

Thermostatic mixing valve for centralised systems

5231 series



Function

The thermostatic mixing valve is used in systems that produce domestic hot water. It is designed to maintain the preset temperature of the mixed water delivered to the user outlet, when there are variations in the temperature and pressure of the hot and cold water at the inlet, or in the drawn-off flow rate.

This particular series of mixing valves is specifically designed for systems which require high flow rates, such as centralised systems or groups of equal users.

These systems also require stable and accurate temperature adjustment, especially in relation to variations in the flow rate drawn-off by the users.



Product range

Code 5231.0 Thermostatic mixing valve for centralised systems _____ sizes DN 20 (3/4"), DN 25 (1"), DN 32 (1 1/4"), DN 40 (1 1/2"), DN 50 (2")
 Code 523162 Thermostatic mixing valve with check valves at the inlet _____ size DN 32 (Ø 28 mm) for copper pipe

Technical specifications

Materials

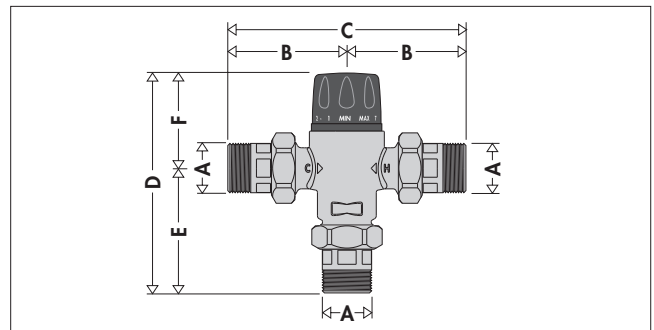
Body: **CR** dezincification resistant alloy
 EN 1982 CB752S
 EN 12165 CW724R (DN 20)
 Obturator: PPSG40
 PSU (DN20)
 Springs: stainless steel (AISI 302)
 Seal elements: EPDM

Performance

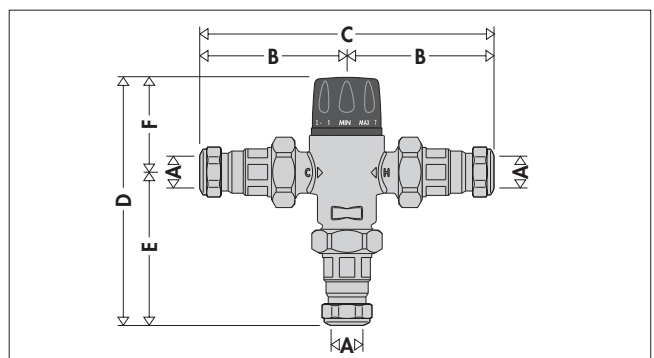
Medium: water
 Adjustment range: 35–65°C
 Accuracy: ±2°C
 Maximum working pressure (static): 14 bar
 Maximum working pressure (dynamic): 5 bar
 Minimum working pressure (dynamic): 0,2 bar
 Maximum inlet pressure ratio (H/C or C/H): 2:1
 Maximum hot water inlet temperature: 90°C
 Minimum hot water inlet temperature: 50°C
 Maximum cold water inlet temperature: 25°C
 Minimum cold water inlet temperature: 5°C
 Minimum temperature difference between inlet hot water and outlet mixed water to ensure optimal performance: 15°C

Connections: 3/4"–2" M (ISO 7/1) with union
 Ø 28 mm for copper pipe

Dimensions



Code	DN	A	B	C	D	E	F	Mass (kg)
523150	20	3/4"	78,5	157	169	95,5	73,5	1,35
523160	25	1"	104,5	209	195,5	109	86,5	2,50
523170	32	1 1/4"	104,5	209	195,5	109	86,5	2,47
523180	40	1 1/2"	121	242	219,5	129	90,5	3,81
523190	50	2"	131	262	234,5	139	95,5	5,58



Code	DN	A	B	C	D	E	F	Mass (kg)
523162*	32	Ø 28	121	242	212	125,5	86,5	2,70

* with check valves at the inlet

Legionella - scalding risk

In systems that produce hot water with storage for domestic purposes, in order to prevent the proliferation of *Legionella* bacteria, the hot water must be stored at a temperature of at least 60°C. At this temperature it is certain that the growth of the bacteria will be totally inhibited. However, the hot water cannot be used directly at this temperature, as it may cause scalding. For example, at 55°C, partial burn occurs in about 30 seconds, whereas at 60°C partial burn occurs in about 5 seconds.

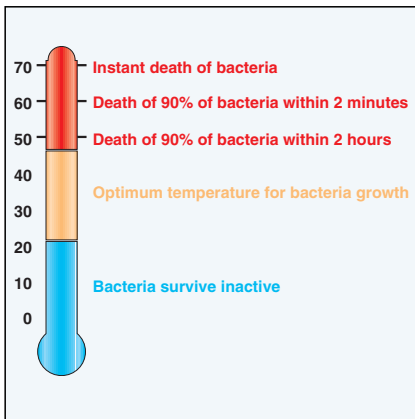
It is therefore necessary to use a thermostatic mixing valve able to:

- reduce the temperature at the user outlet to a lower value than the storage temperature,
- keep this temperature constant in spite of variations in the inlet pressure and temperature.

Thermal disinfection

The diagram below shows the behaviour of *Legionella Pneumophila* bacteria as the temperature of the water containing the bacteria varies.

To ensure correct thermal disinfection, it is necessary to go up to values of at least 60°C.



Energy Saving

Energy savings are governed in Italy by Presidential Decree no. 412/93 making it compulsory to use mixing valves on domestic water systems with storage, which are not otherwise regulated, in order to limit the temperature of the water at the inlet of the distribution network to 48°C with a tolerance of +5°C.

The purpose of limiting the temperature is to reduce passive thermal losses through the delivery network as much as possible, besides preventing the delivery of water at a higher temperature than necessary.

Operating principle

The regulating element in the thermostatic mixing valve consists of a temperature sensor (1) fully immersed in the mixed water outlet pipe which, by expanding and contracting, continuously ensures correct proportioning of hot and cold water at the inlet.

The water proportions are regulated by an obturator (2) that slides inside a special cylinder placed between the hot (3) and cold (4) water passage channels.

Even if the pressure drops due to hot or cold water drawn-off by other users or temperature variations at the inlet, the mixing valve automatically adjusts the water flow rate until the set temperature is achieved.

Construction details

Shaped obturator

The obturator, suitable for use with potable water, is made of a special polymer that enables eliminating the problem of seizing caused by scale deposits.

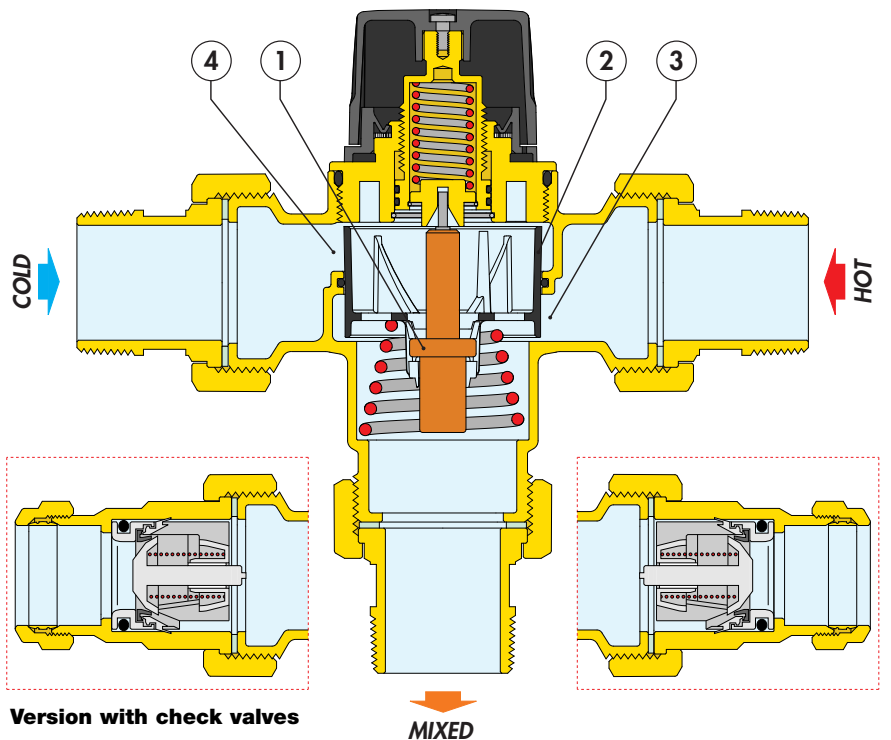
The shape with which it has been designed permits conveying the water over the sensor in an optimal manner in order to obtain an exact adjustment.

Low-inertia thermostat

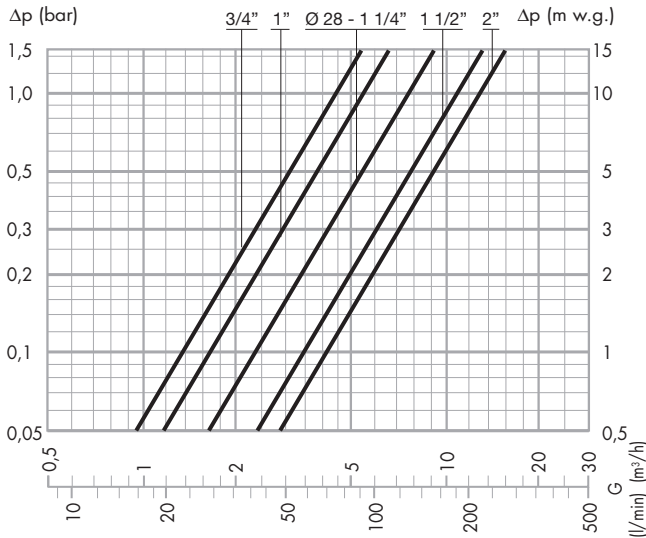
The temperature-sensitive element, the "engine" of the thermostatic mixing valve, has low thermal inertia; in this way it can quickly react to changes in the conditions of inlet pressure and temperature, shortening the valve response time.

Temperature adjustment and locking

The control knob is used to adjust the temperature in a full turn (360°) between min. and max. It also has tamper protection for locking the temperature at the set value.



Hydraulic characteristics



Recommended FLOW RATES to ensure stable operation and accuracy of $\pm 2^\circ\text{C}$ (balanced Hot/Cold pressures)

DN	Size	Kv (m ³ /h)	Size	Minimum (m ³ /h)	Maximum* (m ³ /h)
20	3/4"	4,5	3/4"	0,6	5,5
25	1"	5,5	1"	0,8	6,7
32	Ø 28-1 1/4"	7,6	Ø 28-1 1/4"	1,0	9,3
40	1 1/2"	11,0	1 1/2"	1,5	13,5
50	2"	13,3	2"	2,0	16,3

* $\Delta p = 1,5 \text{ bar}$

Application

In view of their flow rate characteristics, Caleffi 5231 series thermostatic mixing valves can be installed in centralised systems with a number of user outlets or used to control groups of user outlets, such as shower units, washbasin units, etc.

To ensure the delivery of mixed water at the set temperature, the thermostatic mixing valves must have a minimum flow rate of 10 l/min (3/4"), 13,3 l/min (1"), 16,6 l/min (Ø 28 - 1 1/4"), 25 l/min (1 1/2") and 33,3 l/min (2").

Installation

The system in which the Caleffi 5231 series mixing valve is to be installed must be flushed and cleaned to remove any dirt that may have accumulated during installation.

We recommend always installing strainers of sufficient capacity at the inlet from the water main.

Caleffi 5231 series thermostatic mixing valves must be installed according to the diagrams shown in this manual, taking account of the current applicable regulations.

Caleffi 5231 series thermostatic mixing valves can be installed in any position, horizontally or vertically.

The following are indicated on the body of the mixing valve:

- hot water inlet, indicated by the letter H and the red mark.
- cold water inlet, indicated by the letter C and the blue mark.

Check valves

In systems with thermostatic mixing valves, check valves must be installed to prevent undesired backflow.

Thermostatic mixing valves are also available with built-in check valves at the hot and cold water inlets.

Commissioning

In view of the special purpose of the thermostatic mixing valve, it must be commissioned in accordance with current regulations by qualified personnel, using appropriate temperature measurement equipment. We recommend using a digital temperature gauge for measuring the mixed water temperature.

Temperature adjustment

The temperature is set at the desired value using the control knob with the graduated scale on the valve.

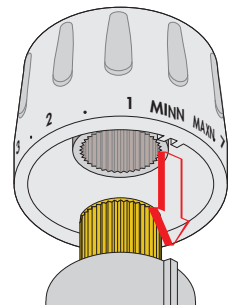
Temperature adjustment table

Position	Min	1	2	3	4	5	6	7	Max
Ø 28; 3/4"-2"; T (°C)	35	40	43	47	50	54	58	61	65

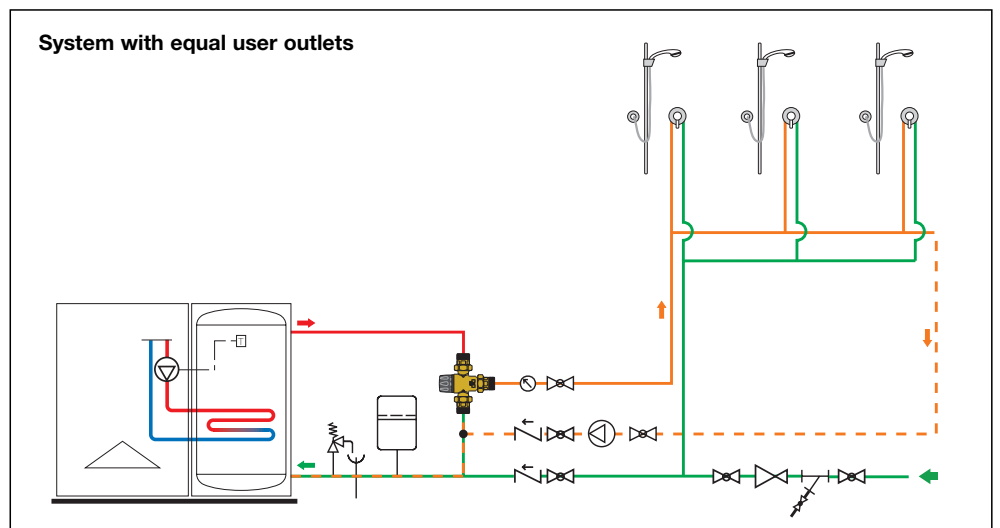
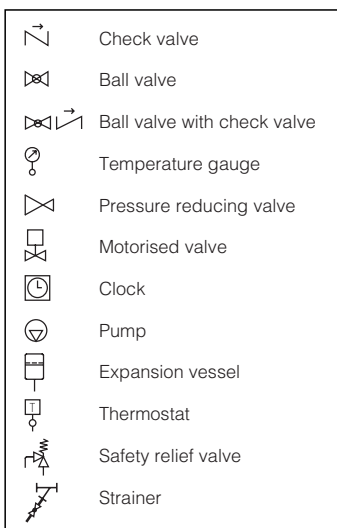
Reference conditions: $T_{\text{hot}} = 68^\circ\text{C}$; $T_{\text{cold}} = 13^\circ\text{C}$; Hot and cold inlet pressures = 3 bar

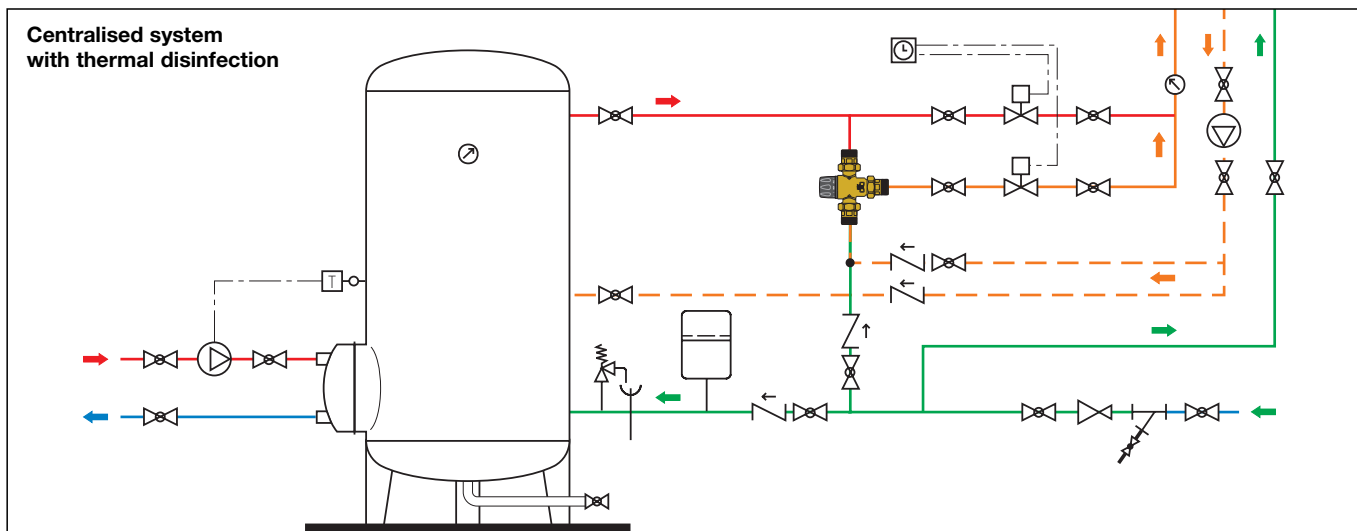
Locking the setting

Turn the knob onto the required number, unscrew the upper screw, remove the knob and put it back on so that the internal reference couples with the catch on the knob holder nut.



Application diagrams





SPECIFICATION SUMMARY

Code 5231.0

Adjustable thermostatic mixing valve. Size DN 20 (from DN 20 to DN 50). Connections 3/4" (from 3/4" to 2") M (ISO 7/1) with union. Dezincification resistant alloy body. PPSG40, PSU obturator (DN 20). Stainless steel springs. EPDM seals. Maximum hot water inlet temperature 90°C. Minimum hot water inlet temperature 50°C. Maximum cold water inlet temperature 25°C. Minimum cold water inlet temperature 5°C. Adjustment range from 35°C to 65°C. Maximum working pressure (static) 14 bar. Maximum working pressure (dynamic) 5 bar. Minimum working pressure (dynamic) 0,2 bar. Accuracy $\pm 2^{\circ}\text{C}$. Minimum temperature difference between hot water inlet and mixed water outlet to ensure optimal performance 15°C. Equipped with tamper-proof temperature locking device.

Code 523162

Adjustable thermostatic mixing valve. Size DN 32. Connection \varnothing 28 mm for copper pipe. Dezincification resistant alloy body. PPSG40 obturator. Stainless steel springs. Complete with check valves at the inlets. EPDM seals. Maximum hot water inlet temperature 90°C. Minimum hot water inlet temperature 50°C. Maximum cold water inlet temperature 25°C. Minimum cold water inlet temperature 5°C. Adjustment range from 35°C to 65°C. Maximum working pressure (static) 14 bar. Maximum working pressure (dynamic) 5 bar. Minimum working pressure (dynamic) 0,2 bar. Accuracy $\pm 2^{\circ}\text{C}$. Minimum temperature difference between hot water inlet and mixed water outlet to ensure optimal performance 15°C. Equipped with tamper-proof temperature locking device.

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