

FRM-NOC

Medium Pressure Controller

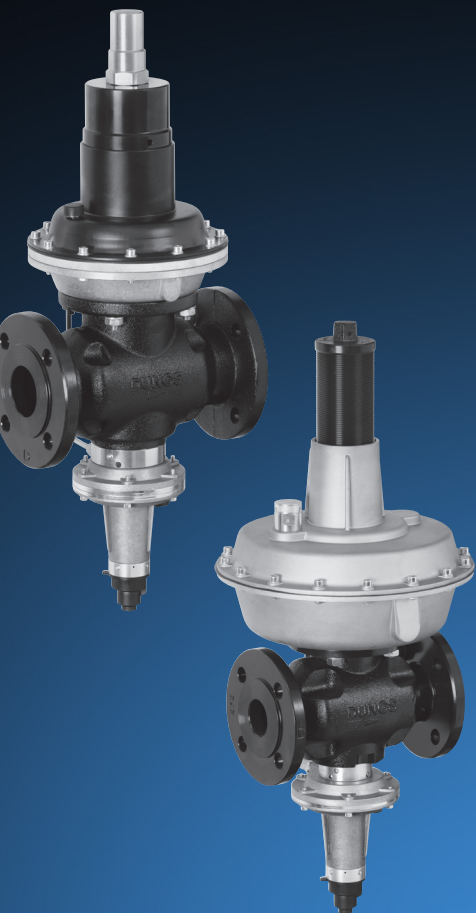


Medium Pressure Controller FRM-NOC

Direct acting pressure controller without inlet pressure balancing with adjustable setpoint spring and modularly attachable safety shut-off valve (SAV).

In compliance with EN 334 and EN 14382

- Input pressures up to 10 bar (1 000 kPa)
- Rapid response to changes in flows
- 4 to 6 different seat diameters available for each size
- Regulating cup without inlet pressure balancing
- Internal pulse (optional: external pulse)
- Easy maintenance
- Flange connection DN 25 - DN 50 / threaded connection 1"-2"
- For applications with constant input pressure P_u



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FRM-NOC

Direct acting (spring-loaded) pressure controller without inlet pressure balancing with adjustable setpoint spring for controlling the controller output pressure. Controller output pressure internal tap (optional: external tap).

Applications

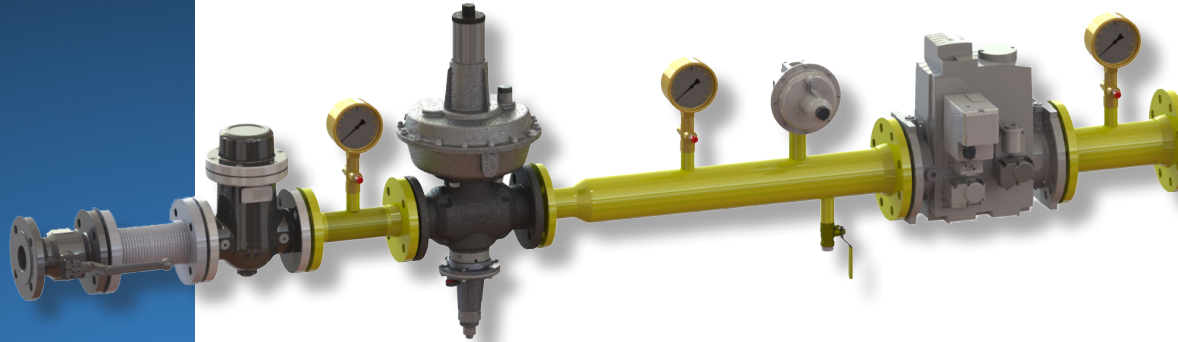
For systems that require rapid response to changes in flows (industrial gas burners and gas burning appliances).

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

Approval

EC type-examination certificate according to:

- EC Pressure Equipment Directive





Medium pressure controller according to EN 334

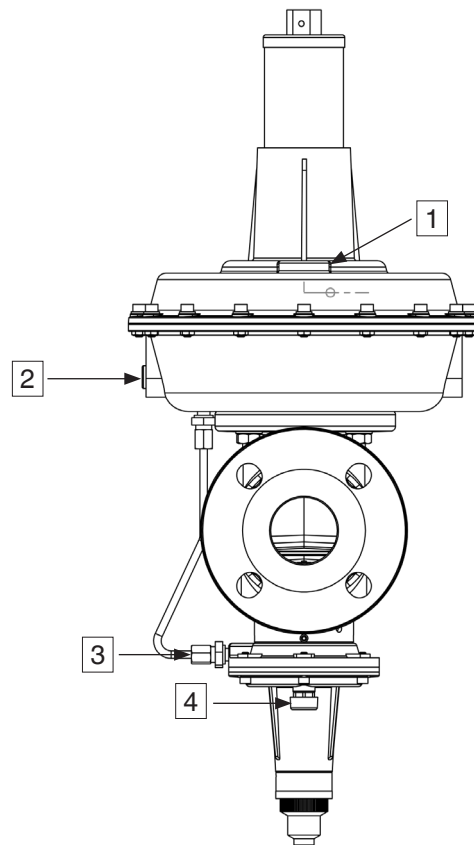
Model	DS (differential strength range)		
Type of gas	Family 1, 2, 3 according to EN 437		
Nominal diameters of flanges	Connecting flanges PN 25 according to EN 1092-1 or ANSI 150 lbs (B16.5)	DN	25 40 50
Nominal diameters of threads	Connecting threads according to BSP (ISO 228/1) or NPT (B1.20.1)	G	1 1½ 2
Max. input pressure	10 bar (1 000 kPa)		
Output pressure range	20 mbar to 4 000 mbar (2-400 kPa)		
Minimum differential pressure (ND)	20 mbar (2 kPa)		
Minimum differential pressure (MD)	80 mbar (8 kPa)		
Minimum differential pressure (HD/UHD)	250 mbar (25 kPa)		
Control quality	up to AC 5 (see Adjustment ranges on page 8+9)		
Closing pressure group	up to SG 10 (see Adjustment ranges on page 8+9)		
Failure mode (diaphragm rupture)	Fail-open		
Materials	Controller housing:	Cast iron GGG 50 (GJS 400-18 on request)	
	Diaphragm housing:	Aluminium/steel plate (UHD)	
	Diaphragms:	NBR	
Ambient temperature	-20 °C to +60 °C		



Safety shut-off valve according to EN 14382, class A

Model	DS (differential strength range)	
Response time	< 2 s	
Lower adjustment range W_{du}	10 mbar to 3 000 mbar (1-300 kPa)	
Upper adjustment range W_{do}	40 mbar to 5 000 mbar (4-500 kPa)	
Materials	Main body housing:	Cast iron GGG 50 (GJS 400-18 on request)
	Diaphragm housing:	Aluminium
	Diaphragms:	NBR

Pressure taps



- 1 Controller vent line connection,
G $\frac{1}{4}$ ISO 228
G $\frac{1}{2}$ ISO 228 (2", DN 40, DN 50 ND, MD)
- 2 Connection for external pulse (optional)
controller, Ermeto screw connection
GE 12 - $\frac{1}{4}$ for tubes 12x1.5
- 3 Connection for external pulse SAV,
Ermeto screw connection
GE 12 - $\frac{1}{4}$ for tubes 12x1.5
- 4 Vent line connection SAV,
G $\frac{1}{4}$ ISO 228



Example FRM-NOC 100025 ND / SAV ND	FRM-NOC	100	025	ND	SAV	ND
Type	Medium pressure controller without inlet pressure balancing					
MOP	100 ... 10 000 mbar (1 000 kPa)					
Nominal diameter	10 1" 15 1½" 20 2" 025 DN 25 040 DN 40 050 DN 50					
Output pressure ranges	ND Low pressure MD Medium pressure HD High pressure UHD Ultra high pressure					
Safety device	SAV Integrated safety shut-off valve					
Trip pressure ranges (SAV)	ND Low pressure MD Medium pressure HD High pressure UHD Ultra high pressure					
Flange/thread type	with standard Rp or PN 25 ANSI with flanges ANSI 150 lbs NPT with NPT threads					

Adjustment range



Type	Con- nection	Model	Accuracy class* [AC]	Closing pressure group* [SG]	Output pressure range W_d	Lower switching point SAV		Upper switching point SAV	
						W_{du}	AG	W_{do}	AG
FRM-NOC 10010 ND	G1"	ND	10 %	20 %	20-100 mbar				
FRM-NOC 10010 MD	G1"	MD	5 % / 10 %**	20 %	80-400 mbar				
FRM-NOC 10010 HD	G1"	HD	5 %	10 %	300-1 500 mbar				
FRM-NOC 10010 UHD	G1"	UHD	5 %	10 %	1 000-4 000 mbar				
FRM-NOC 10010 ND / SAV ND	G1"	ND	10 %	20 %	20-100 mbar	10-115 mbar	10 %	40-240 mbar	10 %
FRM-NOC 10010 MD / SAV MD	G1"	MD	5 % / 10 %**	20 %	80-400 mbar	35-400 mbar	10 %	180-800 mbar	10 %
FRM-NOC 10010 HD / SAV HD	G1"	HD	5 %	10 %	300-1 500 mbar	150-1 400 mbar	5 %	500-3 500 mbar	5 %
FRM-NOC 10010 UHD / SAV UHD	G1"	UHD	5 %	10 %	1 000-4 000 mbar	150-3 000 mbar	5 %	1 300-5 000 mbar	5 %
FRM-NOC 10015 ND	G1½"	ND	10 %	20 %	20-100 mbar				
FRM-NOC 10015 MD	G1½"	MD	5 % / 10 %**	20 %	80-400 mbar				
FRM-NOC 10015 HD	G1½"	HD	5 %	10 %	300-1 500 mbar				
FRM-NOC 10015 UHD	G1½"	UHD	5 %	10 %	1 000-4 000 mbar				
FRM-NOC 10015 ND / SAV ND	G1½"	ND	10 %	20 %	20-100 mbar	10-115 mbar	10 %	40-240 mbar	10 %
FRM-NOC 10015 MD / SAV MD	G1½"	MD	5 % / 10 %**	20 %	80-400 mbar	35-400 mbar	10 %	180-800 mbar	10 %
FRM-NOC 10015 HD / SAV HD	G1½"	HD	5 %	10 %	300-1 500 mbar	150-1 400 mbar	5 %	500-3 500 mbar	5 %
FRM-NOC 10015 UHD / SAV UHD	G1½"	UHD	5 %	10 %	1 000-4 000 mbar	150-3 000 mbar	5 %	1 300-5 000 mbar	5 %
FRM-NOC 10020 ND	G2"	ND	10 %	20 %	20-100 mbar				
FRM-NOC 10020 MD	G2"	MD	5 % / 10 %**	20 %	80-400 mbar				
FRM-NOC 10020 HD	G2"	HD	5 %	10 %	300-1 500 mbar				
FRM-NOC 10020 UHD	G2"	UHD	5 %	10 %	1 000-4 000 mbar				
FRM-NOC 10020 ND / SAV ND	G2"	ND	10 %	20 %	20-100 mbar	10-115 mbar	10 %	40-240 mbar	10 %
FRM-NOC 10020 MD / SAV MD	G2"	MD	5 % / 10 %**	20 %	80-400 mbar	35-400 mbar	10 %	180-800 mbar	10 %
FRM-NOC 10020 HD / SAV HD	G2"	HD	5 %	10 %	300-1 500 mbar	150-1 400 mbar	5 %	500-3 500 mbar	5 %
FRM-NOC 10020 UHD / SAV UHD	G2"	UHD	5 %	10 %	1 000-4 000 mbar	150-3 000 mbar	5 %	1 300-5 000 mbar	5 %

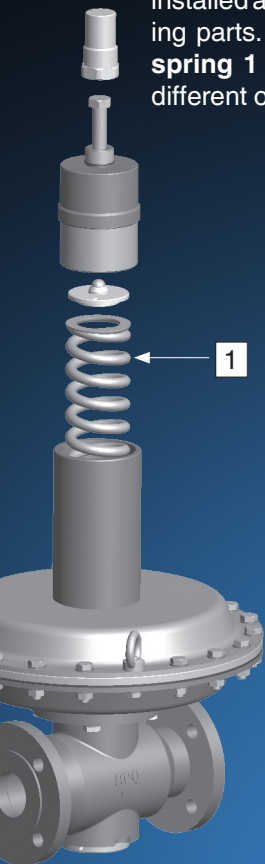
Adjustment range



Type	Con- nection	Model	Accuracy class* [AC]	Closing pressure group* [SG]	Output pressure range W_d	Lower switching point SAV		Upper switching point SAV	
						W_{du}	AG	W_{do}	AG
FRM-NOC 100025 ND	DN 25	ND	10 %	20 %	20-100 mbar				
FRM-NOC 100025 MD	DN 25	MD	5 % / 10 %**	20 %	80-400 mbar				
FRM-NOC 100025 HD	DN 25	HD	5 %	10 %	300-1 500 mbar				
FRM-NOC 100025 UHD	DN 25	UHD	5 %	10 %	1 000-4 000 mbar				
FRM-NOC 100025 ND / SAV ND	DN 25	ND	10 %	20 %	20-100 mbar	10-115 mbar	10 %	40-240 mbar	10 %
FRM-NOC 100025 MD / SAV MD	DN 25	MD	5 % / 10 %**	20 %	80-400 mbar	35-400 mbar	10 %	180-800 mbar	10 %
FRM-NOC 100025 HD / SAV HD	DN 25	HD	5 %	10 %	300-1 500 mbar	150-1 400 mbar	5 %	500-3 500 mbar	5 %
FRM-NOC 100025 UHD / SAV UHD	DN 25	UHD	5 %	10 %	1 000-4 000 mbar	150-3 000 mbar	5 %	1 300-5 000 mbar	5 %
FRM-NOC 100040 ND	DN 40	ND	10 %	20 %	20-100 mbar				
FRM-NOC 100040 MD	DN 40	MD	5 % / 10 %**	20 %	80-400 mbar				
FRM-NOC 100040 HD	DN 40	HD	5 %	10 %	300-1 500 mbar				
FRM-NOC 100040 UHD	DN 40	UHD	5 %	10 %	1 000-4 000 mbar				
FRM-NOC 100040 ND / SAV ND	DN 40	ND	10 %	20 %	20-100 mbar	10-115 mbar	10 %	40-240 mbar	10 %
FRM-NOC 100040 MD / SAV MD	DN 40	MD	5 % / 10 %**	20 %	80-400 mbar	35-400 mbar	10 %	180-800 mbar	10 %
FRM-NOC 100040 HD / SAV HD	DN 40	HD	5 %	10 %	300-1 500 mbar	150-1 400 mbar	5 %	500-3 500 mbar	5 %
FRM-NOC 100040 UHD / SAV UHD	DN 40	UHD	5 %	10 %	1 000-4 000 mbar	150-3 000 mbar	5 %	1 300-5 000 mbar	5 %
FRM-NOC 100050 ND	DN 50	ND	10 %	20 %	20-100 mbar				
FRM-NOC 100050 MD	DN 50	MD	5 % / 10 %**	20 %	80-400 mbar				
FRM-NOC 100050 HD	DN 50	HD	5 %	10 %	300-1 500 mbar				
FRM-NOC 100050 UHD	DN 50	UHD	5 %	10 %	1 000-4 000 mbar				
FRM-NOC 100050 ND / SAV ND	DN 50	ND	10 %	20 %	20-100 mbar	10-115 mbar	10 %	40-240 mbar	10 %
FRM-NOC 100050 MD / SAV MD	DN 50	MD	5 % / 10 %**	20 %	80-400 mbar	35-400 mbar	10 %	180-800 mbar	10 %
FRM-NOC 100050 HD / SAV HD	DN 50	HD	5 %	10 %	300-1 500 mbar	150-1 400 mbar	5 %	500-3 500 mbar	5 %
FRM-NOC 100050 UHD / SAV UHD	DN 50	UHD	5 %	10 %	1 000-4 000 mbar	150-3 000 mbar	5 %	1 300-5 000 mbar	5 %

Controller spring selection

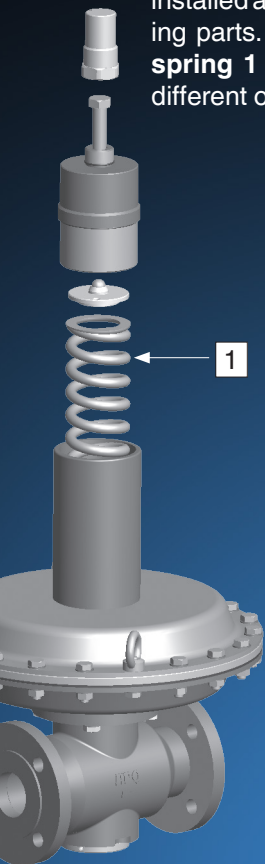
The output pressure results from the force of the adjusting spring installed and the weight of the moving parts. By changing **adjusting spring 1** it is possible to achieve different output pressures.



Output pressure W_{ds} adjustment ranges for FRM-NOC 10010 / 10015 / 100025								
Spring colour	Order number	Wire diameter [mm]	Diameter [mm]	Length [mm]	Setpoint range [mbar]			
					ND	MD	HD	UHD
Red	287881	2.5	37	134	20-35			
White	287882	2.8	37	134	30-50			
Yellow	287883	3	37	134	50-75			
Blue	274969	3.2	37	130	60-100	80-150		
Black	274970	3.5	37	130		100-200		
Purple	274971	3.7	37	130		130-250		
Orange	274972	4	37	130		180-350		
Pink	274973	4.3	37	130		200-400		
White 2	287888	4.5	35	100			300-500	
Yellow 2	287889	5	35	100			450-700	
Blue 2	287890	5.5	35	100			550-900	
Black 2	287891	6	35	100			650-1 150	
Purple 2	287892	6.5	35	100			1 000-1 500	
Purple 3	287893	10	70	155				1 000-1 600
Orange 2	287894	11	70	155				1 500-2 400
Pink 2	287895	12	73	155				2 300-3 600
Red 2	287896	13	74	160				3 500-4 000

Controller spring selection

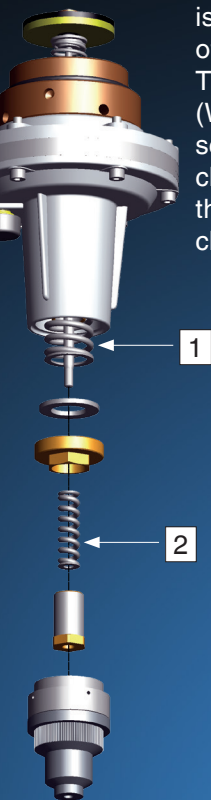
The output pressure results from the force of the adjusting spring installed and the weight of the moving parts. By changing **adjusting spring 1** it is possible to achieve different output pressures.



Output pressure W_{ds} adjustment ranges for FRM-NOC 10020 / 100040 / 100050								
Spring colour	Order number	Wire diameter [mm]	Diameter [mm]	Length [mm]	Setpoint range [mbar]			
					ND	MD	HD	UHD
Yellow	287884	3.5	50	220	20-25			
Blue	287885	4	50	220	25-45			
Black	287886	4.5	50	220	30-65			
Silver	287887	5	50	220	50-100			
Pink	274982	5.5	50	260		80-150		
Green	274983	6	50	260		130-250		
Blue 2	274985	7	50	240		200-350		
Black 2	274986	8	50	240		300-400		
White	287888	4.5	35	100			300-500	
Yellow 2	287889	5	35	100			450-700	
Blue 3	287890	5.5	35	100			550-900	
Black 2	287891	6	35	100			650-1 150	
Purple 2	287892	6.5	35	100			1 000-1 500	
Purple 3	287893	10	70	155				1 000-1 600
Orange 2	287894	11	70	155				1 500-2 400
Pink 2	287895	12	73	155				2 300-3 600
Red 2	287896	13	74	160				3 500-4 000

SAV springs selection

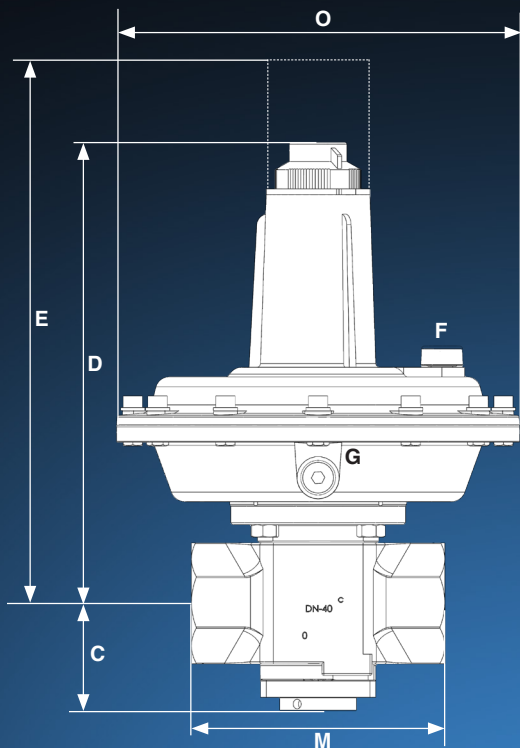
The output pressure results from the force of the adjusting spring installed. The upper response pressure (W_{dso} overpressure) is set on external **spring 1** of the measurement device. The lower response pressure (W_{dsu} underpressure) can be set on internal **spring 2**. By changing the adjusting springs the response pressures are changed.



Specific W_{dsu} underpressure adjustment ranges								
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]			
					ND	MD	HD	UHD
White	270353	1.2	60	10.0	10-32			
Yellow	270355	1.5	55	12.3	24-40			
Blue	270356	2.0	55	12.3	30-115	35-110		
Black	270357	2.3	55	12.3		50-250		
Purple	270358	2.5	55	12.3		80-400	150-500	150-500
Orange	270359	2.8	55	12.3			300-1 000	300-1 000
Silver	270360	3.0	60	15.0			800-1 400	800-1 400
Pink	276126	3.0	60	15.0				1 200-3 000

Specific W_{dso} overpressure adjustment ranges								
Spring colour	Order number	Wire diameter [mm]	Length [mm]	Diameter [mm]	Setpoint range [mbar]			
					ND	MD	HD	UHD
Silver	270361	2.2	60	30.0	40-130			
Green	270366	2.5	60	30.0	60-190	180-290		
Red	270367	2.7	60	30.0	90-240	230-370		
Yellow	270368	3.2	60	30.0		300-500		
Blue	270369	3.5	60	30.0		400-800	500-1 000	
Black	270370	3.7	60	30.0			700-1 300	
Purple	270371	4.0	60	30.0			1 000-1 800	
Orange	270372	4.5	60	30.0			1 300-2 500	1 300-2 500
Pink	270373	4.8	60	30.0			1 800-3 500	1 800-3 500
White	271115	5.0	60	30.0				2 500-5 000

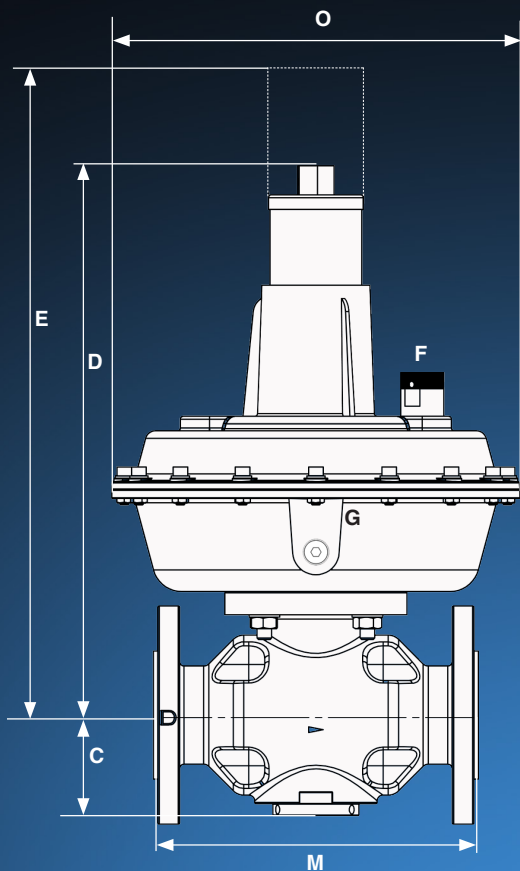
Dimensions FRM-NOC



Type	Order number		p _{max.} [bar/kPa]	DN	Dimensions [mm]							Weight [kg]
	BSP	NPT			O	M	C	D	E	F	G*	
FRM-NOC 10010 ND	279054	280236	10 / 1 000	1"	210	104	57	240	250	G¼"	G¼"	5
FRM-NOC 10010 MD	279055	280237	10 / 1 000	1"	210	104	57	240	250	G¼"	G¼"	5
FRM-NOC 10010 HD	279058	280238	10 / 1 000	1"	210	104	57	240	250	G¼"	G¼"	5
FRM-NOC 10010 UHD	279059	280239	10 / 1 000	1"	210	104	57	342	667	G¼"	G¼"	9
FRM-NOC 10015 ND	279060	280240	10 / 1 000	1½"	210	132	57	240	250	G¼"	G¼"	6
FRM-NOC 10015 MD	279061	280241	10 / 1 000	1½"	210	132	57	240	250	G¼"	G¼"	6
FRM-NOC 10015 HD	279062	280242	10 / 1 000	1½"	210	132	57	240	250	G¼"	G¼"	6
FRM-NOC 10015 UHD	279063	280243	10 / 1 000	1½"	210	132	57	342	667	G¼"	G¼"	10
FRM-NOC 10020 ND	279064	280244	10 / 1 000	2"	280	156	61	345	495	G½"	G¼"	12
FRM-NOC 10020 MD	279065	280245	10 / 1 000	2"	280	156	61	345	495	G½"	G¼"	12
FRM-NOC 10020 HD	279066	280246	10 / 1 000	2"	210	156	61	245	255	G¼"	G¼"	11
FRM-NOC 10020 UHD	279067	280247	10 / 1 000	2"	210	156	61	345	670	G¼"	G¼"	16

*G for external tap (optional)

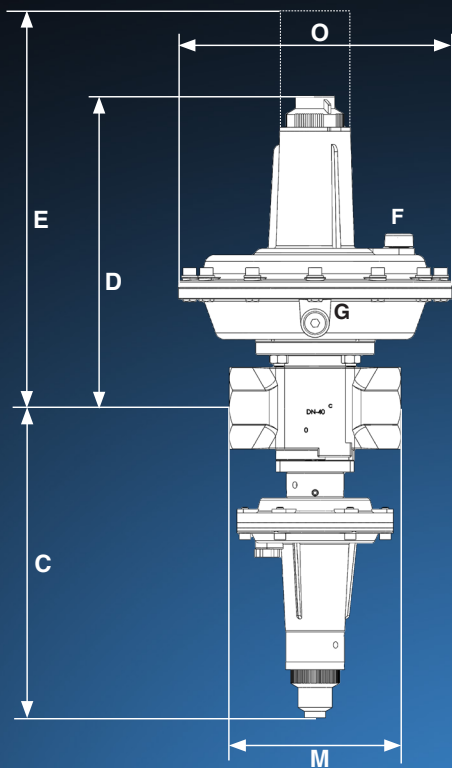
Dimensions FRM-NOC



Type	Order number		p _{max.} [bar/kPa]	DN	Dimensions [mm]							Weight [kg]
	DN	ANSI			O	M	C	D	E	F	G*	
FRM-NOC 100025 ND	279085	280260	10 / 1 000	25	210	184	50	260	270	G¼"	G¼"	9
FRM-NOC 100025 MD	279086	280261	10 / 1 000	25	210	184	50	260	270	G¼"	G¼"	9
FRM-NOC 100025 HD	279087	280262	10 / 1 000	25	210	184	50	260	270	G¼"	G¼"	9
FRM-NOC 100025 UHD	279088	280263	10 / 1 000	25	210	184	50	362	687	G¼"	G¼"	13
FRM-NOC 100040 ND	279089	280264	10 / 1 000	40	280	223	70	350	500	G½"	G¼"	17
FRM-NOC 100040 MD	279090	280265	10 / 1 000	40	280	223	70	350	500	G½"	G¼"	17
FRM-NOC 100040 HD	279091	280266	10 / 1 000	40	210	223	70	250	260	G¼"	G¼"	16
FRM-NOC 100040 UHD	279092	280267	10 / 1 000	40	210	223	70	350	675	G¼"	G¼"	21
FRM-NOC 100050 ND	279093	280268	10 / 1 000	50	280	254	80	400	550	G½"	G¼"	20
FRM-NOC 100050 MD	279094	280269	10 / 1 000	50	280	254	80	400	550	G½"	G¼"	20
FRM-NOC 100050 HD	279095	280270	10 / 1 000	50	210	254	80	300	310	G¼"	G¼"	19
FRM-NOC 100050 UHD	279096	280271	10 / 1 000	50	210	254	80	395	720	G¼"	G¼"	24

*G for external tap (optional)

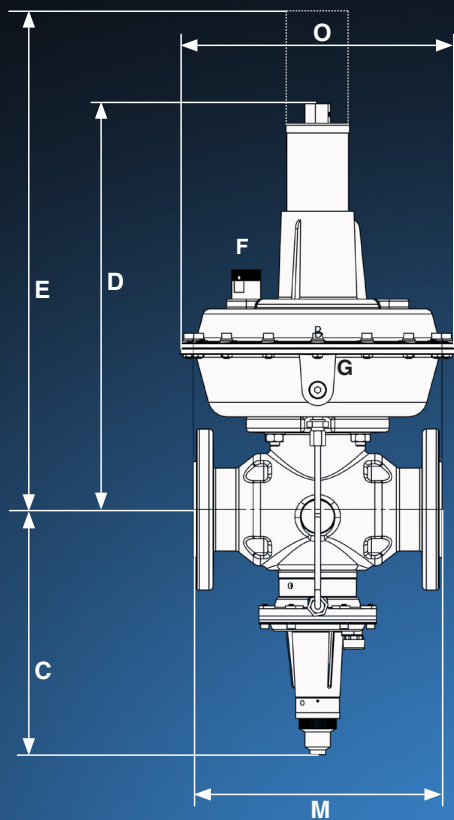
Dimensions FRM-NOC with SAV



Type	Order number		p _{max.} [bar/kPa]	DN	Dimensions [mm]							Weight [kg]
	BSP	NPT			O	M	C	D	E	F	G*	
FRM-NOC 10010 ND / SAV ND	279042	280224	10 / 1 000	1"	210	104	245	240	250	G½"	G¼"	7
FRM-NOC 10010 MD / SAV MD	279043	280225	10 / 1 000	1"	210	104	245	240	250	G½"	G¼"	7
FRM-NOC 10010 HD / SAV HD	279044	280226	10 / 1 000	1"	210	104	245	240	250	G½"	G¼"	7
FRM-NOC 10010 UHD / SAV UHD	279045	280227	10 / 1 000	1"	210	104	245	342	667	G½"	G¼"	11
FRM-NOC 10015 ND / SAV ND	279046	280228	10 / 1 000	1½"	210	132	245	240	250	G½"	G¼"	8
FRM-NOC 10015 MD / SAV MD	279047	280229	10 / 1 000	1½"	210	132	245	240	250	G½"	G¼"	8
FRM-NOC 10015 HD / SAV HD	279048	280230	10 / 1 000	1½"	210	132	245	240	250	G½"	G¼"	8
FRM-NOC 10015 UHD / SAV UHD	279049	280231	10 / 1 000	1½"	210	132	245	342	667	G½"	G¼"	12
FRM-NOC 10020 ND / SAV ND	279050	280232	10 / 1 000	2"	280	156	245	345	495	G½"	G¼"	14
FRM-NOC 10020 MD / SAV MD	279051	280233	10 / 1 000	2"	280	156	245	345	495	G½"	G¼"	14
FRM-NOC 10020 HD / SAV HD	279052	280234	10 / 1 000	2"	210	156	245	245	255	G½"	G¼"	13
FRM-NOC 10020 UHD / SAV UHD	279053	280235	10 / 1 000	2"	210	156	250	345	670	G½"	G¼"	18

*G for external tap (optional)

Dimensions FRM-NOC with SAV



Type	Order number		p _{max.} [bar/kPa]	DN	Dimensions [mm]							Weight [kg]
	DN	ANSI			O	M	C	D	E	F	G*	
FRM-NOC 100025 ND / SAV ND	279073	280248	10 / 1 000	25	210	184	245	260	270	G½"	G¼"	11
FRM-NOC 100025 MD / SAV MD	279074	280249	10 / 1 000	25	210	184	245	260	270	G½"	G¼"	11
FRM-NOC 100025 HD / SAV HD	279075	280250	10 / 1 000	25	210	184	245	260	270	G½"	G¼"	11
FRM-NOC 100025 UHD / SAV UHD	279076	280251	10 / 1 000	25	210	184	245	362	687	G½"	G¼"	15
FRM-NOC 100040 ND / SAV ND	279077	280252	10 / 1 000	40	280	223	250	350	500	G½"	G¼"	19
FRM-NOC 100040 MD / SAV MD	279078	280253	10 / 1 000	40	280	223	250	350	500	G½"	G¼"	19
FRM-NOC 100040 HD / SAV HD	279079	280254	10 / 1 000	40	210	223	250	250	260	G½"	G¼"	18
FRM-NOC 100040 UHD / SAV UHD	279080	280255	10 / 1 000	40	210	223	250	350	675	G½"	G¼"	23
FRM-NOC 100050 ND / SAV ND	279081	280256	10 / 1 000	50	280	254	250	400	550	G½"	G¼"	22
FRM-NOC 100050 MD / SAV MD	279082	280257	10 / 1 000	50	280	254	250	400	550	G½"	G¼"	22
FRM-NOC 100050 HD / SAV HD	279083	280258	10 / 1 000	50	210	254	250	300	310	G½"	G¼"	21
FRM-NOC 100050 UHD / SAV UHD	279084	280259	10 / 1 000	50	210	254	250	395	720	G½"	G¼"	26

*G for external tap (optional)

Function


Operation according to the force comparison principle between the force:


- of the adjustable setpoint spring,
- from the input pressure against the regulating cup,
- from the differential pressure on the working diaphragm and
- the weight of the moving parts.

The adjusting spring functions independently of the weight of the moving parts. The output pressure self-adjusts relative to pre-tension of the adjusting spring.

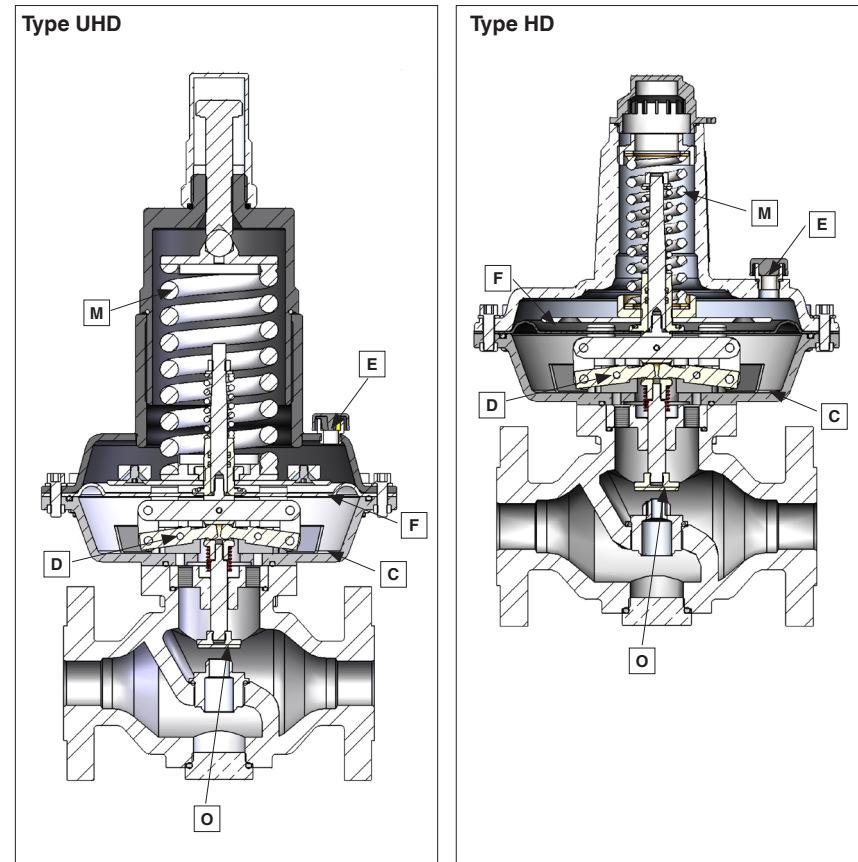
Information

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

 **Condensate from pulse lines must not flow into the pressure controller.**

 **Burnable gas or burnable gas/air mixtures must not enter the installation space of the adjusting spring.**

Sectional drawing FRM-NOC Pressure controller in the open position



- A** Regulating cup
- B** Setpoint spring
- C** Lower diaphragm case
- D** Lever system
- E** Vent connection
- F** Working diaphragm

When the output pressure increases, the force acting on the working diaphragm **F** in the diaphragm case **C** builds up. As a result, the working diaphragm **F** is moved up until the balance of forces between the force of the setpoint spring **B** and that of the output pressure is established. The upward motion of the working diaphragm **F** pulls the lever system **D** up, by which the regulating cup **A** is pressed down and the valve gap is reduced. The flow thus minimised reduces the output pressure until the nominal value (output pressure) set is reached and the balance of forces is re-established on the working diaphragm **F**.

Function


Operation according to the force comparison principle between the force:


- of the adjustable setpoint spring,
- from the input pressure against the regulating cup,
- from the differential pressure on the working diaphragm and
- the weight of the moving parts.

The adjusting spring functions independently of the weight of the moving parts. The output pressure self-adjusts relative to pre-tension of the adjusting spring.

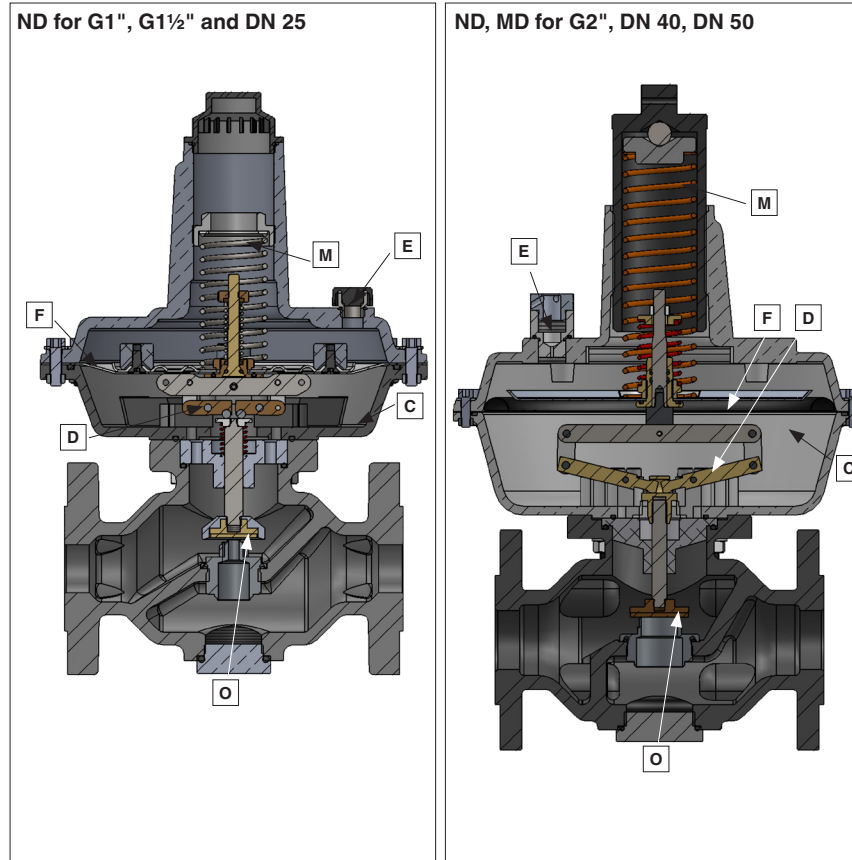
Information

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

 **Condensate from pulse lines must not flow into the pressure controller.**

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

Sectional drawing FRM-NOC Pressure controller in the open position



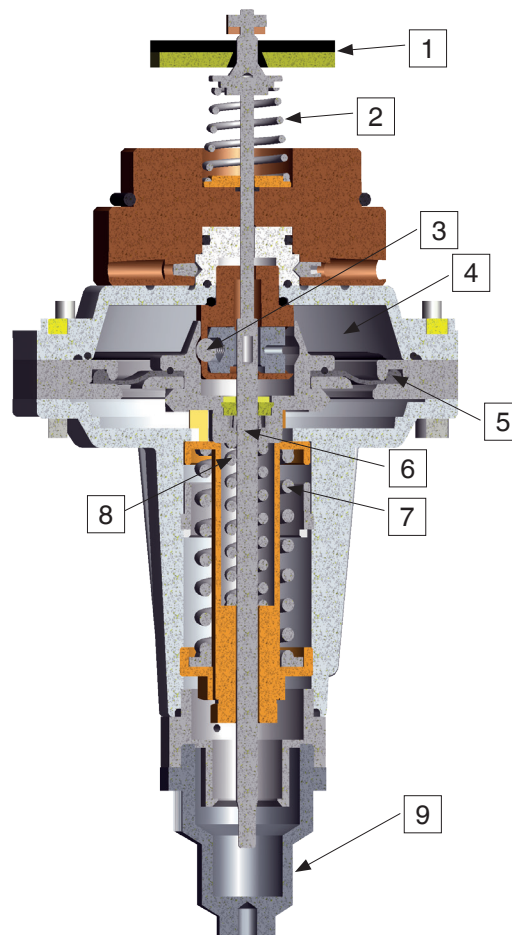
- A** Regulating cup
- B** Setpoint spring
- C** Lower diaphragm case
- D** Lever system
- E** Vent connection
- F** Working diaphragm

When the output pressure increases, the force acting on the working diaphragm **F** in the diaphragm case **C** builds up. As a result, the working diaphragm **F** is moved up until the balance of forces between the force of the setpoint spring **B** and that of the output pressure is established. The upward motion of the working diaphragm **F** pulls the lever system **D** up, by which the regulating cup **A** is pressed down and the valve gap is reduced. The flow thus minimised reduces the output pressure until the nominal value (output pressure) set is reached and the balance of forces is re-established on the working diaphragm **F**.

Function



Sectional drawing SAV
Device in the closed position






Chamber 4 is connected to the output pressure via a pulse line. The pressure to be controlled acts on working diaphragm 5. The force of setpoint springs 7 and 8 acts as a 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_{do}
- 8 Setpoint spring for p_{du}
- 9 Protective cap

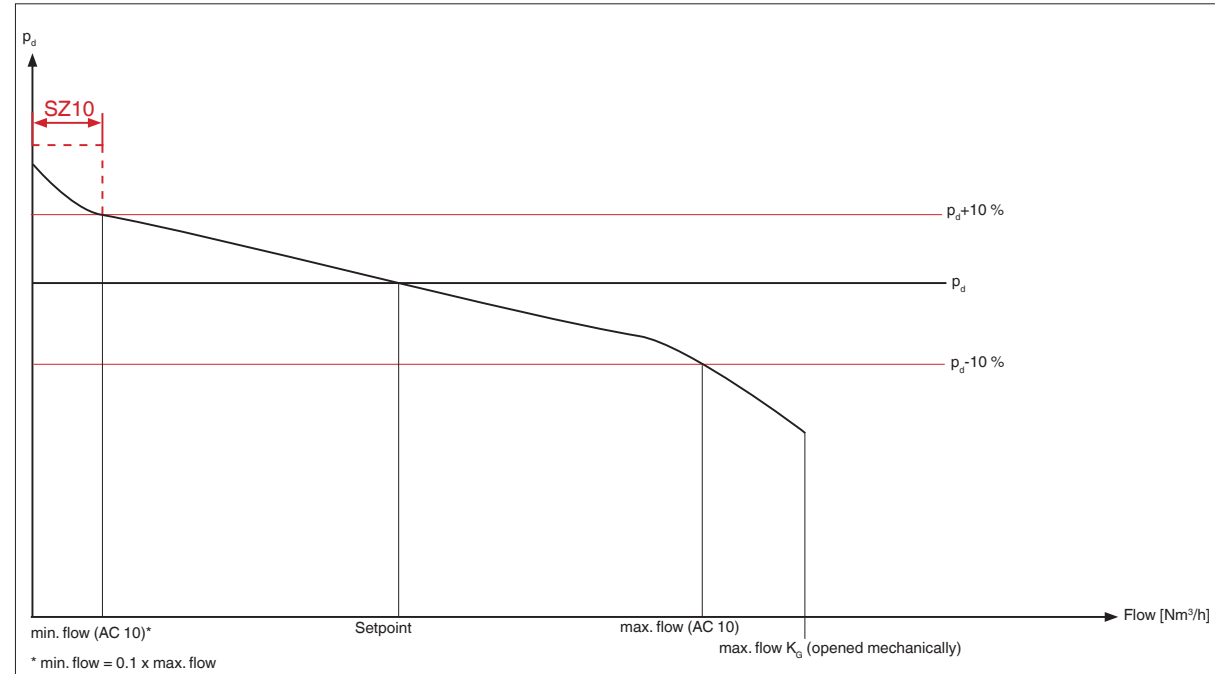
Device selection

The following flow tables can be used to select the device. The maximum volume flow rate indicated refers to natural gas with a density of 0.81 kg/m^3 at $15 \text{ }^\circ\text{C}$ under normal conditions. In case of different types of gases, a conversion of the volume flow rate according to the equation on page 21 is carried out. Using the design tables, the maximum flow of the respective controller can be determined at the operating point defined in terms of p_d and p_u . This involves the maximum power of the controller, at which accuracy class AC 10 is maintained.

-  **Design a straight stabilisation section with a uniform diameter.**
-  **Pulse tap (optional) at a distance of $> 5 \times \text{DN}$.**
-  **Maximum flow velocity in the stabilisation section $\leq 30 \text{ m/s}$.**

Flow tables

Flow tables AC10: See document No. 288127 "Flow Tables FRM-NOC".



Calculation of gas types

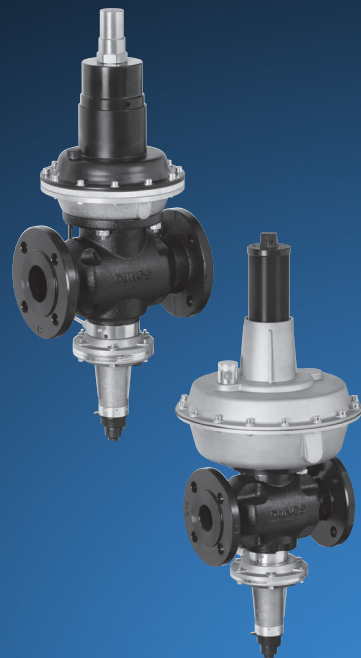


$$\dot{V}_{\text{gas used}} = \dot{V}_{\text{air}} \times f$$

f =

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

Type of gas	Density	dv	f
	[kg/m ³]		
Natural gas	0.81	0.65	1.24
City gas	0.58	0.47	1.46
Liquid gas	2.08	1.67	0.77
Air	1.24	1.00	1.00



Type	Valve core thread	Valve core diameter [mm]									
		Ø 6	Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 30	Ø 35
1", 1½"	M22	34	61	87	115	144					
DN 25	M30	34	61	87	115	144					
2", DN 40	M45			105			279	396	546		
DN 50	M56				151		282	412	575	737	900

Calculation according to maximum power (opened mechanically):

The K_G value required for the application is determined using the following formulas. Then the controller valve core is selected using a higher K_G value than the one calculated. Only applies in case of an external tap.

a) subcritical or critical pressure ratio

$$\frac{p_{d, \text{abs.}}}{p_{u, \text{abs.}}} \geq 0.53$$

$$K_G = \frac{Q_N}{\sqrt{(p_d + 1.013) \cdot (p_u - p_d)}}$$

Abbreviation	Description
p_d [bar]	Output pressure
$p_{d, \text{abs.}}$ [bar]	Output pressure as absolute pressure ($p_d + 1.013$)
p_u [bar]	Input pressure
$p_{u, \text{abs.}}$ [bar]	Input pressure as absolute pressure ($p_u + 1.013$)

b) supercritical pressure ratio

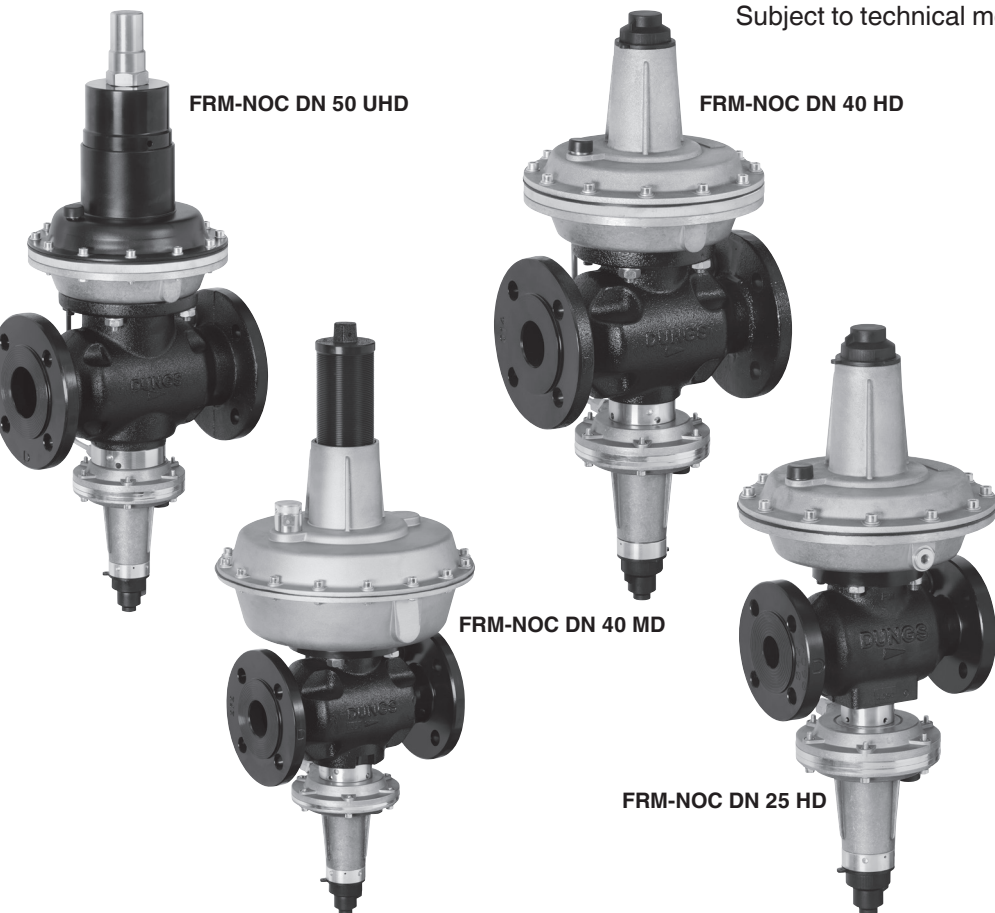
$$\frac{p_{d, \text{abs.}}}{p_{u, \text{abs.}}} < 0.53$$

$$K_G = \frac{Q_N \cdot 2}{(p_u + 1.013)}$$

with

Q_N = controller power under normal conditions

Subject to technical modification in the interest of technical progress.



FRM-NOC DN 50 UHD

FRM-NOC DN 40 HD

FRM-NOC DN 40 MD

FRM-NOC DN 25 HD

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