Combined Regulators
Type 2488 N/5857 Pressure-independent Control Valve

Application

Globe valve **DN 15** · Nominal pressure **PN 10** · Flow set point ranges from **0.3 to 1.0 m³/h** or **0.1 to 0.5 m³/h** with a differential pressure at the restriction of **0.2 bar** · Suitable for treated water up to **110 °C** and non-flammable gases up to **80 °C**

Pressure-independen control valve (PICV) for flow rate control in heat supply networks, combined with an electric actuator to apply a control signal of an electric control device.

Particularly suitable for local heat supply and large heating networks.

The valve closes when the flow rate or the output signal of the electric control device increases.

The combined regulator consists of a valve with integrated diaphragm actuator and an additional Type 5857 Electric Actuator [1].

Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Single-seated globe valve
- Compact design
- Control quality independent of the network differential pressure, for example for temperature control with weather-compensated control equipment
- Suitable for treated circuit water

Versions

Type 2488 N/5857 Pressure-independent Control Valve [1]

Type 2488 N Valve with connecting threads according to ISO 228/1-G ¾ B on both sides for attachment of threaded ends G ½ or welding ends · Type 5857 Electric Actuator

Special version

– ANSI version on request

Accessories

– Threaded ends G ½ or welding ends
– Intermediate insulating piece

[1] Alternatively: TROVIS 5757-3 or TROVIS 5757-7

Fig. 1: *Type 2488 N/5857 Pressure-independent Control Valve*

Principle of operation

The medium flows through the valve (1) as indicated by the arrow. The areas released by the restriction (11) and the valve plug (3) determine the flow rate.

The flow rate is controlled either by the connected electric actuator or the diaphragm actuator (6). The electric actuator reacts to the control signal of an electric control device. As a result, the position of the restriction (11) and the flow rate are changed.

The continuously adjustable restriction (11) is installed above the valve seat (2) as an orifice plate assembly and set point adjuster. The adjusting screw (13) is used to limit the cross-section of flow and the flow rate as well.

The valve plug (3) is located beneath the valve seat. The plug is connected directly to the diaphragm actuator (6). The operating diaphragm (9) and the positioning spring (5) determine the special differential pressure of 0.2 bar at the restriction.

A differential pressure $\Delta p_{restriction}$ is created at the restriction (orifice) by the medium flow. This differential pressure is transmitted over the control line (7) and the hole in the valve plug to the operating diaphragm (9) where it is converted into a positioning force. The diaphragm actuator controls the $\Delta p_{restriction}$ at the restriction (orifice) as well as the flow rate determined by the restriction setting by ensuring that the forces between the plug spring force and the actuator force remain in equilibrium. The maximum flow rate is adjusted at the adjusting screw (13), which adjusts the maximum orifice opening.

If a slower flow rate is needed in the plant than the maximum flow rate adjusted, the electric actuator positions the orifice accordingly.

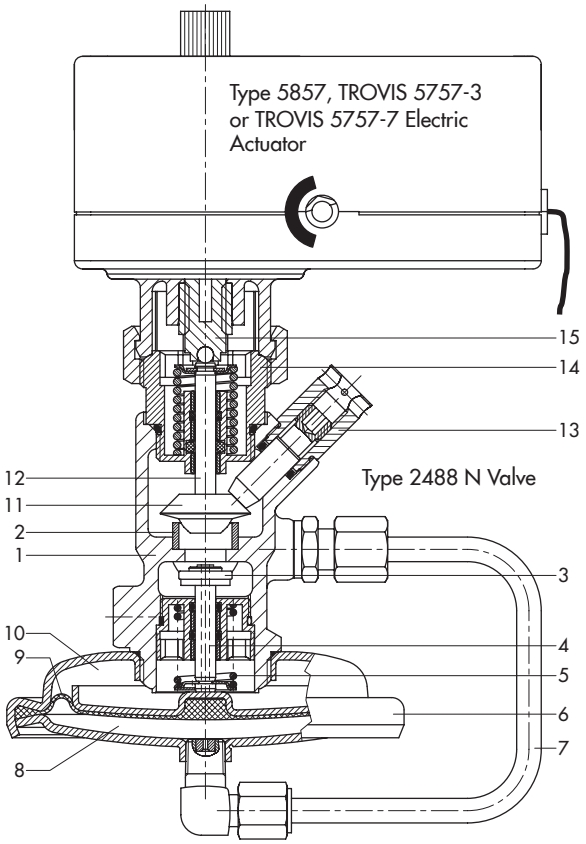
As the differential pressure across the orifice (restriction) has to be kept constant even when the network pressure drop changes, the valve (based on the electrically operated orifice) has a valve authority of 1. As a result, for example, the control quality of weather-compensated temperature control equipment is not affected by the pressure drop across the network.

Differential pressure across the valve

The minimum required differential pressure Δp_{min} across the valve is calculated as follows:

$$\Delta p_{min} = \Delta p_{restriction} + (\dot{V}/K_{VS})^2$$

Δp_{min}	Minimum differential pressure across the valve in bar
$\Delta p_{restriction}$	Differential pressure created at the restriction for measuring the flow rate in bar
$\dot{V}$	Flow rate, adjusted in m^3/h
K_{VS}	Valve flow coefficient in m^3/h



1 Valve body
2 Valve seat
3 Plug
4 Plug stem with hole
5 Positioning spring
6 Diaphragm actuator
7 Control line for high pressure
8 High-pressure side
9 Operating diaphragm
10 Low-pressure side
11 Restriction (orifice)
12 Restriction stem
13 Flow limiter (adjusting screw)
14 Adapter
15 Actuator stem

Fig. 2: *Functional diagram · View in the direction of flow*

Table 1: *Technical data*

Type 2488 N Valve	
Nominal size	DN 15
Connection	ISO 228/1-G ¾ B
K_{VS} coefficient Standard version Special version	 2.5 1.0
Nominal pressure	PN 10
Max. perm. differential pressure Δp	4 bar
Max. permissible temperature Treated water Non-flammable gases	 110 °C 80 °C
z value	0.43
Differential pressure at restriction	0.2 bar
Compliance	CE · EAC
Flow rate set point range/limitation for water with a differential pressure at the restriction of 0.2 bar Standard version Special version	 0.3 to 1 m^3/h 0.1 to 0.5 m^3/h
Type 5857 Electric Actuator	
Electrical connection Power supply	 230 V/24 V±10 %, 50 Hz
Power consumption	Approx. 3 VA
Rated travel	6 mm
Transit time for rated travel	20 s
Nominal thrust	300 N
Permissible ambient temperature range	0 to 50 °C
Permissible ambient temperature range at the actuator stem	0 to 110 °C
Storage temperature	–20 to 70 °C
Degree of protection (installed upright) [1]	IP 42
Noise immunity	EN 61000-6-2
Noise emission	EN 61000-6-3
Compliance	CE · EAC
Weight, approx.	0.7 kg
Additional electrical equipment [2]	
Positioner (for 24 V AC only)	
Input signal	0/2 to 10 V
Position feedback	0 to 10 V

[1] Actuator mounted above the valve
[2] Only with TROVIS 5757-3

Table 2: *Materials · Material numbers according to DIN EN*

Type 2488 N Valve	
Valve body	Red brass CC499K (Rg 5)
Plug	1.4301 with EPDM soft seal
Restriction	Brass, free of dezincification
Plug stem	1.4305
Seat	Red brass CC499K (Rg 5)
Valve spring	1.4310K
Diaphragm	EPDM without fabric reinforcement
Threaded ends	CW617N (brass)
Welding ends	1.0037
Intermediate insulating piece	1.4306, CW617N (brass), PTFE, EPDM, FPM
Type 5857 Electric Actuator	
Housing	Plastic (PPO)
Coupling nut	CW617N (brass)

Typical application

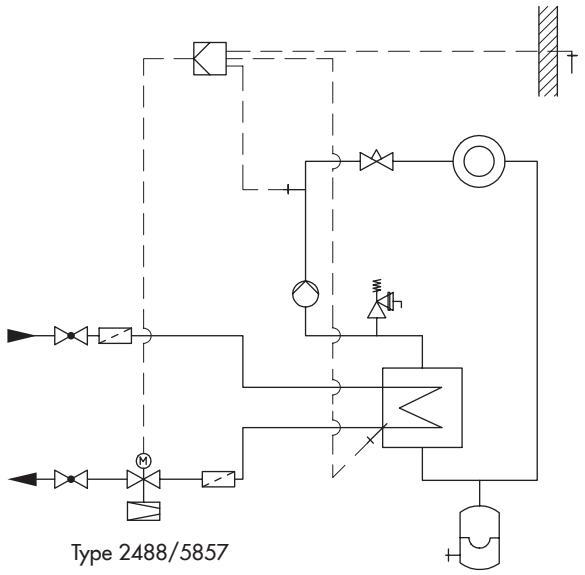


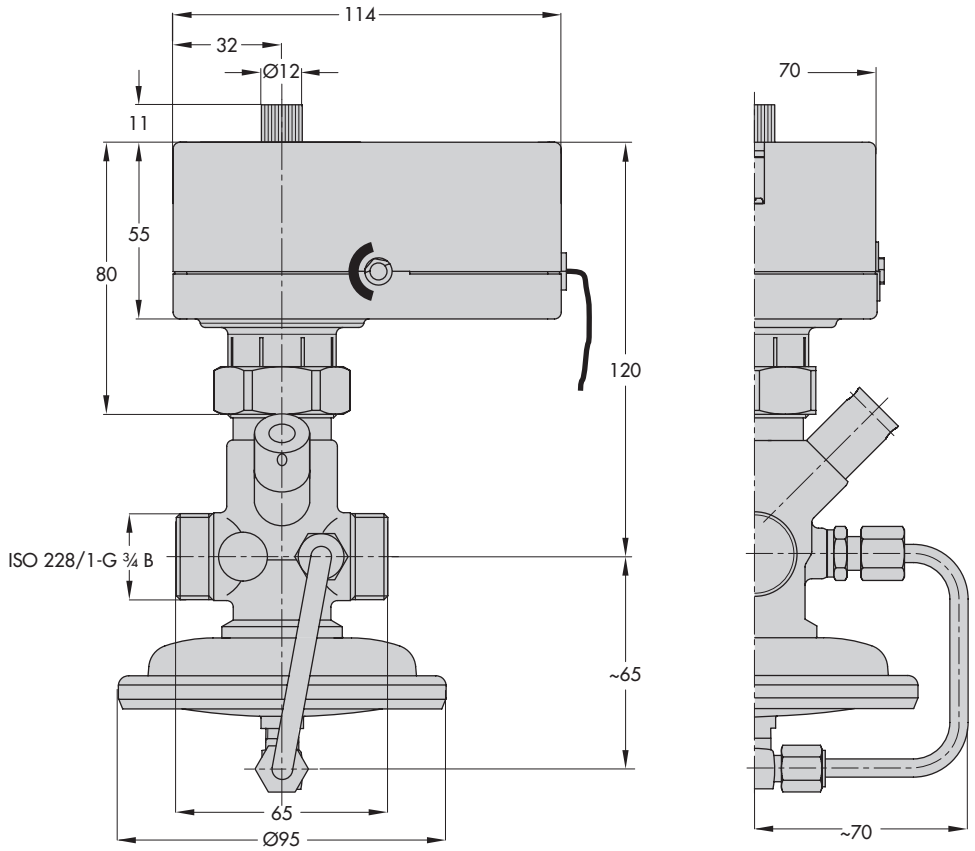
Fig. 3: *Indirect local heating supply connection with Type 2488 N/5857 Flow Regulator*

Ordering text

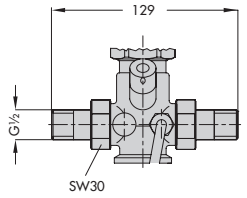
Installation

- The regulator is especially suitable for installation in horizontal pipelines.
- Direction of flow must match the direction indicated by the arrow on the body.
- The electric actuator must be mounted above the valve body.
- Prior to assembling the actuator and valve: Retract the actuator stem.
- If the regulator is to be insulated, do not insulate actuator and coupling nut.
- Observe permissible temperature ranges!
- Use an intermediate insulating piece if the permissible temperature at the actuator stem is exceeded.

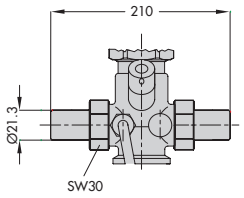
Dimensions



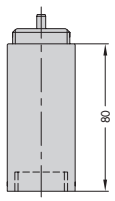
Type 2488 N Valve with Type 5857, TROVIS 5757-3 or TROVIS 5757-7 Actuator



Threaded ends



Welding ends



Intermediate insulating piece

Fig. 4: *Dimensions in mm*

Type 2488 N/5857, 2488 N/5757-3 or 2488 N/5757-7
Pressure-independent Control Valve

With Type 2488 N Valve and Type 5857, TROVIS 5757-3 or TROVIS 5757-7 Actuator

Flow set point range with a differential pressure at the restriction of 0.2 bar:

0.3 to 1.0 m^3/h (standard version) or 0.1 to 0.5 m^3/h (special version)

Accessories

- Threaded ends G ½ or welding ends
- Intermediate insulating piece

Specifications subject to change without notice

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