DATA SHEET

T 3136 EN

Type 2488 N/5857 Pressure-independent Control Valve

Combined Regulators

CE

Application

Globe valve size **DN 15** · Pressure rating **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-independent 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].

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

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 outdoor-temperature-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

Accessories

– Threaded ends G ½
– Welding ends
– Intermediate insulating piece

[1] Alternative: TROVIS 5757-3/5757-7

SAMSON AKTIENGESELLSCHAFT · Weismüllerstraße 3 · 60314 Frankfurt am Main, Germany
Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 · samson@samson.de · www.samson.de
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Principle of operation

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

The flow regulation is ultimately performed by either the mounted electric actuator or the diaphragm actuator (6). The electric actuator responds to the control signal of an electronic control device and moves the restriction stem (12) accordingly. As a result, the flow cross-section at the restriction (11) is changed causing the flow rate to change as well.

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

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

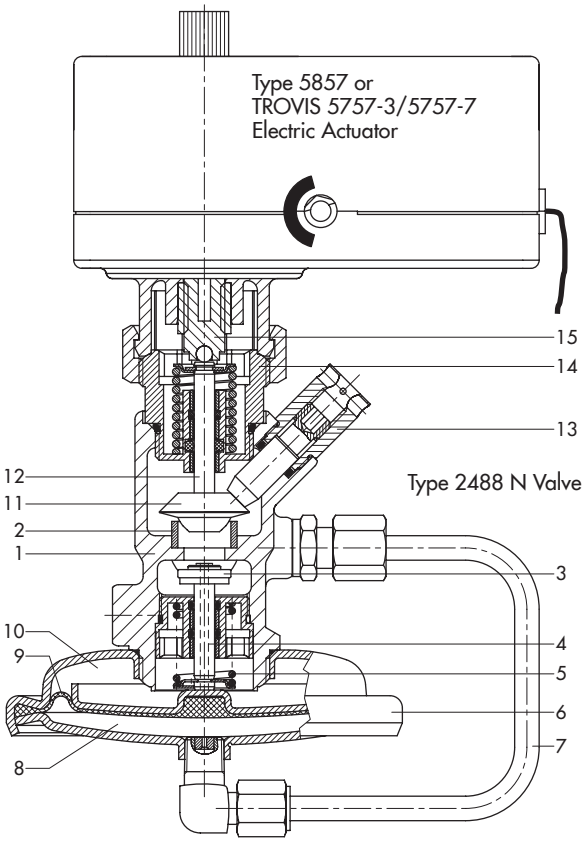
A differential pressure $\Delta p_{restriction}$ is created at the restriction (orifice) by the medium flow. This differential pressure is transmitted over the control line (7) and the hole in the plug and plug stem to the operating diaphragm (9) where it is converted into a positioning force. The diaphragm 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 (restriction) 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, the control quality of outdoor-temperature-controlled temperature control equipment is not affected by the pressure drop across the network, for example.

Installation

- Preferably install the regulator in horizontal pipelines.
- The direction of flow must match the direction indicated by the arrow on the body
- The electric actuator must be mounted above the valve body.
- Before 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.



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

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

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)
$\dot{V}$	Adjusted flow rate in m³/h
K_{VS}	Valve flow coefficient in m³/h

Table 1: *Technical data*

Type 2488 N Valve		
Valve size		DN 15
Connection		ISO 228-1 – G ¾ B
K_{VS} coefficient	Standard	2.5
	Special version	1.0
Pressure rating		PN 10
Max. permissible differential pressure Δp		4 bar
Max. permissible temperature	Treated water	110 °C
	Non-flammable gases	80 °C
z value		0.43
Differential pressure across the 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	0.3 to 1 m³/h
	Special version	0.1 to 0.5 m³/h
Type 5857 Electric Actuator		
Electrical connection	Supply voltage	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 range		–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

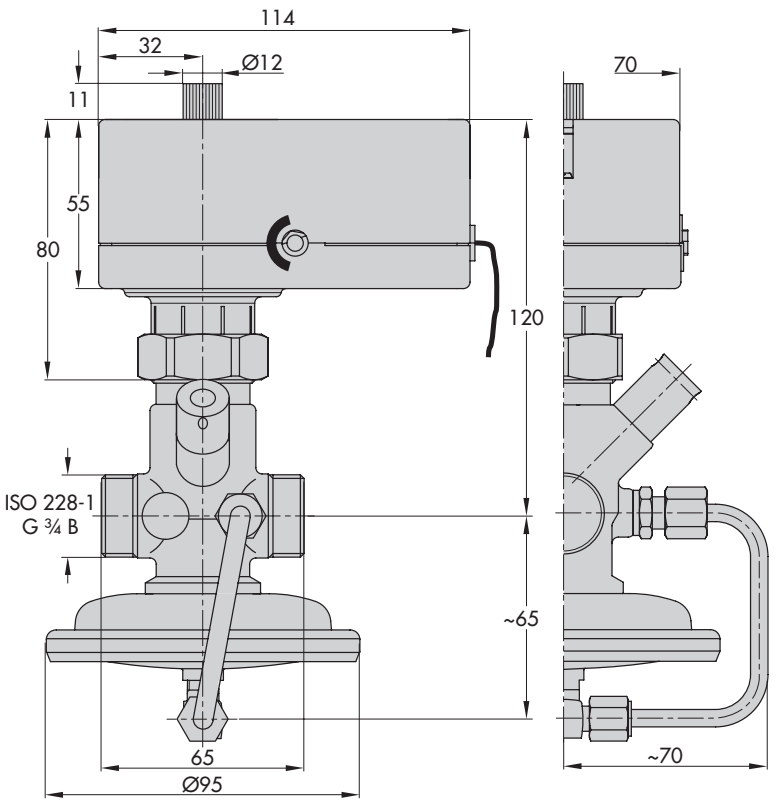
1) Actuator mounted above the valve
2) TROVIS 5757-3 only

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

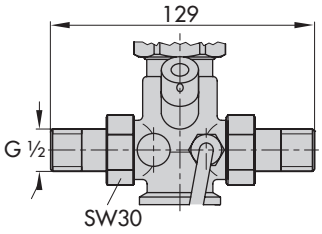
Type 2488 N Valve	
Valve body	Rotguss CC499K (Rg 5)
Plug	1.4301 with EPDM soft seal
Restriction	Brass, free of dezincification
Plug stem	1.4305
Seat	Red brass CC499K (Rg 5)
Valve spring	1.4310 K
Diaphragm	EPDM without fabric reinforcement
Threaded ends	CW617N (brass)
Welding end	1.0037
Intermediate insulating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

Dimensional drawings

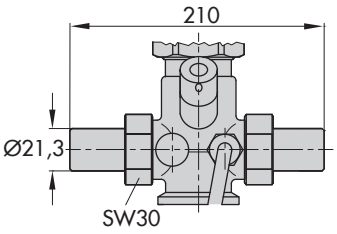
Type 2488 N Valve with Type 5857/TROVIS 5757-3/5757-7 Actuator



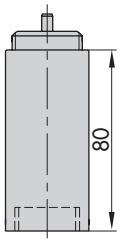
Accessories



Threaded ends



Welding ends



Intermediate insulating piece

Sample application

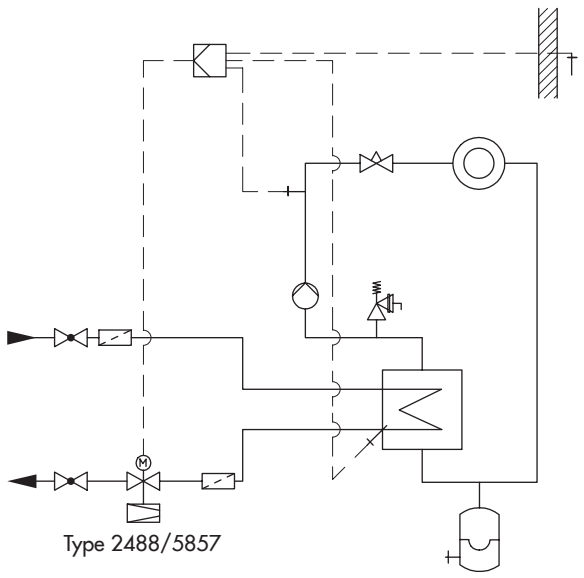


Fig. 3: *Indirect local heating supply connection with Type 2488 N/5857 Flow Regulator*

Ordering text

Types 2488 N/5857 (5757-3 or 5757-7) Pressure-independent Control Valve (PICV)

- With Type 2488 N Valve and Type 5857 Electric Actuator or TROVIS 5757-3 or TROVIS 5757-7 Electric Actuator with Process Controller
- Flow set point range with a differential pressure at the restriction of 0.2 bar:
  - 0.3 to 1.0 m³/h
  - 0.1 to 0.5 m³/h (special version)