

# Adjustable thermostatic mixing valve for solar systems

## 2521 series



cert. n° 0003  
ISO 9001

01127/06 GB

Replaces 01127/05 GB

**CALEFFI  
SOLAR**



### Function

The thermostatic mixing valve is used in systems for the production of domestic hot water.

It is designed to maintain the set temperature of the mixed water supplied to the user when there are variations in the temperature and pressure conditions of the incoming hot and cold water or in the flow rate.

This particular series of mixing valves can function continuously at the high temperatures of the incoming hot water from the solar storage tank.

### Product range

Code 252140/50 Adjustable thermostatic mixing valve for solar systems \_\_\_\_\_ sizes 1/2", 3/4"  
Code 252153 Adjustable thermostatic mixing valve with inlet check valves for solar systems \_\_\_\_\_ size 3/4"

### Technical specifications

- Materials: - body: dezincification resistant alloy **CR**  
EN 12165 CW602N, chrome plated  
- shutter: PSU  
- springs: stainless steel  
- seal components: EPDM

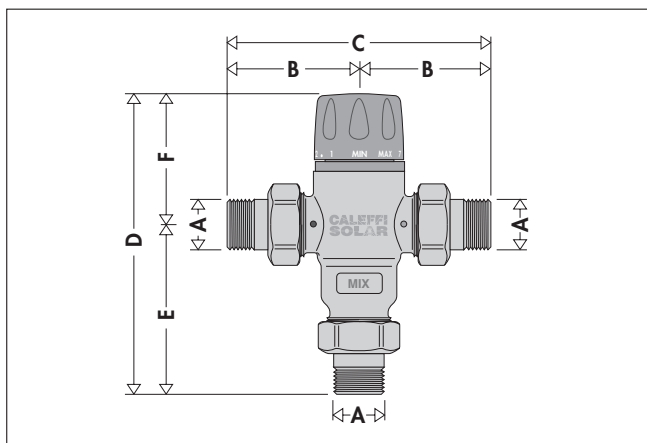
Setting range: 30–65°C  
Accuracy: ±2°C

Max. working pressure (static): 14 bar  
Max. working pressure (dynamic): 5 bar  
Min. working pressure (dynamic): 0,2 bar

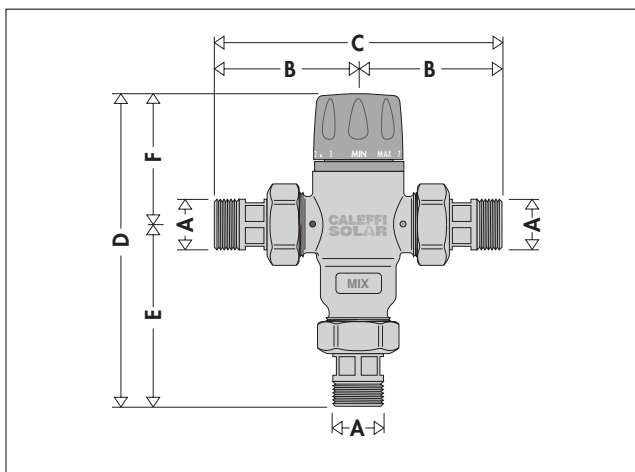
Max. inlet temperature: 100°C  
Max. inlet pressures ratio (H/C o C/H): 2:1  
Min. temperature difference between hot water at inlet and mixed water at outlet for optimum performance: 15°C  
Min. flow rate to ensure stable temperature: 5 l/min

Connections: - standard version: - 1/2" and 3/4" M with union  
- with check valves version: - 3/4" M with union

### Dimensions



Code	A	B	C	D	E	F	Weight (kg)
252140	1/2"	67	134	152	86,5	65,5	1,11
252150	3/4"	67	134	152	86,5	65,5	1,12



Code	A	B	C	D	E	F	Weight (kg)
252153	3/4"	71,5	143	156,5	91	65,5	1,21

## Solar systems - high temperatures

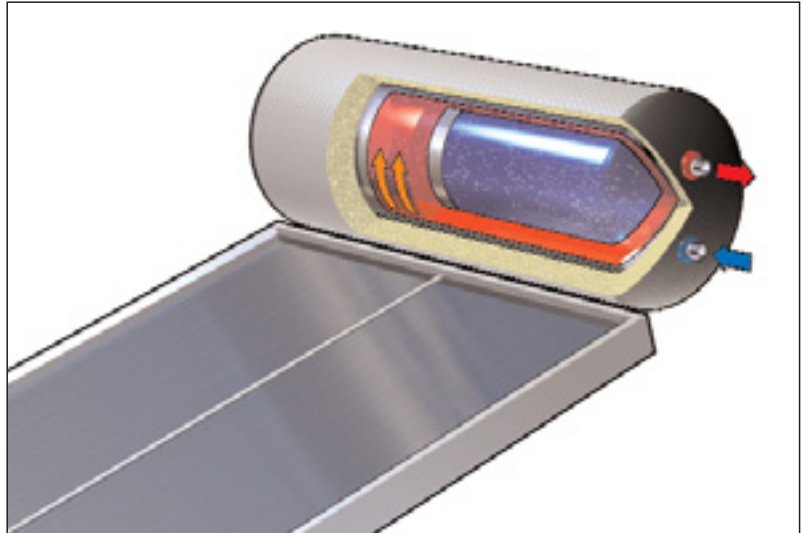
In solar systems with natural circulation in the primary circuit and storage tank with heating jacket, the temperature of the water in the storage tank can vary considerably depending on the degree of solar radiation and can reach very high temperatures over long periods.

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

At these temperatures, the hot water cannot be used directly, because of the danger of scalding. 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.

Consequently, the thermostatic mixing valve installed must be able to:

- reduce the temperature of the water supplied through the hot water system to a lower value than to the storage tank, i.e. a value usable by the user. For reasons of safety, we advise adjusting the temperature of the mixed water supplied to the user to a value not higher than 50°C
- maintain a constant temperature in the mixed water when there are variations in the inlet temperatures and pressures.
- maintain function and efficiency over time, without being affected by the continuous high temperature of the hot water at the inlet.
- ensure that water is stored at high temperature for longer periods, and supplied to the water system at a lower temperature.



### Operating principle

The controlling element of the thermostatic mixing valve is a temperature sensor fully immersed in the mixed water outlet passage which, as it expands or contracts, continuously establishes the correct proportion of hot and cold water entering the valve.

The regulation of these flows is by means of a piston sliding in a cylinder between the hot and cold water passages.

Even when there are pressure drops due to the drawing off of hot or cold water for other uses, or variations in the incoming temperature, the mixer automatically regulates the water flow to obtain the set temperature.

### Construction details

#### High heat resistance

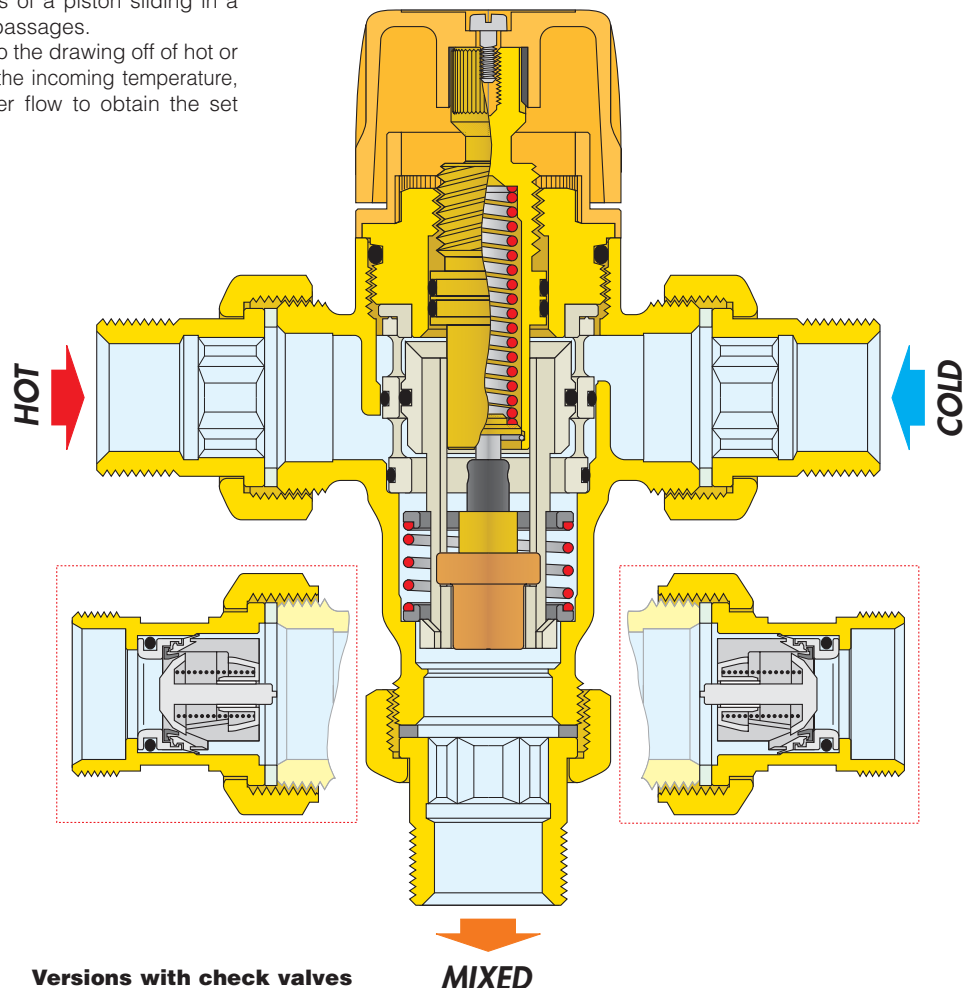
The internal flow regulation components are designed to maintain performance of the mixing valve with inlet hot water temperatures up to 100°C, in continuous operation.

#### Anti-scale materials

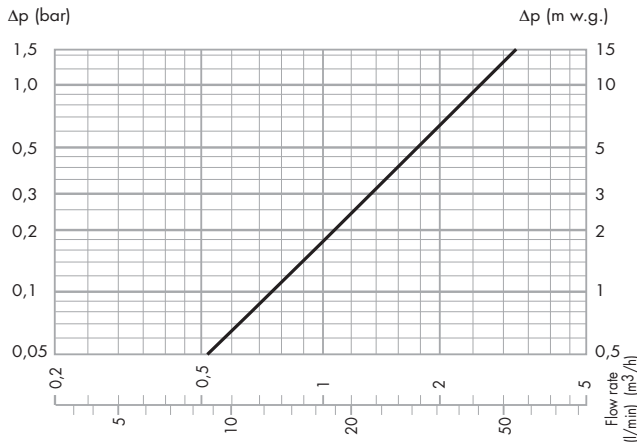
The materials used in the construction of the mixing valve eliminate the problem of jamming caused by lime deposits. All the working parts such as shutter, seats and slide guides are made of a special anti-scale material, with a low friction coefficient, guaranteeing that the performance will be maintained over the long term.

#### Temperature setting and locking

The control knob permits temperature setting between minimum and maximum in one turn (360°). It also has a tamper-proof system to lock the temperature at the set value.



## Hydraulic characteristics



$$K_v = 2,6 \text{ (m}^3\text{/h)}$$

## Use

2521 series thermostatic mixing valves are typically installed at the outlet of hot water storage tanks in solar systems, to ensure constant temperature of the mixed water supplied to the user.

2521 series thermostatic mixing valves, because of their flow characteristics, can be installed to control the temperature for both single consumers (e.g., washbasin, bidet, shower) and for multiple consumers. In order to guarantee the delivery of mixed water at the set temperature, the thermostatic mixing valves must have a minimum flow rate of 5 l/min.

## Installation

Before installing mixing valve, the pipework must be flushed out to ensure that there are no circulating impurities to harm the system. We recommend always installing filters of sufficient capacity at the inlet of the water system.

2521 series thermostatic mixing valves must be installed according to the installation diagrams shown on the instructions sheet or this leaflet.

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 with the colour red and the word "HOT"
- cold water inlet, indicated with the colour blue and the word "COLD"
- mixed water outlet with the word "MIX".

## Check valves

In systems with thermostatic mixing valves, check valves should be installed to prevent undesirable fluid backflow.

The thermostatic mixing valves are also available in versions with incorporated check valves at the hot and cold inlets.

## Commissioning

In view of the special purpose of the thermostatic mixing valve, it must be commissioned in accordance with current standards by qualified personnel using temperature measuring equipment. Use of a digital thermometer is recommended for measurement of the mixed water temperature.

## Temperature adjustment

The temperature is set at the desired value by means of the knob with the graduated scale, on the top of the valve.

## Temperature adjustment table

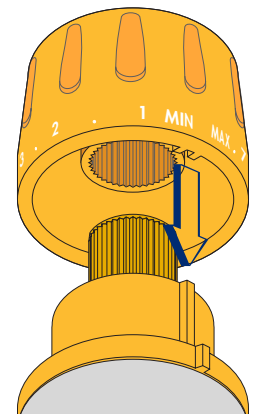
Position	Min.	1	2	3	4	5	6	7	Max.
T (°C)	27	32	38	44	49	53	58	63	67

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

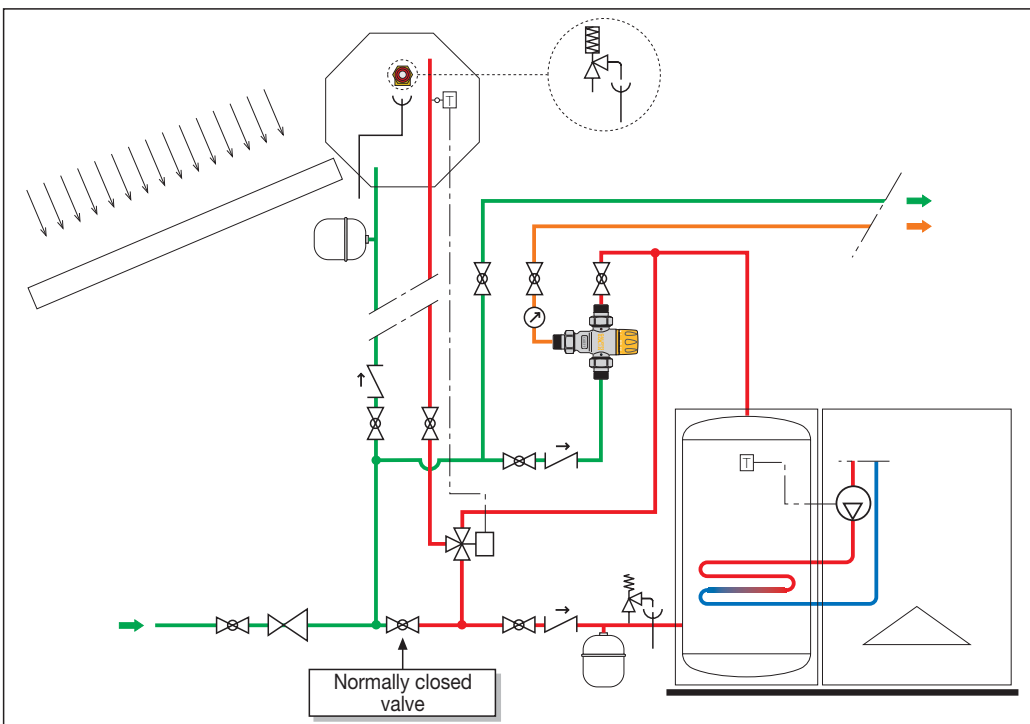
## Locking the setting

After setting the temperature, the setting can be locked at the desired value using the control knob.

In order to do this, unscrew the lock screw on the upper part of the control knob, remove the knob and put it back on so that the internal reference couples with the protrusion on the knob carrier ring nut.

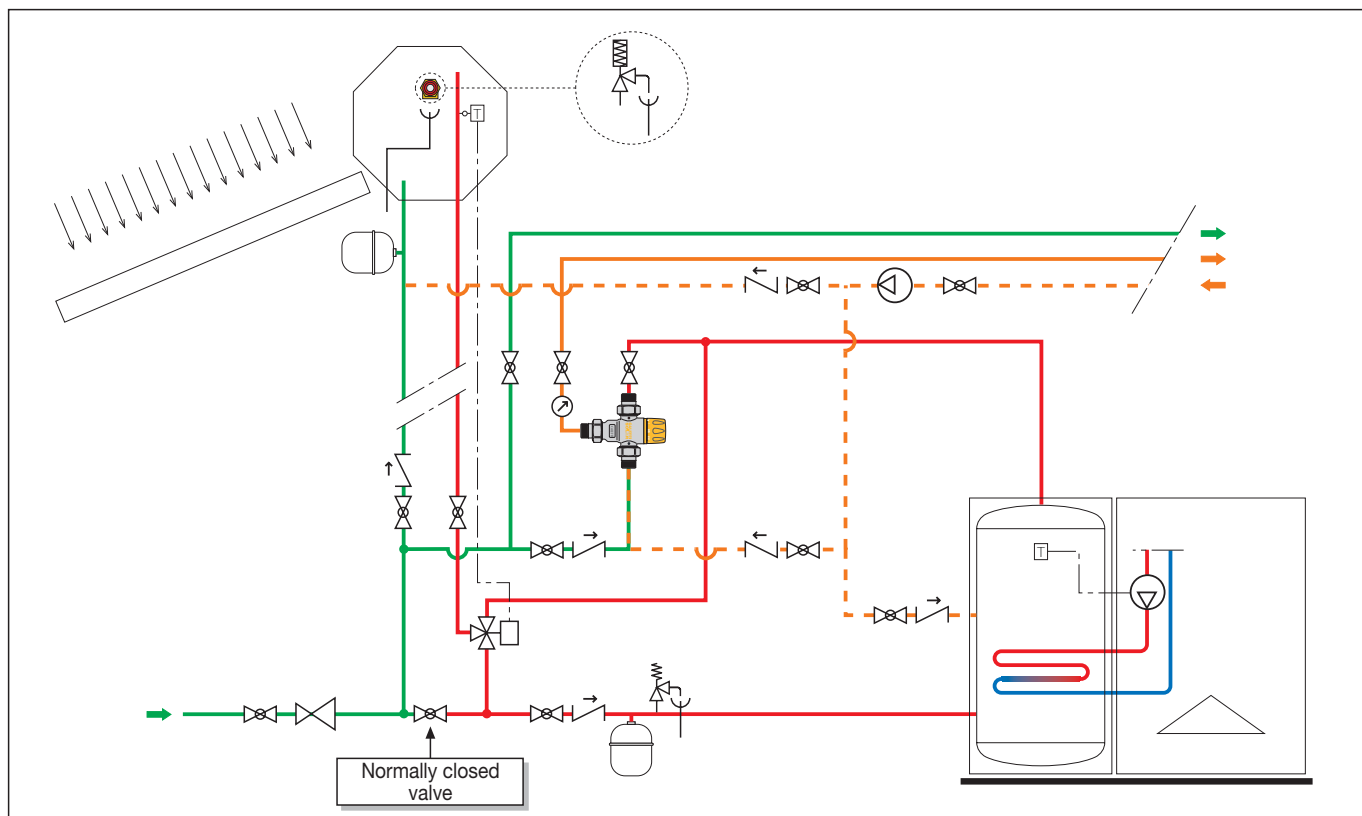


## Application diagrams - System with thermal integration



	Shut-off valve
	Pressure reducing valve
	Tundish
	Check valve
	T/P safety valve
	Temperature gauge
	Expansion vessel
	Automatic diverting valve
	Thermostat
	Pump
	Safety valve

## System with thermal integration and recirculation



## SPECIFICATION SUMMARIES

### Code 2521.0

Adjustable thermostatic mixing valve, for solar systems. 1/2" (or 3/4") M connections with union. Dezincification resistant alloy body. Chrome plated. Shutter, regulator seats and slide surfaces made of plastic, scale-resistant material with high heat resistance. EPDM seals. Stainless steel springs. Maximum inlet temperature: 100°C. Setting range from 30°C to 65°C. Maximum working pressure: 14 bar. Accuracy:  $\pm 2^\circ\text{C}$ . Provided with tamper-proof setting lock.

### Code 252153

Adjustable thermostatic mixing valve, for solar systems. Complete with check valves at the inlets. 3/4" M connections with union. Dezincification resistant alloy body. Chrome plated. Shutter, regulator seats and slide surfaces made of plastic, scale-resistant material with high heat resistance. EPDM seals. Stainless steel springs. Maximum inlet temperature: 100°C. Setting range from 30°C to 65°C. Maximum working pressure: 14 bar. Accuracy  $\pm 2^\circ\text{C}$ . Provided with tamper-proof setting lock.

*We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.*

