

# Thermostatic mixing valve for centralised solar thermal systems



01257/14 GB

## 2521 series



### Function

The thermostatic mixing valve is used in solar thermal systems that produce hot water for domestic purposes. 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 has been specifically designed for systems requiring high flow rates and they can work continuously with hot water supplied at high temperatures from the solar water storage.



### Product range

2521 series Thermostatic mixing valve for solar thermal systems \_\_\_\_\_ sizes DN 20 (3/4"), DN 25 (1"), DN 32 (1 1/4"), DN 40 (1 1/2"), DN 50 (2")

### Technical specifications

#### Materials:

Body: **CR** dezincification resistant alloy  
EN 1982 CB752S  
EN 12165 CW724R (DN 20)

Obturator: PPSG40  
PSU (DN 20)

Springs: stainless steel (AISI 302)

Seal elements: EPDM

#### Performance:

Medium: water

Adjustment range: 35–65°C

Accuracy: ±2°C

Max. working pressure (static): 14 bar

Max. working pressure (dynamic): 5 bar

Minimum working pressure (dynamic): 0,2 bar

Max. inlet pressure ratio (H/C or C/H): 2:1

Maximum hot water inlet temperature: 100°C

Minimum hot water inlet temperature: 50°C

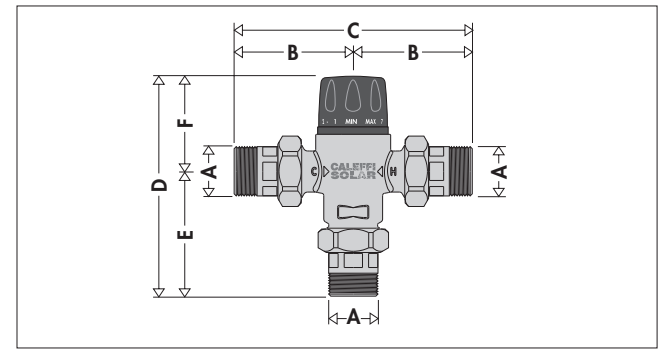
Maximum cold water inlet temperature: 25°C

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

### Dimensions



Code	DN	A	B	C	D	E	F	Mass (kg)
252151	20	3/4"	78,5	157	169	95,5	73,5	1,35
252160	25	1"	104,5	209	195,5	109	86,5	2,50
252170	32	1 1/4"	104,5	209	195,5	109	86,5	2,47
252180	40	1 1/2"	121	242	219,5	129	90,5	3,81
252190	50	2"	131	262	234,5	139	95,5	5,58

## High temperature and solar systems

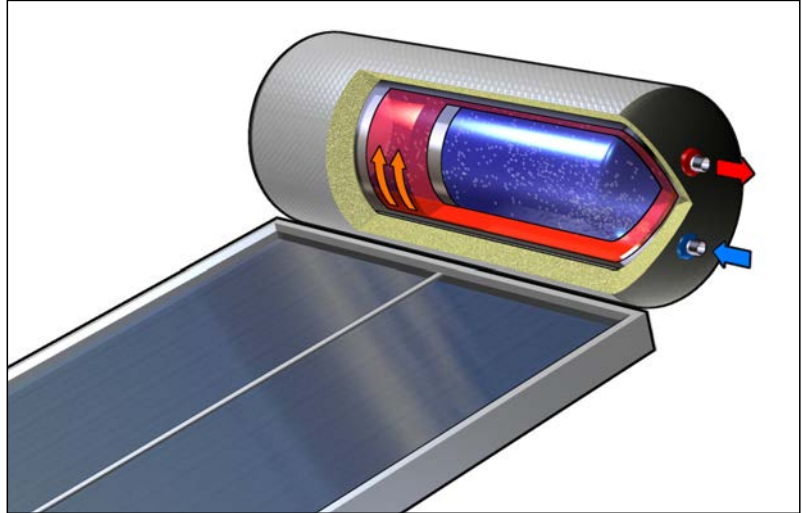
In solar thermal systems with natural circulation in the primary circuit and a water storage with heating jacket, the temperature of the domestic water in the storage can vary considerably depending on the degree of solar radiation and can reach very high temperatures over long periods.

In summer, and if there is little water usage, the hot water at the storage outlet can actually reach temperatures around 98°C before the temperature and pressure safety relief valves are actuated.

At these temperatures, the hot water cannot be used directly, because of the danger of scalding for users. Water temperatures over 50°C can cause burns very quickly. 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 of the water distributed throughout the domestic water system to a value lower than that in the storage and suitable for the end user. For reasons of safety, it is recommended to set the temperature of the mixed water sent to the consumer to values no higher than 50°C.
- keep mixed water temperature constant despite variations in inlet temperature and pressure.
- continue functioning over time without any loss in performance and without problems due to the continuously high temperature of the inlet water.
- enable the high temperature water in the storage to last longer, by distributing water to the user circuit at a reduced temperature.



## Operating principle

The regulating element in the thermostatic mixing valve consists of a temperature sensor 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 a piston that slides inside a special cylinder placed between the hot and cold water passage channels.

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

## Construction details

### High resistance to temperature

Components of the internal adjustment group are designed to resist and keep mixing valve performance with inlet hot water temperatures up to 100°C, in continuous operation.

### 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.

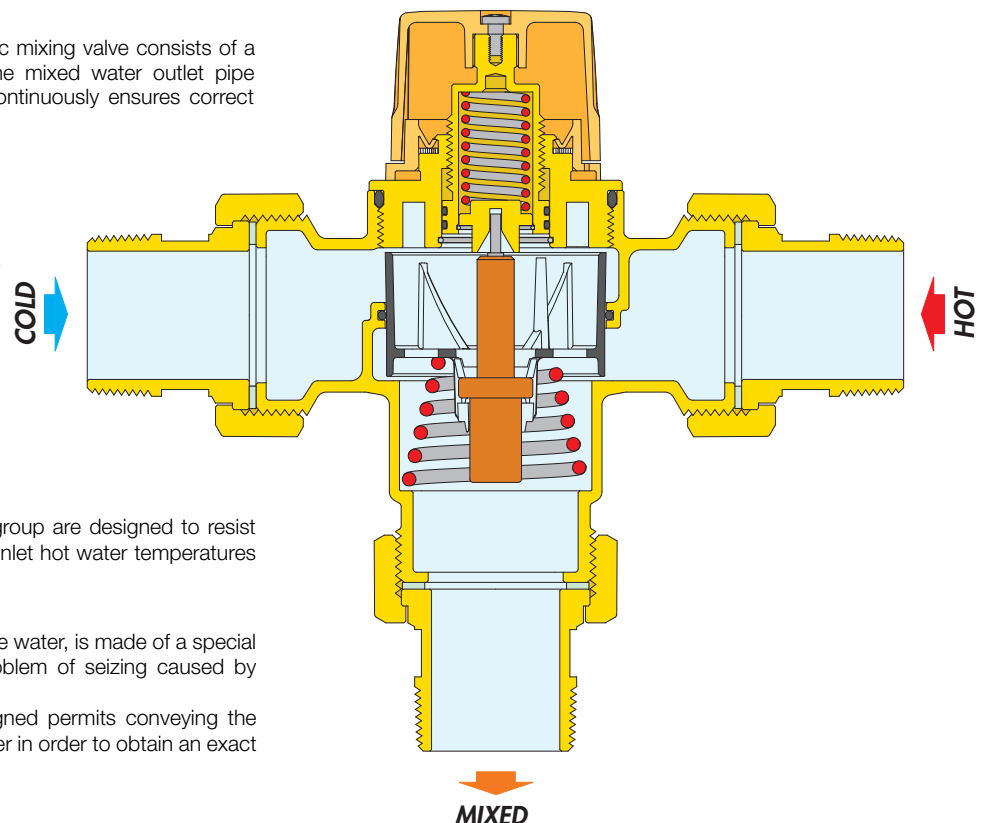
The shape with which it has been designed permits conveying the water over the sensor in an optimal manner in order to obtain an exact adjustment.

### Low-inertia thermostat

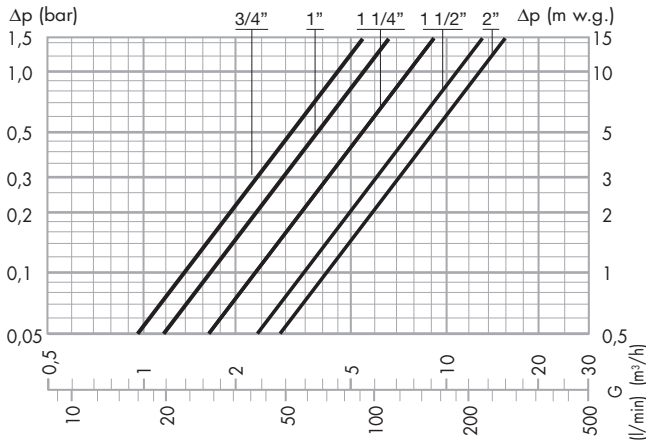
The temperature-sensitive element, the "engine" of the thermostatic mixing valve, has low thermal inertia; in this way it can quickly react to changes in the conditions of inlet pressure and temperature, shortening the valve response time.

### 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 ± 2°C (balanced Hot/Cold pressures)**

DN	Size	Kv (m³/h)	Size	Minimum (m³/h)	Maximum*
20	3/4"	4,5	3/4"	0,6	5,5
25	1"	5,5	1"	0,8	6,7
32	1 1/4"	7,6	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

\* Δp = 1,5 bar

## Application

2521 series thermostatic mixing valves are typically installed at the outlet of solar hot water storage to ensure constant temperature of the mixed water supplied to the consumer.

In view of their flow rate characteristics, 2521 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 (1 1/4"), 25 l/min (1 1/2") and 33,3 l/min (2").

## Installation

The system in which the 2521 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.

The 2521 series thermostatic mixing valves must be installed according to the diagrams shown in this manual, taking account of the current applicable regulations.

2521 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.

## 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.

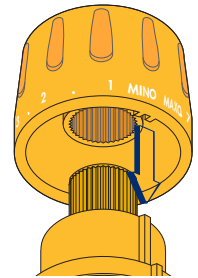
## Temperature adjustment table

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

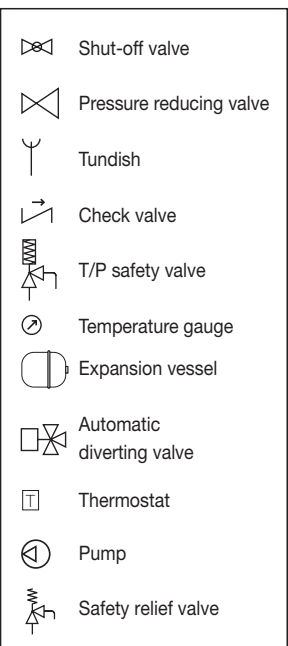
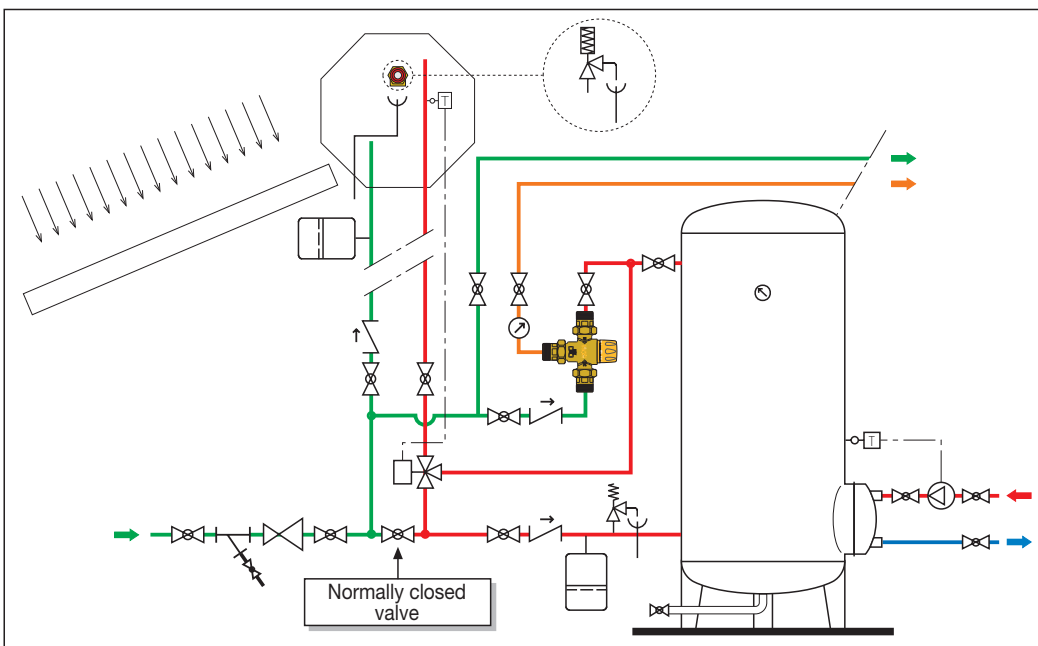
Reference conditions:  $T_{hot} = 68^{\circ}\text{C}$ ;  $T_{cold} = 13^{\circ}\text{C}$ ; Hot and cold inlet pressures = 3 bar

## Locking the setting

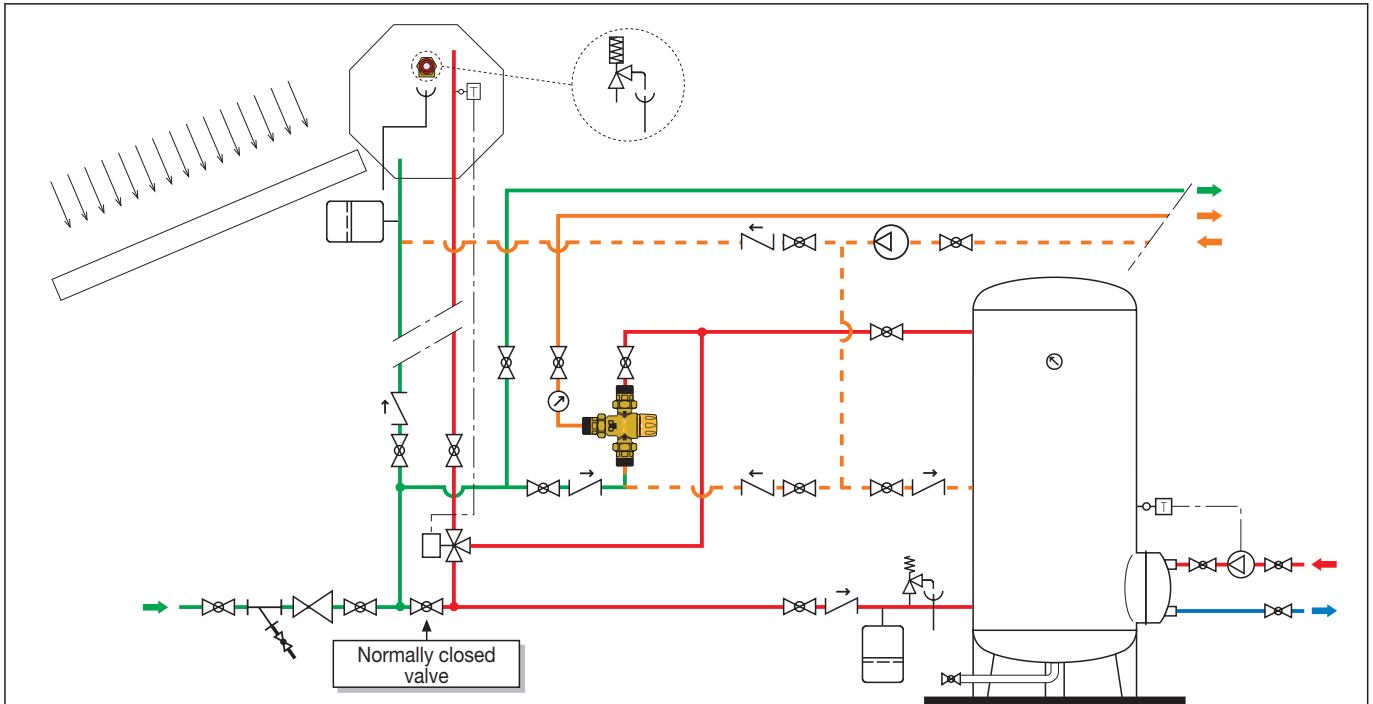
Turn the knob onto the required number, unscrew the upper screw, remove the knob and put it back on so that the internal reference couples with the catch on the knob holder nut.



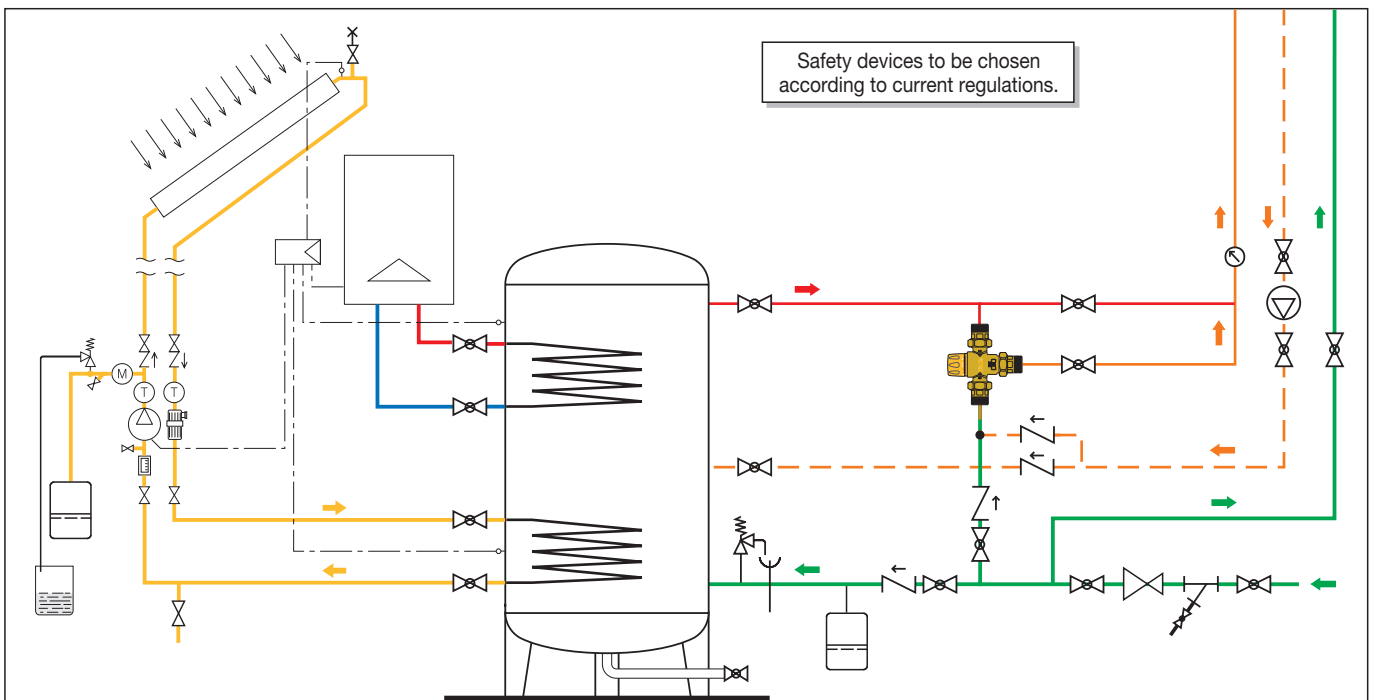
## Application diagrams - System with thermal integration



### System with thermal integration and recirculation



### System with thermal integration and forced circulation



## SPECIFICATION SUMMARY

### 2521 series

Adjustable thermostatic mixing valve for solar thermal systems. 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 100°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. Maximum inlet pressure ratio (H/C or C/H) 2:1. Minimum working pressure (dynamic) 0,2 bar. Accuracy  $\pm 2^\circ\text{C}$ . System with thermal integration and forced circulation. Tamper protection system to lock the set temperature.

*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.*