressure p_{emin}, intermediate pressure p_z from calculation 4.2, and max. flow $q_{n\ max}$.

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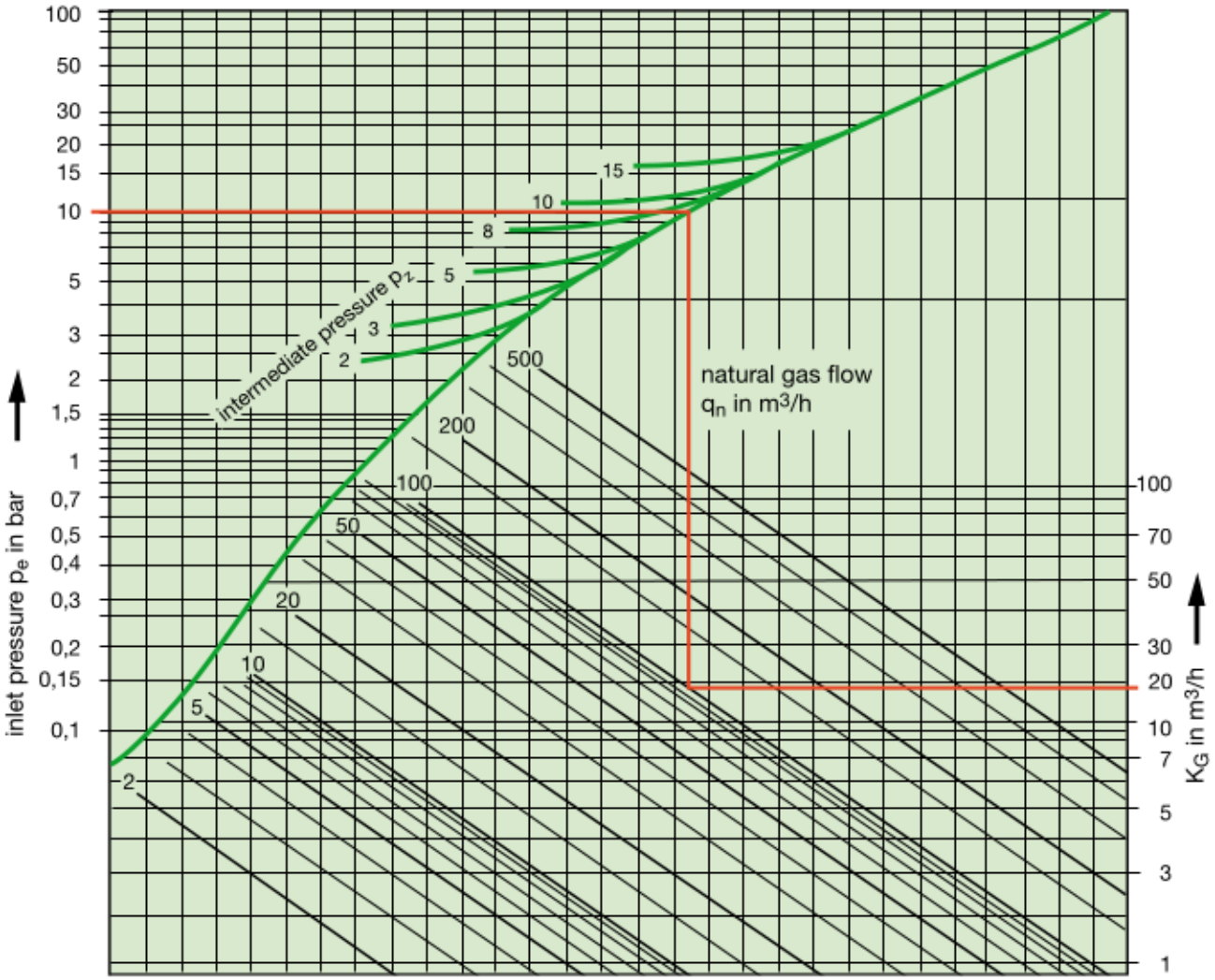
Intermediate prsssure stage:
Determination of the necessary flow rate coefficient K_G-value for natural gas (ρ_n = 0,83 kg/m³)
(use overpressure values in diagram!)



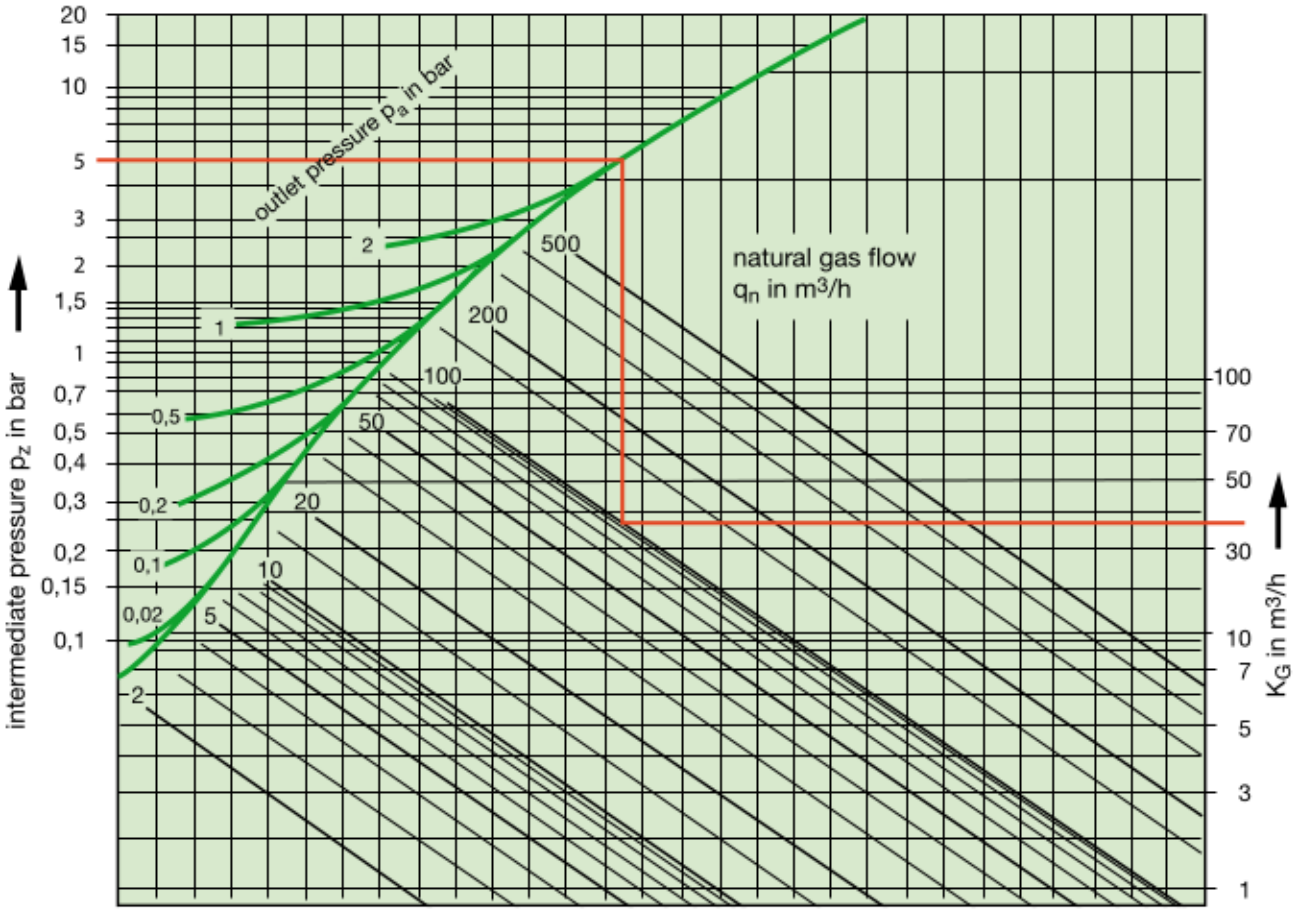
example:

p_e = 10 bar
q_{nmax} = 100 m³/h
p_Z = 5 bar

K_G from diagram = 18 m³/h

Determined: outlet pressure stage valve diameter 5.5 mm with K_G = 35 m³/h

Outlet prsssure stage:
Determination of the necessary flow rate coefficient K_G-value for natural gas (ρ_n = 0,83 kg/m³)
(use overpressure values in diagram!)



example:
p_e = 8 bar
q_{nmax} = 100 m³/h
p_z = 0,5 bar

K_G from diagram = 35 m³/h

Determined: outlet pressure stage valve diameter 12 mm with K_G = 40 m³/h.
NOTE: The chosen K_G-value should be 10% - 20% above the necessary K_G-value.

example: **RMG 201 - 12 - 25/40 - F2 - 3.7 - Ex - 0 - 3.5 - F3**

TYPE DESCRIPTION			
inlet- / outlet-connection			
inlet			
outer pipe diameter 12 mm			12
outer pipe diameter 16 mm			16
outer pipe diameter 18 mm			18
outlet			
outer pipe diameter 12 mm			12
outer pipe diameter 16 mm			16
outer pipe diameter 18 mm			18
outer pipe diameter 22 mm			22
outer pipe diameter 25 mm			25
outer pipe diameter 28 mm			28
outer pipe diameter 38 mm			38
outer pipe diameter 42 mm			42
flanged to PN 40		DN 25	25/40
		DN 40	40/40
		DN 50	50/40
flanged to ANSI 300 RF		DN 25	25/3F
		DN 40	40/3F
		DN 50	50/3F
flanged to ANSI 300 RTJ		DN 25	25/3J
		DN 40	40/3J
		DN 50	50/3J
flanged to ANSI 600 RF		DN 25	25/6F
		DN 40	40/6F
		DN 50	50/6F
flanged to ANSI 600 RTJ		DN 25	25/6J
		DN 40	40/6J
		DN 50	50/6J
intermediate pressure stage			
measuring stage	adjustable		
	p_{2max} = 9 bar + p_a		F2
	p_{2max} = 15 bar + p_a		F3
valve seat dia.	Ø 2.0 mm		2
	Ø 3.7 mm		3.7
	Ø 5.5 mm		5.5
	Ø 8.0 mm		8
Regelstufe			
measuring stage	external measuring line		Ex
	with safety relief valve (SBV), only for p_a up to 0.5 bar		SBV
	without safety relief valve (SBV)		0
valve seat dia.	Ø 1.5 mm		1.5
	Ø 3.5 mm		3.5
	Ø 6.0 mm		6
	Ø 10.0 mm		10
	Ø 12.0 mm		12
specific outlet pressure range	W_a = 20 - 40 mbar		F2
	W_a = 30 - 100 mbar		F3
	W_a = 75 - 250 mbar		F4
	W_a = 150 - 500 mbar		F5
	W_a = 0.25 - 1 bar		F6
	W_a = 0.5 - 1.8 bar		F7
	W_a = 0.75 - 2 bar		F8
safety relief valve			
safety relief valve response pressure p_s in bar	0.025 above p_a	setpoint spring:	F2
	0.050 above p_a		F3
	0.075 above p_a		F4
	0.100 above p_a		F5
	0.150 above p_a		F6*

*) only for p_a up to 0.5 bar