

# Balancing valve with flow meter for solar thermal systems

258 series



## Function

The balancing valve is an hydraulic device that accurately regulates the flow rate of heating medium supplied to the various circuits of solar thermal systems.

This particular series of valves is equipped with a flow meter for a direct reading of the regulated flow rate. The flow meter, housed in a by-pass circuit on the valve body and that can be shut off during normal functioning, allows a fast and easy balancing of circuits without the need of differential pressure gauges or diagrams.

The balancing valve is equipped with a hot preformed shell insulation to ensure a perfect thermal performance.

This particular series of valves has been specifically designed to work with glycol solutions at high temperatures, typical conditions of solar thermal systems.

Patent application No. MI2007A000703.

## Product range

258 series Balancing valves with flow meter for solar thermal systems size 3/4" and 1"

## Technical specifications

### Materials

**Valve**  
 Body: brass EN 12165 CW617N, chrome plated  
 Ball: brass EN 12164 CW614N  
 Ball control stem: brass EN 12164 CW614N, chrome plated  
 Ball seal seat: high resistance polymer  
 Control stem guide: high resistance polymer  
 Seals: high resistance elastomer

### Flow meter

Body: brass EN 12165 CW617N, chrome plated  
 Headwork: brass EN 12164 CW614N  
 Obturator stem: brass EN 12164 CW614N, chrome plated  
 Springs: stainless steel  
 Seals: high resistance elastomer  
 Flow meter float: high resistance polymer  
 Indicator cover: high resistance polymer

### Performance

Medium: water, glycol solutions  
 Max. percentage of glycol: 50%  
 Max. working pressure: 10 bar  
 Working temperature range: -30-130°C  
 Flow rate scale unit of measurement: l/min  
 Accuracy: ±10%  
 Control stem angle of rotation: 90°  
 Operating wrench: 9 mm  
 Threaded connections: 3/4" and 1" F

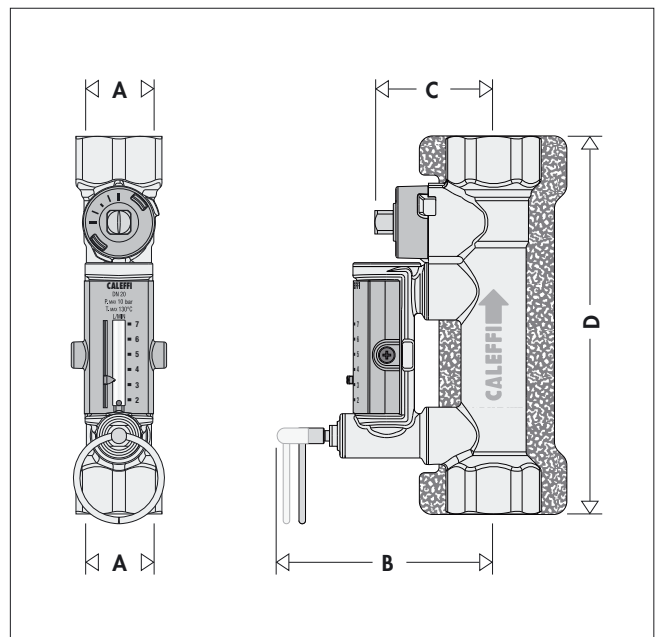
### Insulation

Material: closed cell expanded PE-X  
 Thickness: 10 mm  
 Density: - inner part: 30 kg/m³  
 - outer part: 50 kg/m³  
 Thermal conductivity (DIN 52612): - at 0°C: 0,038 W/(m·K)  
 - at 40°C: 0,045 W/(m·K)  
 Coefficient of resistance to water vapour (DIN 52615): > 1.300  
 Working temperature range: 0-100°C  
 Reaction to fire (DIN 4102): class B2

## Flow rate ranges

Code	258503	258523	258603
Size	3/4"	3/4"	1"
Flow rates (l/min)	2-7	7-28	10-40

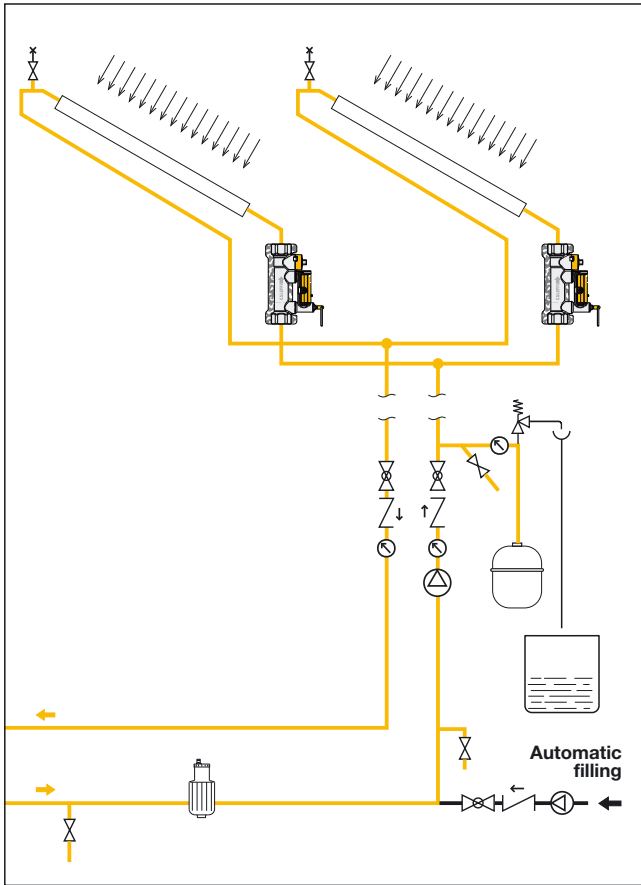
## Dimensions



Code	A	B	C	D	Weight (kg)
258503	3/4"	83,5	45,5	145	0,74
258523	3/4"	83,5	45,5	145	0,74
258603	1"	85	47	158	0,96

## Benefits of balancing solar thermal circuits

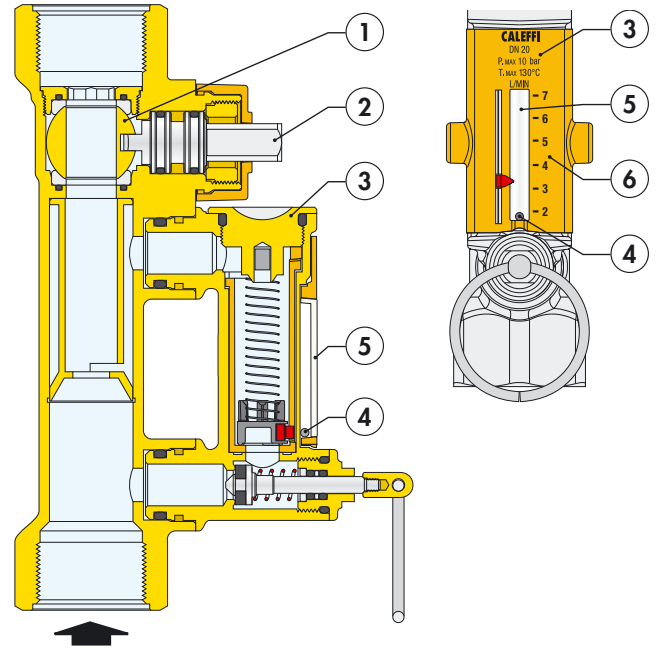
When a solar thermal circuit is properly balanced, it is ensured the correct flow rate circulating through the system, depending on the panel size.



## Operating principle

The balancing valve is a hydraulic device that allows to regulate the medium flow rate passing through.

The regulating action is made by a ball obturator (1), operated by a control stem (2). The flow rate is controlled by means of a flow meter (3) housed in a by-pass circuit, on the valve body, that can be shut off during normal functioning. The flow rate value is indicated by a metal sphere (4), sliding within a transparent guide (5), marked alongside by a graduated scale (6).



## Construction details

### Temperature

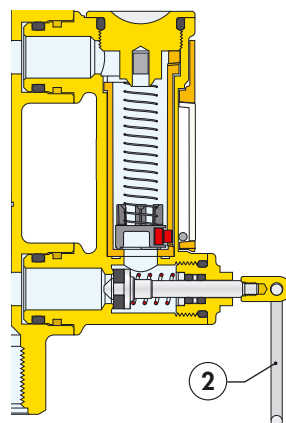
In solar thermal systems, the primary circuit thermal medium is a glycol solution operating at high temperature; for taking into account these particular working conditions, the seals and the inner plastic components of the valve are made of highly temperature resistant materials.

### Flow meter

The flow rate value is displayed directly by a flow meter housed in a by-pass circuit on the valve body, automatically shut-off during normal functioning.

The use of a flow meter greatly simplifies the process of system balancing, since the flow rate can be measured and controlled at any time and there is no need for differential pressure gauges or reference charts.

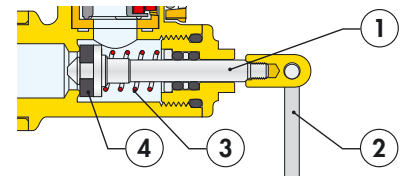
The provision of a flow meter also means that it is not anymore necessary to calculate valve settings at the system design stage. The advantages of this solution can be explained as significant time and cost saving, because the traditional balancing device presetting, performed by qualified technicians, is a long and difficult procedure.



### Flow meter obturator

The obturator (1) opens and shuts the circuit between the flow meter and the valve. The obturator can be easily opened by pulling the ring (2), and is closed automatically, after completion of the procedure, by the internal spring (3). The spring and the EPDM seal (4) guarantee over time a perfect circuit closure during normal functioning.

The operating ring (2) is made of a material with low thermal conductivity to avoid burns if the flow meter is opened while hot medium is passing through the valve.

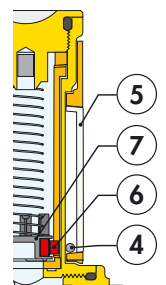


### Ball and magnet indicator

The ball (4) that indicates the flow rate value is not in direct contact with the thermal medium passing through the flow meter.

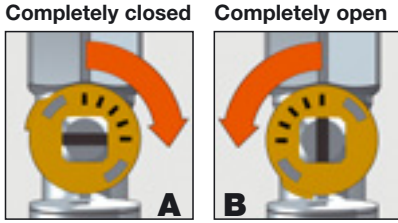
Thanks to an effective and innovative measuring system, the ball slides up and down in a cylinder (5) that is actually separate from the body of the flow meter. The ball is moved by a magnet (6) fixed to a float (7).

This means that the flow rate indication system remains perfectly clean and provides reliable readings over time.



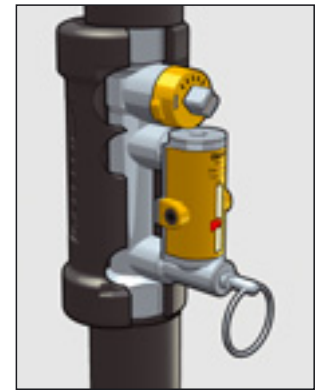
## Complete closing and opening of the valve

The valve can be completely closed and opened. A slot on the obturator stem indicates the status of the valve. When the control stem is turned fully clockwise and the slot lies perpendicular to the axis of the valve, the valve is fully closed (A). When the control stem is turned fully anti-clockwise and the slot lies parallel to the axis of the valve, the valve is fully open (B).

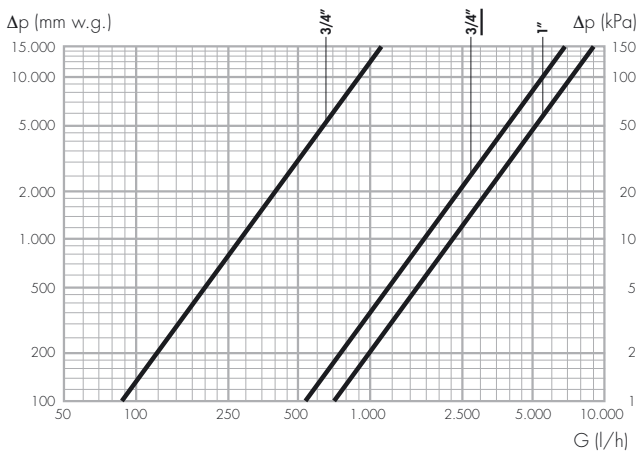


## Insulation

The 258 series balancing valve is supplied complete with hot pre-formed insulation. This system ensures total thermal insulation, which is especially helpful in limiting heat losses in outdoor installations, typical of solar thermal systems.



## Hydraulic characteristics



Code	258503	258523	258603
Size	3/4"	3/4"	1"
Flow rates (l/min)	2 - 7	7 - 28	10 - 40
Kv (m³/h)	0,9	5,4	7,2

*Kv valves fully open*

## Correction for media with different density

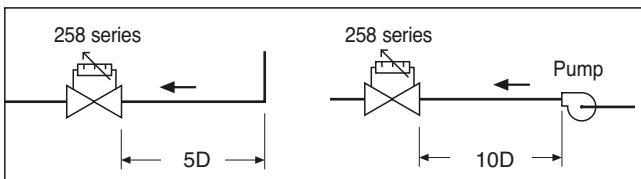
For fluids with a viscosity  $\leq 3^{\circ}\text{E}$ , e.g. water/glycol solutions with density different with respect to the water at 20°C ( $\rho = 1 \text{ kg/dm}^3$ ), to which the upper diagram refers, it should be considered that:

- pressure drop (for sizing the pump) is determined by:  

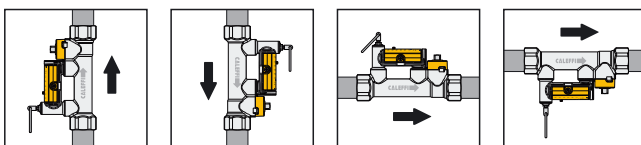
$$\Delta p_{\text{actual}} = \Delta p_{\text{reference}} \times \rho_{\text{glycol solution}}$$
- variation in flow rate measurement remains within the specified accuracy ( $\pm 10\%$ ) for glycol percentages up to 50%.

## Installation

Install the balancing valve in such a way to ensure free access to the flow meter obturator, control stem and flow rate indicator. We recommend to install straight sections of pipe as shown in the illustration below to ensure accurate flow measurement.



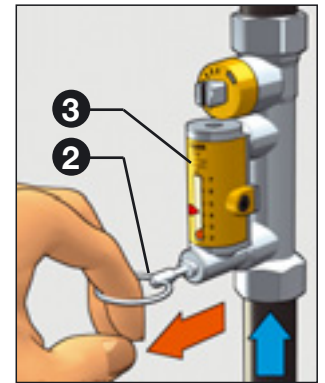
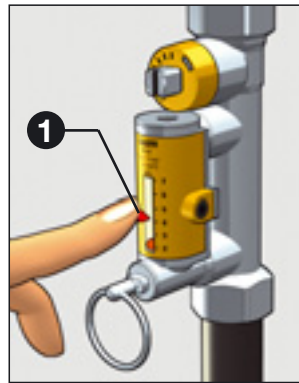
The valve can be installed in any position by respecting the flow direction shown on the valve body. The valve can be installed either horizontally or vertically.



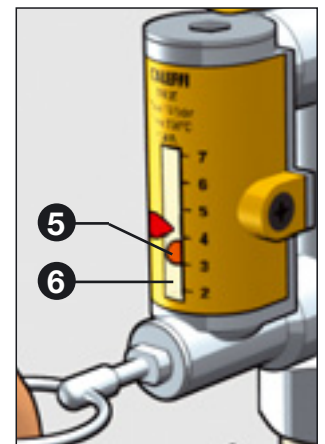
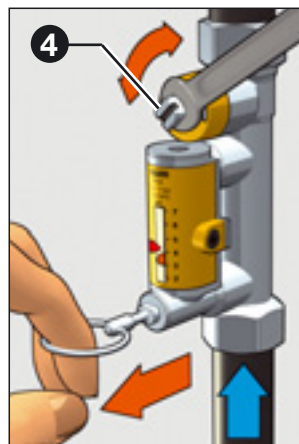
## Flow rate adjustment

The flow rate is adjusted by carrying out the following operations:

- With the aid of the indicator (1), mark the reference flow rate at which the valve has to be set.
- Use the ring (2) to open the obturator that shuts off the flow of medium in the flow meter (3) under normal operating conditions.

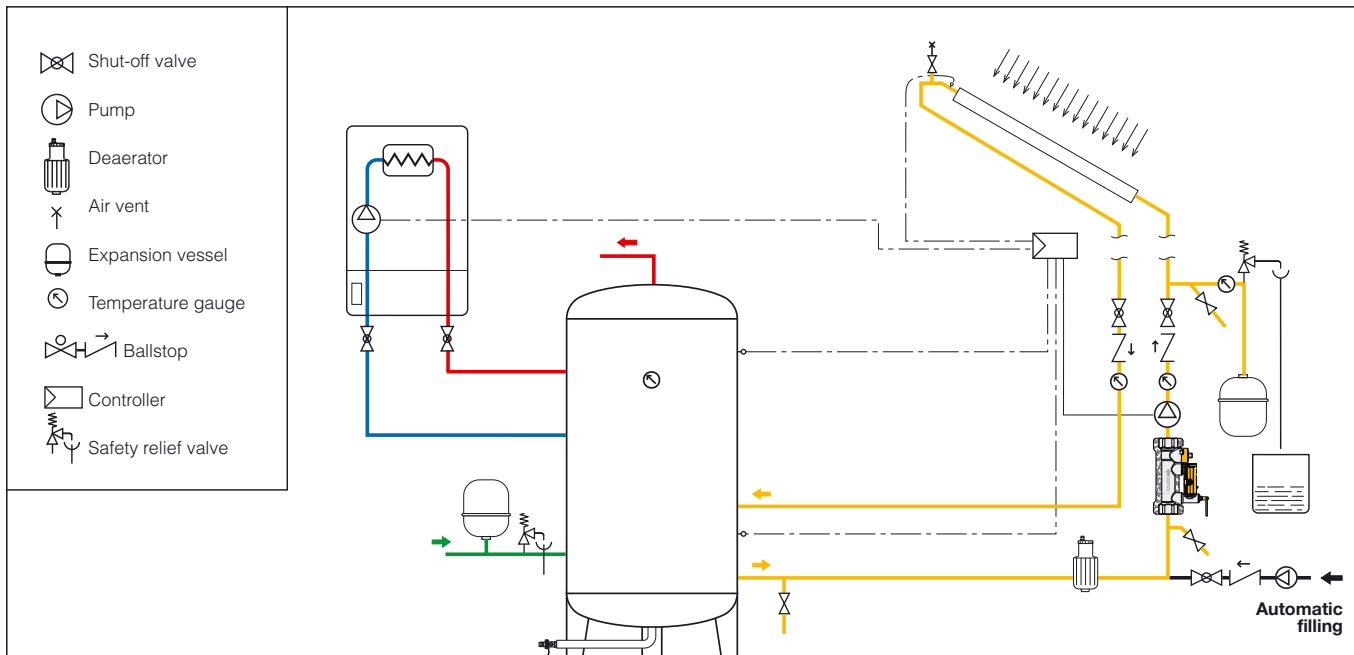


- Keeping the obturator open, apply a wrench on the control stem of the valve (4) to adjust the flow rate. It is indicated by a metal ball (5) that runs inside a transparent guide (6) marked by a graduated scale in l/min.

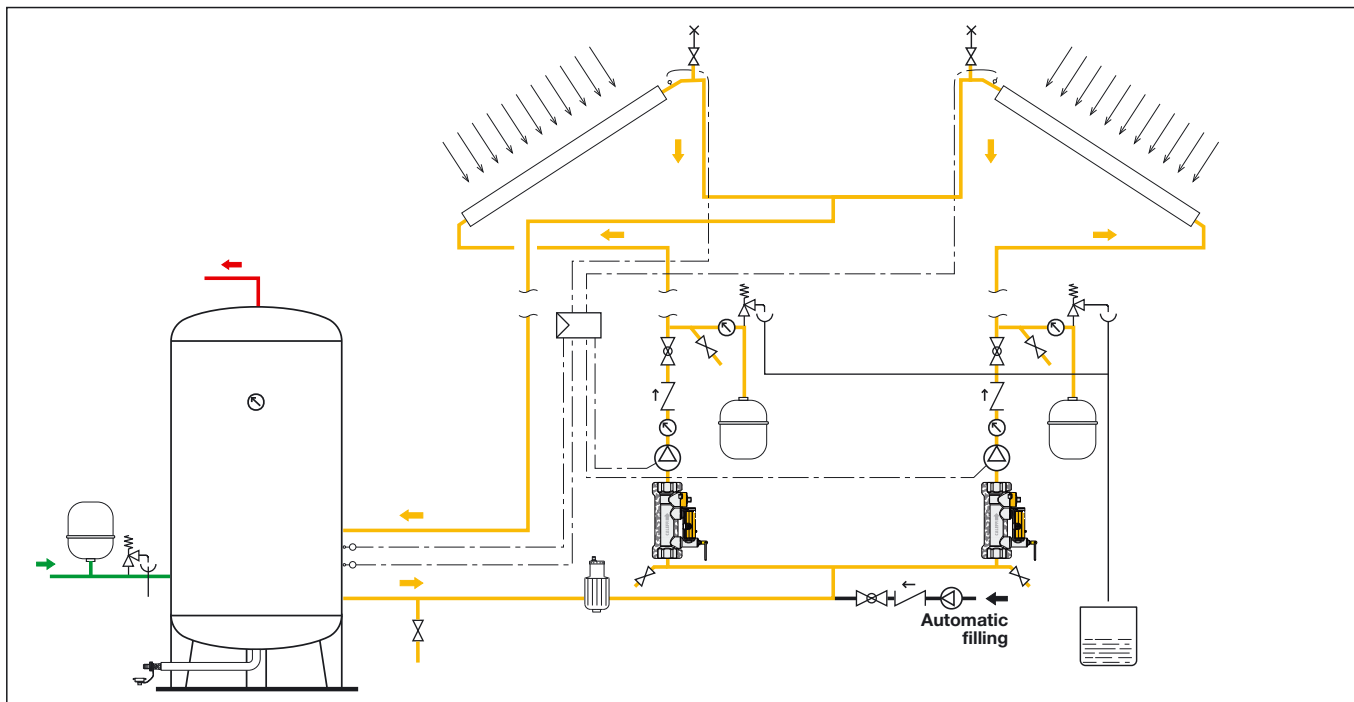


- After completing the balancing, release the ring of the flow meter obturator that, thanks to an internal spring, will automatically go back into the closed position.

**Application diagrams - Flow rate adjustment on a single solar circuit**



**Flow rate adjustment in two or more solar circuits**



**SPECIFICATION SUMMARY**

**258 series**

Balancing valve with flow meter for solar thermal systems. Threaded connections 3/4" (and 1") F x F. Brass body, chrome plated. Brass ball. Brass control stem ball, chrome plated. High resistance elastomer seals. High resistance polymer control stem guide. Brass flow meter body, chrome plated. Brass flow meter headwork. Brass flow meter obturator stem, chrome plated. Stainless steel flow meter spring. High resistance polymer flow meter float. High resistance polymer flow indicator cover. High resistance elastomer seals. Expanded closed cell PE-X pre-formed shell insulation. Medium water and glycol solutions. Maximum percentage of glycol 50%. Maximum working pressure 10 bar. Working temperature range -30-130°C. Flow rate scale unit of measurement l/min. Accuracy ±10%. Control stem angle of rotation 90°.

*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.*

