Pressure regulator
FRS

4.01

DUNGS®

Technical description

The DUNGS pressure regulator, type FRS, has an adjustable setpoint spring. The pressure regulator complies with EN 88 and DIN 3380:

- Input pressures up to 500 mbar
- High flow rate
- Sturdy, precise and sensitive regulation of regulator output pressure
- Inlet pressure compensation diaphragms
- Safety diaphragms
- Internal pulse for regulator output pressure as standard, optional external pulse connection optional on both sides
- Rp 3/8 to Rp 2 thread connection
- DN 20 to DN 150 flange connection

Application

Gas pressure regulator for gas burners and gas equipment. It does not contain any non-ferrous metals, suitable for gases of up to max. 0.1 vol.% H_2S, dry. Suitable for gases of families 1, 2, 3 and other neutral gaseous media.

Approval

EU type test approval as per EU Gas Appliance Directive.

FRS 503	CE-0085 AQ 0244
FRS 505	CE-0085 AQ 0245
FRS 507 / 5020	CE-0085 AQ 0246
FRS 510 / 5025	CE-0085 AQ 0247
FRS 515 / 5040	CE-0085 AQ 0264
FRS 520 / 5050	CE-0085 AQ 0265
FRS 525	CE-0085 AQ 0266
FRS 5065	CE-0085 AQ 0267
FRS 5080	CE-0085 AQ 0268
FRS 5100	CE-0085 AQ 0269
FRS 5125	CE-0085 AQ 0270
FRS 5150	CE-0085 AQ 0271

Approvals in other important gas-consuming countries.

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FRS Spring-loaded pressure regulator with adjustable setpoint spring. Internal tap of regulator output pressure. External pulse connections optional, suitable for controlling regulator output pressure.

Specifications

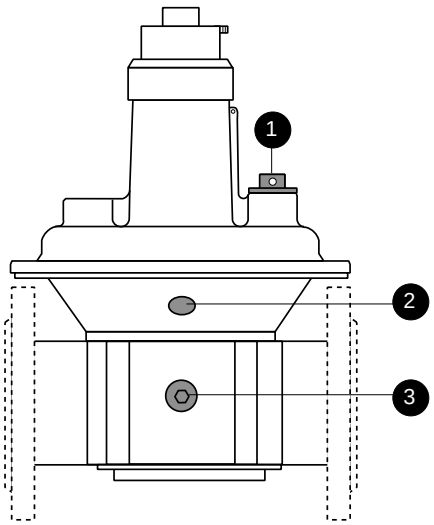
Nominal diameters Pipe thread as per ISO 7/1 Flange	DN 10 15 20 25 40 50 65 80 100 125 150 Rp 3/8 1/2 3/4 1 1 1/2 2 Connection flange as per DIN 2501 Part 1, to fit preweld flanges as per DIN 2633 (PN 16) DN 40 to DN 150, ISO 7085 - 1 (PN 16), ISO 7005 - 2 (PN 16)
Max. operating pressure	up to 500 mbar (50 kPa)
Pressure regulator	Pressure regulator as per EN 88, Class A, Group 2, DIN 3380, RG 10
Input pressure range	+ 5 mbar or p2 +2.5 mbar up to 500 mbar
Pressure stage	PN 1
Output pressure range	2.5 mbar to 150 mbar as a factor of adjustable setpoint spring
Materials of gas-conveying parts	Housing: aluminium, steel Seals and diaphragms: NBR
Ambient temperature	-15 °C to + 70 °C
Installation position	Regulator dome from vertically upright to lying horizontally
Measuring/ignition gas connections	G 1/4 ISO 228 on both sides in inlet section
Pulse connection	Internal in outlet section, Optional: external on housing on both sides
Blow-off line	Blow-off line only required in special cases. Safety diaphragms are installed. Connection: G 1/4 ISO 228 to Rp 1; from Rp 1 1/2, DN 40: G 1/2 ISO 228

Pressure taps

1 Breathing plug, blow-off line.

2 Connection for external pulse G 1/4 ISO 228 screw plug on both sides, **optional**

3 G 1/4 ISO 228 screw plug in input section on both sides

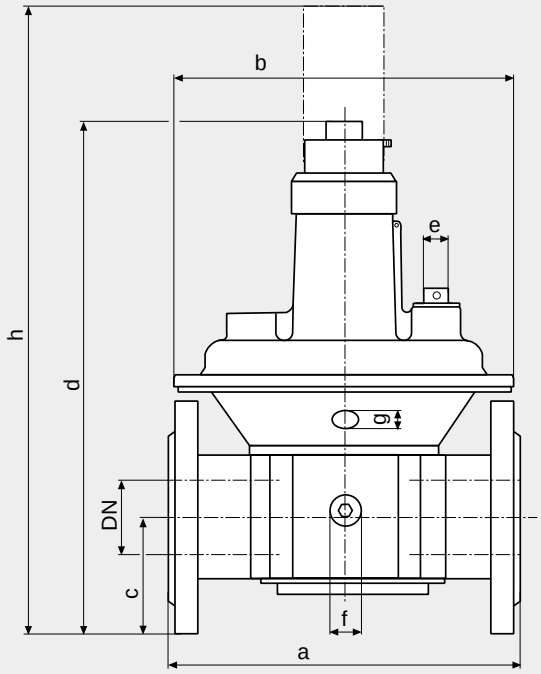


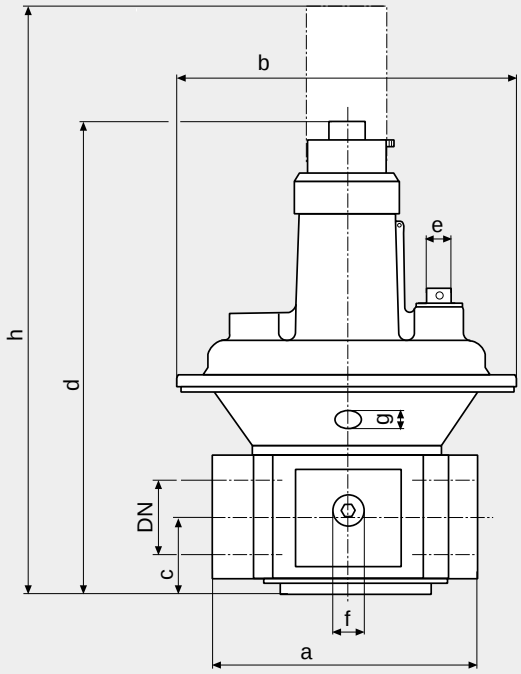
Spring selection

The output pressure is provided by the force of the installed adjustable spring and the force due to weight of the moving parts. The pressure regulator is equipped with the blue spring No. 4 as standard. By exchanging the adjustable spring, other output pressures can be adjusted.

Setpoint spring range [mbar]	2,5…9	5…13	5…20	10…30	25…55	30…70	60…110	100…150
Spring colour	Spring 1 brown	Spring 2 white	Spring 3 orange	Spring 4 blue	Spring 5 red	Spring 6 yellow	Spring 7 black	Spring 8 pink
Nominal width Rp/DN				**Standard**				
Rp 3/8, Rp 1/2	069 112	069 120	069 138	069 146	069 153	069 161	069 179	069 187
Rp 3/4	069 195	069 203	069 211	069 229	069 237	069 245	069 252	069 260
Rp 1	069 278	069 286	069 294	069 302	069 310	069 328	069 336	069 344
Rp 1 1/2, DN 40	058 859	058 867	058 875	058 883	058 891	058 909	058 917	069 351
Rp 2, DN 50	058 925	058 933	058 941	058 958	058 966	058 974	058 982	069 369
DN 65, 80	058 636	058 644	058 651	058 669	058 677	058 685	058 693	069 377
DN 100	083 188	083 196	083 204	083 212	083 220	083 238	083 246	083 253
DN 125	053 082	053 090	053 108	053 116	053 124	053 132	053 140	223 461
DN 150	053 157	053 165	053 173	053 181	053 199	053 207	053 215	223 462

Dimensions





Type	**Order No. Internal pulse**	**Order No. External pulse**	**$p_{max.}$ [mbar]**	**Rp / DN**	**Dimensions [mm]**								**Weight [kg]**
					a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	
FRS 503	086 462	220 998	**500**	Rp 3/8	75	115	24	143	G 1/4	G 1/4	G 1/8	225	0.60
FRS 505	070 383	211 817	**500**	Rp 1/2	75	115	24	143	G 1/4	G 1/4	G 1/8	225	0.60
FRS 507	070 391	220 999	**500**	Rp 3/4	100	130	28	165	G 1/4	G 1/4	G 1/8	245	1.00
FRS 510	070 409	210 381	**500**	Rp 1	110	145	33	190	G 1/4	G 1/4	G 1/8	310	1.20
FRS 515	058 446	221 000	**500**	Rp 1 1/2	150	195	40	250	G 1/2	G 1/4	G 1/4	365	2.50
FRS 520	058 628	208 237	**500**	Rp 2	170	250	47	310	G 1/2	G 1/4	G 1/4	450	3.50
FRS 5040	065 144	214 474	**500**	DN 40	200	195	65	280	G 1/2	G 1/4	G 1/4	395	3.50
FRS 5050	065 151	183 600	**500**	DN 50	230	250	75	340	G 1/2	G 1/4	G 1/4	480	5.00
FRS 5065	058 792	183 930	**500**	DN 65	290	285	95	405	G 1/2	G 1/4	G 1/4	590	7.50
FRS 5080	079 681	183 940	**500**	DN 80	310	285	95	405	G 1/2	G 1/4	G 1/4	590	10.00
FRS 5100	082 552	211 019	**500**	DN 100	350	350	105	495	G 1/2	G 1/4	G 1/4	760	16.00
FRS 5125	013 250	208 301	**500**	DN 125	400	400	135	635	G 1/2	G 1/4	G 1/4	1000	28.00
FRS 5150	013 268	208 302	**500**	DN 150	480	480	160	780	G 1/2	G 1/4	G 1/4	1180	38.00

Functional description

Functions according to the force comparison principle between the force of:

- the adjustable setpoint spring
- the differential pressure at the working diaphragm
- the force due to weight of the moving parts

The adjustable spring acts with the force due to weight of the moving parts. The output pressure is adjusted depending on the pretension of the adjustable spring and the installation position.

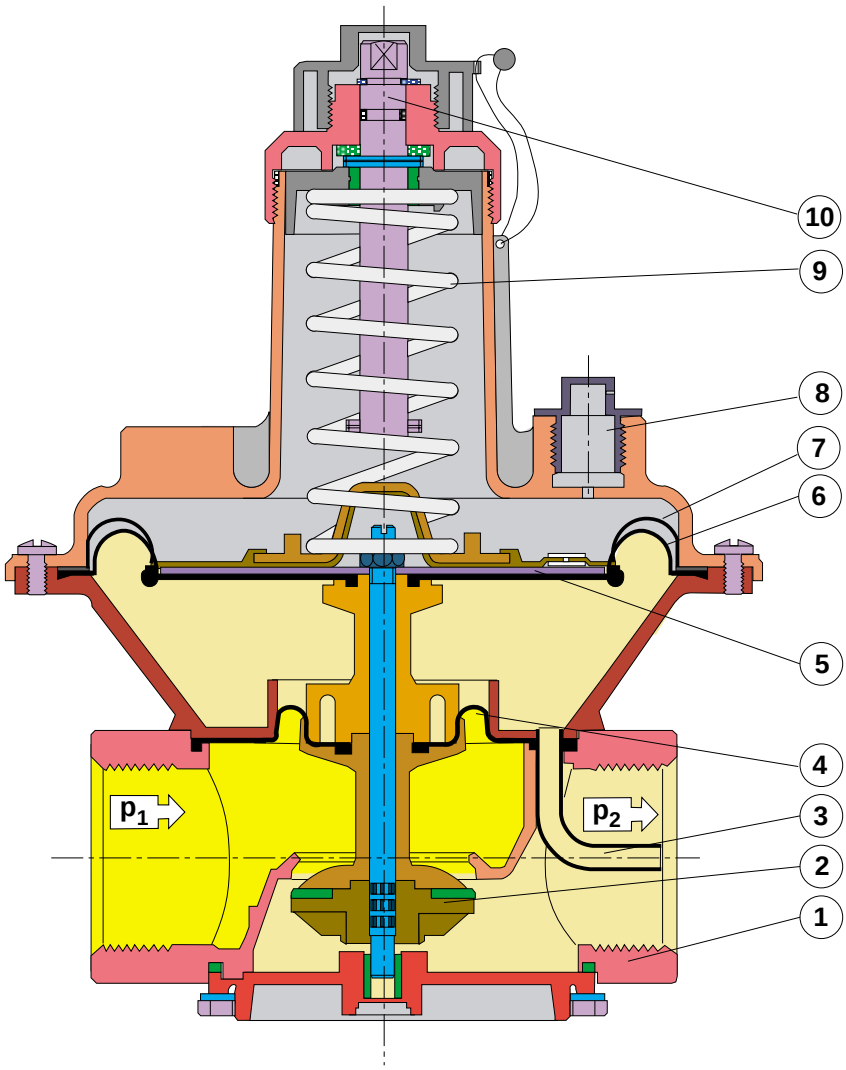
Instructions

Gas-conveying lines, pulse and connection lines must be made of steel and at least PN 1, DN 6. The lines must be resistant to thermal, chemical and mechanical loads. The lines must be durable and resistant to deformation and cracks.

⚠ Do not route condensate from lines into the pressure regulator.
Protect the pressure regulator from fouling by means of a suitable dirt trap.

⚠ Do not apply combustion gas or combustion gas air mixtures to the installation chamber of the adjustable spring. Pressure regulators for this application on request only.

FRS 515 sectional drawing
Pressure regulator in operating position



1	Housing	4	Compensation diaphragm	7	Safety diaphragm
2	Regulating cup	5	Diaphragm disk	8	Breathing plug
3	Pulse tap, internal	6	Working diaphragm	9	Setpoint spring
				10	Adjustment device

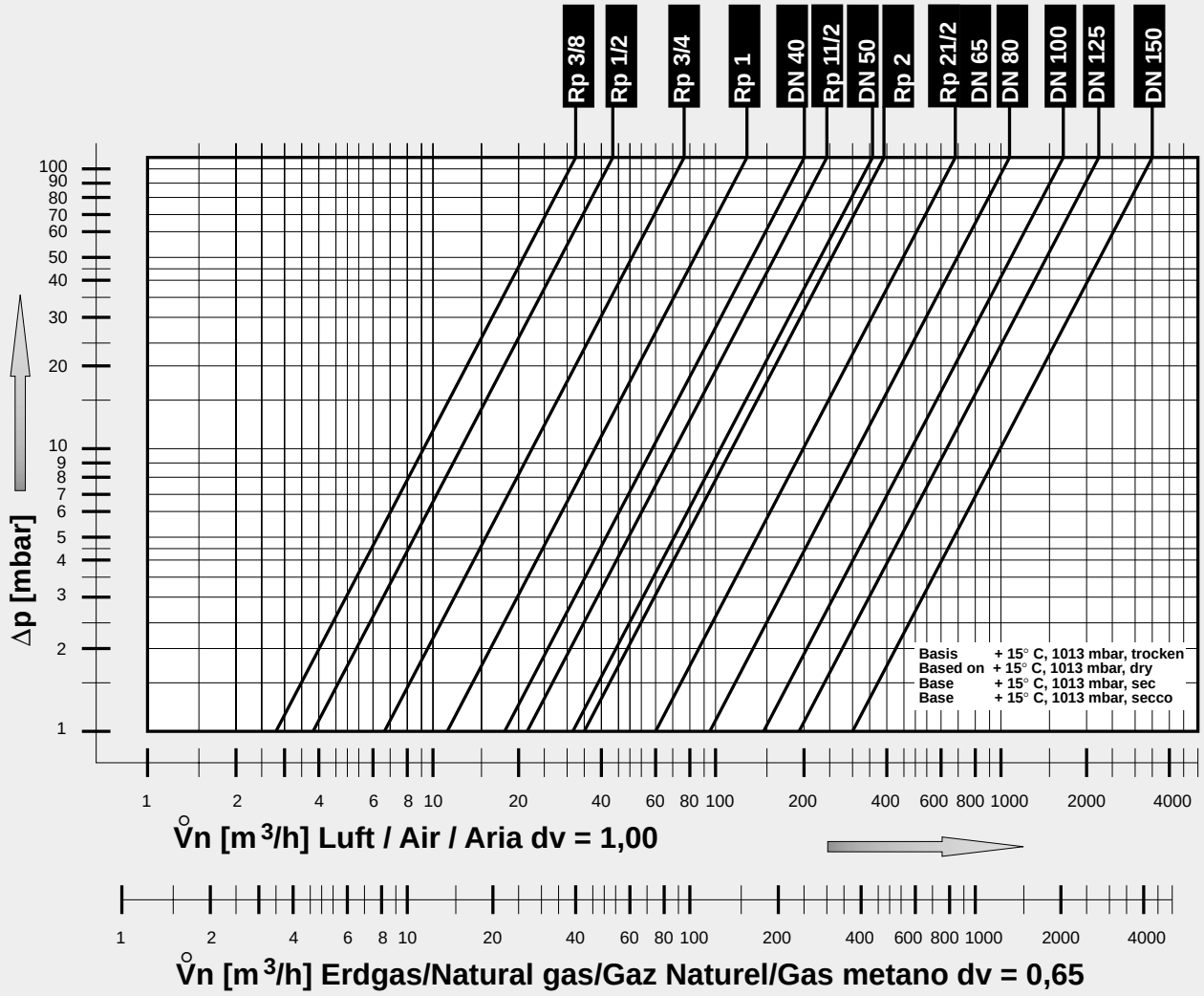
Equipment preselection, blocked pressure regulators

You can **preselect** the nominal diameter using the volumetric flow pressure drop characteristic of the pressure regulators in mechanically open state. The pressure drop between input pressure p_1 and regulator output pressure p_2 in connection with the maximum volumetric flow V_{max} determine the nominal width of the pressure regulator. The operating point described by Δp_{min} and V_{max} is left of the nominal width of the pressure regulator to be selected.

The pressure drop over **blocked pressure regulators** is described by the "mechanically open" characteristic.

The final determination is performed according to the dimension specified by the gas appliance manufacturer.

Volumetric flow pressure drop characteristic mechanically open



$$\mathring{V}_{\text{verwendetes Gas/gas used/ gaz utilisé/gas utilizzato}} = \mathring{V}_{\text{Luft/air/air/aria}} \times f$$

$$f = \sqrt{\frac{\text{Dichte Luft / Air density / Densité de l'air / Densità dell'aria}}{\text{spez. Gewicht des verwendeten Gases / Spec. weight of gas used / poids spécifique du gaz utilisé / peso specifico del gas utilizzato}}}$$

Gasart Type of gas Type de gaz Tipo di gas	Dichte Density Densité Densità [kg/m³]	dv	f
Erdgas/Nat.Gas/ Gaz naturel/Gas metano	0.81	0.65	1.24
Stadtgas/City gas/ Gaz de ville/Gas città	0.58	0.47	1.46
Flüssiggas/LPG/ Gaz liquide/Gas liquido	2.08	1.67	0.77
Luft/Air/ Air/Aria	1.24	1.00	1.00

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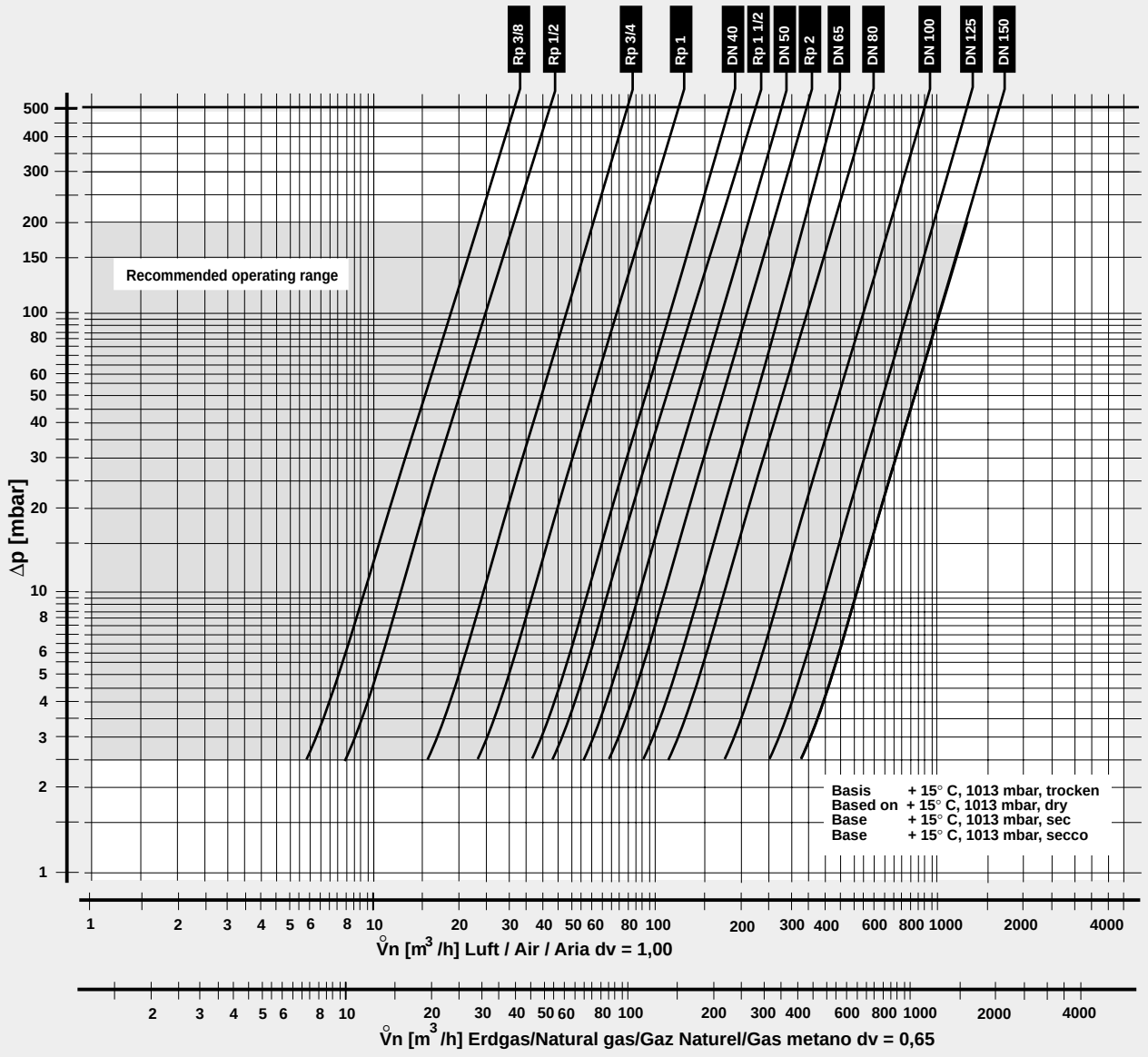
Flow diagram in regulated state, where p_2 = 20 mbar
$\dot{V}_{min} = 0{,}05 \times \dot{V}_{max}$



We reserve the right to make any changes in the interest of technical progress.

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