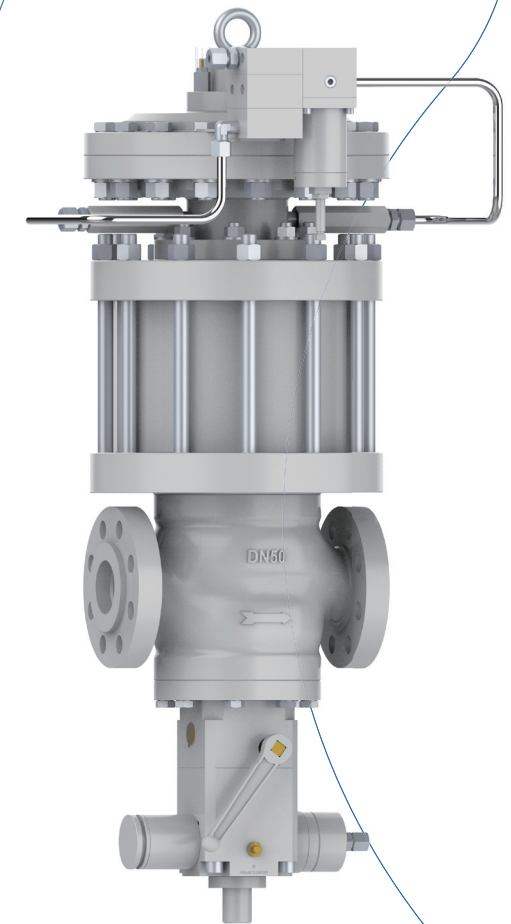
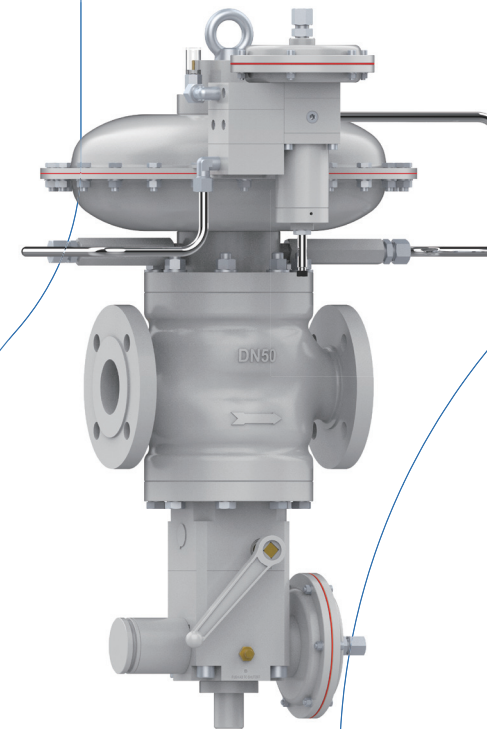




Regulator **GR Series**



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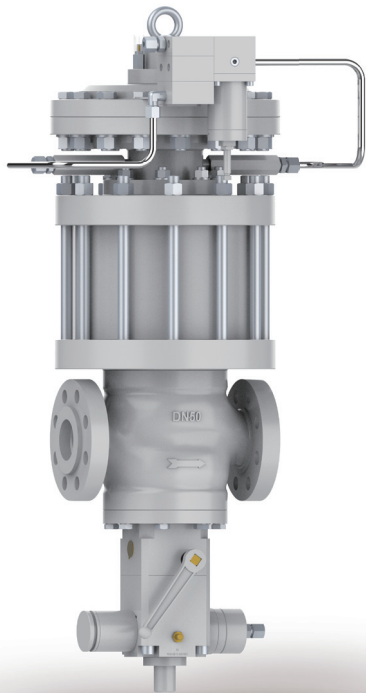
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GR Series

DESCRIPTION

The GR series pressure regulator is an indirect-acting regulator equipped with the DGP300 series high-performance pilot, is suitable for high, medium and low pressure.

The regulators are widely used in both commercial and industrial installations using Natural Gas, LPG and other non-corrosive gases.



FEATURES

- High flow coefficient.
- Low startup differential pressure
- Fail to close/ fail to open
- Equipped with valve position indicator device
- Optional SD500 series shut-off sensor, realize integrated shut-off function
- Optional DDB silencer
- Optional valve position remote transmission and shut-off remote transmission device

PARAMETERS

Operating Parameters

- Maximum inlet pressure: 100 bar
- Outlet pressure range: 15 mbar-80bar
- Accuracy class AC: up to 1
- Lock-up pressure class SG: up to 1
- Shut-off response time: ≤ 1s
- Working temperature: -20℃ -+60℃

Flow Coefficient (Cg)

GR100	GR200	GR300	GR400	GR600	GR800
575	2200	4930	8000	16600	25900

Connecting Parameters

Model	GR100	GR200	GR300	GR400	GR600	GR800
Connecting size	DN25	DN50	DN80	DN100	DN150	DN200
Pressure rating	PN16 / PN25 & Class150 / Class300 / Class600					
Flange standards*	PN according to EN 1092-2 / Class according to ASME B16.5					

* Other connection standards can be provided upon request

Materials

Valve body	Cast steel (ASTM A216 WCB) Optional: Cast steel (ASTM A352 LCC)
Covers	Carbon steel (EN 10028) Forged steel (ASTM A350 LF2)
Stem	Stainless steel
Diaphragm	Reinforced fiber rubber
Seat	Stainless steel
O-ring	Nitrile rubber (NBR) Fluoro rubber (FKM)
Pilot	Aluminum alloy (6082-T6), Stainless steel, Brass
Shut-off valve	Stainless steel, Brass, Aluminum alloy

MODEL INTRODUCTION

Model	Description
GR	GR series pressure regulator
FTO	Indicates "fail to open"; if omitted, it defaults to "fail to close"
1	Indicates different nominal diameters, such as "1" representing the nominal diameter of NPS1" (DN25)
2	
3	
4	
6	
8*	
1	With shut-off valve
2	Without shut-off valve
1	P1 ≤ 20bar, 15mbar ≤ P2 ≤ 150mbar, with DGP 301 Pilot**
2	P1 ≤ 20bar, 0.15bar ≤ P2 ≤ 0.5bar, with DGP 302 Pilot
3	P1 ≤ 20bar, 0.5bar ≤ P2 ≤ 13bar, with DGP 303 Pilot
4	P1 ≤ 100bar, 0.5bar ≤ P2 ≤ 13bar, with DGP 303 Pilot
5	P1 ≤ 100bar, 13bar ≤ P2 ≤ 40bar, with DGP 304 Pilot
6	P1 ≤ 100bar, 40bar ≤ P2 ≤ 80bar, with DGP 305 Pilot
DDB	Equipped with silencer, omitted if not equipped

* Larger diameter pressure regulators are available upon request

**P1: Inlet pressure, P2:Outlet pressure

Model	Description
SD	SD Series Shut-off Sensor
7	Type 7000 Shut-off Sensor
1	For use with DN25 valve
2	For use with DN50 valve
3	For use with DN80 valve
4	For use with DN100 valve
6	For use with DN150 valve
8	For use with DN200 valve
1	Equipped with overpressure shut-off and underpressure shut-off
2	Equipped with overpressure shut-off
1	15mbar ≤ OPSO ≤ 360mbar, 6mbar ≤ UPSO ≤ 200mbar*
2	190mbar ≤ OPSO ≤ 760mbar, 60mbar ≤ UPSO ≤ 340mbar
3	700mbar ≤ OPSO ≤ 5000mbar, 300mbar ≤ UPSO ≤ 2400mbar
4	4.8bar ≤ OPSO ≤ 24bar, 2.3bar ≤ UPSO ≤ 12bar
5	20.5bar ≤ OPSO ≤ 90bar, 10bar ≤ UPSO ≤ 51bar
*OPSO: Over pressure shut-off value, UPSO: Under pressure shut-off value	

Model		Description
DGP		DGP Series pilot
3		Type 300 pilot
0	1	P1 ≤ 100bar, 15mbar ≤ P2 ≤ 150mbar*
	2	P1 ≤ 100bar, 0.15bar ≤ P2 ≤ 0.5bar
	3	P1 ≤ 100bar, 0.5bar ≤ P2 ≤ 13bar
	4	P1 ≤ 100bar, 13bar ≤ P2 ≤ 40bar
	5	P1 ≤ 100bar, 40bar ≤ P2 ≤ 80bar
*P1: Inlet pressure, P2: Outlet pressure		

SPRING

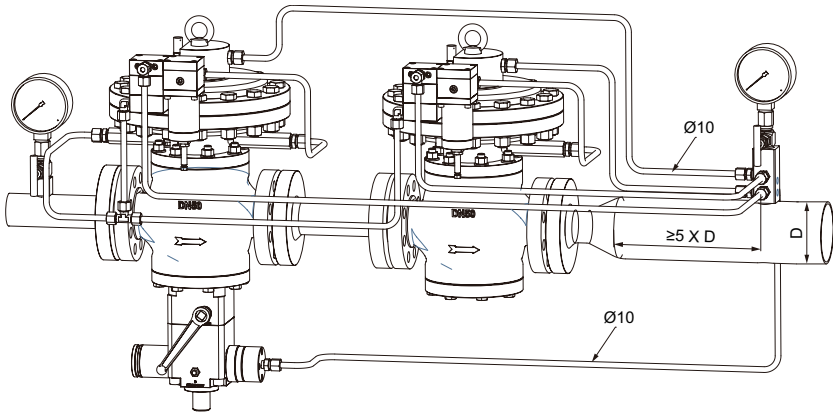
Pressure range of the pilot spring

Model	Version	Outlet pressure range (mbar)	Part number	Color
DGP300	DGP301	15–30	19010807041	White
		25–45	19010807042	Yellow
		40–75	19010807043	Green
		70–130	19010807044	Blue
		120–230	19010807045	Red
	DGP302	120–230	19010807045	Red
		220–450	19010807046	Black
		400–700	19010807047	White
	DGP303	500–1200	19010500321	Magenta
		1100–2600	19010500322	Medium Yellow
		2200–4000	19010500323	light Blue
		3500–6000	19011001121	White
		5500–9000	19011001122	Yellow
		8000–17000	19011001123	Green
		8000–17000	19011001123	Blue
	DGP304	16000–22000	19011001124	Red
		21000–27000	19011001125	Black
		26000–31000	19011001126	White
		29000–40000	19011001127	Yellow
	DGP305	39000–80000	19011001128	Green

Pressure range of the shut-off spring

Model	Shut-off pressure range (mbar)	Part number	Color
Over pressure shut-off spring	15-46	19010801651	White
	36-100	19010801652	Yellow
	90-200	19010801653	Green
	190-360	19010801654	Blue
	190-360	19010801654	Blue
	310-760	19010801655	Red
	700-1260	19010801654	Blue
	1080-2050	19010801655	Red
	1900-5000	19010801657	Black
	4800-10000	19010801655	Red
Under pressure shut-off spring	9000-24000	19010801657	White
	21000-43000	19010801655	Red
	38000-90000	19010801657	White
	6-20	19010700311	White
	12-40	19010700312	Yellow
	30-90	19010700313	Green
	60-200	19010700314	Blue
	60-200	19010700314	Blue
	130-340	19010700315	Red
	300-700	19010700314	Blue
	460-1260	19010700315	Red
	900-2400	19010700317	White
	2300-6000	19010700315	Red
	4000-12000	19010700316	Black
	10000-26000	19010700315	Red
	18000-51000	19010700316	Black

INSTALLATION

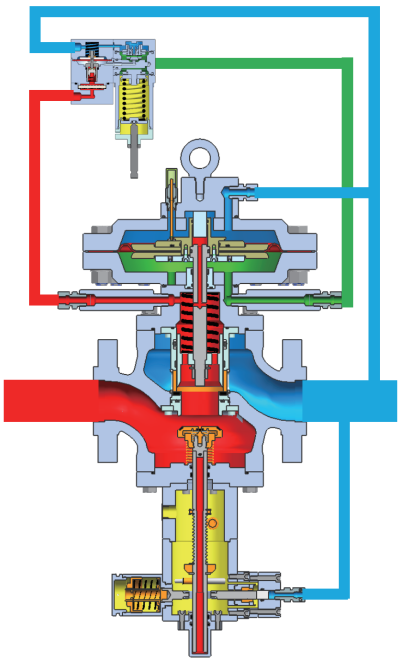


OPERATING PRINCIPLE

The GR series pressure regulator is an indirect-acting regulator equipped with the DGP300 series pilot.

When the downstream flow demand decreases, the outlet pressure above the diaphragm and the pilot increases. Under the joint action of the load pressure set by the pilot and the outlet pressure above the diaphragm, the diaphragm moves downward, and the movement of the diaphragm drives the valve orifice to move downward. The valve seat installed on the valve body is vulcanized with rubber to ensure a tight fit between the seat and the orifice for sealing purposes.

When the downstream flow demand increases, the outlet pressure above the diaphragm and the pilot decreases. Under the joint action of the load pressure set by the pilot and the outlet pressure above the diaphragm, the diaphragm moves upward, and the movement of the diaphragm drives the valve orifice to move upward, moving away from the valve seat, until the flow demand decreases.

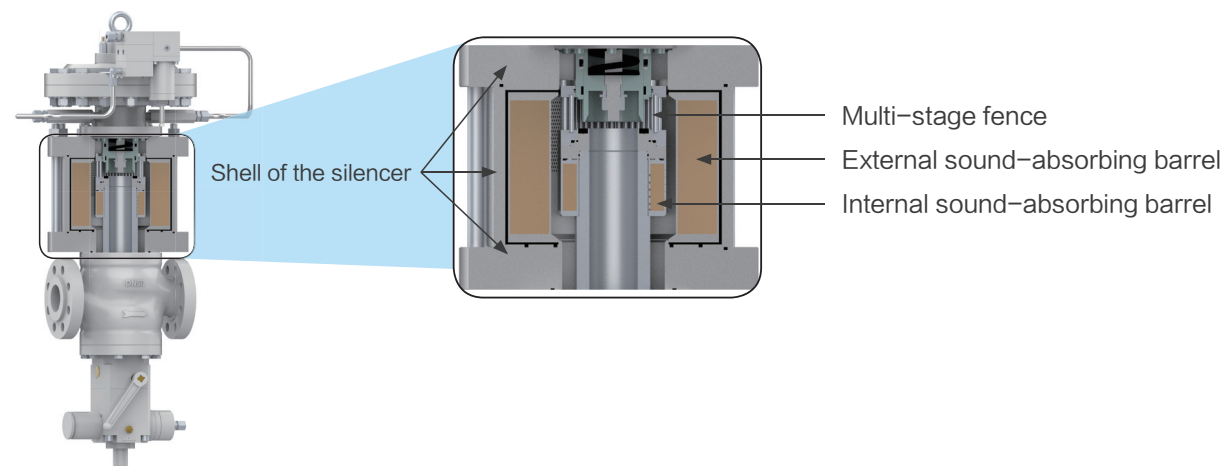


- atmospheric pressure
- inlet pressure
- outlet pressure
- actuating pressure

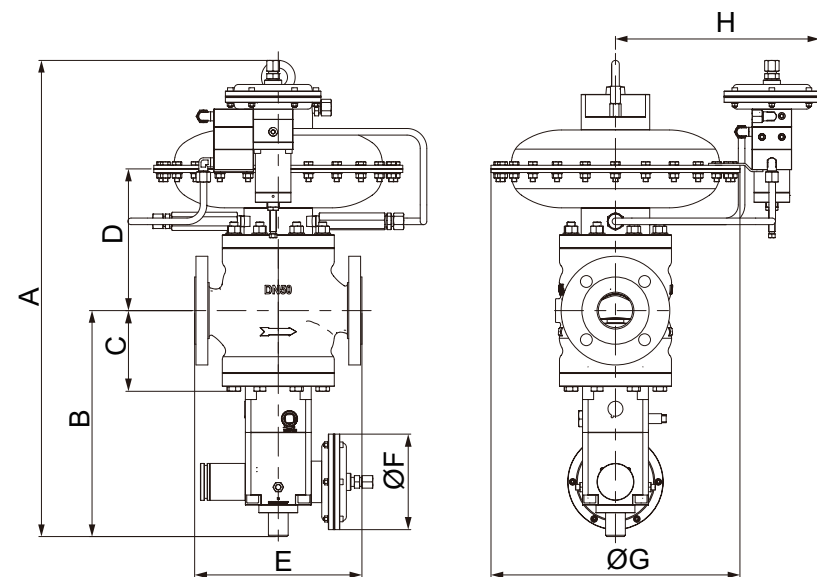
SILENCER

The GR series pressure regulator can be equipped with composite fence-type silencer. The DDB silencer consists mainly of a shell, internal and external sound-absorbing barrels, and multi-stage fences. The gas is dispersed and diverted through multiple stages of fence, and then absorbed by inner and outer sound-absorbing barrels, achieving the purpose of noise reduction. It has a compact structure, strong durability, low air resistance, and good noise reduction performance. These advantages offer good performance benefits.

The DDB silencer adopts a modular design, allowing for independent installation without changing the existing pipeline infrastructure. In various operating conditions, it can maintain the gas velocity at the outlet flange without impact. The noise reduction is at least 25 decibels, while ensuring that the flow rate decreases by less than 5%.

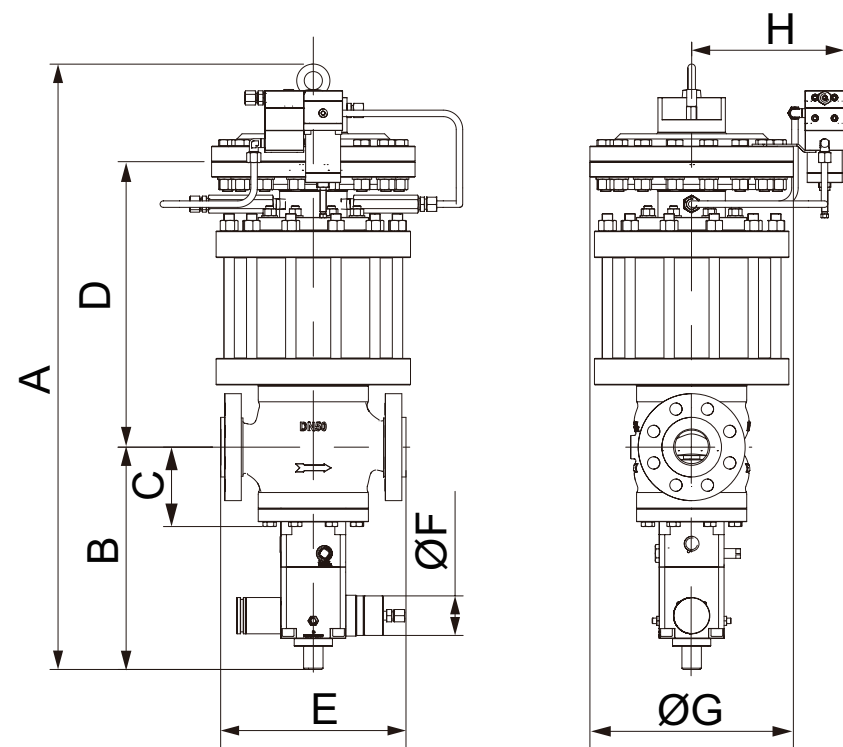


DIMENSIONS



Unit: mm

Model	Pressure rating	A	B	C	D	E	F	G	H	Weight(Kg)
GR100	Class300	616.6	291	101.4	175	197	95 61	314	235	66
	Class600					210	95 61			67
GR200	PN16/PN25 Class150	722.8	343	122.5	215.1	254	145 95 61	378	310 235	74
	Class300				201	267	95 61			87
	Class600					286	95 61			89
GR300	PN16/PN25 Class150	748	367	146.5	246.5	298	145 95 61	496	375 332	112
	Class300				227	317	95 61			146
	Class600					336	95 61			151
GR400	PN16/PN25 Class150	872	404	183.5	288	352	145 95 61	496	375 332	140
	Class300				268	368	95 61			187
	Class600					394	95 61			196
GR600	PN16/PN25 Class150	1200	587	248.5	362.2	451	145 95 61	625	442 396	305
	Class300				346	473	95 61			420
	Class600					508	95 61			448
GR800	PN16/PN25 Class150	1300	637	298.5	412	543	145 95	625	442 396	417
	Class300				396	568	95 61			580
	Class600					609	95 61			613



Unit: mm

Model	Pressure rating	A	B	C	D	E	F	G	H	Weight(Kg)
GR100-DDB	Class300	826.6	291	101.4	385	197	95/61	314	235	108
	Class600					210	95/61			109
GR200-DDB	PN16/PN25	962.3			454.6	254	145	378	310	167
	Class150		343	122.5			95/61		235	
	Class300				440.5	267	95/61	314	235	180
	Class600	934.1				286	95/61			182
GR300-DDB	PN16/PN25	1018			516.5	298	145	496	375	226
	Class150		367	146.5			95/61		332	
	Class300				497	317	95/61	404	274	260
	Class600	1022.6				336	95/61			265
GR400-DDB	PN16/PN25	1262			678	352	145	496	375	324
	Class150		404	183.5			95/61		332	
	Class300				658	368	95/61	404	274	371
	Class600	1221.6				394	95/61			380
GR600-DDB	PN16/PN25	1560			722.2	451	145	625	442	599
	Class150		587	248.5			95/61		396	
	Class300				706	473	95/61	534	356	714
	Class600	1527.6				508	95/61			742
GR800-DDB	PN16/PN25	1700			812	543	145	625	442	916
	Class150		637	298.5			95/61		396	
	Class300				796	568	95/61	534	356	1079
	Class600	1667.6				609	95/61			1112

FLOW CAPACITY

The size of the regulator is usually selected based on the flow coefficient C_g . Under the reference condition (15°C), the maximum flow rate of a natural gas regulator when fully open is calculated using the following formula:

1) Sub-critical state [When $(P_1 - P_2) \leq 0.5 (P_1 + P_a)$]

$$Q = 0.526 * C_g * (P_1 + P_a) * \sin \left[K_1 * \sqrt{\frac{P_1 - P_2}{P_1 + P_a}} \right] \text{ deg}$$

2) Critical state [When $(P_1 - P_2) > 0.5 (P_1 + P_a)$]

$$Q = 0.526 * C_g * (P_1 + P_a)$$

Q — Flow rate (m^3/h);

P_1 — Inlet pressure (bar);

P_a — Atmospheric pressure (bar);

C_g — Flow coefficient;

P_2 — Outlet pressure (bar);

K_1 — valve shape coefficient, 115.4 in this formula;

When the relative density d of the gas used differs from 0.61 (natural gas) or the gas temperature is not 15 °C, the flow rate should be multiplied by the correction factor F obtained using the following formula:

$$F = \sqrt{\frac{0.61 * 288}{d * (t + 273)}}$$

F — Correction factor;

d — Relative density d of the gas;

t — Gas temperature (°C);

The following is the gas relative density d and correction factor F of commonly used gases at the gas temperature of 15 °C:

Gas type	Relative density d	Factor F
Air	1	0.78
Coal gas	0.44	1.18
Methane	0.55	1.05
Ethane	1.05	0.76
Propane	1.53	0.63
Butane	2.01	0.55
Nitrogen	0.97	0.79
Carbon dioxide	1.52	0.63