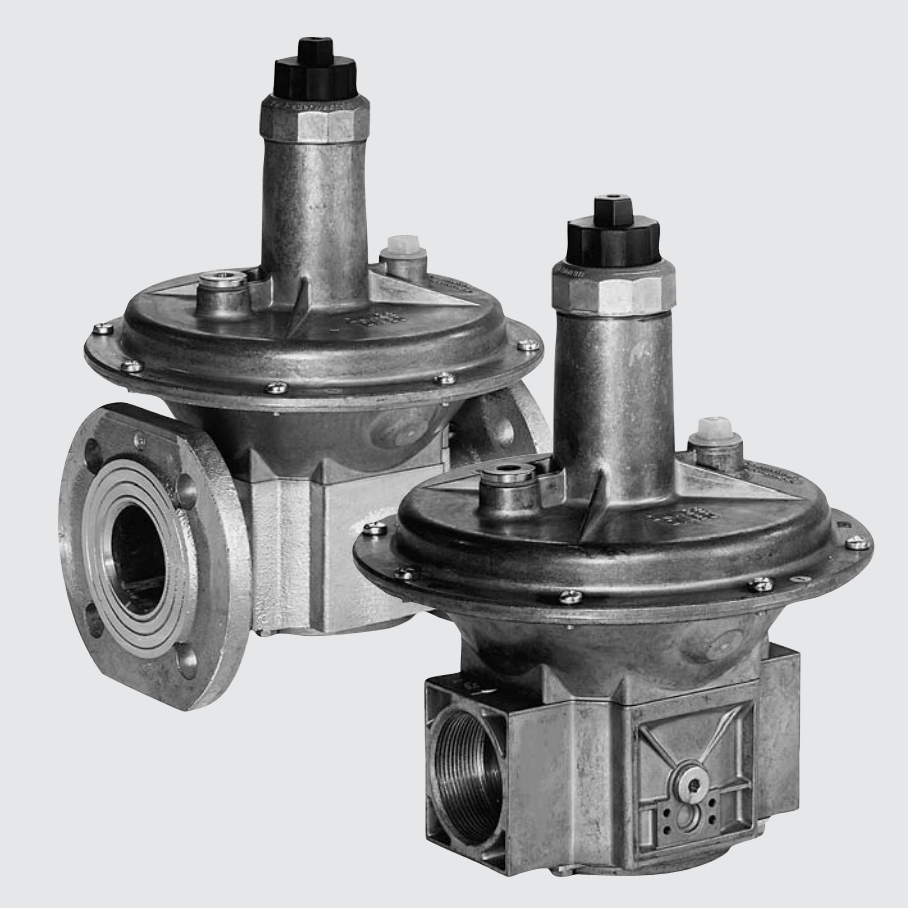
Pressure regulator FRNG

Zero pressure regulator
Proportional pressure regulator
Compressed air-controlled pressure regulator

4.14

DUNGS®
Combustion Controls



Technical description

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

- **Input pressures up to 50 mbar (5 kPa) for zero pressure applications**
- **Input pressures up to 200 mbar (20 kPa) for proportional pressure applications**
- Bypass prepared, Rp 3/8 to Rp 2
- Sturdy, precise and sensitive regulation of regulator output pressure
- Inlet pressure compensation diaphragms
- Safety diaphragms
- Internal pulse for regulator output pressure as standard, external pulse connection prepared
- Connection for blower pressure as standard

Application

The DUNGS pressure regulator, type FRNG, is suitable for gases of families 1, 2, 3 and other neutral gaseous media. Does not contain any non-ferrous metals, suitable for gases of up to max. 0.1 vol.% H_2S, dry.

Approval

EC type test approval as per EC Gas Appliance Directive:
FRNG 5… CE-0085 AQ7126
Approvals in other important gas consuming countries.

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FRNG Spring-loaded pressure regulator with adjustable setpoint spring and defined counterspring. Internal tap of regulator output pressure, external pulse and blower pressure connections prepared. Suitable for controlling regulator output pressure via a pneumatic command variable.

Specifications

Nominal diameters Pipe thread as per ISO 7/1 Flange	DN 40 50 65 80 100 125 150 Rp 3/8 1/2 3/4 1 11/2 2 Connection flange per DIN EN 1092-1
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, EN 12078
Input pressure range **Zero pressure regulator** **Proportional pressure regulator** **Compressed air-controlled pressure regulator**	 **5 to 50 mbar (0.5 to 5 kPa)** **5 to 200 mbar (0.5 to 20 kPa)** **to 500 mbar (50 kPa)**
Output pressure range	Zero pressure regulator - 3 to 5 mbar (-0.3 to 0.5 kPa) Proportional pressure regulator -10 to 150 mbar (-1 to 15 kPa) Pressure with compressed air up to max. 350 mbar (35 kPa).
Materials of gas-conveying parts	Housing: aluminium, steel, no non-ferrous metals Seals and diaphragms: NBR
Ambient temperature	–15 °C to +70 °C
Installation position	Regulator dome from vertically upright to lying horizontally Rp 1/2 - DN 100 Regulator dome in vertical position DN 125, DN 150
Measuring/ignition gas connections	G 1/4 ISO 228 on both sides in inlet section
Measurement opening	G 1/8 ISO 228 in the baseplate (option DN 125, DN 150) Reclosable opening for setting system-specific valuas when the system is put into operation, e. g. gas motor
Bypass	Bypass prepared: Rp 3/8 to Rp 2 on right of housing
Pulse connection	Internal in outlet section, externally prepared on housing: Rp 3/8 to Rp 1 left, G 1/8; on both sides from Rp 1 1/2, DN 40 G 1/4; internal pulse lockable
Ventilation line / pressure connection for blower pressure	Ventilation line needs no routing, use existing connection as pressure connection for command variable (blower pressure). Connection: G 1/4 to Rp 1; from Rp 1 1/2, DN 40: G 1/2
Blower pressure command variable	For proportional pressure applications and gas-air ratio applications at pressure ratio of approx. 1:1 and in compressed-air controlled operation: p_{max} = 150 mbar (15 kPa)

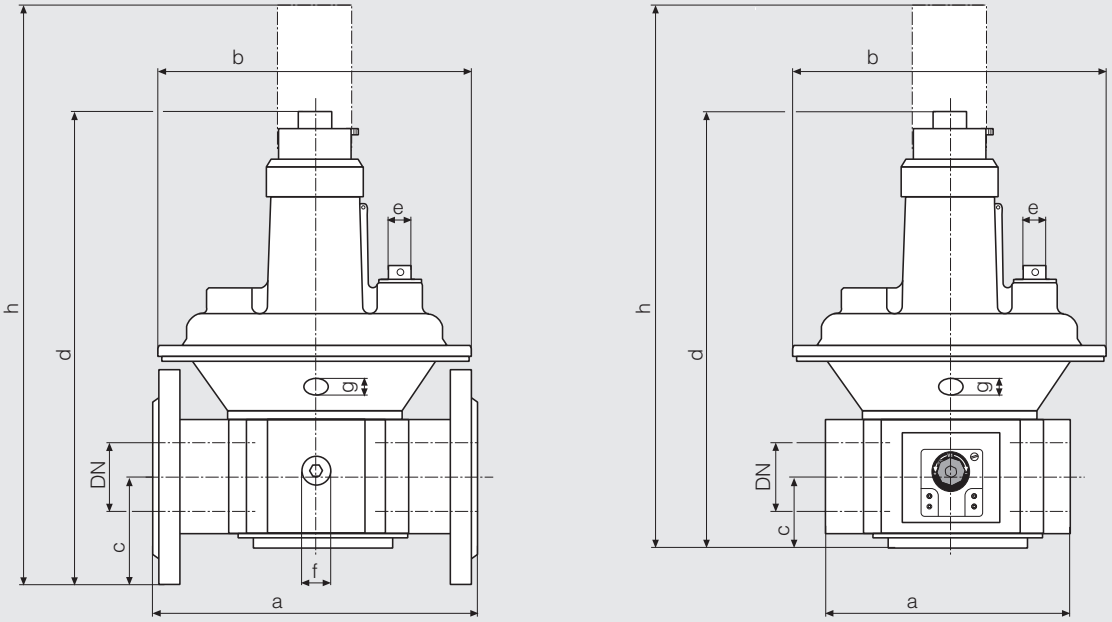
Spring selection

The output pressure is provided by the force of the installed adjustable spring, the counterspring and the the blower pressure applied. The pressure regulator is equipped with the brown spring No. 1 as standard. By exchanging the adjustable spring, it is possible to achieve larger positive zero point shifts (offsets) of the output pressure (refer to Fig. Compressed air-controlled pressure regulator).

Setpoint spring range [mbar]	2.5…+9	5…13	5…20	10…30	25…55	30…70	60…110	100…150	140…200
	Spring 1	Spring 2	Spring 3	Spring 4	Spring 5	Spring 6	Spring 7	Spring 8	Spring 9
Spring colour	brown	white	orange	bluw	red	yellow	black	pink	grey
Nominal diameter Rp/DN	Standard	Spring 2 to 9 for compressed air applications only							
Rp 3/8, Rp 1/2	229 817	229 818	229 821	229 821	229 822	229 823	229 824	229 825	229 826
Rp 3/4	229 833	229 834	229 836	229 836	229 837	229 838	229 839	229 840	229 841
Rp 1	229 842	229 843	229 845	229 845	229 846	229 847	229 848	229 849	229 850
Rp 1 1/2, DN 40	229 851	229 852	229 854	229 854	229 869	229 870	229 871	229 872	229 873
Rp 2, DN 50	229 874	229 875	229 877	229 877	229 878	229 879	229 880	229 881	229 882
DN 65, 80	229 883	229 884	229 886	229 886	229 887	229 888	229 889	229 890	229 891
DN 100	229 892	229 893	229 895	229 895	229 896	229 897	229 898	229 899	229 900
DN 125	229 901	229 902	229 904	229 904	229 905	229 906	229 907	229 908	243 416
DN 150	229 909	229 910	229 912	229 912	229 913	229 914	229 915	229 916	243 417

Standard Offset ≤ 5 mbar (Closing force of counterspring in closed position)

Dimensions



Type	Order No.	$p_{max.}$ [mbar]	Rp / DN	Dimensions [mm] a	b	c	d	e	f	g	h	Weight [kg]
FRNG 503	220 967	**500**	Rp 3/8	75	115	24	143	G 1/4	G 1/4	G 1/8	225	0.60
FRNG 505	220 968	**500**	Rp 1/2	75	115	24	143	G 1/4	G 1/4	G 1/8	225	0.60
FRNG 507	220 969	**500**	Rp 3/4	100	130	28	165	G 1/4	G 1/4	G 1/8	245	1.00
FRNG 510	220 970	**500**	Rp 1	110	145	33	190	G 1/4	G 1/4	G 1/8	310	1.20
FRNG 515	209 064	**500**	Rp 1 1/2	150	195	40	250	G 1/2	G 1/4	G 1/4	365	2.50
FRNG 520	209 065	**500**	Rp 2	170	250	47	310	G 1/2	G 1/4	G 1/4	450	3.50
FRNG 5040	159 350	**500**	DN 40	200	195	75	280	G 1/2	G 1/4	G 1/4	395	3.50
FRNG 5050	209 067	**500**	DN 50	230	250	82.5	340	G 1/2	G 1/4	G 1/4	480	5.00
FRNG 5065	209 068	**500**	DN 65	290	285	92.5	405	G 1/2	G 1/4	G 1/4	590	7.50
FRNG 5080	209 069	**500**	DN 80	310	285	100	405	G 1/2	G 1/4	G 1/4	590	10.00
FRNG 5100	214 422	**500**	DN 100	350	350	110	495	G 1/2	G 1/4	G 1/4	760	16.00
FRNG 5125	220 758	**500**	DN 125	400	400	125	635	G 1/2	G 1/4	G 1/4	1000	28.00
FRNG 5150	224 212	**500**	DN 150	480	480	142.5	780	G 1/2	G 1/4	G 1/4	1180	38.00
Bypass restrictor Rp 3/8 - Rp2	225 256											

Functional description

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

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

The counterspring acts against the adjustable spring and the weight due to force of the moving parts. Depending on the pretension of the adjustable spring and the installation position, the force of the counterspring is compensated. Overcompensation leads to positive regulator output pressures, partial compensation leads to negative regulator output pressures.

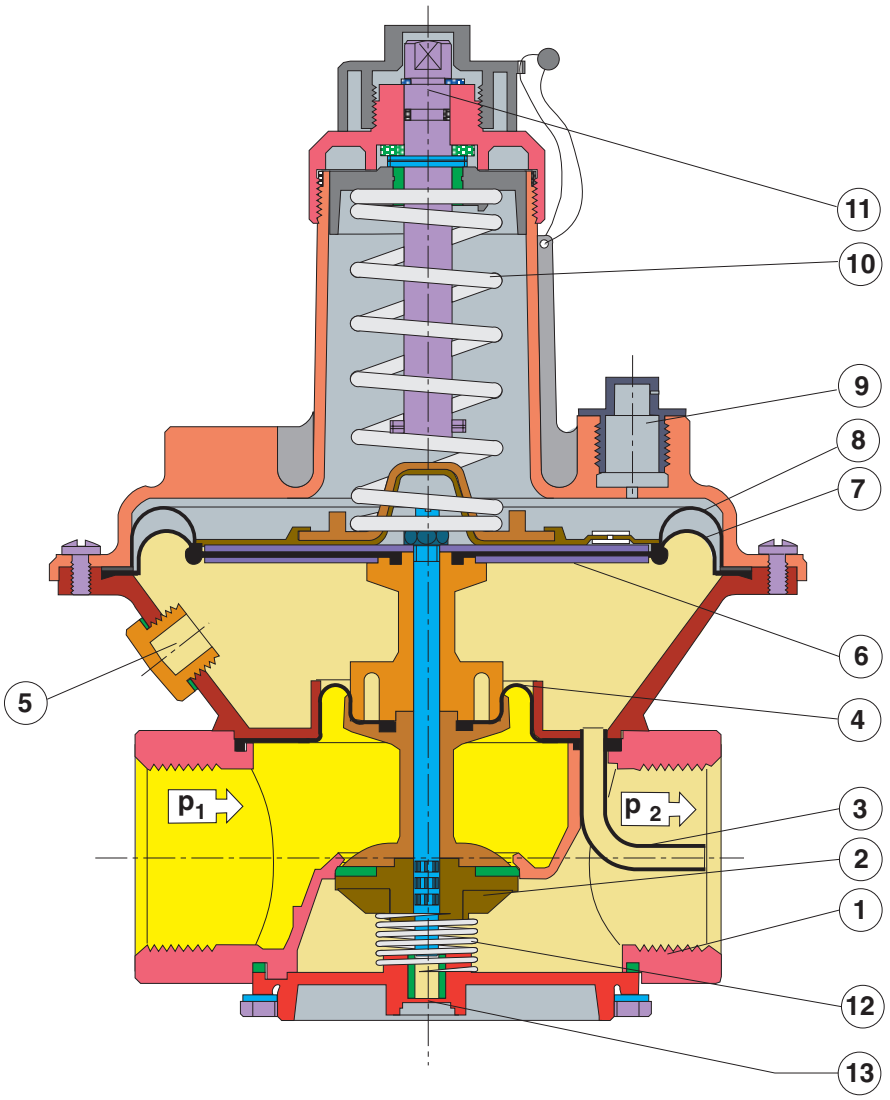
Instructions

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 deformation- and crack-proof.

⚠ Do not route condensate from lines into the pressure regulator.

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

FRNG 515 sectional drawing
Pressure regulator in closed position



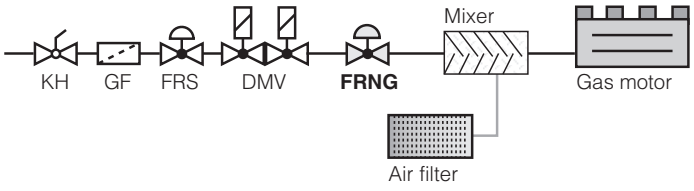
1	Housing	6	Diaphragm disk	11	Adjustment device
2	Regulating cup	7	Working diaphragm	12	Counterspring
3	Pulse tap, internal	8	Safety diaphragm	13	Option DN 125, DN 150
4	Compensation diaphragm	9	Breathing plug		Measurement opening with
5	External pulse	10	Setpoint spring		screw plug G 1/8

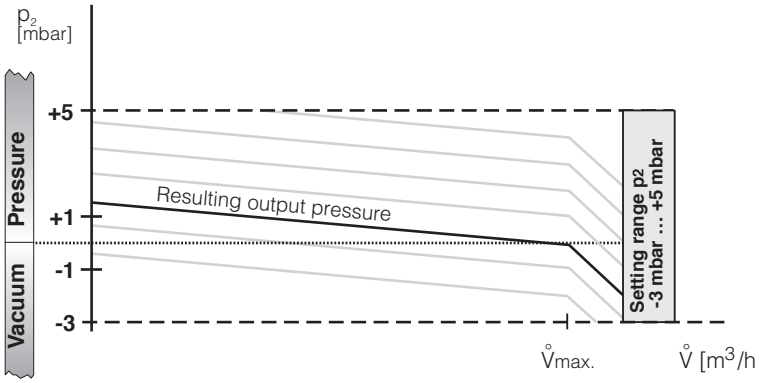
Application of zero pressure regulator (standard design)
The FRNG regulates a gas flow proportional to the consumer vacuum for gas motors and self-intaking gas equipment.

The regulator is adjusted within the setting range at the setpoint spring.

⚠ $\dot{V}_{min.} = \dot{V}_{max.} \times 0.1$

For $\dot{V}_{max}$, see volumetric flow pressure drop characteristic.



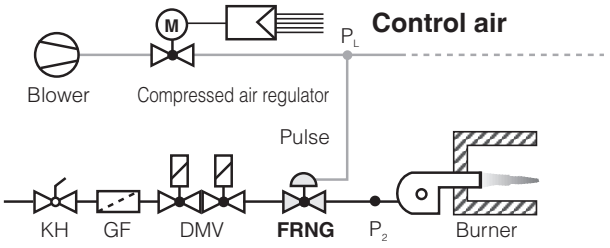


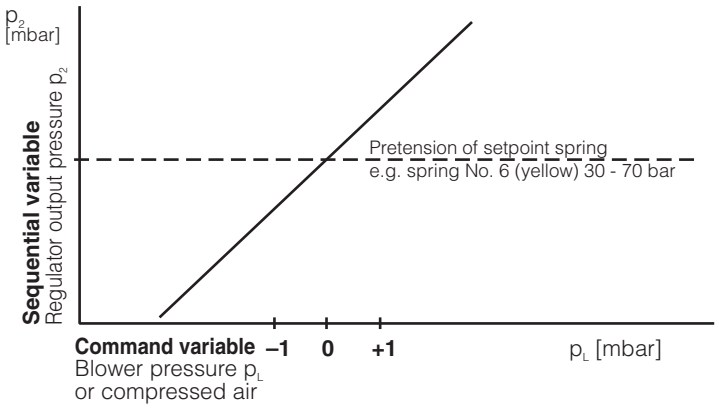
Application with compressed air-controlled pressure regulator (standard design)
For externally controlled gas equipment.

In connection with a selected setpoint spring, the regulator output pressure can be controlled depending on the blower pressure (compressed air). The command variable can be up to +150 mbar.

⚠ $\dot{V}_{min.} = \dot{V}_{max.} \times 0.05$

For $\dot{V}_{max}$, see volumetric flow pressure drop characteristic.



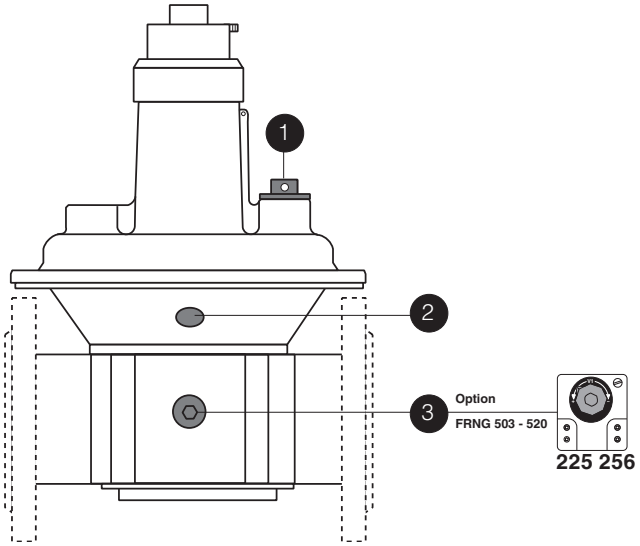


Pressure taps
Pulse and blower connection

1 Breathing plug **or** connection for ventilation line. Only route ventilation line in special cases **or** connection for air pulse line

2 Connection for external gas pulse. Internal pulse must be closed.

3 Pressure connection in inlet section G 1/4 ISO 228 screw plug, Rp 3/8 to Rp 2 with bypass cover prepared for mounting adjustable bypass restriction.



Application of proportional pressure regulator (standard design)

As proportional pressure regulator for gas-air ratio regulators with fixed efficiency pressure ratio V = 1:1 on gas equipment operated with differential pressure.

The offset range of the counterspring can be set by the setpoint spring. The moving parts are compensated by the force due to weight.

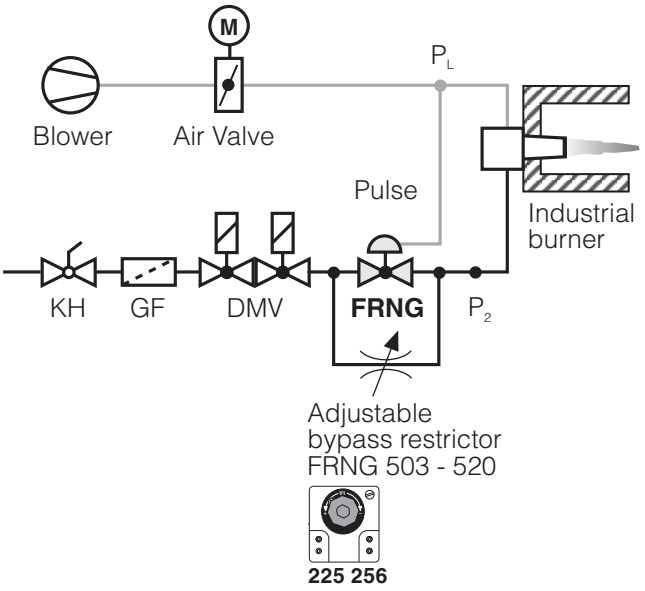
Gas supply or air supply are adjustable at full load and partial load.

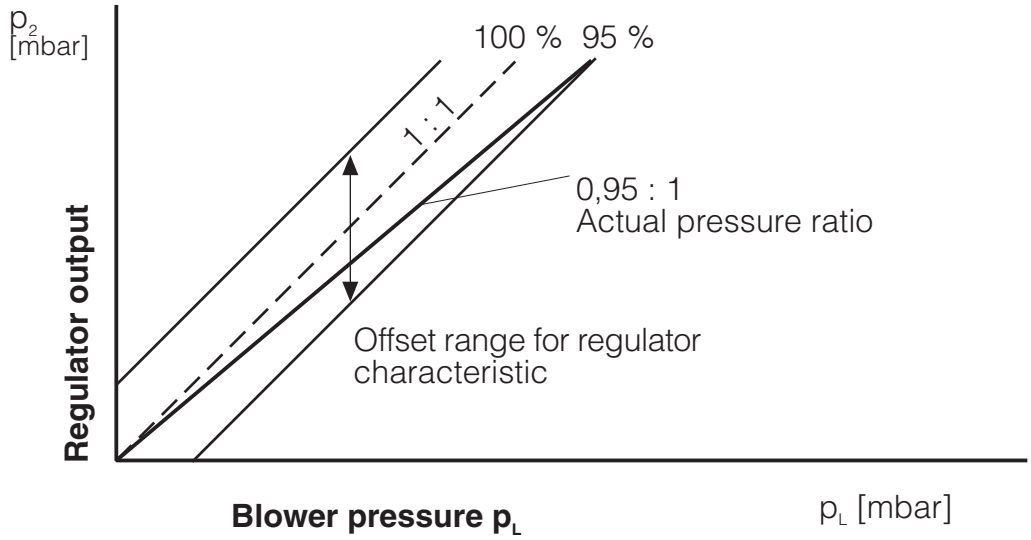
Basic load is adjustable via bypass restrictor.

The command variable can be up to +150 mbar.

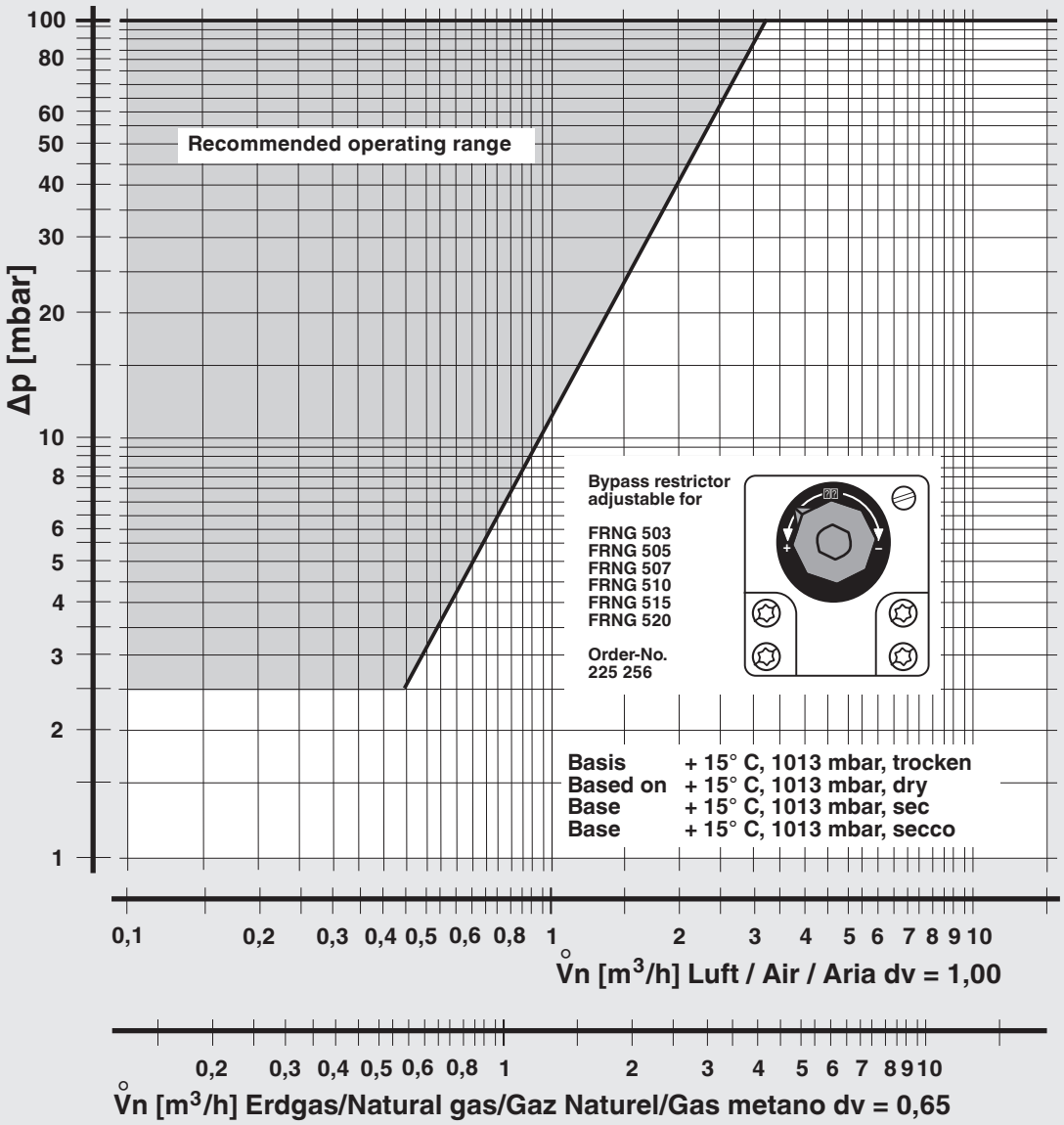
$\dot{V}_{min.} = \dot{V}_{max.} \times 0{,}05$

For $\dot{V}_{max}$, see volumetric flow pressure drop characteristic.





Volumetric flow pressure difference characteristic
Bypass restrictor



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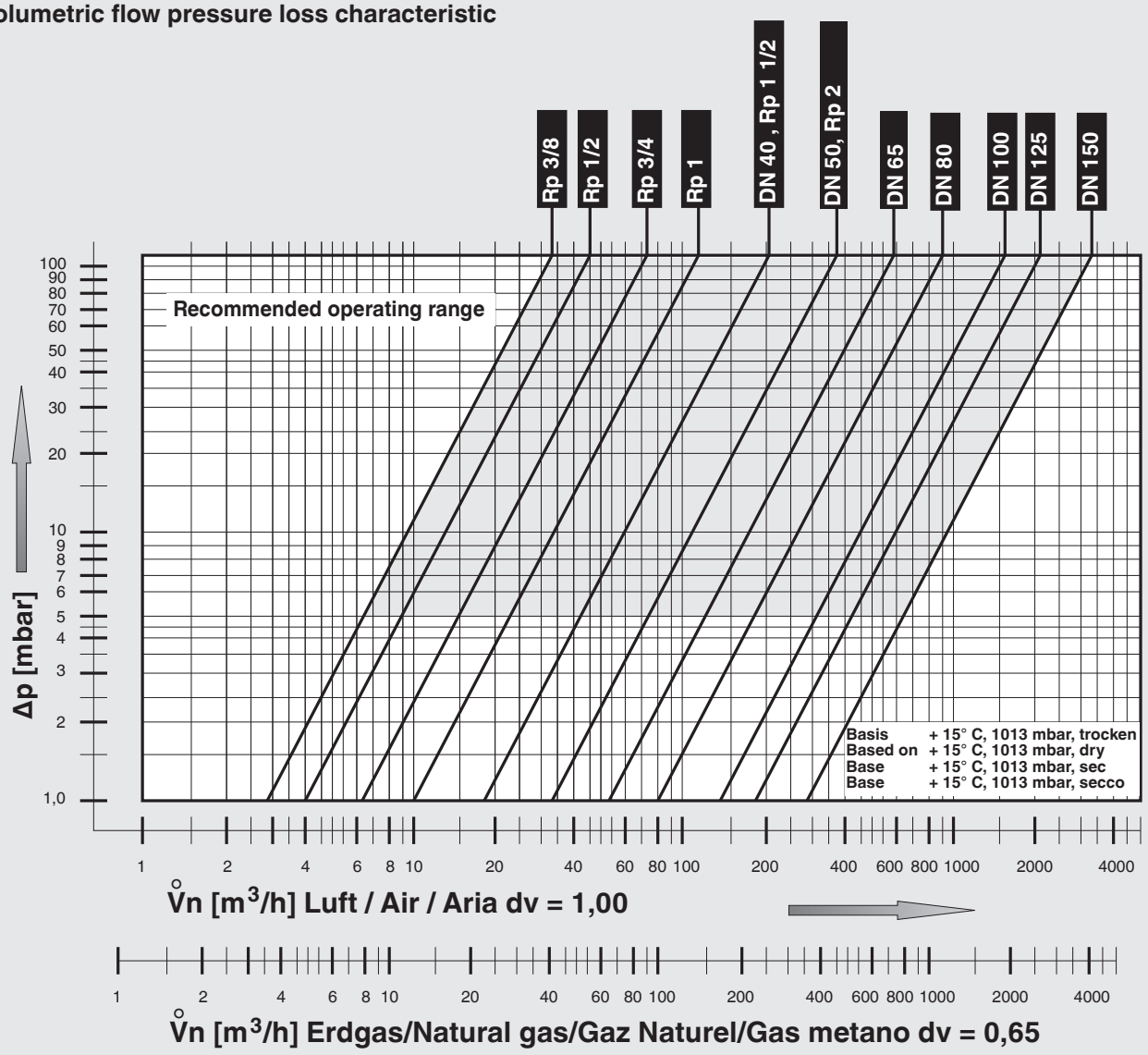
Volumetric flow pressure loss characteristic



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

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