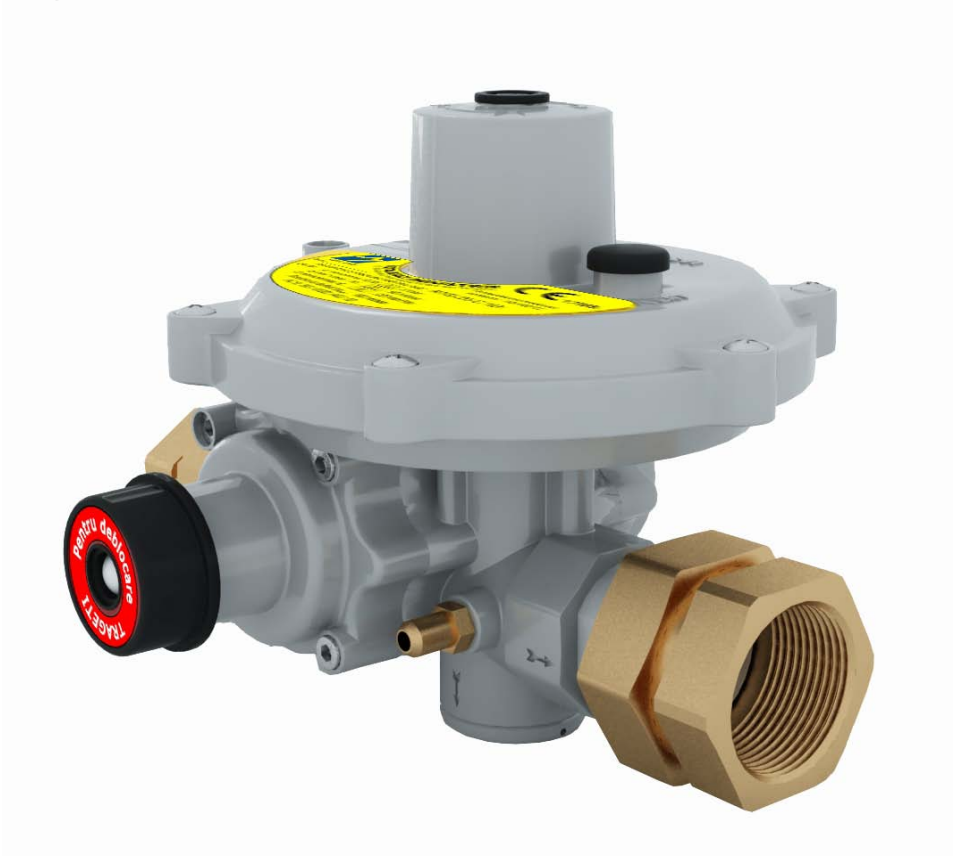
TOTALGAZ INDUSTRIE

PRESSURE REGULATOR RTG 25 C



Introduction

RTG 25 C pressure regulator is included within the direct acting and balanced valve regulator class. The regulators have a large range of applications both in industrial and domestic installations. RTG 25 C pressure regulator is used for reducing and regulating the pressure of natural gas, LPG and other non-corrosive gases (LPG, air).

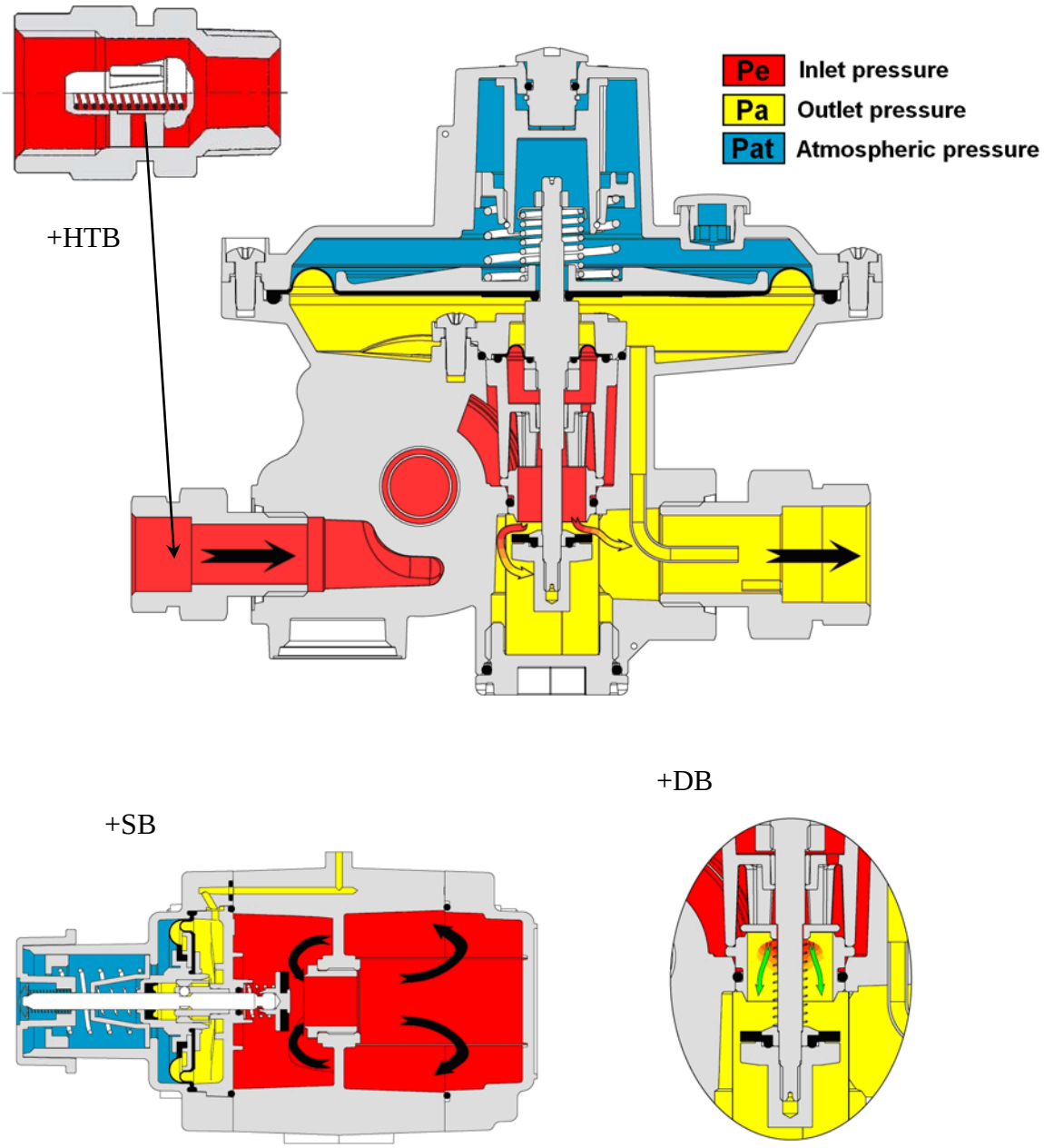


Figure 1 - RTG 25 C regulator

RTG 25 C regulator operation

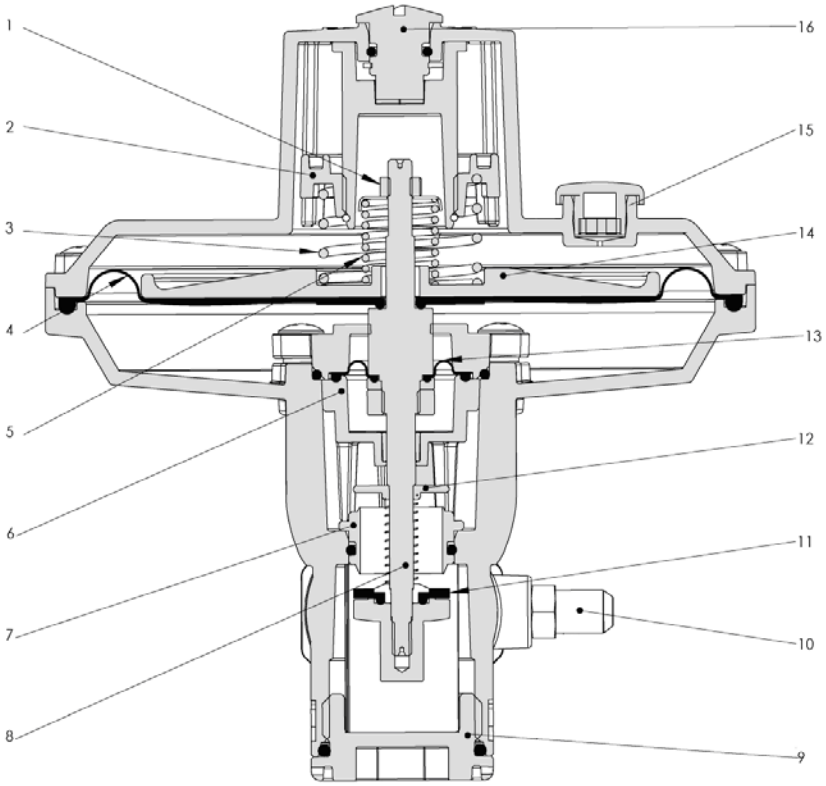
The upstream (inlet) pressure enters the regulator body via the inlet connection.

The pressure is regulated by modifying the distance between the seat (7) and the valve plate (11), which results in different passage sections.

The downstream (set) pressure is applied by means of the impulse connection under the control diaphragm (4), generating a force that opposes the force exerted by the spring (3).

A change in the downstream pressure creates an imbalance in the system, determining the valve plate (11) to open proportionally with the flow required by the consumer.

In the rated operation conditions (constant inlet pressure, constant flow rate), the system comprising the spring, diaphragm, rod and valve plate is in balance. Modifications in one or more parameters produce an imbalance in the system, which moves until reaching another balance position. The set value of the inlet pressure can be changed by means of the adjustment nut (2). The nut acts on the spring (3) modifying the pre-tensioning force.



1. Relief nut
2. Adjustment nut
3. Adjustment spring
4. Control diaphragm
5. Relief spring
6. Upper seat
7. Seat
8. Rod
9. G1” plug
10. Metering point
11. Valve plate
12. Obturator
13. Separation diaphragm
14. Diaphragm disk
15. Relief connection
16. Adjustment plug

Figure 2 – Main components of RTG 25 C

If the outlet pressure increases accidentally over the set value, the force generated by the pressure under the control diaphragm (4) overcomes the force exerted by the relief spring (5) and the assembly comprising the control diaphragm (4) and the diaphragm disk (14) moves. The pressure excess is vented into the atmosphere via the relief connection (15).

The set pressure can be measured by means of the metering point (10) which is located on the exterior of the body. The metering point is mounted optionally.

Technical characteristics

Design features

- Fail open type
- Balanced plug
- Incorporated relief valve
- Maintenance without removing the pressure regulator from installation
- Incorporated stainless steel filter (9000 mm^2)

Table 1 – Main technical characteristics of RTG 25 C regulator

Regulator	**Inlet pressure Pe** [bar]		0.02 ÷ 2; 0.05 ÷ 6
	Nominal flow rate (Pe = 200 mbar) [Nm^3/h]		6, 10, 20
	Outlet pressure range Pa [mbar]		10 ÷ 70
	Accuracy class (AC)		± 5 ÷ 10 %
	Lock-up pressure class (SG)		+ 20%
Shut-off valve	**Intervention range [mbar]**	minimum	10 ÷ 40
		maximum	30 ÷ 125
	Intervention accuracy class (AG)		- minimum – up to 5% - maximum – up to 2.5% (depending on the control pressure)
Relief valve	**Relief range Pd** [mbar]		10 ÷ 50 over Pa
	Intervention accuracy class (AG)		± 10 %
Climatic conditions	**Ambient temperature** [°C]		-30 ÷ 80
	Working fluid temperature [°C]		-20 ÷ 60
	Working medium	Normal, no corrosive agents	

The RTG 25 C pressure regulators constructive variants:

RTG 25 C – basic variant

RTG 25 C SB – variant with incorporated shut-off valve

RTG 25 C DB – variant with DB safety shut-off device for lack of feeding

RTG 25 C SB DB – variant with shut-off valve and safety shut-off device for lack of feeding.

Materials

Part	Material
Body	Die-cast aluminium
Covers	Die-cast aluminium
Connection fittings	Steel/brass
Seal seat	Brass
Diaphragm	Rubber
Gaskets	Rubber

Safety devices and optional accessories

The RTG 25 C pressure regulator is supplied with the following safety devices and accessories:

- **impurity filter** – the second impurity filter placed at the regulator inlet in order to retain impurities in the natural gas. It is supplied optionally in case the regulator is not equipped with a shut-off valve;
- **metering point** - provided for measuring the outlet pressure;
- **shut-off valve (SB)** – blocks the gas flow at outlet pressure increase or decrease;
- **thermal shut-off valve (HTB)** – blocks the gas flow in case the gas temperature at regulator inlet reaches 90 ÷ 100 °C;
- **safety diaphragm** – covers the working diaphragm and prevents gas leaks in case the diaphragm is damaged. It limits gas leaks into the atmosphere to less than 30dm^3/h;
- **safety shut-off device for lack of feeding (DB)** – blocks the gas flow through the regulator in case the inlet pressure is absent or decreases significantly or when the outlet flow rate is exceeded.
- **1st stage regulator** - The 1st stage regulator is of direct acting type, fail open, provided with balanced plug. The functioning of the pressure regulator is based on balancing the force generated by the set pressure with the pressing force generated by the adjustment spring. The adjustment spring reduces the inlet pressure to the constant pressure of 0,25 bar.

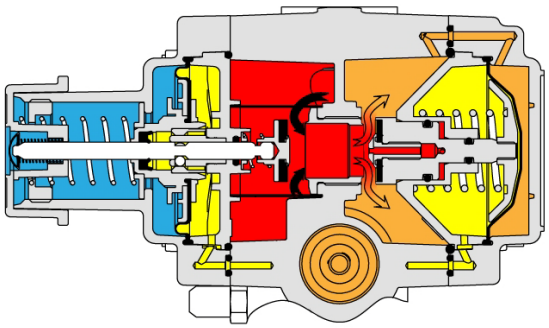


Figure 3 – 1st stage regulator

Shut-off valve operation

The shut-off valve (Figure 4) that is mounted (optionally) on RTG 25 C regulator is a safety device which intervenes if the outlet pressure (Pa) increases or decreases in an uncontrolled manner.

In normal operation conditions, the shut-off valve is open. The diaphragm seat (32) – Figure 4 – together with the control diaphragm (29) retains the rod (35) by means of the balls (22).

If the regulator outlet pressure is within the maximum and minimum set values of the shut-off valve, the diaphragm seat (32) does not move.

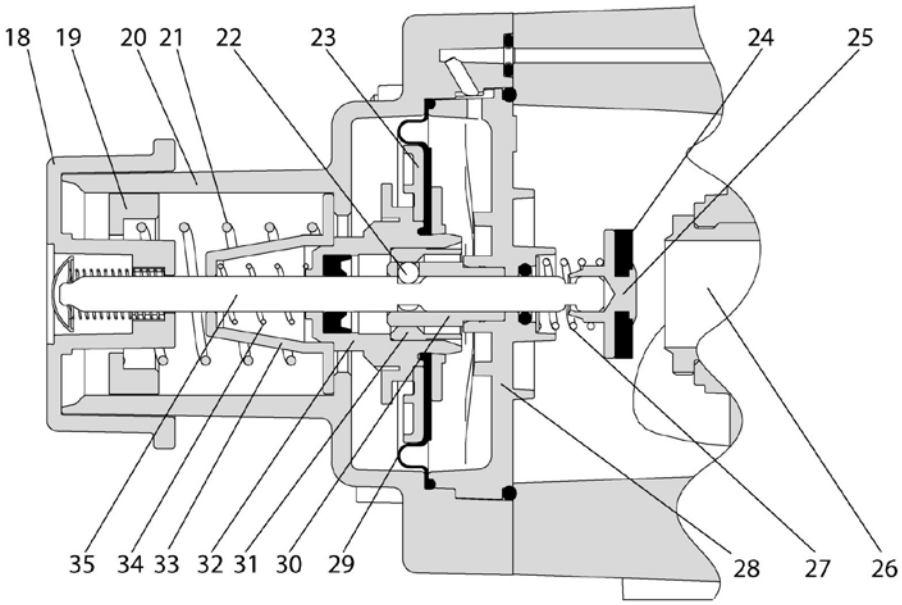


Figure 4 – Shut-off valve

18. Cover
19. Maximum nut
20. Upper cover
21. Maximum spring
22. Balls
23. Upper diaphragm disk
24. Valve plate
25. Valve plate holder
26. Seat
27. Blocking spring
28. Lower cover
29. Diaphragm
30. Ball chamber
31. Cam
32. Diaphragm seat
33. Minimum spring disk
34. Minimum spring
35. Rod

If the outlet pressure exceeds the valve set value at overpressure or decreases under the valve intervention value at pressure drop, the diaphragm (29) and implicitly the diaphragm seat (32) move, allowing the balls (22) to release the rod (35). Under the action of the spring (27), the rod moves and the contact between the valve plate (24) and the seat (26) blocks the gas flow.

Safety shut-off device for lack of feeding (DB) operation

A decrease in the inlet pressure or an increase in the consumed gas flow determines the regulator to open further. At a certain point, the obturator (12) – Figure 2 - reaches the upper edge of the seat (7), preventing the gas from passing through the regulator.

The safety device is armed automatically: the small by-pass orifice (25 ÷ 30 dm3/h) in the seat (7) of the DB device determines the outlet pressure to increase up to the set value. When the closing pressure is reached, the valve plate (11) seals on the lower edge of the seat (7) and the obturator (12) is released.

Sealing is possible when there is no active user and the installation downstream from the regulator is tight.

If the regulator is equipped with a safety device (DB), the minimum shut-off valve (SB) is not necessary.

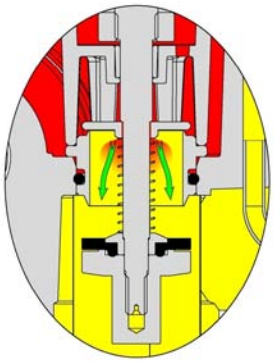


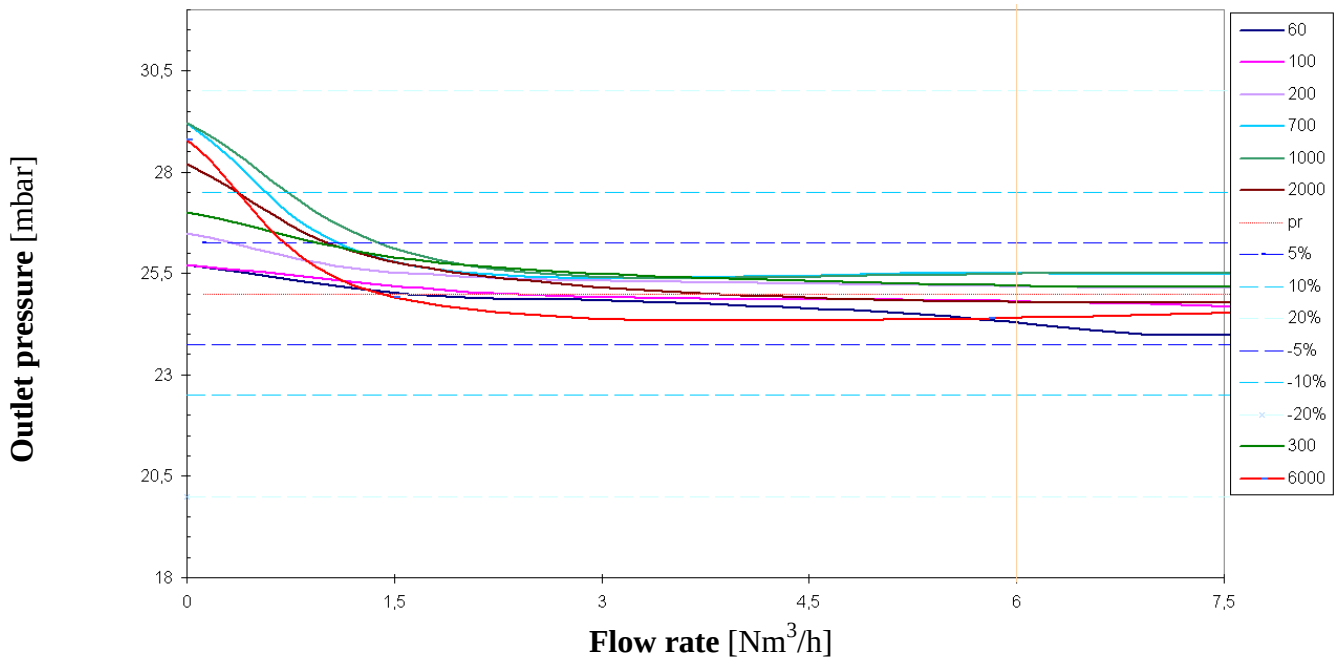
Figure 5 - Detail of RTG 25 C DB with automatic arming

Adjustment springs

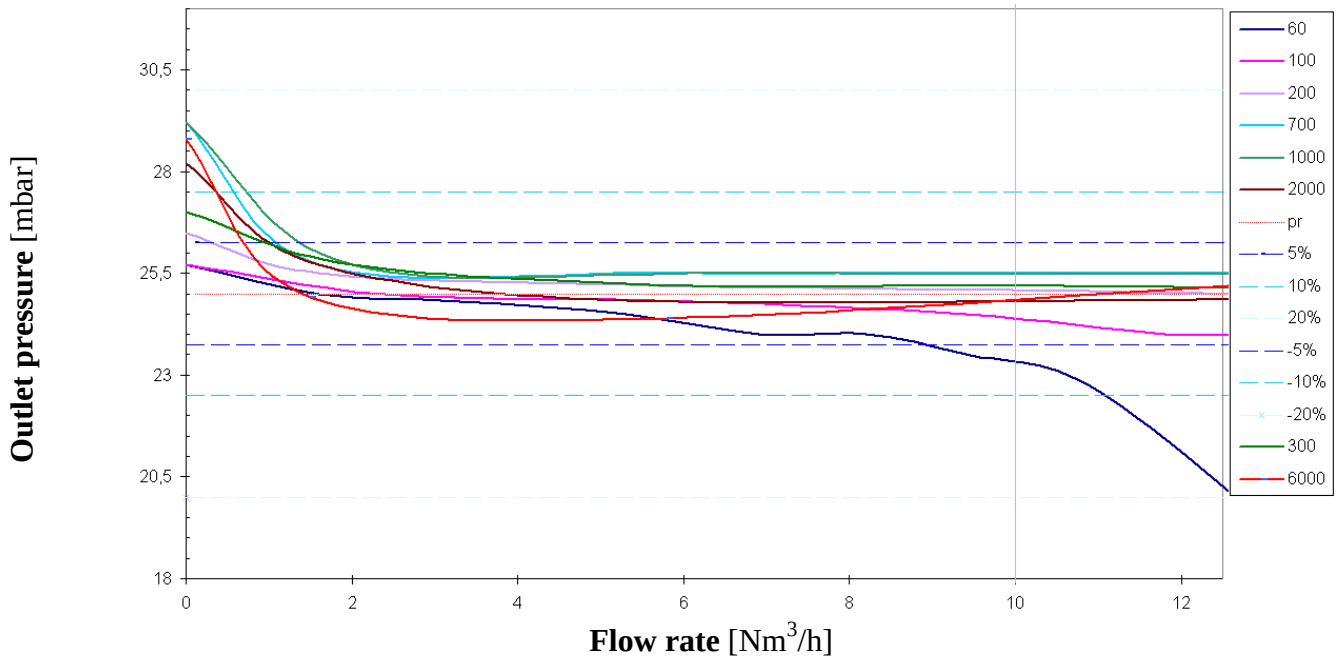
Regulator	Spring code	Setting range [mbar]	Shut-off valve			
			Maximum spring		Minimum spring	
			Code	Setting range [mbar]	Code	Setting range [mbar]
RTG 25 C	1450371	10 ÷ 25	1450288	30 ÷ 54	1450230	10 ÷ 40
	1450372	20 ÷ 35				
	1450373	34 ÷ 70	1450289	40 ÷ 125		

Performance curves for natural gas

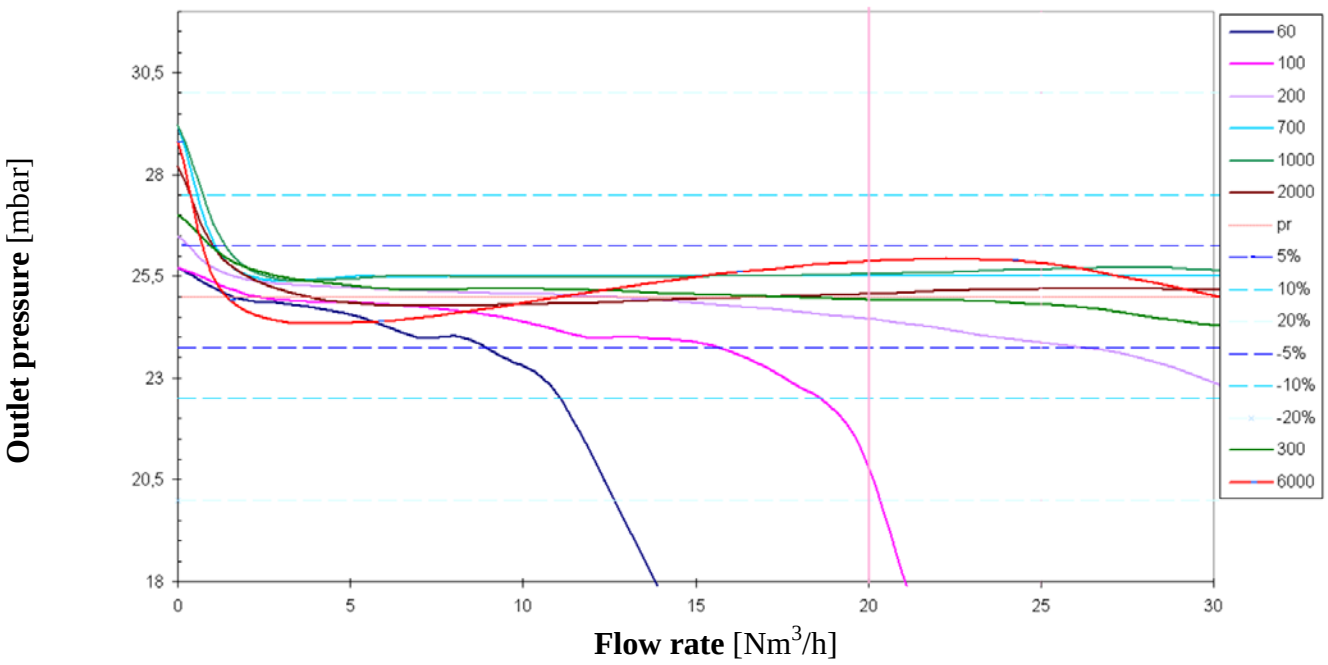
Flow rate curves RTG 25 C Q 6



Flow rate curves RTG 25 C Q 10



Flow rate curves RTG 25 C Q 20



Overall dimensions

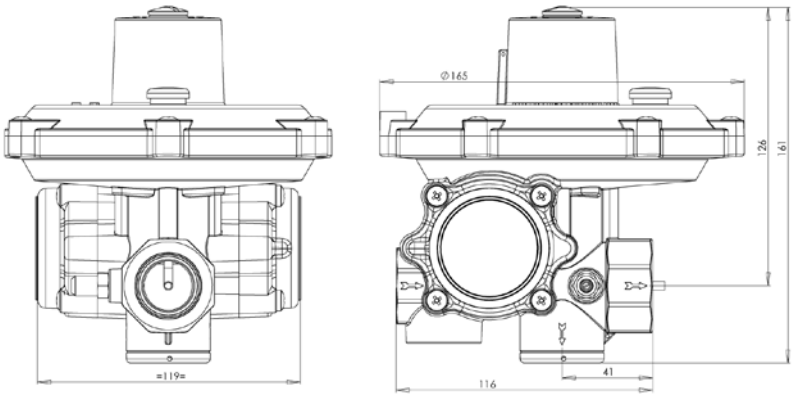


Figure 6 – Overall dimensions of RTG 25 C without shut-off valve

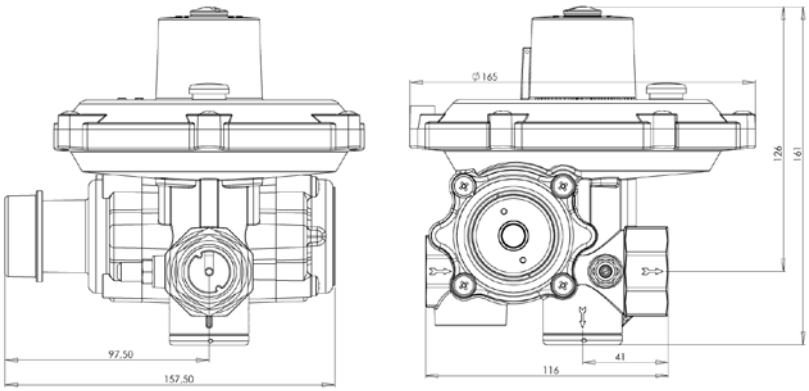


Figure 7 – Overall dimensions of RTG 25 C with shut-off valve

Packing dimensions

					Pallet L×l×h [cm] 120×80×170		
Code	**Items** [no]	**Dimensions** [cm]	**Volume** [m^3]	**Weight** [kg]	**Items** [no]	**Weight** [kg]	**Volume** [m^3]
RTG 25 C Q 6	1	20×17×20	0.007	2.1	180	378÷410	1.63
RTG 25 C Q 10	1	20×17×20	0.007	2.1	180	378÷410	1.63
RTG 25 C Q 20	1	20×17×20	0.007	2.1	180	378÷410	1.63

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