



Medium pressure regulator Type FRM

Direct acting pressure regulator with adjustable setpoint springs and modular mounted safety shutoff valve (SAV)

In compliance with EN 334 and EN 14382

- Inlet pressures up to 20 bar (2 000 kPa)
- High flow rate
- Stable, accurate and sensitive regulation of the outlet pressure
- Admission pressure compensation diaphragm for a high regulation accuracy
- External impulse
- Maintenance-friendly
- Flange connection according to DN 65 - DN 80



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FRM

Spring-loaded, pressure compensating regulator with adjustable setpoint springs for regulation of the regulator outlet pressure. External impulse of the regulator outlet pressure.

Application

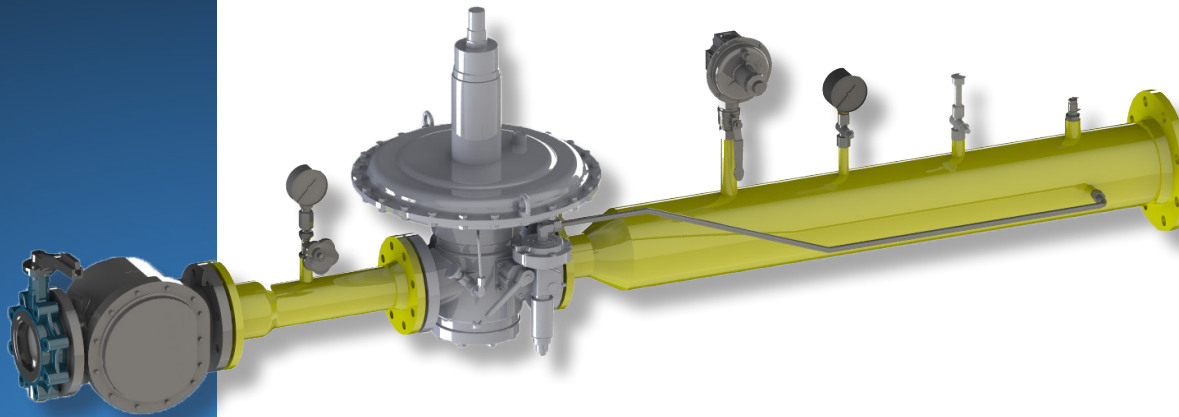
Pressure regulation of industrial gas burners and gas heating appliances. Also for installation in the municipal and commercial gas supply.

Suitable for gases of gas families 1, 2, 3 and other neutral gases.

Approval

EC type testing certificate as per:

- EC-Pressure Equipment Directive





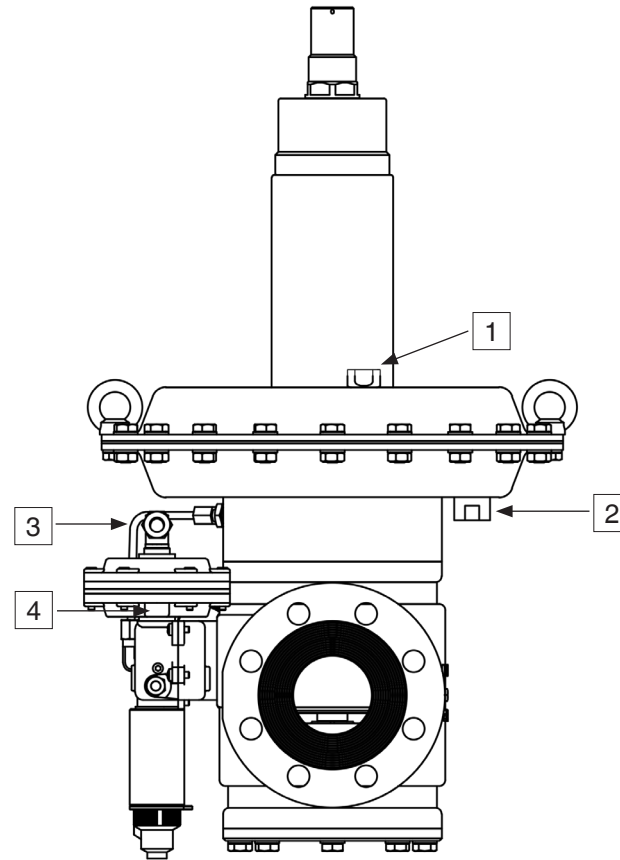
Type	FRM 100... IS (integral strength range) / FRM 250... DS (differential strength range)
Type of gas	Family 1+2+3 (e.g. manufactured gas (town gas), commercial grade natural gas and commercial grade LPG gases in the vaporized phase).
Nominal diameters Flanges	Connecting flanges PN 25 according to EN 1092-1 or ANSI Class 150 per B16.5 DN 65 80 NPS 2.5" 3"
Max. inlet pressure	FRM 250... 20 bar (2 000 kPa / 290 PSI) / FRM 100... 10 bar (1 000 kPa / 145 PSI)
Outlet pressure range	90-4 000 mbar (9 - 400 kPa) / 12 to 1 600 "W.C. (0.4 - 58 PSI)
Minimum inlet pressure (MD)	440 mbar (44 kPa) / 170 "W.C. (6.4 PSI)
Minimum inlet pressure (HD)	900 mbar (90 kPa) / 360 "W.C. (13 PSI)
Minimum inlet pressure (UHD)	1 500 mbar (150 kPa) / 602 "W.C. (22 PSI)
Accuracy class	up to AC 5 (see adjustment range, page 8)
Lock-up pressure class	up to SG 10 (see adjustment range, page 8)
Failure mode (diaphragm rupture)	fail-open
Materials	Main body housing: cast iron GJS 400-15 Diaphragm housing: steel Diaphragms: NBR
Ambient temperature	-20 °C to + 60 °C / -4 °F to + 140 °F

Safety shut-off valve in compliance with EN 14382, class A



Type	FRM 100... IS (integral strength range) / FRM 250... DS (differential strength range)	
Response time	< 2 s	
Lower adjustment range W_{du}	35 - 3 000 mbar (3,5 - 3 00 kPa) / 14 - 1 205 "W.C. (0.5 - 43.5 PSI)	
Upper adjustment range W_{do}	180 - 5 000 mbar (18 - 500 kPa) / 72 - 2 007 "W.C. (2.6 - 72.5 PSI)	
Materials	Main body housing:	cast iron GJS 400-15
	Diaphragm housing:	aluminium
	Diaphragms:	NBR

Pressure taps



- 1 Vent line connection of the regulator,
G $\frac{1}{2}$ ISO 228
- 2 External impulse line connection of the
regulator, Ermeto screw connection
GE 12- $\frac{1}{2}$ for tubes 12 x 1,5
- 3 External impulse line connection of the
SAV, Ermeto screw connection
GE 12- $\frac{1}{4}$ for tubes 12 x 1,5
- 4 Vent line connection SAV,
G $\frac{1}{4}$ ISO 228

Only for US/CDN versions:

- 1 $\frac{1}{2}$ " NPT adapter
- 2 $\frac{1}{2}$ " straight connector for $\frac{1}{2}$ " tubes
- 3 $\frac{1}{2}$ " elbow connector for $\frac{1}{2}$ " tubes
- 4 $\frac{1}{4}$ " NPT adapter

Example FRM 100080 MD/ SAV MD	FRM	080	MD	SAV	MD
Type	Spring-loaded medium pressure regulator				
Maximum operating pressure MOP	100 ...	10 000 mbar (1 000 kPa) 4 018 "W.C (145 PSI)			
	250 ...	20 000 mbar (2 000 kPa) 8 360 "W.C. (290 PSI)			
Nominal diameter	065	DN 65 (2½")			
	080	DN 80 (3")			
Pressure range, outlet pressure	MD	Medium pressure			
	HD	High pressure			
	UHD	Ultra high pressure			
Safety device	SAV	Integrated shut-off valve			
Pressure range, trip pressure	MD	Medium pressure			
	HD	High pressure			
	UHD	Ultra high pressure			
Flange type		with standard PN-25			
	ANSI	with ANSI Class 150			



Adjustment range

Type	Con- nection	Ver- sion	Accuracy class* [AC]	Lock-up pressure class* [SG]	Outlet pressure range W_d	Under pressure monitoring SAV		Over pressure monitoring SAV	
						W_{du}	AG	W_{do}	AG
FRM 100065 MD	DN 65	MD	AC 5/10**	SG 10/20**	90 - 420 mbar 36 - 168 "W.C.				
FRM 100065 HD	DN 65	HD	AC 5	SG 10	400 - 1 500 mbar 160 - 602 "W.C.				
FRM 250065 UHD	DN 65	UHD	AC 5	SG 10	1 000 - 4 000 mbar 400 - 1 600 "W.C.				
FRM 100065 MD / SAV MD	DN 65	MD	AC 5/10**	SG 10/20**	90 - 420 mbar 36 - 168 "W.C.	35 - 400 mbar 12 - 160 "W.C.	AG 10	180 - 800 mbar 72 - 321 "W.C.	AG 10
FRM 100065 HD / SAV HD	DN 65	HD	AC 5	SG 10	400 - 1 500 mbar 160 - 602 "W.C.	150 - 1 400 mbar 60 - 562 "W.C.	AG 5	500 - 3 500 mbar 200 - 1 406 "W.C.	AG 5
FRM 250065 UHD / SAV UHD	DN 65	UHD	AC 5	SG 10	1 000 - 4 000 mbar 400 - 1 600 "W.C.	150 - 3 000 mbar 60 - 1 200 "W.C.	AG 5	1 300 - 5 000 mbar 522 - 2 005 "W.C.	AG 5
FRM 100080 MD	DN 80	MD	AC 5/10**	SG 10/20**	90 - 420 mbar 36 - 168 "W.C.				
FRM 100080 HD	DN 80	HD	AC 5	SG 10	400 - 1 500 mbar 160 - 602 "W.C.				
FRM 250080 UHD	DN 80	UHD	AC 5	SG 10	1 000 - 4 000 mbar 400 - 1 600 "W.C.				
FRM 100080 MD / SAV MD	DN 80	MD	AC 5/10**	SG 10/20**	90 - 420 mbar 36 - 168 "W.C.	35 - 400 mbar 12 - 160 "W.C.	AG 10	180 - 800 mbar 72 - 321 "W.C.	AG 10
FRM 100080 HD / SAV HD	DN 80	HD	AC 5	SG 10	400 - 1 500 mbar 160 - 602 "W.C.	150 - 1 400 mbar 60 - 562 "W.C.	AG 5	500 - 3 500 mbar 200 - 1 406 "W.C.	AG 5
FRM 250080 UHD / SAV UHD	DN 80	UHD	AC 5	SG 10	1 000 - 4 000 mbar 400 - 1 600 "W.C.	150 - 3 000 mbar 60 - 1 200 "W.C.	AG 5	1 300 - 5 000 mbar 522 - 2 005 "W.C.	AG 5

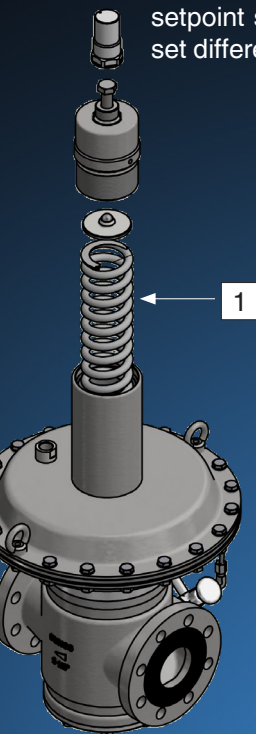
*Accuracy class / Lock-up pressure class to EN 334

** p_d = 90-180 mbar: AC 10, SG 20; p_d = 180-420 mbar: AC 5, SG 10



Selection of regulator springs

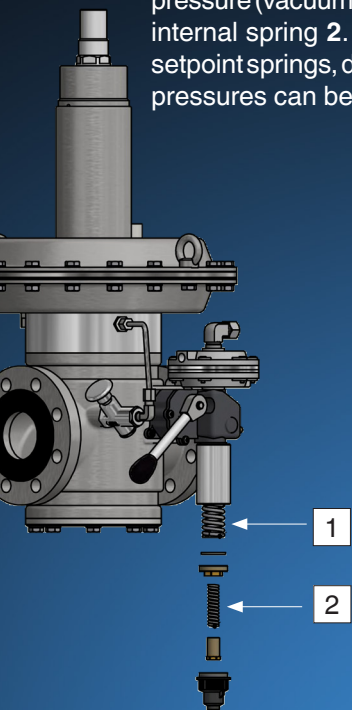
The response pressure results from the force of the installed adjusting spring and the weight force of the movable parts. By changing the setpoint spring 1, it is possible to set different outlet pressures.



Specific set range, outlet pressure W_{ds}							
Spring colour	Order number	Wire \varnothing [mm]	Length [mm]	\varnothing [mm]	Setpoint range		
					MD	HD	UHD
Blue	270347	8.0	300	65.0	90 - 140 mbar 36 - 56 "W.C		
Black	270348	9.0	300	68.0	120 - 185 mbar 48 - 74 "W.C	400-550 mbar 161 - 221 "W.C	
Purple	270349	10.0	300	69.0	180-280 mbar 72 - 112 "W.C	540-850 mbar 217 - 341"W.C	1 000 - 1 300 mbar 401 - 522 "W.C
Orange	270350	11.0	300	71.0	250-420 mbar 100 - 169 "W.C	800 - 1 150 mbar 321 - 462 "W.C	1 100 - 1 800 mbar 442 - 723 "W.C
Pink	270352	12.0	300	73.0		1 100 - 1 500 mbar 442 - 602 "W.C	1 600 - 2 500 mbar 642 "W.C. - 1 004 "W.C
Red	271132	14.0	300	77.0			2 900 - 4 000 mbar 964 - 1 606 "W.C.

Selection of SAV springs

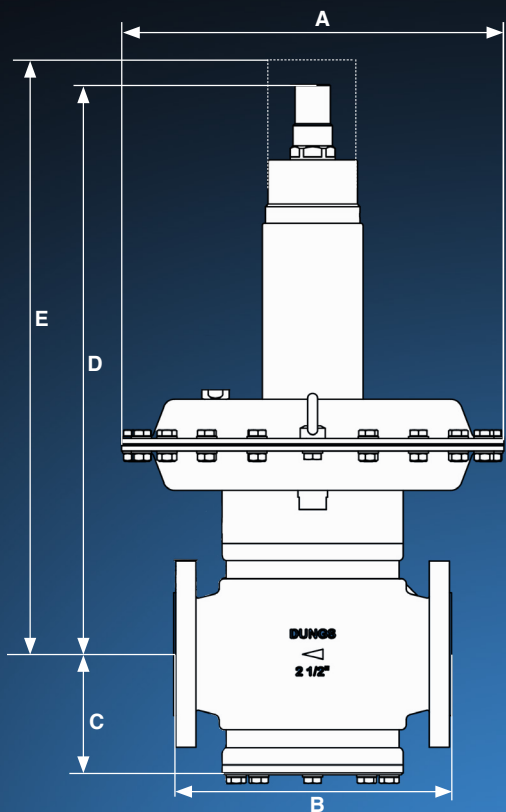
The response pressure results from the force of the installed adjusting spring. The upper response pressure (overpressure) is set on the external spring **1** of the measurement device. The lower response pressure (vacuum) can be set on the internal spring **2**. By changing the setpoint springs, different response pressures can be set.



Specific set range, underpressure W_{dsu}							
Spring colour	Order number	Wire \varnothing [mm]	Length [mm]	\varnothing [mm]	Setpoint range		
					MD	HD	UHD
Blue	270356	2.0	55	12.3	35 - 110 mbar 14 - 44 "W.C.		
Black	270357	2.3	55	12.3	50 - 250 mbar 20 - 100 "W.C.		
Purple	270358	2.5	55	12.3	80 - 400 mbar 32 - 160 "W.C.	150 - 500 mbar 60 - 200 "W.C.	150 - 500 mbar 62 - 101 "W.C.
Orange	270359	2.8	55	12.3		300 - 1 000 mbar 120 - 401 "W.C.	300 - 1 000 mbar 121 - 402 "W.C.
Silver	270360	3.0	60	15.0		800 - 1 400 mbar 321 - 563 "W.C.	800 - 1 400 mbar 321 - 563 "W.C.
Pink	276126	3.5	60	15.0			1 200 - 3 000 mbar 482 - 1 205 "W.C.

Specific set range, overpressure W_{dso}							
Spring colour	Order number	Wire \varnothing [mm]	Length [mm]	\varnothing [mm]	Setpoint range		
					MD	HD	UHD
Green	270366	2.5	60	30.0	180 - 270 mbar 72 - 117 "W.C.		
Red	270367	2.7	60	30.0	230 - 370 mbar 92 - 148 "W.C.		
Yellow	270368	3.2	60	30.0	300 - 500 mbar 120 - 200 "W.C.		
Blue	270369	3.5	60	30.0	400 - 800 mbar 160 - 321 "W.C.	500 - 1 000 mbar 120 - 401 "W.C.	
Black	270370	3.7	60	30.0		700 - 1 300 mbar 281 - 522 "W.C.	
Purple	270371	4.0	60	30.0		1 000 - 1 800 mbar 401 - 723 "W.C.	
Orange	270372	4.5	60	30.0		1 300 - 2 500 mbar 522 - 1 004 "W.C.	1 300 - 2 500 mbar 522 - 1 005 "W.C.
Pink	270373	4.8	60	30.0		1 800 - 3 500 mbar 723 - 1 406 "W.C.	1 800 - 3 500 mbar 723 - 1 407 "W.C.
White	271115	5.0	60	30.0			2 500 - 5 000 mbar 1 005 - 2 009 "W.C.

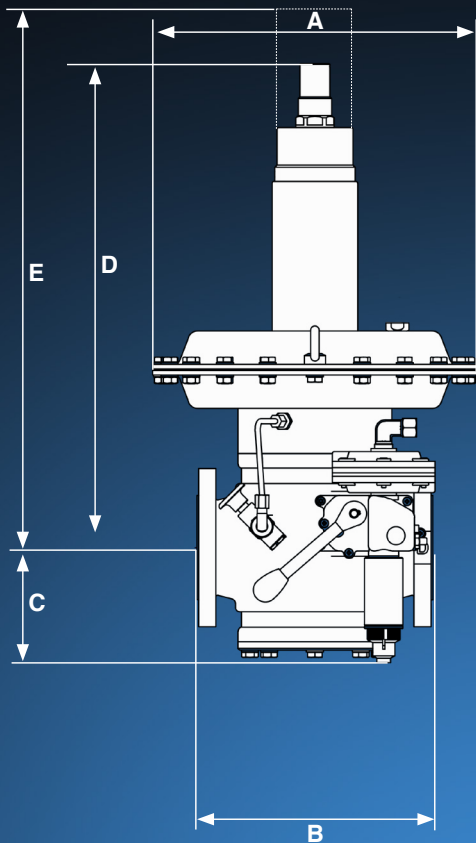
Dimensions FRM



Type	Order number	p _{max.} [bar / kPa/PSI]	DN	Dimensions [mm]					F**	G	Weight [kg]
				A	B	C	D	E			
FRM 100065 MD	277241	10 / 1 000 / 145	65	500	276	120	567	892	½ "G	ø 12	56 (123 lbs)
FRM 100065 HD	277242	10 / 1 000 / 145	65	380	276	120	567	892	½ "G	ø 12	50 (110 lbs)
FRM 250065 UHD	277243	20 / 2 000 / 290	65	380	276	120	567	892	½ "G	ø 12	52 (114 lbs)
FRM 100080 MD	277244	10 / 1 000 / 145	80	500	298	120	567	892	½ "G	ø 12	58 (128 lbs)
FRM 100080 HD	277245	10 / 1 000 / 145	80	380	298	120	567	892	½ "G	ø 12	53 (115 lbs)
FRM 250080 UHD	277246	20 / 2 000 / 290	80	380	298	120	567	892	½ "G	ø 12	55 (121 lbs)

**½ "G to ½ "NPT adapter p/n 231945

Dimensions FRM with SAV



Type	Order number	p _{max.} [bar / kPa/PSI]	DN	Dimensions [mm]							Weight [kg]
				A	B	C	D	E	F**	G	
FRM 100065 MD/SAV MD	273061	10 / 1 000 / 145	65	500	276	135	567	892	½ "G	∅ 12	71 (156 lbs)
FRM 100065 HD/SAV HD	276113	10 / 1 000 / 145	65	380	276	135	567	892	½ "G	∅ 12	65 (143 lbs)
FRM 250065 UHD/SAV UHD	276114	20 / 2 000 / 290	65	380	276	135	567	892	½ "G	∅ 12	67 (148 lbs)
FRM 100080 MD/SAV MD	276115	10 / 1 000 / 145	80	500	298	135	567	892	½ "G	∅ 12	73 (161 lbs)
FRM 100080 HD/SAV HD	276116	10 / 1 000 / 145	80	380	298	135	567	892	½ "G	∅ 12	68 (150 lbs)
FRM 250080 UHD/SAV UHD	276117	20 / 2 000 / 290	80	380	298	135	567	892	½ "G	∅ 12	70 (154 lbs)

**½ "G to ½ "NPT adapter p/n 231945

**Sectional drawing FRM
Pressure regulator in open position**

Function


Mode of operation according to the force comparison principle between the force:


- of the adjustable setpoint spring,
- coming from the differential pressure on the working diaphragm and
- of the weight of the movable parts.

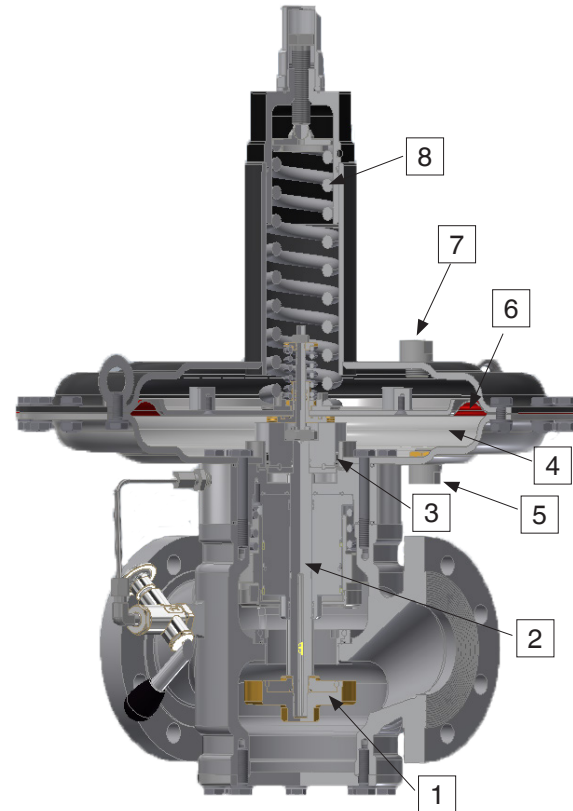
The setting spring acts independently of the weight of the movable parts. The outlet pressure is set depending on the preload of the setting spring.

Information

gas carrying and impulse lines and connecting lines must be resistant to thermal, chemical and mechanical stresses. They must also be durable and resistant to deformation and cracks.

 Any condensate from impulse lines must not flow into the pressure regulator.

 Combustible gas and gas/air mixtures must not enter the installation space of the adjusting spring.

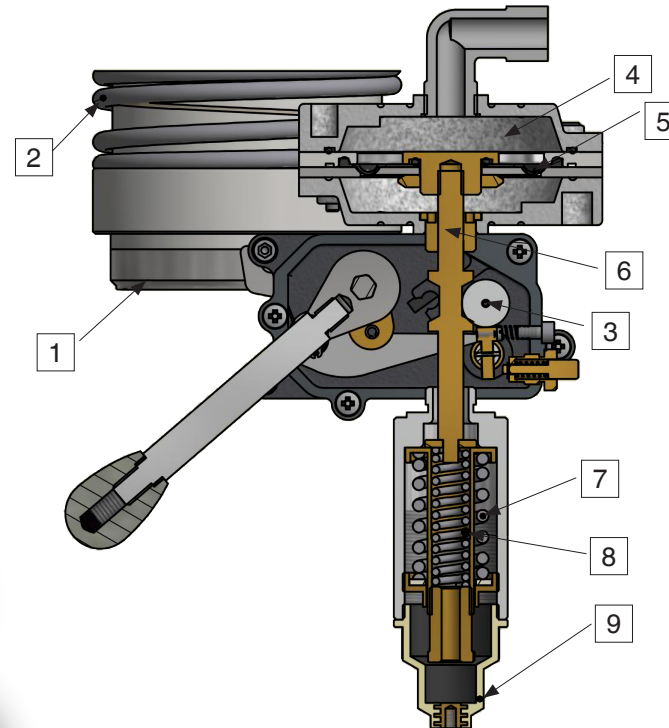


As the output pressure increases, the force in the lower diaphragm shell **4** increases to the working diaphragm **6**.

The working diaphragm **6** is pushed upwards, until the force of the setpoint spring **8** is equal to that of the outlet pressure. The upward movement of the working diaphragm **6** causes the working plate shaft **2** to be pulled upwards. In this way, the control plate **1** is then pushed upwards and the valve gap is reduced.

The flow volume decreased in this way reduces the outlet pressure until the set nominal value (outlet pressure) is reached and a balance of forces at the working diaphragm **6** is established.

- 1 Control plate
- 2 Control plate shaft
- 3 Inlet pressure compensation diaphragm
- 4 Lower diaphragm shell
- 5 Impulse connection for the outlet pressure
- 6 Working diaphragm
- 7 Vent connection
- 8 Setpoint spring



Chamber **4** is connected to the outlet pressure via an impulse line. The pressure being monitored acts on the working diaphragm **5**. The force of the setpoint springs **7** and **8** acts as counterforce. In case of an unbalance of forces (overpressure or underpressure), the SAV is actuated and the gas supply is blocked.

- 1 Valve disc
- 2 Closing spring
- 3 Ball catch / trigger mechanism
- 4 Chamber with the pressure to be monitored
- 5 Working diaphragm
- 6 Push rod
- 7 Setpoint spring for p_{d_o}
- 8 Setpoint spring for p_{d_u}
- 9 Protective cap

Device selection

The following flow rate tables can be used to select the device. The maximum indicated volume flow refers to the natural gas with a standard density of 0.81 kg/m³ at a temperature of 15 °C. In case of different types of gases, a conversion of the volume flow according to the equation on page 22 is carried out. It is possible to determine the maximum flow volume of the corresponding regulator at the operating point defined using p_d and p_u .



Design a straight stabilisation section with the equal diameter.



Impulse connection at a distance of > 5 x DN.



Maximum flow velocity in the stabilisation section of ≤ 30 m/s.

Flow rate tables

FRM 100065... DN 65 – max. flow volume [Nm³/h] natural gas of density 0.81 kg/m³ (K_G)

FRM ...	MD							HD					
p_d [bar] \ / \ p_u [bar]	0,1	0,15	0,2	0,25	0,3	0,35	0,4	0,4	0,5	0,75	1	1,25	1,5
0,2	346	399											
0,5	602	652	702	882	1061	1132	1202	1407					
0,75	809	857	906	1089	1273	1342	1411	1490	1517				
1	1010	1057	1105	1293	1480	1548	1615	1571	1599	1627			
1,5	1396	1443	1490	1685	1879	1944	2010	1726	1890	2054	2227	2400	
2	1759	1808	1857	2057	2257	2321	2386	1872	2164	2457	2668	2879	3877
2,5	2101	2154	2207	2411	2615	2679	2743	2009	2422	2835	3085	3335	4726
3	2420	2479	2537	2745	2953	3017	3082	2137	2663	3188	3478	3768	5527
3,5	2717	2783	2850	3061	3271	3336	3402	2257	2887	3516	3847	4178	6281
4	2991	3068	3145	3357	3569	3636	3703	2368	3094	3820	4192	4565	6986
4,5	3243	3333	3422	3634	3846	3916	3986	2470	3284	4098	4514	4929	7643
5	3473	3577	3680	3892	4104	4177	4250	2563	3457	4352	4811	5270	8253
6	3866	4005	4143	4350	4558	4640	4722	2723	3754	4785	5334	5883	9328
7	4170	4352	4534	4732	4931	5025	5120	2847	3983	5119	5761	6404	10211
8	4385	4618	4852	5038	5224	5333	5443	2936	4145	5353	6093	6833	10902
9	4511	4804	5097	5266	5436	5563	5691	2990	4239	5489	6329	7169	11401
10	4548	4909	5270	5419	5567	5716	5865	3009	4267	5525	6469	7414	11708

Device selection



Flow rate tables

FRM 100065 ... DN 65 - max. flow volume [CFH] natural gas of density 0.81 kg/m³ (AC 10)

FRM ...		MD						HD				
Outlet pressure P _v [PSI]	Inlet pressure p _d [PSI]	1.50	2.00	3.00	4.00	5.00	6.00	6.00	10.00	15.00	20.00	22.00
	Inlet pressure p _d [“W.C.]	41.6	55.4	83.1	110.8	138.5	166.2	166.2	277.1	415.6	554.2	609.6
3.0		12553	13829									
5.0		16700	17948	12374	16601	19154	20474	23974				
10.0		26902	28093	31122	40030	45338	48030	51912				
15.0		36709	37868	40864	50021	55361	57986	55846	58166			
20.0		46104	47258	50266	59646	65022	67595	59617	67771	732619	724500	
30.0		63900	65107	68252	78012	83468	85974	66761	85952	97275	123028	141016
40.0		80131	81495	84948	94989	100537	103036	73283	102517	117409	154461	181499
50.0		94990	96598	100513	110744	116396	118940	79258	117661	136065	183666	219003
60.0		108259	110217	114767	125087	130856	133505	84599	131165	153014	210296	253066
70.0		120073	122474	127822	138137	144034	146843	89361	143162	168397	234564	283972
80.0		130111	133069	139412	149607	155646	158684	93414	153323	181869	255950	311025
90.0		139099	142684	150137	160144	166334	169640	97049	162399	194213	275634	335805
100.0		146573	150884	159614	169335	175689	179320	100081	169910	204931	292864	357303
110		152220	157375	167586	176903	183435	187462	102385	175534	213683	307131	374841
120		156683	162759	174581	183418	190137	194604	104217	179932	221162	319476	389811
130		159846	166927	180505	188777	195695	200651	105531	182987	227245	329714	401964
145		64167	64167	64167	64167	64167	64167	64167	64167	64167	64167	64167

Device selection



Flow rate tables

FRM 100080... DN 80 – max. flow volume [Nm³/h] natural gas of density 0.81 kg/m³ (K_G)

FRM ...	MD							HD					
p_d [bar]	0,1	0,15	0,2	0,25	0,3	0,35	0,4	0,4	0,5	0,75	1	1,25	1,5
p_u [bar]													
0,2	407	469	531										
0,5	708	767	825	1037	1249	1331	1414	1655					
0,75	951	1008	1065	1282	1498	1579	1660	1753	1784				
1	1188	1244	1300	1521	1741	1821	1900	1848	1881	1914			
1,5	1642	1698	1753	1982	2210	2287	2364	2030	2224	2417	2620	2823	
2	2070	2128	2185	2420	2655	2731	2807	2202	2546	2891	3139	3387	4561
2,5	2471	2534	2596	2836	3077	3152	3227	2363	2849	3335	3629	3923	5560
3	2847	2916	2985	3230	3474	3550	3625	2515	3132	3750	4092	4433	6503
3,5	3196	3275	3353	3601	3848	3925	4002	2655	3396	4137	4526	4915	7389
4	3519	3610	3700	3949	4199	4278	4357	2786	3640	4494	4932	5371	8219
4,5	3816	3921	4026	4275	4525	4607	4689	2905	3863	4821	5310	5799	8992
5	4086	4208	4330	4579	4828	4914	5000	3015	4067	5120	5660	6200	9709
6	4549	4711	4874	5118	5362	5459	5555	3203	4416	5629	6275	6921	10974
7	4906	5120	5334	5567	5801	5912	6023	3350	4686	6022	6778	7534	12012
8	5159	5433	5708	5927	6145	6274	6403	3455	4876	6298	7168	8038	12825
9	5307	5652	5997	6196	6395	6545	6695	3518	4988	6457	7446	8435	13413
10	5350	5775	6200	6375	6549	6724	6900	3540	5020	6500	7611	8722	13774

Device selection

Flow rate tables



FRM 100080 ... DN 80 - max. flow volume [CFH] natural gas of density 0.81 kg/m³ (AC 10)

FRM ...		MD						HD				
Outlet pressure P ₀ [PSI]	Inlet pressure p _d [PSI]	1.50	2.00	3.00	4.00	5.00	6.00	6.00	10.00	15.00	20.00	22.00
	Inlet pressure p _d [°W.C.]	41.6	55.4	83.1	110.8	138.5	166.2	166.2	277.1	415.6	554.2	609.6
3.0		14769	16270									
5.0		19647	21115	14558	19531	22534	20474	23974				
10.0		31650	33050	36614	47094	53338	48030	51912				
15.0		43187	44550	48075	58848	65130	57986	55846	68430			
20.0		54240	55597	59137	70172	76497	67595	59617	79730	861900	852350	
30.0		75176	76597	80296	91779	98198	85974	66761	101120	114441	144739	141016
40.0		94273	95877	99939	111752	118279	103036	73283	120608	138128	181719	181499
50.0		111752	113645	118250	130287	136936	118940	79258	138425	160076	216078	219003
60.0		127365	129667	135020	147162	153948	133505	84599	154311	180016	247407	253066
70.0		141263	144087	150379	162514	169451	146843	89361	168426	198114	275958	283972
80.0		153072	156553	164014	176008	183113	158684	93414	180380	213964	301117	311025
90.0		163645	167864	176632	188405	195687	169640	97049	191058	228487	324276	335805
100.0		172438	177510	187781	199218	206693	179320	100081	199894	241094	344546	357303
110		179082	185147	197160	208121	215806	187462	102385	206510	251392	361330	374841
120		184333	191481	205389	215786	223691	194604	104217	211685	260191	375854	389811
130		188054	196385	212358	222090	230229	200651	105531	215279	267346	387899	401964
145		64167	64167	64167	64167	64167	64167	64167	64167	64167	64167	64167

Device selection



Flow rate tables

FRM 250065 UHD... DN 65 - max. flow volume
[Nm³/h] natural gas of density 0,81 kg/m³ (AC 10)

FRM ...	UHD							
p_d [bar]	1	1,5	2	2,5	3	3,5	4	
p_u [bar]								
1,5	1002							
2	1093	1233						
2,5	1185	1598	2011					
3	1275	1692	2108	2537				
3,5	1366	1829	2291	2768	3705			
4	1456	1964	2472	2995	4040	5085		
6	1813	2495	3177	3880	4695	5511	6351	
8	2164	3008	3852	4722	5688	6655	7650	
10	2509	3503	4498	5523	6622	7721	8854	
12	2847	3981	5114	6282	7497	8712	9964	
14	3180	4440	5700	6999	8312	9626	10979	
16	3506	4881	6257	7674	9068	10463	11900	
18	3827	5305	6784	8307	9765	11224	12726	
20	4141	5711	7281	8898	10403	11908	13458	
22	4449	6099	7748	9448	10982	12515	14096	
25	4900	6647	8394	10194	11738	13283	14875	

FRM 250065 UHD... DN 65 - max. flow volume
[Nm³/h] natural gas of density 0,81 kg/m³ (AC 5)

FRM ...	UHD							
p_d [bar]	1	1,5	2	2,5	3	3,5	4	
p_u [bar]								
1,5	979							
2	1024	1195						
2,5	1068	1282	1496					
3	1112	1259	1405	1556				
3,5	1156	1351	1545	1745	2038			
4	1201	1442	1682	1931	2318	2706		
6	1378	1795	2213	2643	3296	3949	4622	
8	1555	2133	2711	3307	4039	4771	5525	
10	1732	2455	3178	3923	4728	5534	6365	
12	1909	2760	3612	4489	5364	6239	7140	
14	2086	3050	4014	5007	5946	6885	7852	
16	2263	3323	4383	5476	6474	7472	8500	
18	2440	3580	4721	5896	6948	8000	9084	
20	2617	3822	5026	6268	7369	8470	9604	
22	2794	4047	5300	6590	7735	8881	10060	
25	3060	4354	5649	6983	8185	9387	10625	

Device selection



Flow rate tables

FRM 250080 UHD... DN 80 - max. flow volume
[Nm³/h] natural gas of density 0,81 kg/m³ (AC 10)

FRM ...	UHD						
p_d [bar]	1	1,5	2	2,5	3	3,5	4
p_u [bar]							
1,5	1178						
2	1286	1450					
2,5	1394	1880	2366				
3	1501	1991	2480	2985			
3,5	1607	2151	2695	3256	4359		
4	1713	2311	2908	3524	4753	5982	
6	2133	2935	3738	4564	5524	6484	7472
8	2546	3539	4532	5556	6692	7829	9000
10	2951	4122	5292	6498	7791	9084	10417
12	3350	4683	6016	7390	8820	10249	11722
14	3741	5224	6706	8234	9779	11324	12917
16	4125	5743	7361	9028	10669	12309	14000
18	4502	6241	7981	9773	11489	13204	14972
20	4871	6718	8566	10469	12239	14009	15833
22	5234	7175	9115	11115	12920	14724	16583
25	5764	7820	9875	11992	13810	15627	17500

FRM 250080 UHD... DN 80 - max. flow volume
[Nm³/h] natural gas of density 0,81 kg/m³ (AC 5)

FRM ...	UHD						
p_d [bar]	1	1,5	2	2,5	3	3,5	4
p_u [bar]							
1,5	1152						
2	1204	1406					
2,5	1256	1508	1760				
3	1308	1481	1653	1831			
3,5	1360	1589	1817	2053	2398		
4	1412	1696	1979	2271	2727	3183	
6	1621	2112	2604	3110	3878	4646	5437
8	1829	2510	3190	3891	4752	5613	6500
10	2037	2888	3739	4615	5563	6511	7488
12	2246	3247	4249	5281	6311	7340	8400
14	2454	3588	4722	5890	6995	8100	9238
16	2662	3910	5157	6442	7616	8790	10000
18	2871	4212	5554	6937	8174	9412	10687
20	3079	4496	5913	7374	8669	9964	11299
22	3287	4761	6235	7753	9100	10448	11836
25	3600	5123	6646	8215	9629	11043	12500

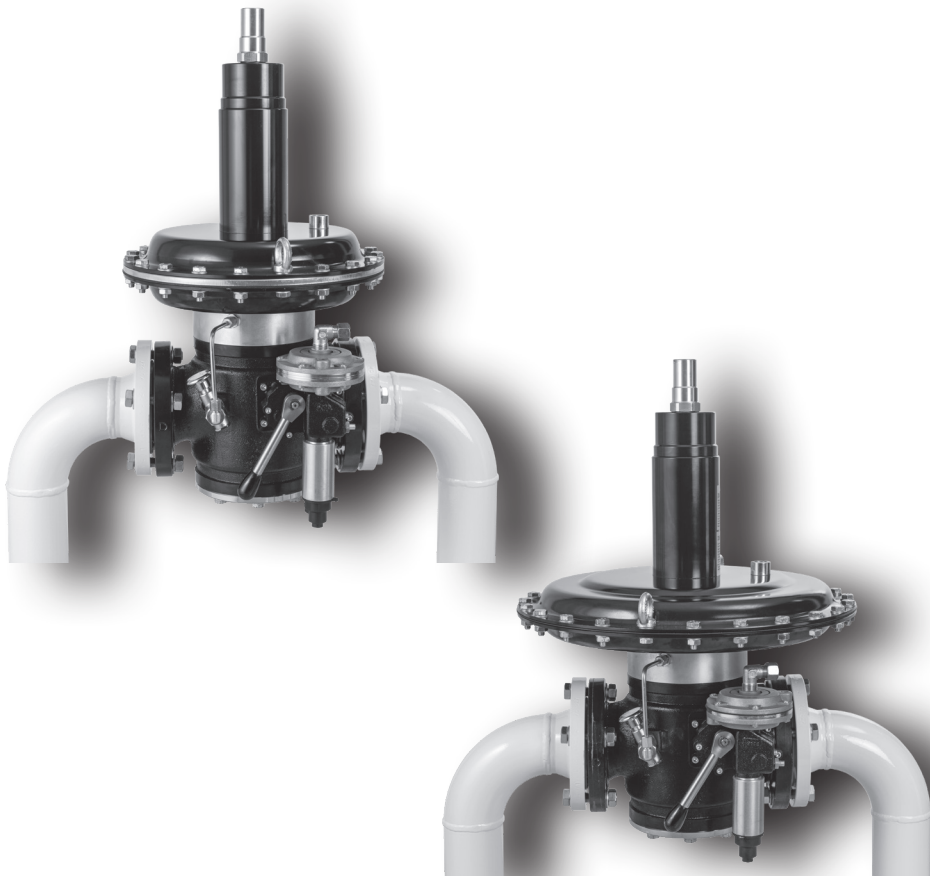
Calculation of gas types



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

$$f = \sqrt{\frac{\text{air density}}{\text{spec. weight of the gas used}}}$$

Type of gas	Spec. Wgt.	dv	f
	[kg/m³]		
Natural gas	0.81	0.65	1.24
City gas	0.58	0.47	1.46
LPG	2.08	1.67	0.77
Air	1.24	1.00	1.00



Subject to technical modification in the interest of technical progress.

Karl Dungs GmbH & Co. KG
Karl-Dungs-Platz 1
73660 Urbach,
Germany

Phone +49 (0)7181-804-0
Fax +49 (0)7181-804-166
E-mail info@dungs.com
Internet www.dungs.com