

Self-operated Temperature Regulators

Temperature Regulator Type 1

with unbalanced single-seated globe valve · Female thread connection ¹⁾



Application

Temperature regulators for heating installations · Control thermostats for set points from **-10 to 250 °C** · **G ½** to **G 1** · Nominal pressure **PN 25** · Suitable for gases up to **80 °C** as well as liquids and steam up to **220 °C**

The valve **closes** as the temperature rises

Conversion of valve sizing coefficients

$$C_V \text{ (in US gallons/min)} = 1.17 \cdot K_{VS} \text{ (in m}^3\text{/h)}$$

$$K_{VS} \text{ (in m}^3\text{/h)} = 0.86 \cdot C_V \text{ (in US gallons/min)}$$

The regulators consist of an unbalanced globe valve and a control thermostat, comprising a temperature sensor, set point adjuster with excess temperature protection, capillary tube and operating element.

Special features

- Low-maintenance P regulators requiring no auxiliary energy
- Wide set point range and convenient set point adjustment indicated on a dial
- Unbalanced single-seated globe valves suitable for applications with liquids, gases and vapors, especially for heat transfer fluids such as water and steam
- Versions with double adapter available to attach a temperature limiter or a second control thermostat to the regulator. For details, see Data Sheet T 2036 EN.

Versions

Type 1 Temperature Regulators · Type 2111 Valve with G ½ to G 1 female thread · Type 2231 to 2235 Control Thermostats

For details on the application of the control thermostats, refer to Information Sheet T 2010 EN.

Type 2111/2231 (Fig. 1) · With Type 2111 Valve and Type 2231 Control Thermostat for liquids · Set point adjustment at the sensor · Set points from **-10 to +150 °C**

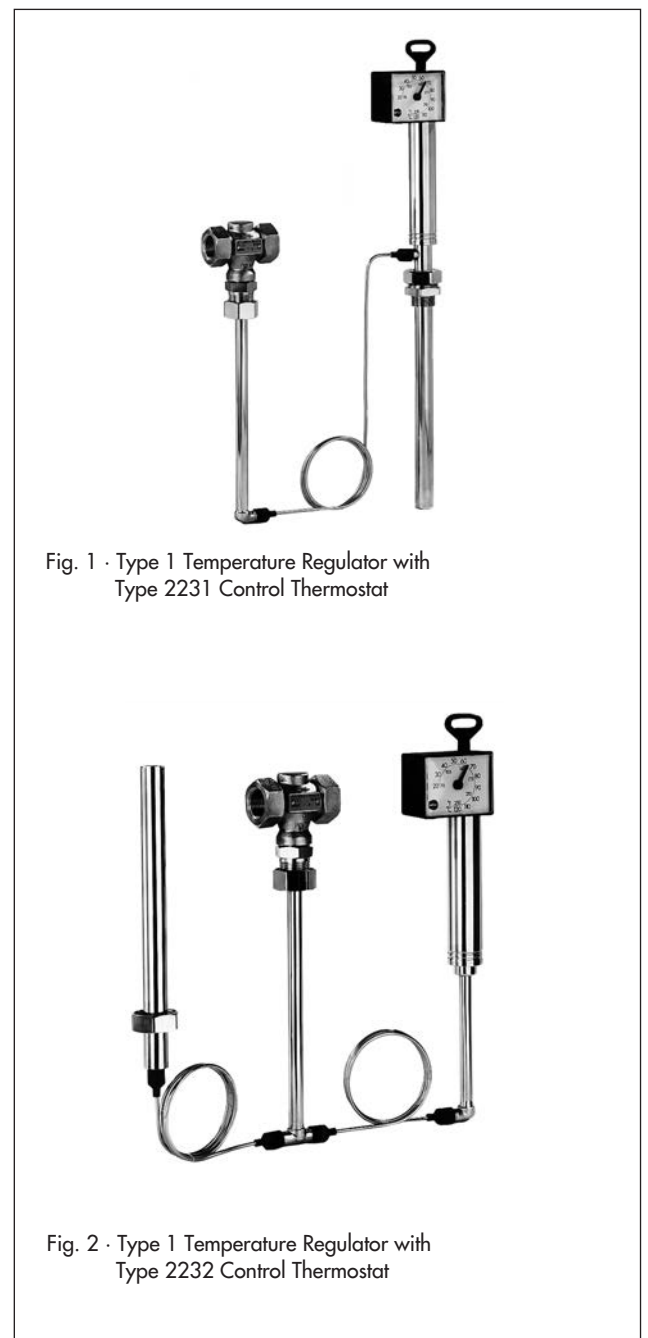
Type 2111/2232 (Fig. 2) · With Type 2111 Valve and Type 2232 Control Thermostat for liquids and steam · Separate set point adjustment · Set points from **-10 to +250 °C**

Type 2111/2233 · With Type 2111 Valve and Type 2233 Control Thermostat for liquids, air and gases · Set point adjustment at the sensor · Set points from **-10 to +150 °C**

Type 2111/2234 · With Type 2111 Valve and Type 2234 Control Thermostat for liquids, steam, air and gases · Separate set point adjustment · Set points from **-10 to +250 °C**

Type 2111/2235 · With Type 2111 Valve and Type 2235 Control Thermostat for air-heated storerooms as well as drying, climatic and heating cabinets · Separate set point adjustment and a sensor tube to be installed on site · Set points from **-10 to +250 °C**

¹⁾ Refer to Data Sheet T 2111 EN for valve versions with flanges DN 15 to 50



Special version

- Capillary tube 5 m, 10 m, 15 m
- Sensor made of CrNiMo steel
- Capillary tube made of CrNiMo steel or plastic-coated copper
- Set point ranges of 100 to 200 °C/150 to 250 °C only for Types 2232, 2234 and 2235
- ANSI version

Principle of operation (see Fig. 3)

The regulators operate according to the liquid expansion principle.

The temperature sensor (13), capillary tube (10), and operating element (7) are filled with an expanding liquid. The liquid changes its volume depending on the temperature, causing the operating element (7) and thus the plug stem (5) with the plug (3) of the valve to move.

The position of the plug determines the flow rate of the heat transfer medium across the area released between the plug (3) and seat (2).

The temperature set point can be adjusted with a key (11) to a value that can be read off the dial (12).

Valve

- 1 Valve body
- 2 Valve seat
- 3 Valve plug
- 5 Plug stem
- 5.1 Spring
- 6 Threaded nipple

Control thermostat

- 7 Operating element
- 10 Capillary tube
- 11 Key for set point adjustment
- 12 Set point dial
- 13 Temperature sensor (bulb sensor)

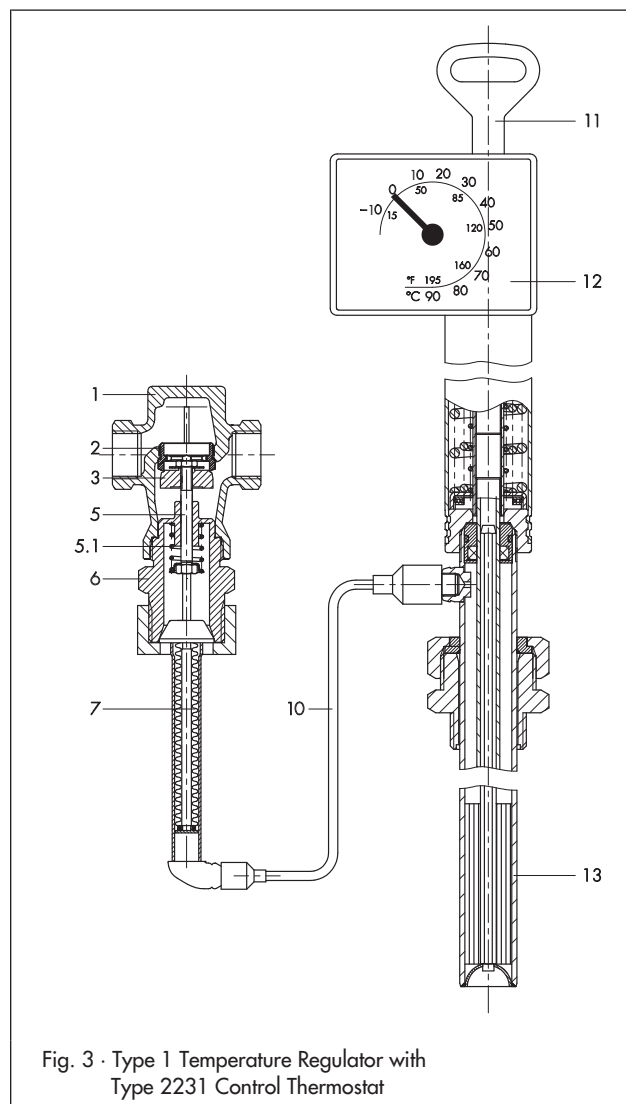


Fig. 3 · Type 1 Temperature Regulator with Type 2231 Control Thermostat

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

Type 2111 Valve		Female thread		
Nominal pressure		PN 25		
Thread size		G ½	G ¾	G 1
Kvs coefficient	Standard version	3.6	5.7	7.2
	Special version	0.4 · 1.6	1.6	-
Leakage rate acc. to IEC 60534-4		≤ 0.05 % of Kvs coefficient		
Perm. differential pressure Δp_{max} bar		14 bar		
Permissible valve temperature		Steam 220 °C · Liquids 220 °C · Gases 80 °C		
Types 2231 to 2235 Thermostats		Size 150		
Set point ranges (set point span 100 K)	Type 2231, 2233	-10 to 90 °C, 20 to 120 °C or 50 to 150 °C		
	Type 2232, 2234, 2235	-10 to 90 °C, 20 to 120 °C, 50 to 150 °C, 100 to 200 °C or 150 to 250 °C		
Permissible temperature at set point adjustment head		-40 to 80 °C		
Permissible temperature at sensor		100 K above adjusted set point		
Permissible pressure at sensor	Type 2231, 2232	Without thermowell: PN 40 · With thermowell: PN 40/PN 100 With thermowell and flange: PN 40/PN 100		
	Type 2233, 2234	Without thermowell: PN 40 · With flange: PN 6/PN 40		
Length of capillary tube		3 m (special version 5, 10 or 15 m)		

Table 2 · Materials · Material numbers according to DIN EN

Type 2111 Valve			
Nominal pressure	PN 25		
Body	CC491K/CC499K (red brass, Rg 5)		
Seat	Stainless steel 1.4104		
Plug	1.4305		
Threaded nipple	Brass		
Separating piece	Brass		
Types 2231 to 2235 Control Thermostats			
	Standard version	Special version	
Operating element	Nickel-plated brass		
Sensor	Type 2231 Type 2232	Nickel-plated bronze	Stainless steel 1.4571
	Type 2233 Type 2234	Nickel-plated copper	
	Type 2235	Copper	–
	Capillary tube	Nickel-plated copper	Plastic-coated copper or 1.4571
Thermowell			
Threaded connection G 1			
Immersion tube	Nickel-plated bronze Nickel-plated steel	Stainless steel 1.4571	
Threaded nipple	Nickel-plated brass Nickel-plated steel		
Flange connection			
Immersion tube	Steel	Stainless steel 1.4571	
Flange			

Accessories

Thermowells with threaded or flanged connections for Types 2231 and 2232 Bulb Sensors · G 1 threaded connection, PN 40, of bronze/steel/CrNiMo steel · Flanged connection DN 32, PN 40, with CrNiMo steel/steel immersion tube · Steel immersion tube with PVC/PPH coating, DN 32, PN 40 · PTFE immersion tube, PN 6 (flange PN 40)

Thermowells typetested by **DVGW** (German gas & water association) for flammable gases, G 1 threaded connection, PN 100

Mounting parts for Type 2233 and Type 2234 · Clamps for wall mounting · Perforated cover for thermostat

An **extension piece** is needed for temperatures over 220 °C. The standard version does not have sealing.

The special version of the extension piece is made of stainless steel and has a bellows seal for valves in DN 15 to 100. It additionally acts as a separating piece.

In combinations with Type 2212 Safety Temperature Limiter or Type 2213 Safety Temperature Monitor, an extension piece is required for temperatures over 150 °C.

A **separating piece** is made of brass (for water and steam) or CrNi steel (for water and oil).

A separating piece must be used when a seal between thermostat and valve is required. Separating pieces made of CrNi steel must be used when all wetted parts are to be free of non-ferrous metals.

In addition, it prevents the medium from leaking while the thermostat is being replaced.

Accessories

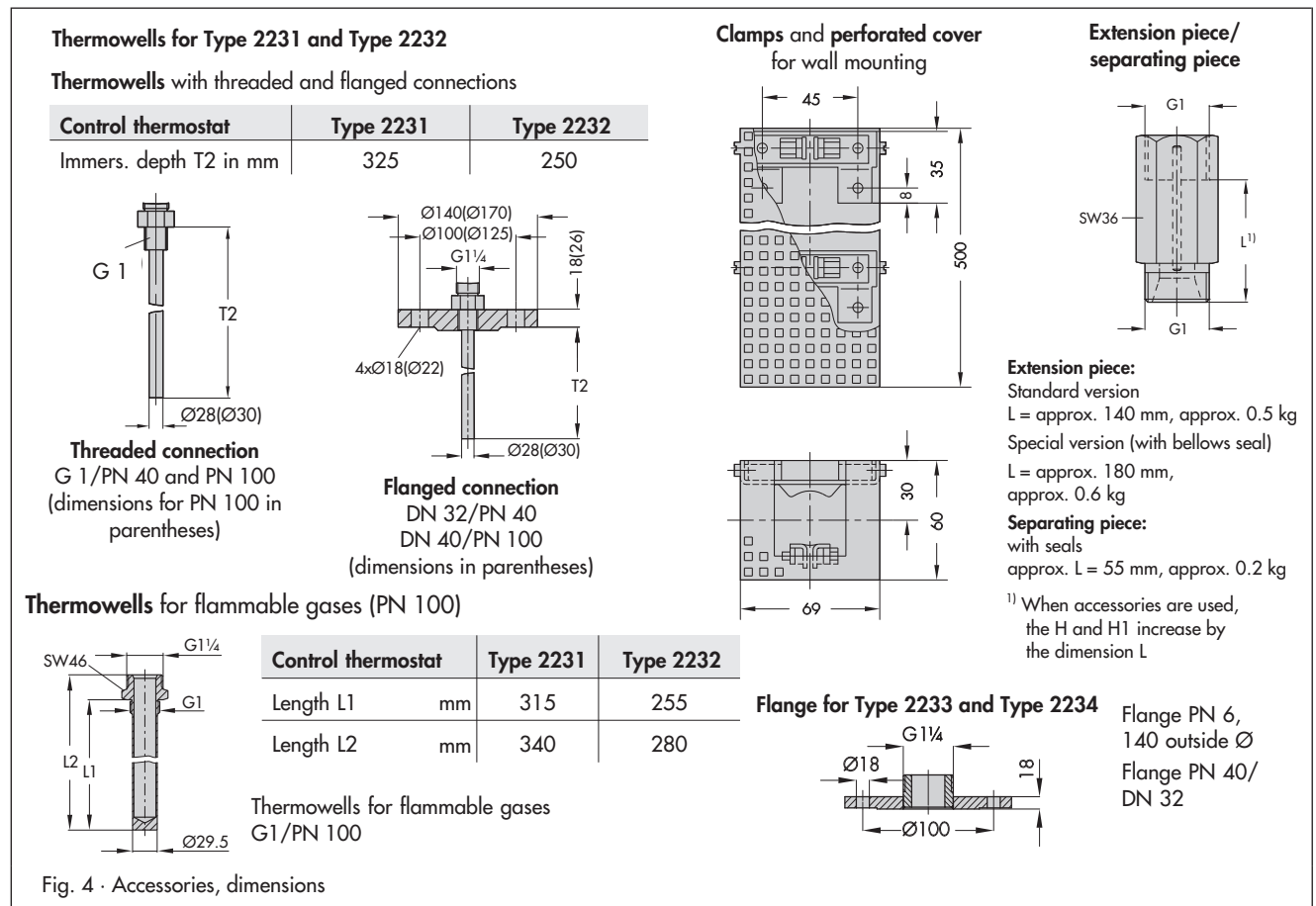


Fig. 4 · Accessories, dimensions

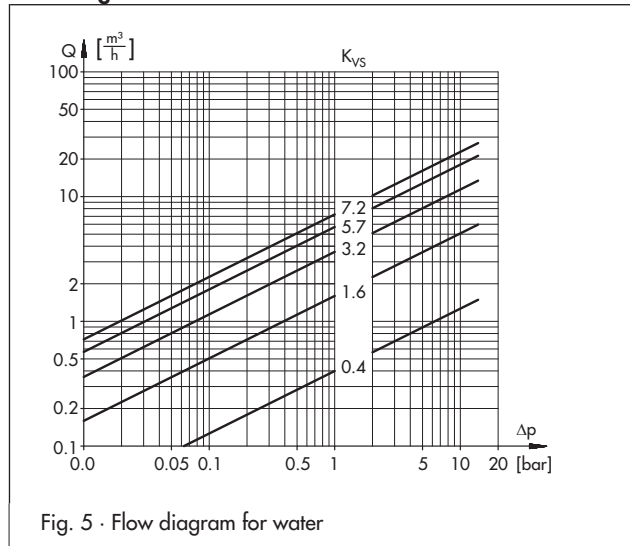
Table 3 · Dimensions in mm and weights

Type 2111 Valve	Female thread		
	G 1/2	G 3/4	G 1
H	372		
H1	82		
Length L	65	75	90
Weight, approx. kg	0.9	1.0	1.1

Control thermostat	Type	2231	2232	2233	2234	2235
Immersion depth T		290 ¹⁾	235 ¹⁾	430	460	3460
Weight, approx. kg		3.2	4	3.4	3.7	3.6

¹⁾ Greater immersion depths available on request

Flow diagram for water



Installation

• **Valve**

Install the valves in horizontal pipelines. The direction of flow must correspond with the arrow on the body. The connecting element must be vertically suspended.

• **Capillary tube**

Install the capillary tube such that it is not exposed to considerable temperature fluctuations and cannot be damaged. Make sure the permissible ambient temperature range (approx. ambient temperature: 20 °C) is not exceeded. The smallest possible bending radius is 50 mm.

• **Temperature sensor**

The temperature sensor can be installed in any desired position. Nevertheless, its entire length must be immersed in the process medium. Choose a place of installation where neither overheating nor considerable idle times occur.

Only use the same kind of materials together; thermowells made of stainless steel 1.4571, for example, can be installed in stainless steel heat exchangers.

Ordering text

Temperature Regulator Type 1

Body material ..., female thread G ...

With Control Thermostat Type ..., set point range ...°C

Capillary tube ... m,

Special version or accessories, if required

Specifications subject to change without notice.

Dimensions

