

PRESSURE REGULATOR RTG 25



Introduction

RTG 25 pressure regulator is included within the direct acting and balanced valve regulator class. These regulators have a large range of applications both in industrial and domestic installations. RTG 25 pressure regulator is used for reducing and regulating the pressure of natural gases (SR 3317 - 2003) or of other non-corrosive gases (LPG, air).

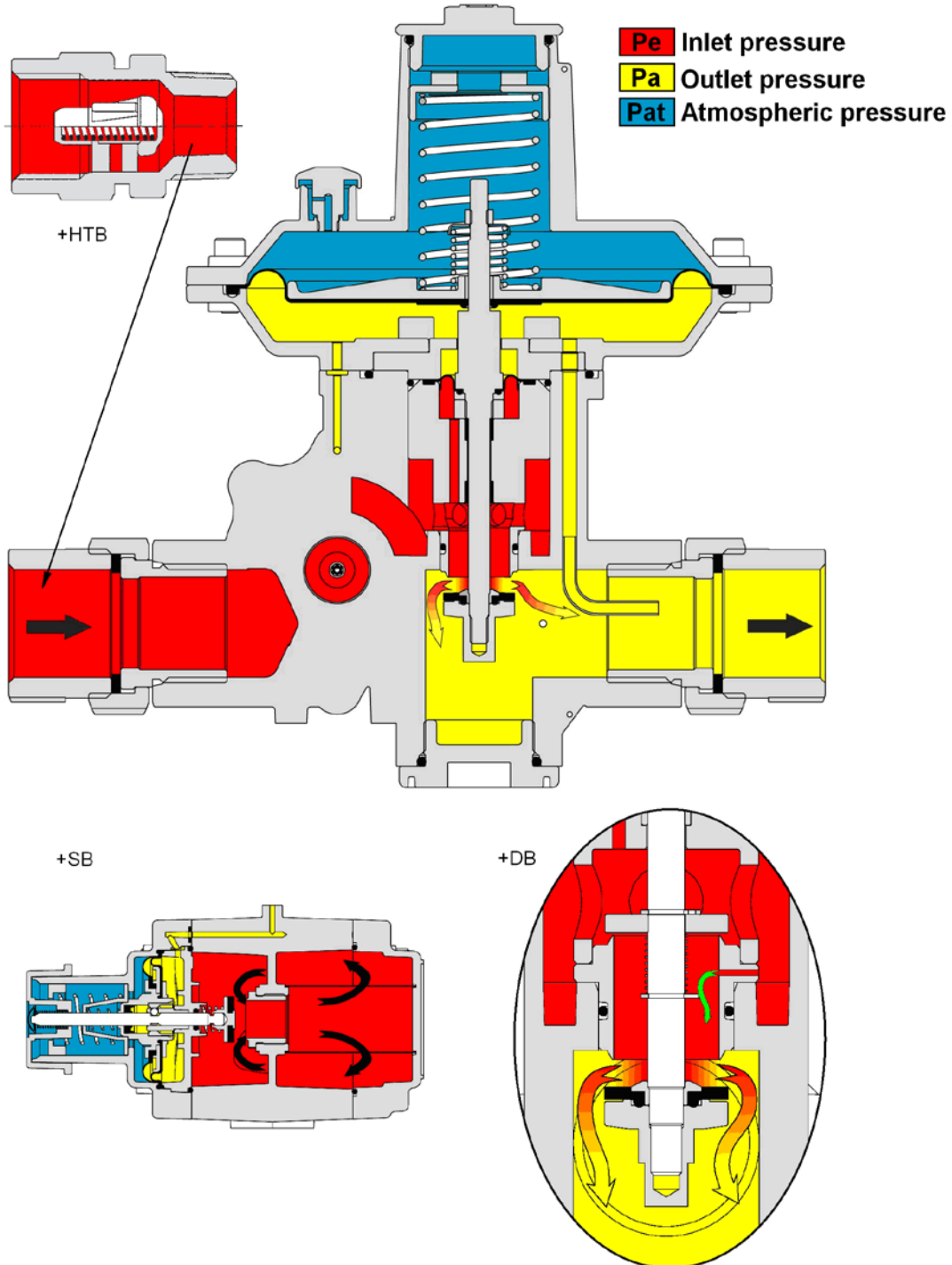


Figure 1 - RTG 25 regulator

RTG 25 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 (12), which results in different passage sections. The downstream (regulated) pressure is applied by means of the impulse connection under the control diaphragm (5), generating a force that opposes the force exerted by the spring (2). A change in the downstream pressure creates an imbalance in the system, determining the valve plate (12) 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 outlet pressure can be changed by means of the adjustment nut (1). The nut acts on the spring (2) modifying the pre-tensioning force.

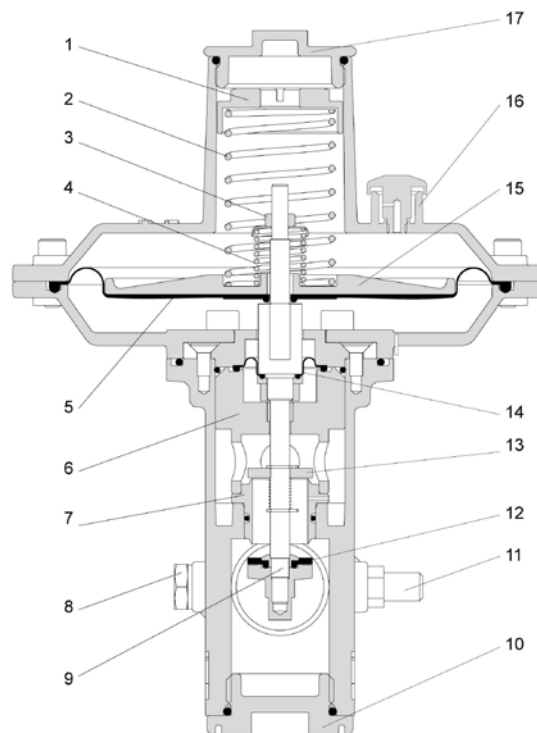


Figure 2 – Main components of RTG 25

- | | | |
|----------------------|--------------------|--------------------------|
| 1. Adjustment nut | 7. Seat | 13. Obturator |
| 2. Adjustment spring | 8. 1/8" plug | 14. Separation diaphragm |
| 3. Relief nut | 9. Rod | 15. Diaphragm disk |
| 4. Relief spring | 10. G1" plug | 16. Relief connection |
| 5. Control diaphragm | 11. Metering point | 17. Protection cover |
| 6. Diaphragm seat | 12. Valve plate | |

If the outlet pressure increases accidentally over the set value, the force generated by the pressure under the control diaphragm (5) overcomes the force exerted by the relief spring (4) and the assembly comprising the control diaphragm (5) and the diaphragm disk (15) moves. The pressure excess is vented into atmosphere via the relief connection (16).

The regulated pressure can be measured by means of the metering point (11) 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 regulator from installation
- Incorporated stainless steel filter (9000 mm²)

Table 1 – The main technical characteristics of the RTG 25 regulator

| | | | |
|----------------------|--|-----------------------------|---|
| Regulator | Inlet pressure P_e [bar] | | 0.02 ÷ 2; 0.05 ÷ 6 |
| | Nominal flow rate ($P_e = 200$ mbar) [Nm ³ /h] | | 10, 20, 35 |
| | Setting range P_a [mbar] | | 10 ÷ 70 |
| | Regulation class (AC) | | ± 5 ÷ 10% |
| | Lock-up pressure class (SG) | | + 20% |
| Shut-off valve | Intervention range [mbar] | minimum | 10 ÷ 40 |
| | | maximum | 30 ÷ 125 |
| | Intervention accuracy (AG) | | - minimum up to 5% - maximum up to 2.5% (depending on the control pressure) |
| Relief valve | Relief range P_d [mbar] | | 10 ÷ 50 over P_a |
| | Intervention accuracy (AG) | | ± 10 % |
| Operating conditions | Ambient temperature [°C] | | -30 ÷ 80 |
| | Working fluid temperature [°C] | | -20 ÷ 60 |
| | Working medium | Normal, no corrosive agents | |

RTG 25 pressure regulators are manufactured in the following constructive variants:

RTG 25 – basic variant;

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

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

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

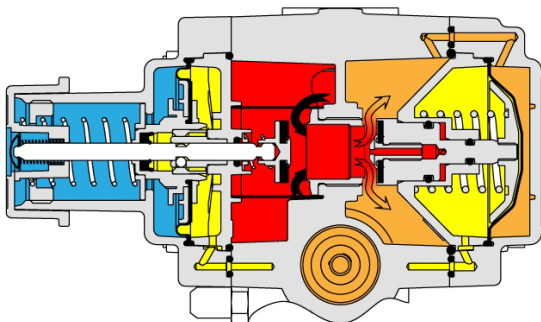
Materials

| Item | Material |
|------------|--------------------|
| Body | Die-cast aluminium |
| Cover | Die-cast aluminium |
| Connection | Steel/brass |
| Seat | Brass |
| Diaphragm | Rubber |
| Gasket | Rubber |

Safety devices and optional accessories

RTG 25 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 present in the natural gas. It is optionally supplied 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 $90 \div 100^{\circ}\text{C}$;
- **safety diaphragm** – covers the working diaphragm and prevents gas leaks in case the diaphragm is damaged. It limits gas leaks into atmosphere to less than $30\text{dm}^3/\text{h}$;
- **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** - 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 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 regulator is a safety device which intervenes if the outlet pressure (P_a) increases or decreases in an uncontrolled manner. In normal operation conditions, the shut-off valve is open.

The diaphragm seat (32) together with the control diaphragm (29) retains the rod (35) by means of the balls (22).

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

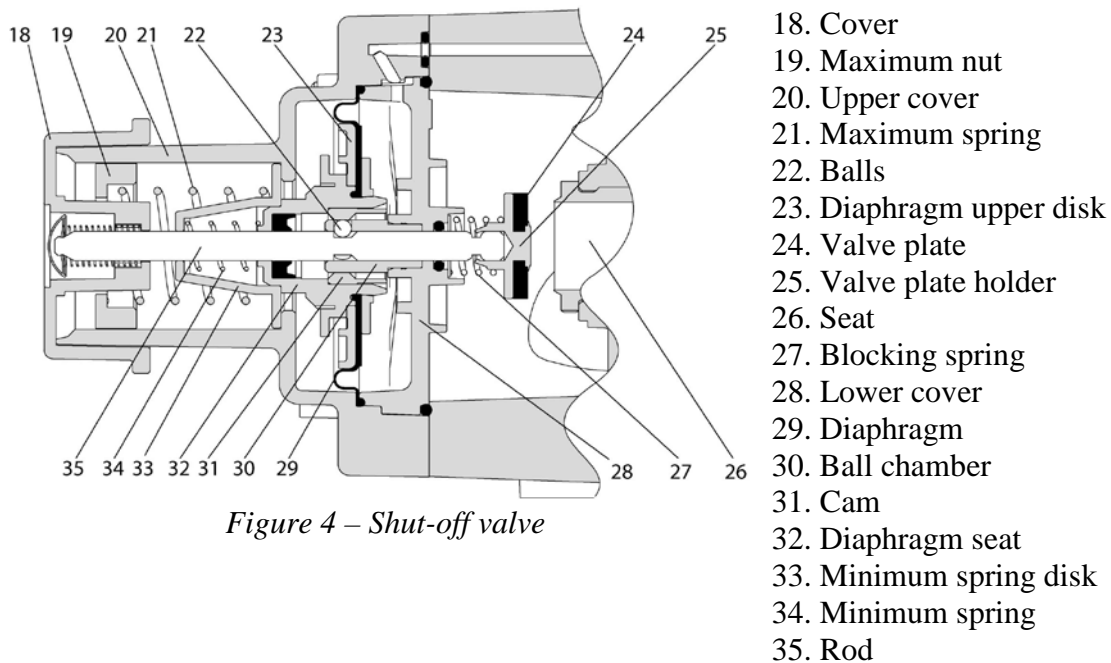


Figure 4 – Shut-off valve

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 gas consumption determines the regulator to open further. At a certain point, the obturator (13) (Figure 2) reaches the upper edge of the seat (7) preventing the gas flow through the regulator.

The safety device is armed automatically: the small bypass orifice ($25 \div 30 \text{ dm}^3/\text{h}$) in the seat (7) of the DB device determines the outlet pressure to increase up to the initially set value. When the closing pressure is reached, the valve plate (12) seals on the lower edge of the seat (7), therefore the obturator (13) is released.

Sealing is possible when there are no active users 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 anymore.

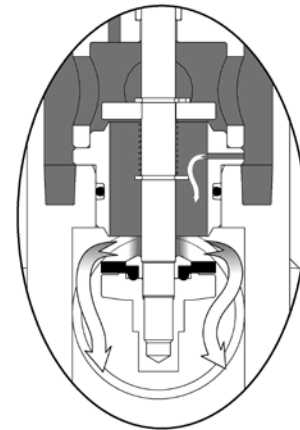


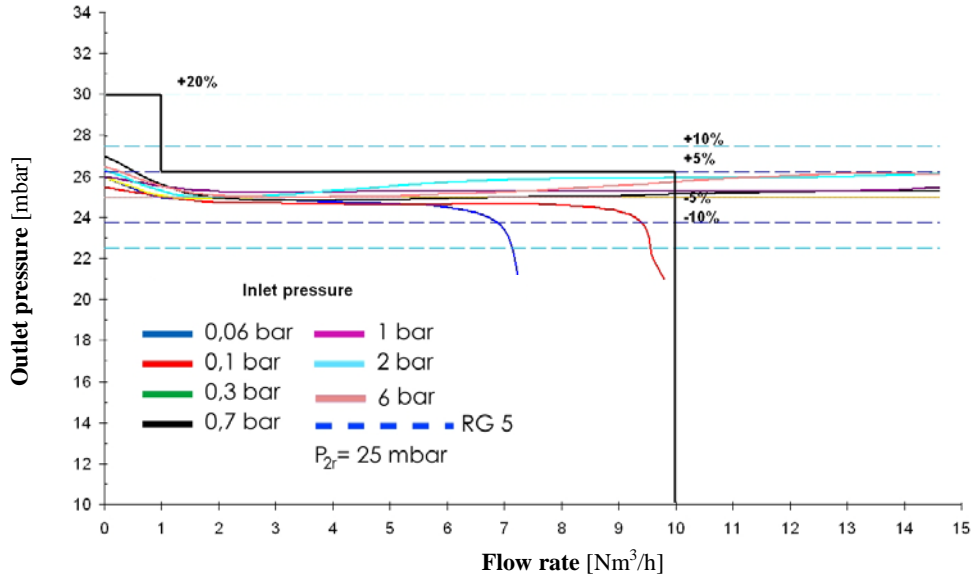
Figure 5 -
Detail of RTG 25 DB
with automatic arming

Adjustment springs

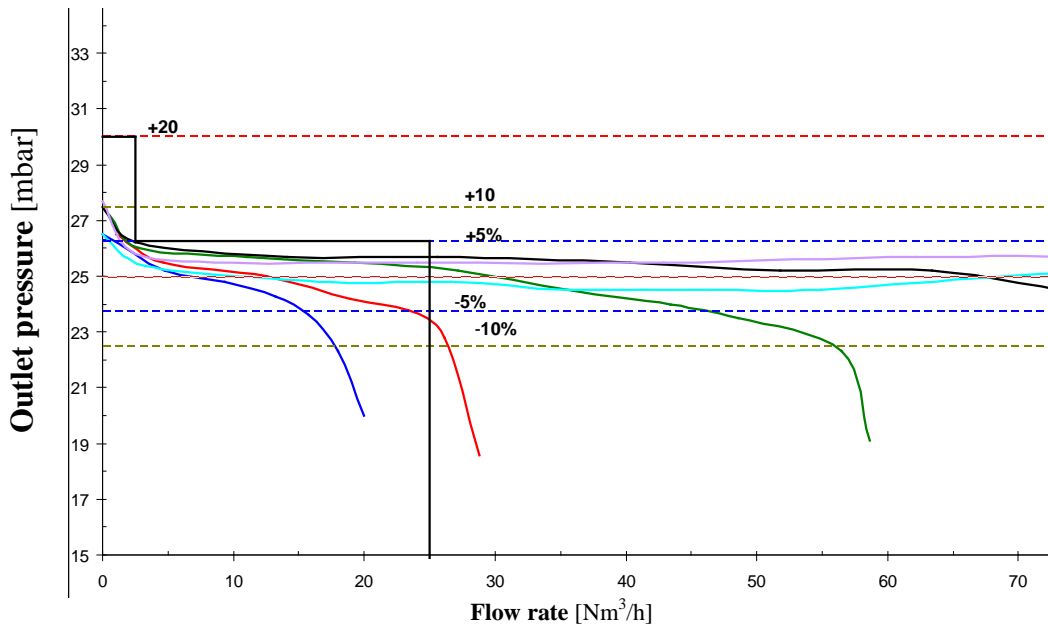
| Regulator | Spring code | Setting range [mbar] | Shut-off valve | | | |
|-----------|-------------|----------------------|----------------|----------------------|----------------|----------------------|
| | | | Maximum spring | | Minimum spring | |
| | | | Code | Setting range [mbar] | Code | Setting range [mbar] |
| RTG 25 | 1450151 | 10 ÷ 25 | 1450288 | 30 ÷ 54 | 1450230 | 10 ÷ 40 |
| | 1450152 | 20 ÷ 35 | | | | |
| | 1450153 | 25 ÷ 40 | 1450289 | 40 ÷ 125 | | |
| | 1450154 | 40 ÷ 70 | | | | |

Performance curves for natural gas

Performance curve RTG 25 Q 10



Performance curve RTG 25 Q 20



Overall dimensions

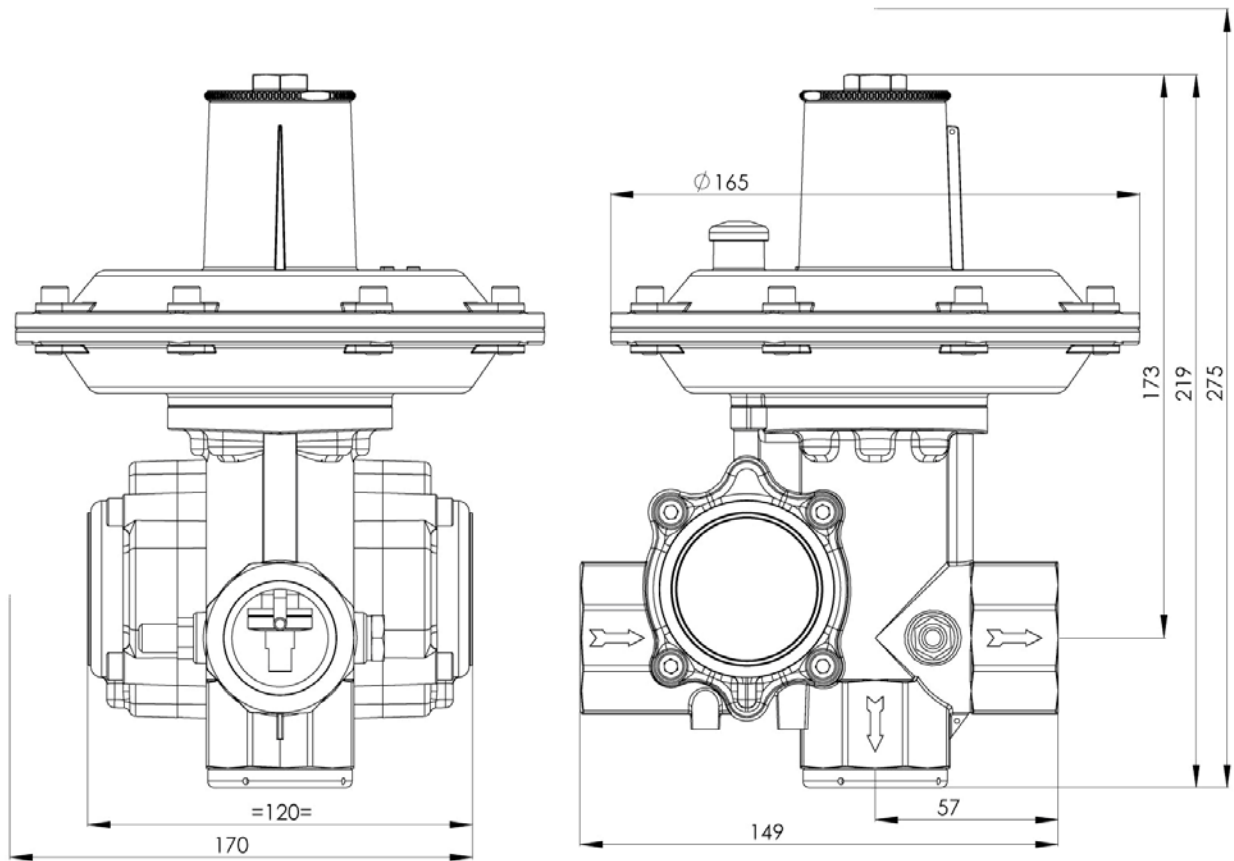


Figure 6 – Overall dimensions of RTG 25 without shut-off valve

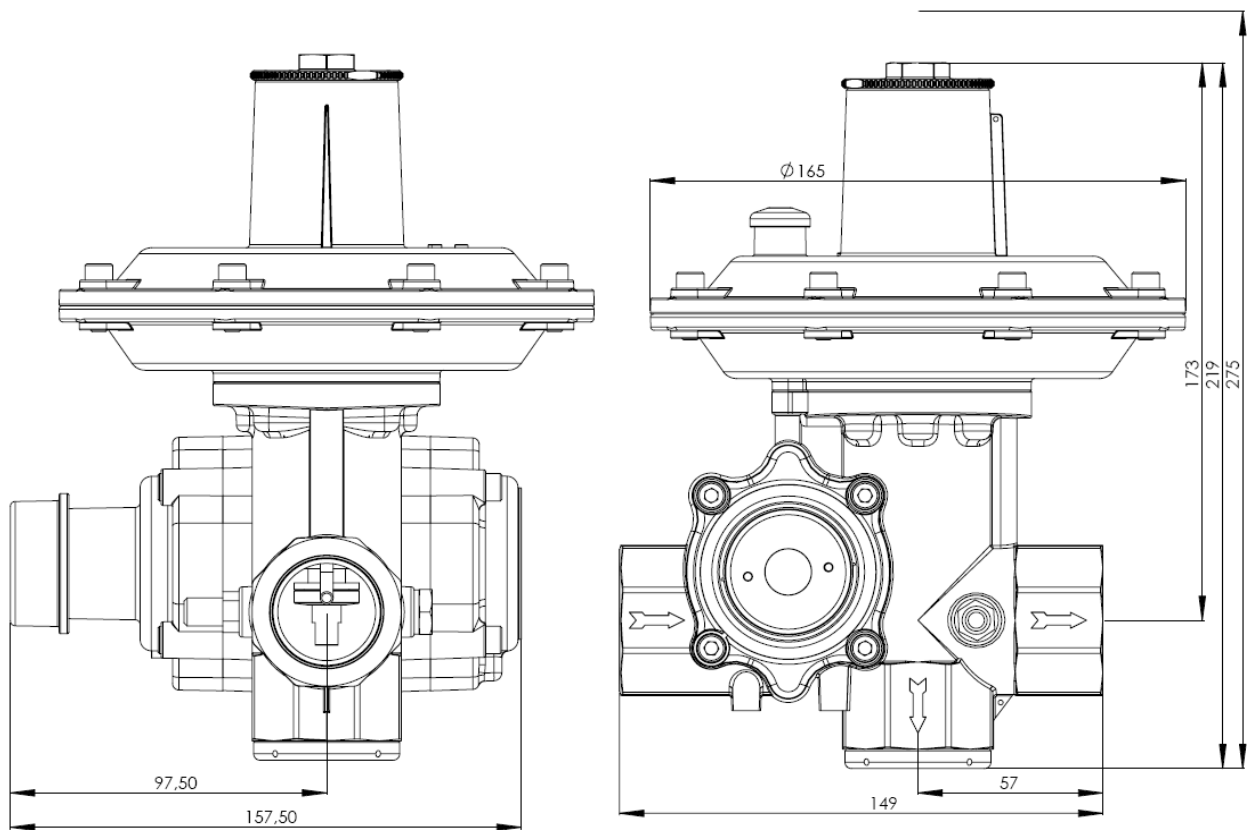


Figure 7 – Overall dimensions of RTG 25 equipped with shut-off valve

Packing dimensions

| | | | | | Pallet L×l×h [cm] 120×80×170 | | |
|-------------------|-------------|--------------|-----------------------------|----------------|---------------------------------|----------------|-----------------------------|
| Code | Pcs [no] | Size [cm] | Volume [m ³] | Weight [kg] | Pcs [no] | Weight [kg] | Volume [m ³] |
| RTG 25 Q10 | 1 | 20×17×24 | 0.008 | 2.77 | 180 | 495÷515 | 1.63 |
| RTG 25 Q20 | 1 | 20×17×24 | 0.008 | 2.77 | 180 | 495÷515 | 1.63 |
| RTG 25 Q35 | 1 | 20×17×24 | 0.008 | 2.77 | 180 | 495÷515 | 1.63 |

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

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