

## T 3132 EN

### Type 2469 and Type 2479 Regulators for Differential Pressure, Flow Rate and Temperature Combined Self-operated Regulators



#### Application

Regulators for district heating systems, heat generators, heat exchangers and other HVAC or industrial applications. For safety monitoring and safety limitation of the energy supplied to heat generators or heat exchangers.

Temperature set points from **0 to 150 °C** · Limit signals **up to 120 °C** · Valves **DN 15 to 50** · Pressure rating **PN 25** · Suitable for liquids **up to 150 °C**

The valve **closes** when the differential pressure, flow rate or temperature **rises**.

#### Special features

- Low-maintenance proportional regulators requiring no auxiliary energy
- Suitable for water and other liquids or gases, provided these do not cause the materials used to corrode
- Temperature sensors for operating pressures up to 40 bar
- Particularly suitable for district heating plants according to DIN 4747-1 (AGFW requirements for components in house substations)

Combinations with Type 2403 Safety Thermostat have the same function as a safety temperature monitor (STM). With Type 2439 Safety Thermostat, the same function as a safety temperature limiter (STL). Regulators have extended safety specified in DIN EN 14597.

#### Versions

##### Differential pressure or flow regulators with temperature regulators

DN 15 to 50 valve made of red brass with welding ends (special versions with threaded ends or screwed-on flanges) · Valve sizes DN 32, 40 and 50 also available with flanged valve body made of spheroidal graphite iron · Type 2430 Control Thermostat

##### Type 2469/2430 (Fig. 1)

Flow and temperature regulator with continuously adjustable flow set point at the integrated restriction of the Type 2469 Valve (differential pressure across the restriction of 0.2 bar) · Type 2430 Control Thermostat · Installation in either flow or return flow pipes

##### Type 2479/2430

Differential pressure limiter and temperature regulator with flow limitation with Type 2469 Valve · Fixed differential pressure set point adjusted to  $\Delta p = 0.2$  bar · Continuously adjustable flow limitation · With internal overload protection <sup>1)</sup> (excess pressure limiter) in the actuator · Type 2430 Control Thermostat · Installation in return flow pipes

<sup>1)</sup> DN 15 to 25 only



Fig. 1: Type 2469/2430

**Type 2469/2430/2403 Flow and Temperature Regulator and Safety Temperature Monitor (FR/TR/STM)** · With Type 2469 Valve, Type 2430 Control Thermostat and Type 2403 Safety Thermostat

**Type 2469/2430/2439 Flow and Temperature Regulator and Safety Temperature Limiter (FR/TR/STL)** · With Type 2469 Valve, Type 2430 Control Thermostat and Type 2439 Safety Thermostat

### Principle of operation (see Fig. 2 to Fig. 4)

The regulators consist of a valve, actuator and control thermostat (20) and, in some cases, also a safety thermostat (26/27).

#### Type 2469/2430 Flow and Temperature Regulator

The high pressure upstream of the restriction (1.2) is transmitted to the high-pressure side of the diaphragm actuator (6) through the attached control line (11). The low pressure downstream of the restriction acts on the low-pressure side of the operating diaphragm (6.1) through a hole in the valve plug (3). The differential pressure generated across the restriction is converted into a positioning force by the operating diaphragm. This force is used to move the valve plug according to the force of the set point spring (5).

The temperature of the medium creates a pressure in the sensor which is proportional to the measured temperature. This pressure is transferred to the operating bellows (23) and converted into a positioning force. This force moves the valve plug (3) according to the force of the spring (21) and the temperature set point adjustment.

The largest signal is always used to control the regulator.

#### Type 2479/2430 Differential Pressure Limiter and Temperature Regulator with Flow Limitation

This device is largely identical to the Type 2469/2430. It does not have a fixed control line (11). Instead, the high pressure of the plant is transmitted over a control line to be attached on installing the regulator in the pipeline. The flow limitation is adjusted at the restriction (1.2).

An overload protection (excess pressure limiter) (6.2) in the actuator of the Type 2479/2430 Regulator (DN 15 to 25 only) protects the seat and plug from overload during exceptional operating conditions that could lead to valve or plant damage.

Legend for Fig. 2 to Fig. 4

- 1 Valve body
- 1.1 Connection nut with seal and welding end
- 1.2 Restriction for adjusting the flow rate set point
- 2 Seat
- 3 Plug (balanced)
- 4 Plug stem
- 5 Differential pressure springs
- 6 Actuator
- 6.1 Operating diaphragm
- 6.2 Internal excess pressure limiter (overload protection)
- 10 Coupling nut
- 11 Control line
- 12 Set point screw
- 15 Coupling rod
- 20 Control thermostat
- 21 Spring
- 22 Set point adjuster
- 23 Operating bellows
- 24 Capillary tube
- 25 Temperature sensor

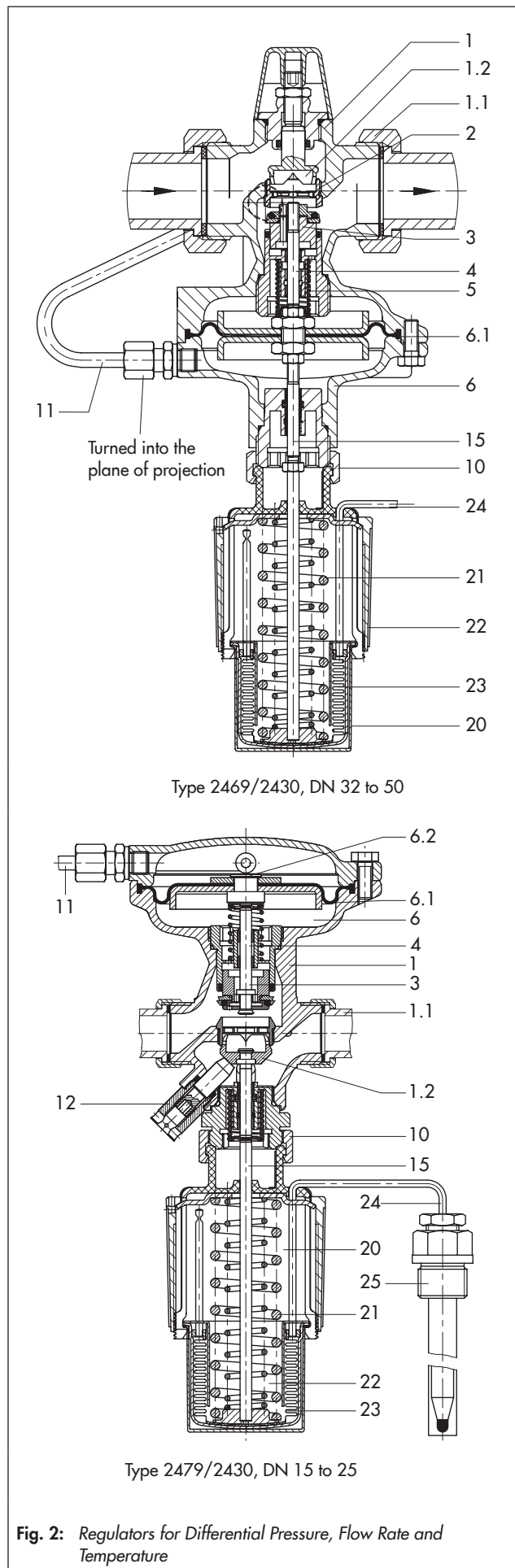


Fig. 2: Regulators for Differential Pressure, Flow Rate and Temperature

### Type 2469/2430/2403 Flow and Temperature Regulator and Safety Temperature Monitor (see Fig. 3)

This regulator is the same as Type 2469/2430, but additionally has a Type 2403 Safety Thermostat (26).

The valve is closed by a spring mechanism when the temperature reaches the adjusted limit, when the capillary tube breaks or when leakage occurs in the sensor system. It resets itself automatically when the fault has been remedied and the temperature has fallen below the limit. The Type 2403 Safety Thermostat is available in two versions selected depending on how the temperature sensor is installed (see Data Sheet ► T 2183).

### Type 2469/2430/2439 Flow and Temperature Regulator and Safety Temperature Limiter (see Fig. 4)

This regulator is the same as Type 2469/2430, but additionally has a Type 2439 Safety Thermostat (27). A spring mechanism closes and locks the valve when the temperature reaches an adjusted temperature limit, when the capillary tube ruptures or there is a leak in the sensor system. The valve can only be reset and put back into operation with a tool (see Data Sheet ► T 2185).

#### Installation

The regulator is only suitable for installation in horizontal pipelines.

#### Valve

- The direction of flow must match the arrow on the valve body.
- The valve must be installed to hang downward.

#### Control thermostat

- The temperature sensor (with a Type 2430 Control Thermostat and Type 2439 Safety Thermostat) can be installed in any position as required.
- The installation position of the temperature sensor of the Type 2403 Safety Thermostat must be carefully observed as it depends on the sensor version.

The following generally applies:

- The entire temperature sensor must be immersed in the process medium.
- It must be installed in a location where overheating or considerable idling times cannot occur.
- The capillary tube must be run in such a way that the temperature range cannot be exceeded, any deviations in temperature cannot occur and that the tube cannot be damaged.
- The smallest permissible bending radius of the capillary tube is 50 mm.

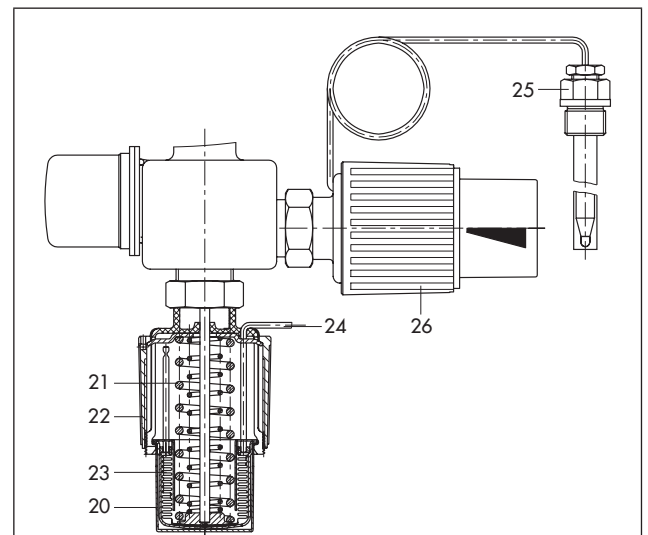


Fig. 3: Type 2469/2430/2403 Flow and Temperature Regulator and Safety Temperature Monitor

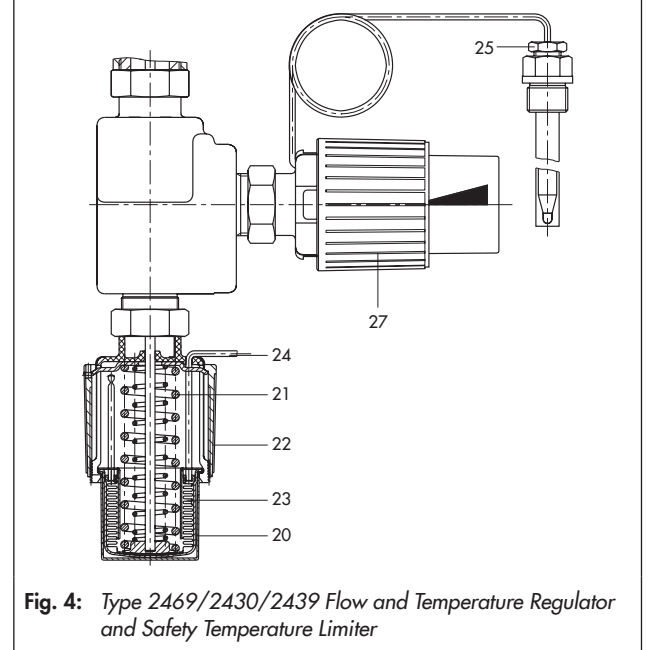


Fig. 4: Type 2469/2430/2439 Flow and Temperature Regulator and Safety Temperature Limiter

**Table 1: Technical data · All pressures in bar (gauge)**

Valve size	DN	15				20	25	32 <sup>1)</sup>	40 <sup>1)</sup>	50 <sup>1)</sup>
K <sub>VS</sub> coefficient	Body with screwed ends	0.4 <sup>2)</sup>	1.0 <sup>2)</sup>	2.5	4.0 <sup>2)</sup>	6.3	8.0	12.5	16.0	20.0
	Flanged body	–						12.5	20.0	25.0
x <sub>FZ</sub> value	Body with screwed ends	0.6				0.55		0.5		0.45
	Flanged body	–						0.45		0.4
Pressure rating	PN 25									
Max. permissible differential pressure Δp across the valve	20 bar							16 bar		
Max. permissible valve temperature	Liquids 150 °C									
<b>Differential pressure set point</b>										
Type 2479/...	Adjusted to 0.2 bar									
<b>Flow rate set point range in m<sup>3</sup>/h</b>										
Type 2469/... with a differential pressure at the restriction <sup>4)</sup>	0.2 bar	0.01 to 0.2	0.002 to 0.64	0.2 to 1.2	0.1 to 1.3 <sup>3)</sup> 0.1 to 2.5	0.1 to 2.3 <sup>3)</sup> 0.1 to 3.6	0.1 to 3.5 <sup>3)</sup> 0.1 to 4.2	0.3 to 5.8 <sup>3)</sup> 0.3 to 10	0.4 to 9.1 <sup>3)</sup> 0.4 to 12.5	0.4 to 14.1 <sup>3)</sup> 0.4 to 15

<sup>1)</sup> Additional version: valve with flanged body made of spheroidal graphite iron (EN-GJS-400-18-LT)

<sup>2)</sup> Special version

<sup>3)</sup> An increase in noise level can be expected when the specified flow rate is exceeded, even if cavitation does not occur (see AGFW (German District Heating Association) document FW 514).

<sup>4)</sup> The minimum required differential pressure Δp<sub>min</sub> across the valve is calculated as follows:

$$\Delta p_{\min} = \Delta p_{\text{restriction}} + \left( \frac{\dot{V}}{K_{VS}} \right)^2$$

**Table 2: Flow rate set point ranges for Type 2479/...**

Flow rate set point ranges $\dot{V}$ for water in m <sup>3</sup> /h for Type 2479/...												
Δp <sub>set point</sub> Δp <sub>plant</sub> + Δp <sub>restriction</sub>	Δp <sub>plant</sub> Calculation for plant	Δp <sub>restriction</sub> Differential pressure across the restriction	DN	15				20	25	32	40	50
			K <sub>VS</sub>	0.4 <sup>1)</sup>	1.0 <sup>1)</sup>	2.5	4.0 <sup>1)</sup>	6.3	8.0	12.5	16.0	20.0
			$\dot{V}_{\min.}$	0.01	0.12	0.2	0.5	0.8	0.8	2	3	4
0.2 bar	0.1 bar	0.1 bar	$\dot{V}_{\max.}$	0.14	0.45	0.85	1.8	2.6	3.6	7.1	8.5	10.7
0.3 bar	0.1 bar	0.2 bar	$\dot{V}_{\max.}$	0.2	0.64	1.2	2.5	3.6	4.2	10.0	12.5	15.0
				–			1.3 <sup>2)</sup>	2.3 <sup>2)</sup>	3.5 <sup>2)</sup>	5.8 <sup>2)</sup>	9.1 <sup>2)</sup>	14.1 <sup>2)</sup>

<sup>1)</sup> Special version

<sup>2)</sup> An increase in noise level can be expected when the specified flow rate is exceeded, even if cavitation does not occur (see AGFW (German District Heating Association) document FW 514).

The minimum required differential pressure Δp<sub>min</sub> between the flow and return flow pipe is calculated as follows:

$$\Delta p_{\min} = \Delta p_{\text{set point}} + \left( \frac{\dot{V}}{K_{VS}} \right)^2$$

**Table 3: Thermostats**

Type 2430 Control Thermostat		
Set point range	Continuously adjustable: 0 to 35 °C, 25 to 70 °C, 40 to 100 °C, 50 to 120 °C, 70 to 150 °C	
Permissible ambient temperature range	–20 to +80 °C <sup>1)</sup>	
Max. perm. temperature at the sensor	50 K above the adjusted set point	
Max. perm. pressure at sensor	40 bar	
Capillary tube length	2 m <sup>2)</sup>	
Safety thermostat ...		
	Type 2403 for STM	Type 2439 for STL
Adjustment range of limit value	60 to 75 °C · 75 to 100 °C · 100 to 120 °C	10 to 95 °C · 20 to 120 °C
Max. permissible ambient temperature	50 °C	80 °C (with electric signal transmitter 60 °C)
Max. perm. temperature at the sensor	25 K above the adjusted set point	20 K above the adjusted set point
Max. permissible pressure at sensor with thermowell	40 bar	
Capillary tube length	5 m	2 m <sup>2)</sup>

<sup>1)</sup> At temperatures below freezing: ice formation may damage the plant and especially the valve.

<sup>2)</sup> Special version: Type 2430 with 5 m and 10 m capillary tube · Type 2439 with 5 m capillary tube

**Table 4: Materials** · Material numbers according to DIN EN

Valves		
Enclosure		Red brass CC499K (Rg 5) · Spheroidal graphite iron EN-GJS-400-18-LT <sup>1)</sup>
Seat		Stainless steel 1.4305
Plug		Brass (resistant to dezincification) <sup>3)</sup> with EPDM <sup>2)</sup> soft seal
Valve spring		Stainless steel 1.4310
Operating diaphragm		EPDM with fabric reinforcement
Seals		EPDM <sup>2)</sup>
Thermostats		
Sensor	Capillary tube	Copper
	Thermowell	Nickel-plated copper or stainless steel 1.4571

<sup>1)</sup> Additional version in DN 32 to 50: valve with flanged body made of spheroidal graphite iron

<sup>2)</sup> Special version, e.g. for mineral oils: FKM

<sup>3)</sup> When  $K_{VS}$  0.4 and 1.0: 1.4305

### Ordering text

Typetested temperature regulators (TR), safety temperature monitors (STM) and safety temperature limiters (STL) are available.

#### Type 2469/2430 Flow and Temperature Regulator

or

#### Type 2479/2430 Differential Pressure Limiter and Temperature Regulator with Flow Limitation

or

#### Type 2469/2430/2403 Flow and Temperature Regulator and Safety Temperature Monitor

or

#### Type 2469/2430/2439 Flow and Temperature Regulator and Safety Temperature Limiter

For Type ... Valve, DN ..., PN ...,  $K_{VS}$  ...

With welding ends/threaded ends/flanges

Differential pressure set point ... bar/differential pressure across the restriction ... bar

Temperature set point range ... °C, limit range ... °C

With Type ... Safety Thermostat when Type 2403 is used, optionally:

Version 1: Sensor horizontal or tip of sensor pointing up

Version 2: Sensor horizontal or tip of sensor pointing down

Limit adjusted/lead-sealed to ... °C

Red brass body/flanged valve (spheroidal graphite iron body)

Optionally, special version or accessories ...

**Table 5: Dimensions in mm and weights**

Valve size	DN	15	20	25	32 <sup>1)</sup>	40 <sup>1)</sup>	50 <sup>1)</sup>
Pipe Ø d		21.3	26.8	32.7	42	48	60
Thread size R		G 3/4	G 1	G 1 1/4	G 1 3/4	G 2	G 2 1/2
AF		30	36	46	59	65	82
Length L		65	70	75	100	110	130
H <sup>3)</sup> Type 2469/2430 Type 2479/2430		85					
H1 <sup>3)</sup> Type 2469/2430 Type 2479/2430		280		265		295	
H2 <sup>3)</sup> Type 2469/2430/2439		340		360		390	
H3 <sup>3)</sup> Type 2469/2430/2439		360		380		410	
<b>Connection nuts with welding ends</b>							
Length L1		210	234	244	268	294	330
Weight <sup>2)</sup> , approx. kg	Type 2469/2430 Type 2479/2430	2.5	2.6	2.7	3.8	6.5	7.0
	Type 2469/2430/2403	3.8	3.9	4.0	5.1	7.8	8.3
	Type 2469/2430/2439	3.9	4.0	4.1	5.2	7.9	8.4
<b>Special versions</b>							
<b>Connection nuts with threaded ends (male thread)</b>							
Length L2		129	144	159	180	196	228
Male thread A		G 1/2	G 3/4	G 1	G 1 1/4	G 1 1/2	G 2
<b>With flanged body made of spheroidal graphite iron</b>							
Length L3		130	150	160	180	200	230
Weight <sup>2)</sup> , approx. kg	Type 2469/2430 Type 2479/2430	2.5	2.6	2.7	3.8	6.5	7.0
	Type 2469/2430/2403	3.8	3.9	4.0	5.1	7.8	8.3
	Type 2469/2430/2439	3.9	4.0	4.1	5.2	7.9	8.4

- 1) Also with flanged body made of spheroidal graphite iron
- 2) Weights for version with bulb sensor and thermowell. Minus 0.2 kg for version with thermowell
- 3) Add minimum clearance of approx. 50 mm for mounting and removal.

