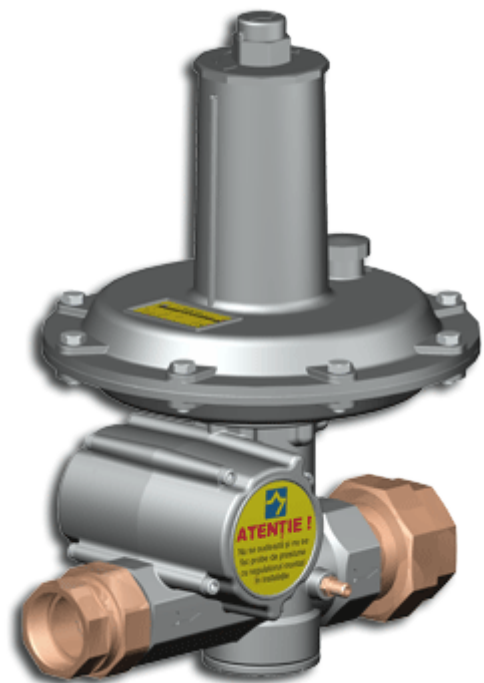


PRESSURE REGULATOR RTG 311



Introduction

RTG 311 pressure regulators are included within the direct acting and balanced valve regulator class.

The regulator is used for reducing and regulating the pressure of natural gases and LPG, ensuring a constant value of the outlet pressure within the limits of the regulating class, irrespective of the fluctuations of inlet pressure and flow rate.

RTG 311 regulator

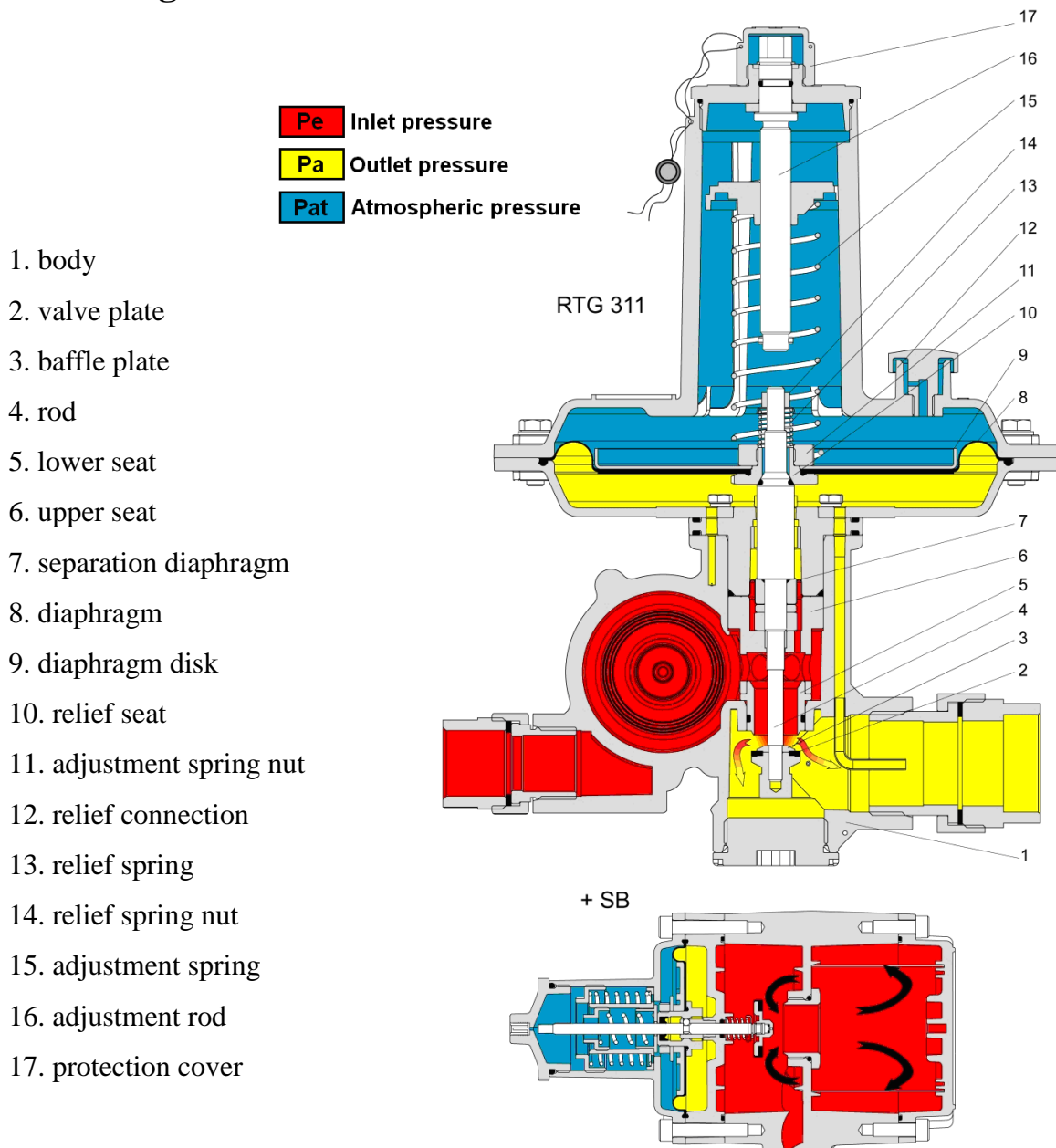


Figure 1 – RTG 311 regulator

RTG 311 regulator operation

The description of RTG 311 operation refers to the diagram in Figure 1. RTG 311 regulator is of direct action and normally open type.

When the inlet pipe is pressurized, the gas enters the body (1) threaded connection, then passes through the filter placed at the regulator inlet and through the holes in the upper seat (6). When the gas passes through the space between the lower seat (5) and the valve plate (2), the pressure decreases from the inlet pressure value to the set (outlet) pressure value, according to Table 1.

A change in the downstream pressure creates an imbalance in the system, determining the valve plate (2) to open proportionally with the flow required by the user.

In the set operation conditions (constant inlet pressure, constant flow rate), the system comprising the spring, diaphragm, rod and valve plate is in balance position.

Modifications in one or more parameters produce an imbalance in the system, which moves until reaching another balance position.

The set value of the outlet pressure can be changed by means of the adjustment rod (16). The rod acts on the spring (15), modifying the pretensioning force.

Technical characteristics

Constructive features

- Fail open type
- Balanced plug
- Incorporated relief valve

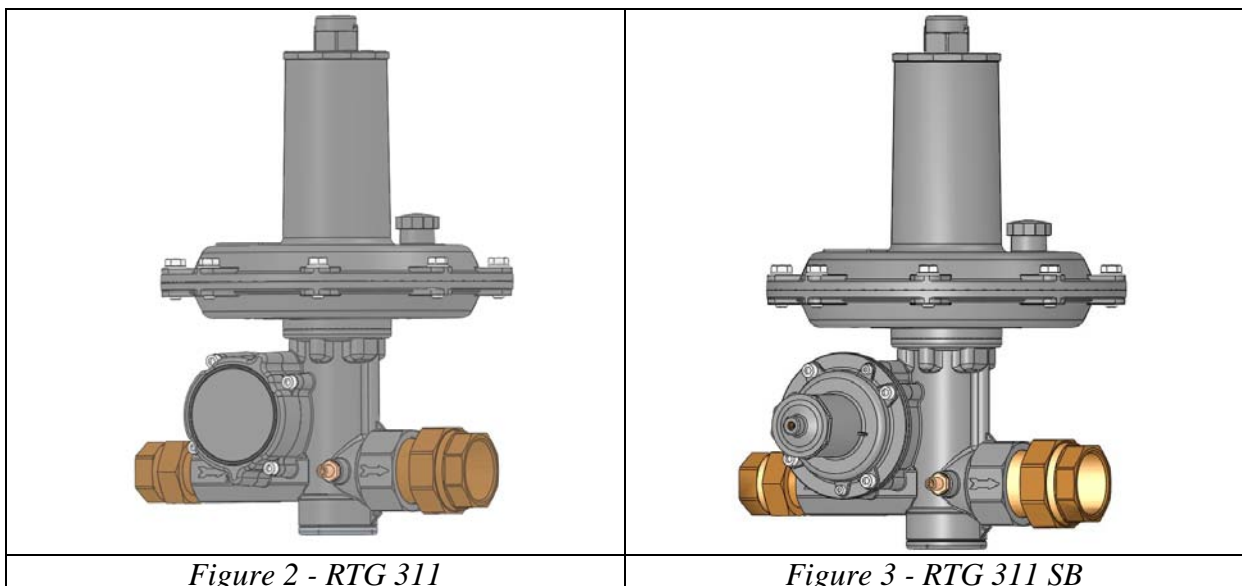


Table 1 – Technical characteristics

Regulator	Inlet pressure Pe [bar]		0.05 ÷ 2; 0.05 ÷ 6	
	Nominal flow rate [Nm ³ /h] (for Pe = 200 mbar) for natural gas	DN	25-40	35; 50
		DN	32-50	100
		DN	40-50	140
	Outlet pressure range Pa [mbar]		15 ÷ 200	
	Accuracy class (AC)		± 2.5 ÷ 10%	
Lock-up pressure class (SG)		+ 10 ÷ 30 %		
Shut-off valve	Intervention range [mbar]	minimum	8 ÷ 120	
		maximum	30 ÷ 300	
	Intervention accuracy (AG)	- minimum up to 2.5% - maximum up to 1% (depending on the control pressure)		
Relief valve	Relief range Pd [mbar]		10 ÷ 50 over Pa	
	Intervention accuracy (AG)		± 10 %	
Operating conditions	Ambient temperature [°C]		-30 ÷ 80	
	Working fluid temperature [°C]		-20 ÷ 60	
	Working medium		Normal, without corrosive agents	

Materials

Part	Material
Body	Die cast aluminium
Seat	Aluminium, brass
Rod	Brass
Cover	Die cast aluminium
Valve plate	Rubber (NBR)
Diaphragm	Rubber (NBR) with textile insert, rubber (NBR)
O-ring	Rubber (NBR), Viton, HNBR

Gas velocity calculation

For regulators, the recommended gas velocity in the outlet flange is 150 m/s. The erosion phenomenon accelerates and the noise level increases significantly at greater velocities.

The pipes are sized for gas velocities lower than 20 m/s.

Gas velocity in the outlet flange or in pipes is calculated using the formula:

$$V = 345.92 \times \frac{Q \times (1 - 0.002 \cdot p_a)}{D_i^2 \times (1 + p_a)}$$

where:

V – gas velocity [m/s]

Q – flow rate [Stm³/h]

D_i – inner diameter [mm] – for pressure regulators D_i = DN

p_a – outlet pressure [barg]

Safety devices and optional accessories

RTG 311 pressure regulator is equipped with the following safety devices and accessories, depending on the model ordered:

- **integrated filter** – the second impurity filter placed at the regulator inlet in order to retain the impurities in the natural gas. It is optionally delivered if the regulator is not equipped with a shut-off valve;
- **relief valve** – relieves excess pressure by shifting the relief seat when the outlet pressure increases over the initially set value (Figure 4);
- **shut-off valve (SB)** – blocks the gas access into the regulator when the outlet pressure increases or decreases in an uncontrolled manner;
- **metering point** – provided for measuring the outlet pressure (Figure 5).

The control (set) pressure can be measured by means of the metering point on the exterior of the body (Figure 5) which is delivered optionally.

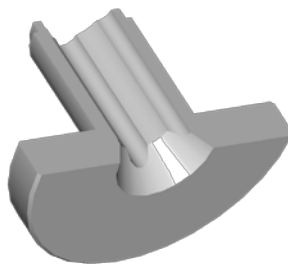


Figure 4 – Relief seat

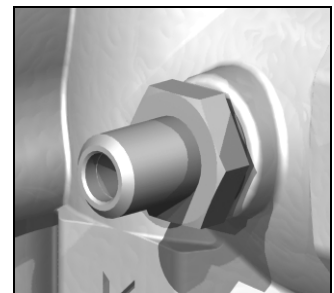


Figure 5 – Metering point

Shut-off valve

The shut-off valve mounted (optionally) on the RTG 311 regulator is a safety device which intervenes when the outlet pressure (Pa) increases or decreases in an uncontrolled manner.

The explanation of the shut-off valve operation refers to the diagram in Figure 6.

In normal operation conditions, the diaphragm seat (29) together with the diaphragm (28) holds the rod (30) in open position by means of the balls (23).

If the outlet pressure (Pa) exceeds the value for which the valve was set at overpressure or decreases under the intervention value at pressure decrease, an imbalance occurs. Consequently, the rod (30) is released and the gas flow is obstructed.

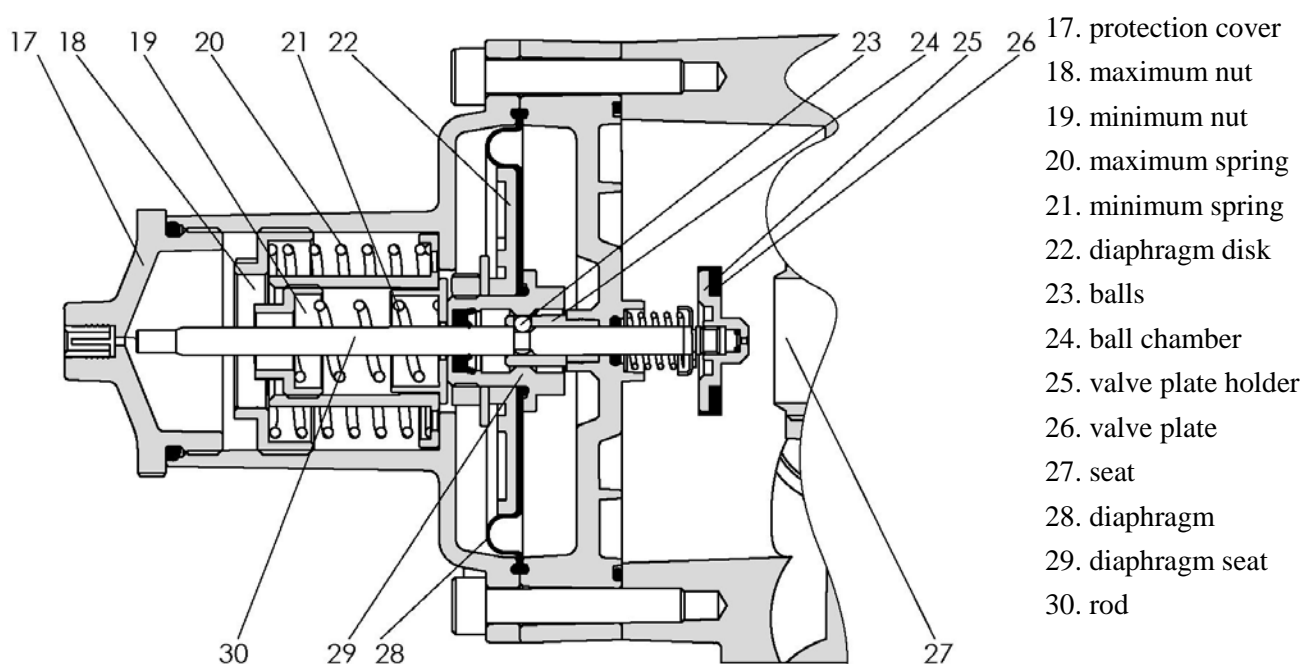


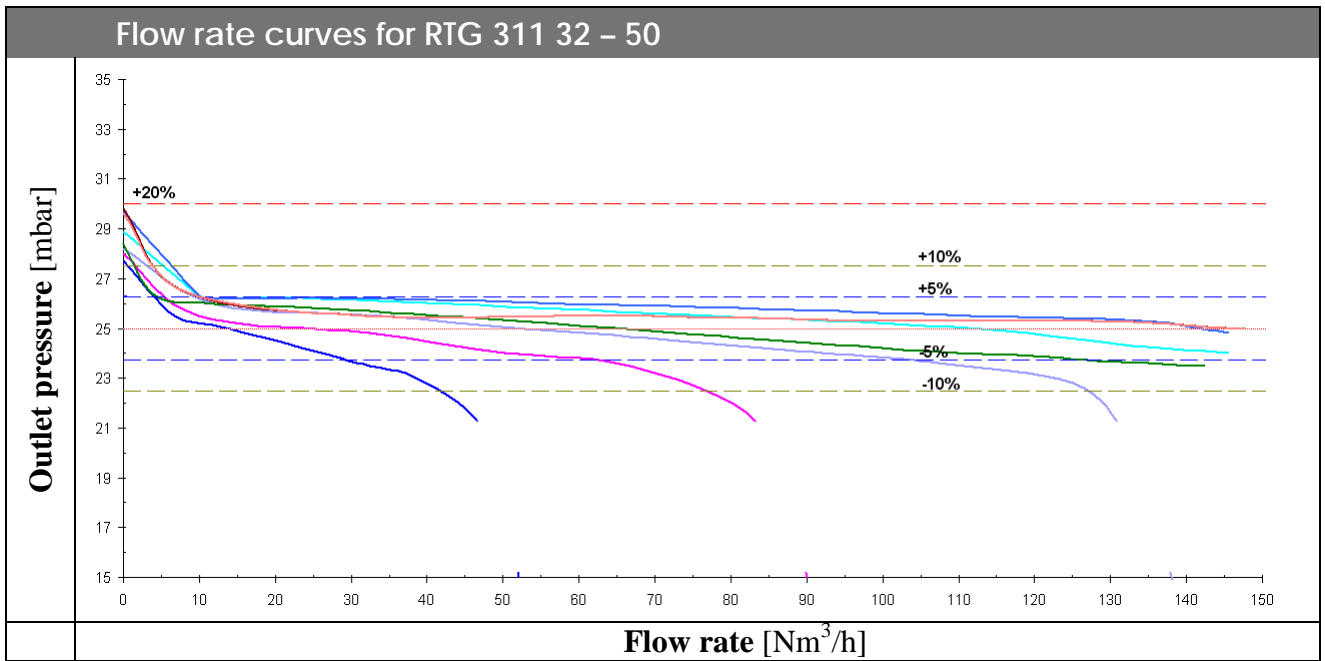
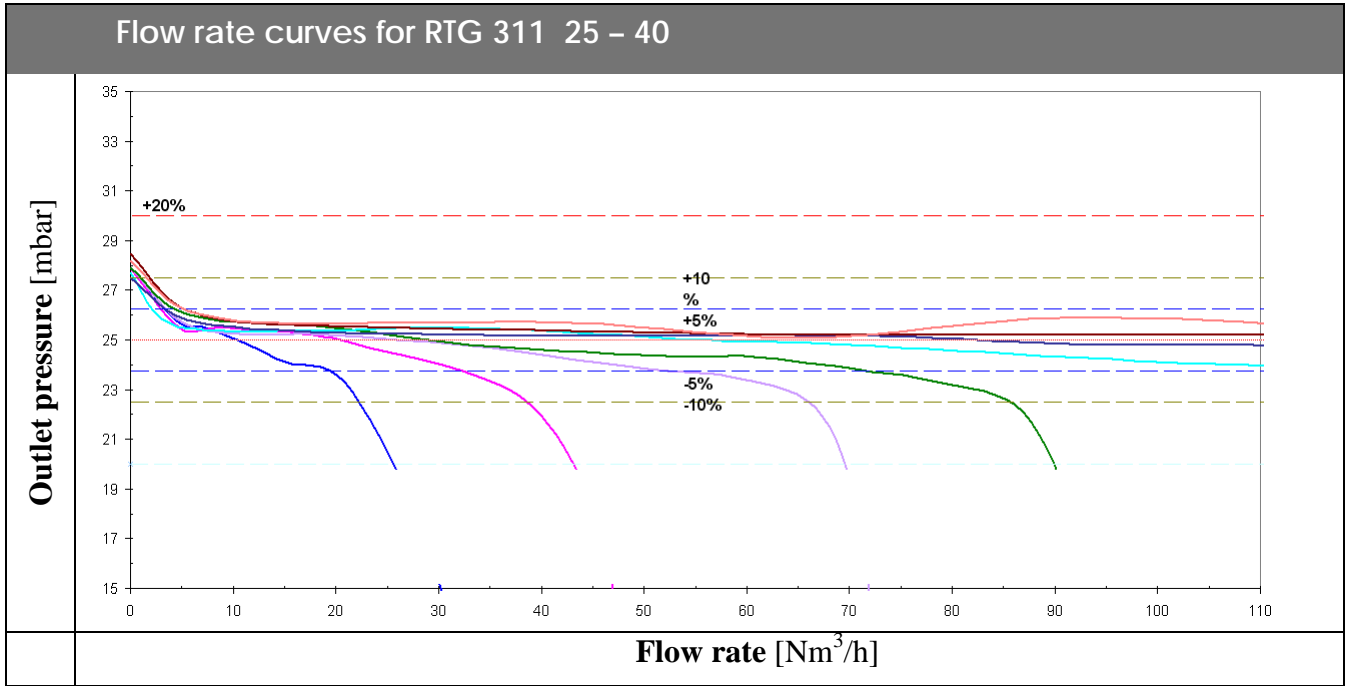
Figure 6 – Shut-off valve

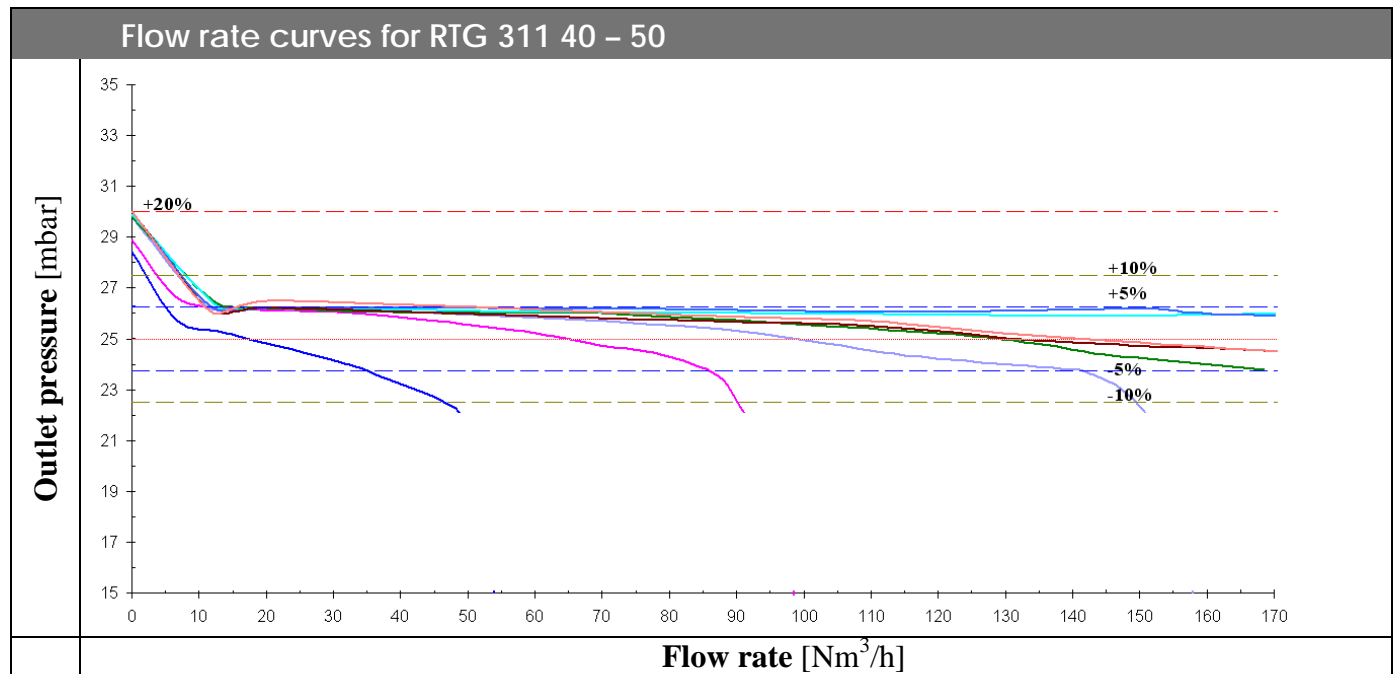
Adjustment springs









Table 2 – Adjustment springs for RTG 311 regulator

RTG 311		Shut-off valve			
		Maximum spring		Minimum spring	
Code	Setting range [mbar]	Code	Setting range [mbar]	Code	Setting range [mbar]
1450311	20 ÷ 30	1450292	30 ÷ 54	1450165	8 ÷ 18
1450312	30 ÷ 40	1450293	40 ÷ 115	1450166	15 ÷ 25
1450313	40 ÷ 70	1450345	50 ÷ 150	1450350	22 ÷ 35
1450314	60 ÷ 130	1450346	80 ÷ 180	1450351	30 ÷ 65
1450315	120 ÷ 220	1450347	150 ÷ 300	1450352	60 ÷ 120

Performance curves for natural gas




Inlet pressure

- | | |
|---|--|
|  0,06 bar |  1 bar |
|  0,1 bar |  2 bar |
|  0,3 bar |  6 bar |
|  0,7 bar |  AC 5 |
- $P_{2r} = 25 \text{ mbar}$

* NOTE:

The flow rates for the regulators equipped with shut-off valves are 5 ÷ 8% lower than the flow rates presented in the above diagrams.

Overall dimensions

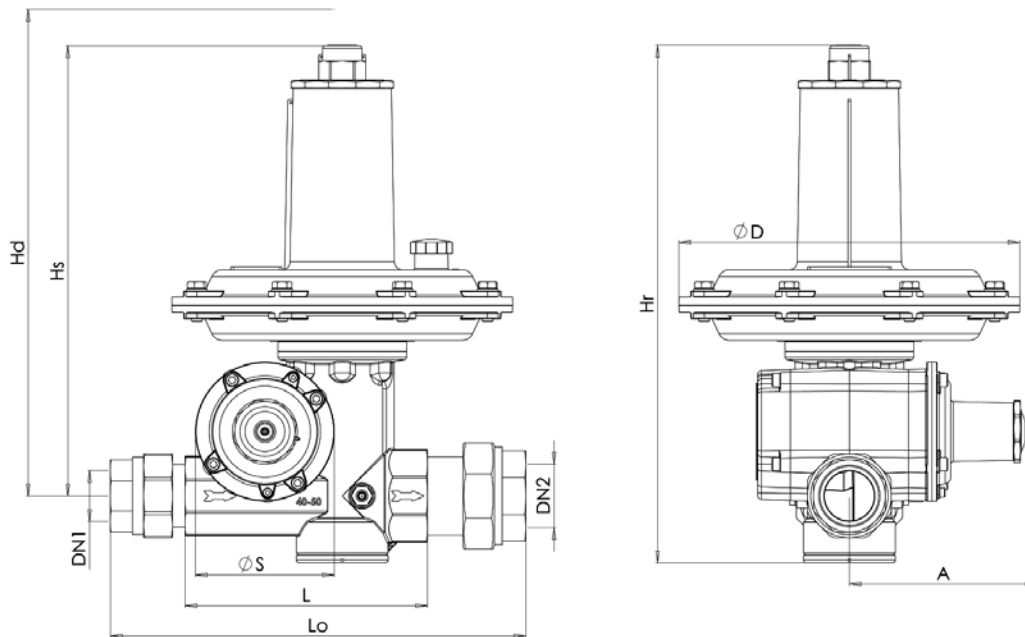


Table 3– RTG 311 regulator overall dimensions

Regulator model	DN1 in / (mm)	DN2 in / (mm)	L (mm)	Lo (mm)	Hr (mm)	Hs (mm)	ØD (mm)	Hd (mm)	ØS (mm)	A (mm)
Dn 25-40	G1" (25)	G1 ½" (40)	175	285	385.5	339	260	364	106	138.5
Dn 32-50	G1 ¼" (32)	G2" (50)	180	296	395	344	260	369	106	141
Dn 40-50	G1 ½" (40)	G2" (50)	185	317	395	344	260	369	106	144

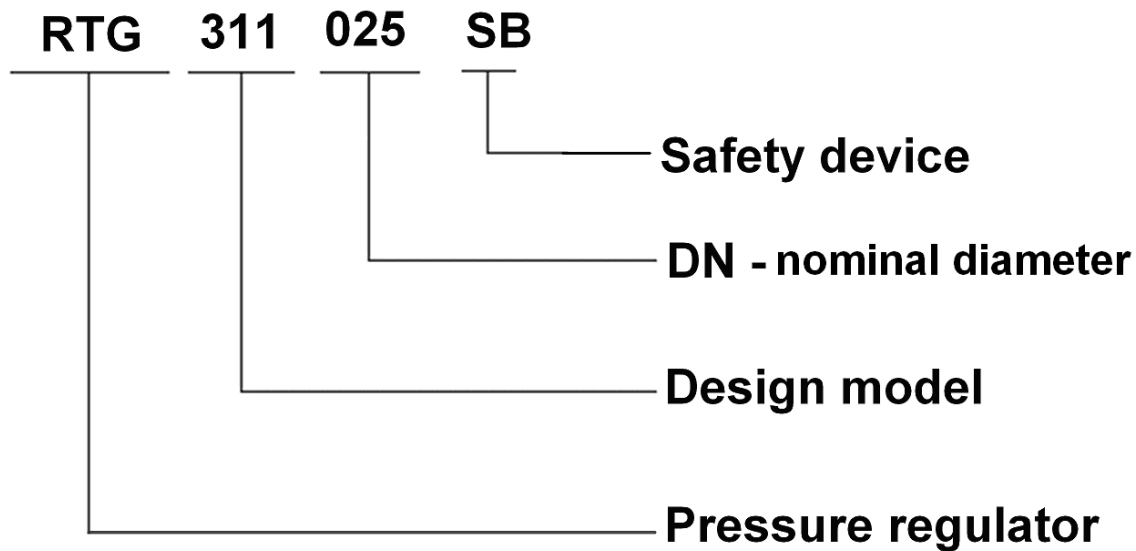
Packaging dimensions

Code	Items [no]	Dimensions [cm]	Volume [m ³]	Weight [kg]	Pallet L×l×h [cm] 120×80×150		
					Items [no]	Weight [kg]	Volume [m ³]
RTG 311 25-40	1	27.5×27×45	0.033	7.11	40	284	1.44
RTG 311 32-50	1	27.5×27×45	0.033	7.86		314	
RTG 311 40-50	1	27.5×27×45	0.033	8.25		330	

Ordering code

The pressure regulators are identified by specifying the constructive variant, the nominal dimension of inlet-outlet connections and the maximum working pressure.

Example:



For example, the code **RTG 311-25-SB** designates the RTG 311 pressure regulator, with DN 25 flanged connections and it also indicates the fact that the regulator is equipped with an SB shut-off valve.

Additional requirements, if any, must be specified when placing the order.

The manufacturer reserves the right to make modifications without any prior notification.

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