# Thermostatic mixing valve for centralised systems



# 5231 series



# **Product range**

Code 5231.0 Thermostatic mixing valve for centralised systems Code 523162 Thermostatic mixing valve with check valves at the inlet

### **Technical specifications**

Materials Body:	CR dezincification resistant alloy EN 1982 CB752S EN 12165 CW724R (DN 20)
Obturator:	PPSG40 PSU (DN20)
Springs: Seal elements:	stainless steel (AISI 302) EPDM
Performance Medium:	water
Adjustment range: Accuracy:	35–65°C ±2°C
Maximum working pressure (static): Maximum working pressure (dynamic); Minimum working pressure (dynamic); Maximum inlet pressure ratio (H/C or	0,2 bar
Maximum hot water inlet temperature Minimum hot water inlet temperature: Maximum cold water inlet temperature Minimum cold water inlet temperature	50°C e: 25°C
Minimum temperature difference betw inlet hot water and outlet mixed water to ensure optimal performance:	
Connections:	3/4"-2" M (ISO 7/1) with union

Ø 28 mm for copper pipe

# Function

ANAB 50 9001

FM 21654

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.

ICIM

ISO 9001 No. 0003

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.

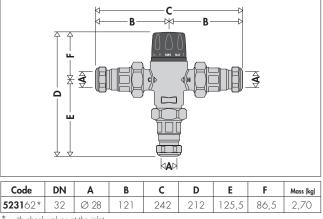
These systems also require stable and accurate temperature adjustment, especially in relation to variations in the flow rate drawn-off by the users.



sizes DN 20 (3/4"), DN 25 (1"), DN 32 (1 1/4"), DN 40 (1 1/2"), DN 50 (2") size DN 32 (Ø 28 mm) for copper pipe

# С B -144 B Ā

Code	DN	Α	В	С	D	Е	F	Mass kg)
<b>5231</b> 50	20	3/4″	78,5	157	169	95,5	73,5	1,35
<b>5231</b> 60	25	1″	104,5	209	195,5	109	86,5	2,50
<b>5231</b> 70	32	1 1/4″	104,5	209	195,5	109	86,5	2,47
<b>5231</b> 80	40	1 1/2"	121	242	219,5	129	90,5	3,81
<b>5231</b> 90	50	2″	131	262	234,5	139	95,5	5,58



with check valves at the inlet

# Dimensions

#### 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.

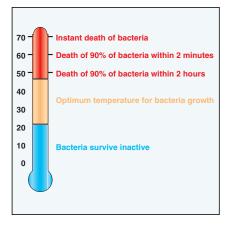
It is therefore necessary to use a thermostatic mixing valve able to:

- 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.

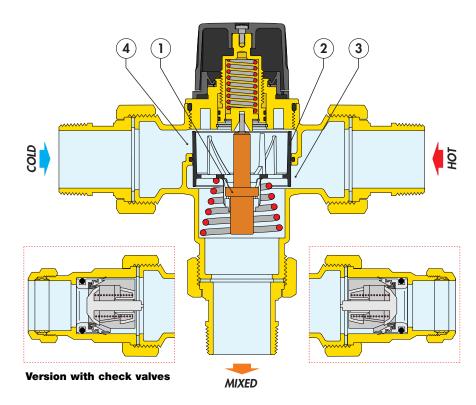
The shape with which it has been designed permits conveying the water over the sensor in an optimal manner in order to obtain an exact adjustment.

#### Low-inertia thermostat

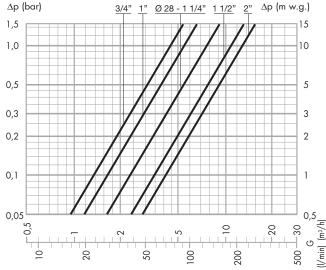
The temperature-sensitive element, the "engine" of the thermostatic mixing valve, has low thermal inertia; in this way it can quickly react to changes in the conditions of inlet pressure and temperature, shortening the valve response time.

#### 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 accuracy of ± operation and 2°C (balanced Hot/Cold pressures)

DN	Size	Kv (m³/h)	Size	Minimum (m³/h)	Maximum* (m <sup>3</sup> /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		
* 4							

\*  $\Delta p = 1,5$  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

 $\vec{\bigtriangledown}$ 

Q

 $\mathbb{R}$ 

७

 $\bigcirc$ 

P

Ţ

гФ

F

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 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.  $\cdot$  cold water inlet, indicated by the letter C and the blue mark.

current applicable regulations.

#### **Check valves**

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

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

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.

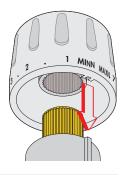
#### Temperature adjustment table

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

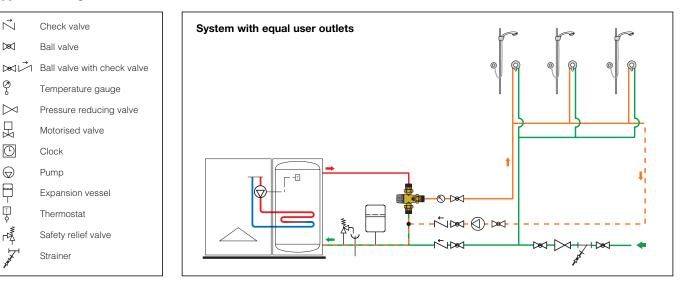
Reference conditions: T<sub>hot</sub> = 68°C; T<sub>cold</sub> = 13°C; Hot and cold inlet pressures = 3 bar

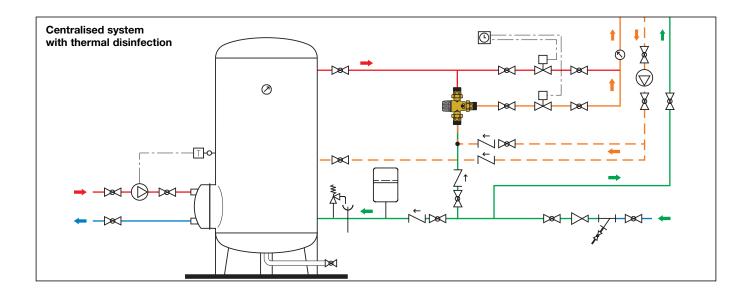
#### Locking the setting

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 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 ±2°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 Ø 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 ±2°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.

We reserve the right to make changes and improvements to the products and related data in this publication, at any time and without prior notice.



Caleffi S.p.A. S.R. 229 n. 25 · 28010 Fontaneto d'Agogna (NO) · Italy Tel. +39 0322 8491 · Fax +39 0322 863723 info@caleffi.com · www.caleffi.com © Copyright 2014 Caleffi