

Self-operated Temperature Regulators

Temperature Regulator Type 4

with balanced single-seated globe valve



Application

Temperature regulator for heating installations with control thermostats for **set points** from $-10\text{ }^{\circ}\text{C}$ to $+250\text{ }^{\circ}\text{C}$ · **Nominal sizes** DN 15 to DN 250 · **Nominal pressures** PN 16 to PN 40 · For temperatures up to $350\text{ }^{\circ}\text{C}$
The valve closes when the temperature rises.

Note

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



The regulators consist of a balanced valve and a control thermostat, comprising a temperature sensor, a set point adjustment head with an excess temperature safety device, a capillary tube, and an operating element.

Special features

- Low-maintenance P regulators requiring no auxiliary energy
- Wide set point range and easy adjustment of the set point indicated on a dial
- Single-seated globe valves with plug balancing by means of a metal bellows, applicable for liquids, gases, and vapors, especially for heat transfer fluids such as water, oil, and steam
- Valve body optionally made of cast iron, spheroidal graphite iron, cast steel, or stainless cast steel
- Versions with double adapter or manual override available for attachment of a second control thermostat. For details, refer to Data Sheet T 2036 EN.

Versions

Type 4 Temperature Regulator · With **Type 2114 Valve** for sizes DN 15 to DN 250 · PN 16 to PN 40 · **Types 2231 to 2235 Control Thermostats** · For details on the application of the thermostats, refer to Information Sheet T 2010 EN.

Type 2114/2231 (Fig. 1) · With Type 2114 Valve and Type 2231 Control Thermostat for liquids · Set points from -10 to $+150\text{ }^{\circ}\text{C}$, set point adjustment at the sensor

Type 2114/2232 (Fig. 3) · With Type 2114 Valve and Type 2232 Control Thermostat for liquids and steam · Set points from -10 to $+250\text{ }^{\circ}\text{C}$, separate set point adjustment

Type 2114/2233 · With Type 2114 Valve and Type 2233 Control Thermostat for liquids, air, and other gases · Set points from -10 to $+150\text{ }^{\circ}\text{C}$, set point adjustment at the sensor

Type 2114/2234 · With Type 2114 Valve and Type 2234 Control Thermostat for liquids, air, and other gases · Set points from -10 to $+250\text{ }^{\circ}\text{C}$, separate set point adjustment

Type 2114/2235 · With Type 2114 Valve and Type 2235 Control Thermostat for air-heated storerooms as well as drying, climatic, and heating cabinets · Set points from -10 to $+250\text{ }^{\circ}\text{C}$, separate set point adjustment and a sensor tube to be installed by the operator

For **ANSI versions**, refer to Data Sheet T 2025 EN.

For version with a valve plug balanced by a diaphragm, refer to Data Sheet T 2650 EN.

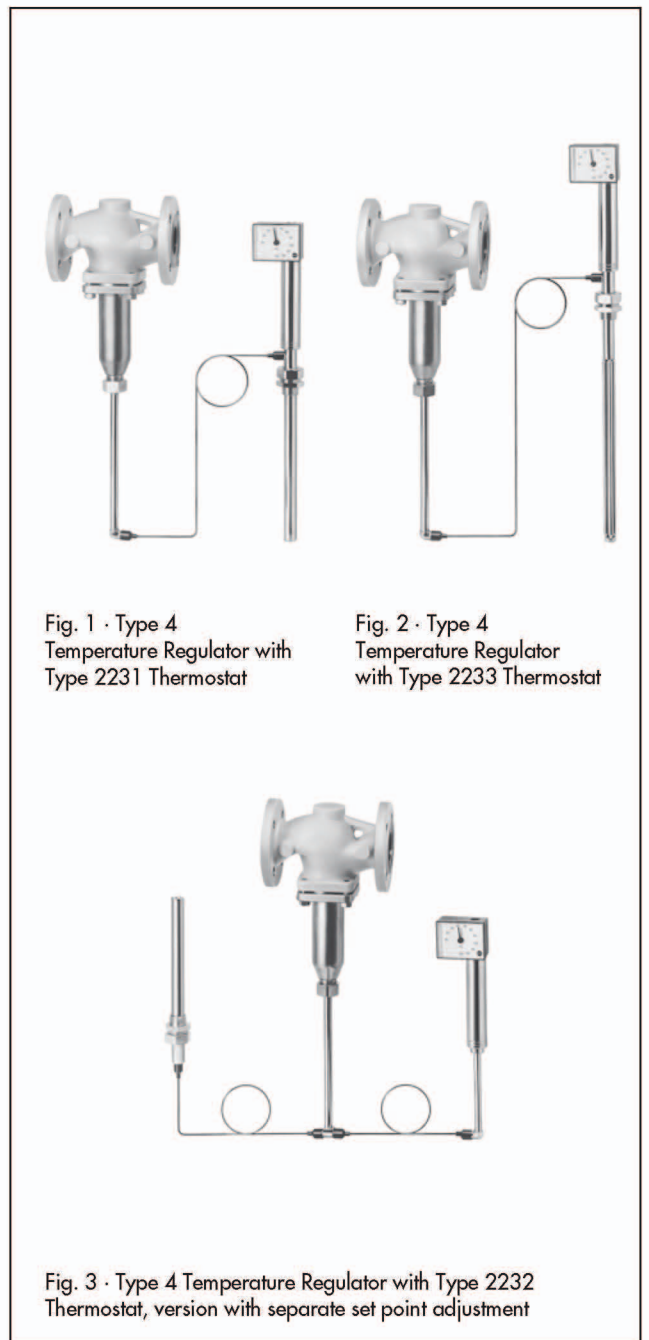


Fig. 1 · Type 4 Temperature Regulator with Type 2231 Thermostat

Fig. 2 · Type 4 Temperature Regulator with Type 2233 Thermostat

Fig. 3 · Type 4 Temperature Regulator with Type 2232 Thermostat, version with separate set point adjustment

Special version

- Capillary tube of either 5 m, 10 m, or 15 m
- Sensor made of CrNiMo steel
- Capillary tube made of CrNiMo steel or plastic-coated Cu
- Valve made completely of stainless steel
- Reduced K_{vs}
- Valve with flow divider I for noise reduction when handling steam and non-flammable gases
- Set point range from 100 °C/150 to 250 °C
- ANSI version (see Data Sheet T 2025 EN)

Principle of operation (Fig. 4)

The regulators operate according to the liquid expansion principle. The temperature sensor (12), capillary tube (9), and operating element (7) are filled with an expansion liquid. The temperature-dependent change in volume of this liquid causes the bellows in the operating element (7) to move and, as a result, also moves the plug stem (5) with the attached plug (3).

The position of the plug determines the flow rate of the heat transfer medium across the area released between the seat (2) and plug.

The set point is adjustable with a key (10); the adjusted value can be read off the dial (11).

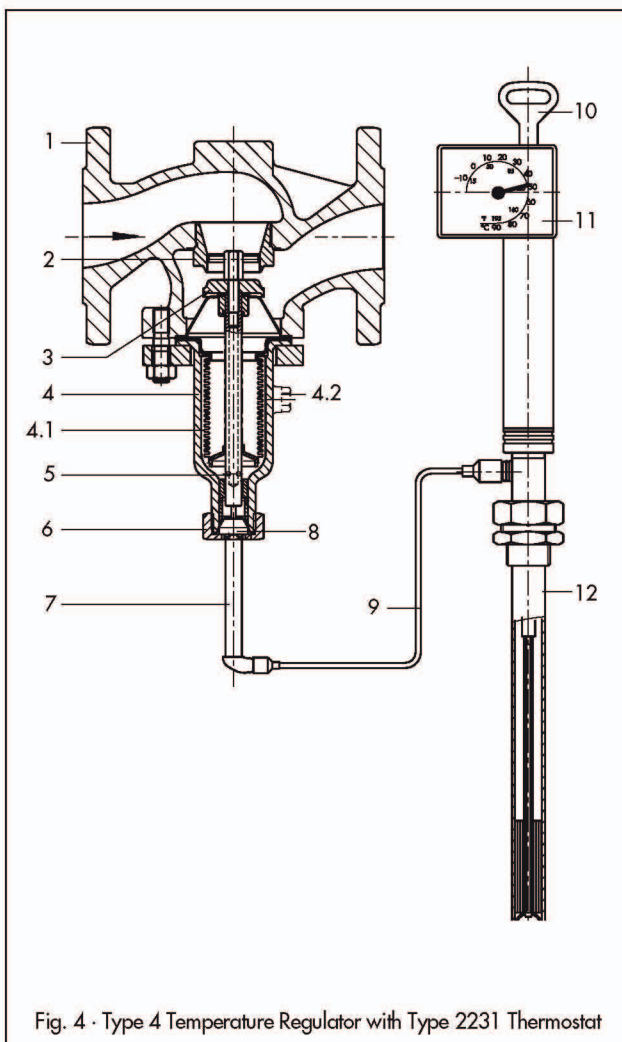


Fig. 4 · Type 4 Temperature Regulator with Type 2231 Thermostat

Valve

- 1 Valve body
- 2 Seat (exchangeable)
- 3 Plug
- 4 Bellows housing
- 4.1 Balancing bellows
- 4.2 Vent screw (DN 125 and larger)
- 5 Plug stem with spring
- 6 Connection for operating element (coupling nut)

Control thermostat

- 7 Operating element with bellows
- 8 Pin of operating element
- 9 Capillary tube
- 10 Key for set point adjustment
- 11 Set point dial
- 12 Temperature sensor (bulb sensor)

Table 1 · Technical data · All pressures in bar (gauge). The specified permissible pressures and differential pressures are limited by the values given in the pressure-temperature diagram and the nominal pressure ratings.

Type 2114 Valve		Nominal pressure		PN 16 to PN 40												
Standard version		Connection DN		15	20	25	32	40	50	65	80	100	125	150	200	250
K_{vs}				4	6.3	8	16	20	32	50	80	125	190	280	420	500
Leakage rate				≤ 0.05 % of K_{vs}												
Differential pressure		Δp		25				20			16		12		10	
Special version		Connection DN		15	20	25	32	40	50	65	80	100	125	150	200	250
K_{vs}				2.5, 4, 6.3		6.3	8	16	20	32	50	-	-	-	-	-
Diff. pressure		Δp		25							16		-			
Permissible valve temperature				See pressure-temperature diagram												
Types 2231 to 2235 Thermostats				Size 150											Size 250 ²⁾	
Set point range				-10 to +90 °C, 20 to 120 °C, or 50 to 150 °C For Types 2232, 2234, 2235 also 100 to 200 °C, 150 to 250 °C											0 to 70, 30 to 100, 50 to 120, 80 to 150 °C	
Permissible ambient temperature at the set point adjustment head				-40 to +80 °C											-20 to +80 °C	
Permissible temperature at the sensor				100 K above the adjusted set point											30 K above the set point	
Permissible pressure at the sensor		Type 2231/2232		Without thermowell: PN 40 · With thermowell: PN 40/PN 100 (version of copper PN 16) With thermowell with flange: PN 40/DN 32 or PN 100/DN 40											PN 16 ³⁾	
		Type 2233/2234		With flange PN 6 (external \varnothing 140) or PN 40/DN 32												
Length of the capillary tube				3 m (special version: 5 m, 10 m, or 15 m)												

¹⁾ The differential pressure corresponds to the pressure head of the pump for liquids · ²⁾ Only Types 2231 and 2232

³⁾ Version with flanges or other pressure ratings on request