

# Thermostatic regulator for domestic hot water recirculation circuits



01362/21 EN

replaces 01362/19 EN

## 116 series



### Function

The thermostatic regulator is used for automatic balancing of recirculation circuits in domestic hot water distribution systems, so as to ensure that all parts of the system reach the required temperature.



### Product range

Code 116420	Thermostatic regulator for recirculation circuits	DN 20 (Ø 22)
Code 116450	Thermostatic regulator for recirculation circuits	DN 20 (3/4")
Code 116451	Thermostatic regulator for recirculation circuits with temperature gauge	DN 20 (3/4")
Code 116415	Thermostatic regulator for recirculation circuits	DN 15 (Ø 15)
Code 116440	Thermostatic regulator for recirculation circuits	DN 15 (1/2")
Code 116441	Thermostatic regulator for recirculation circuits with temperature gauge	DN 15 (1/2")

### Technical specifications

#### Materials:

Body: dezincification resistant alloy **CR** EN 12165 CW724R  
 Adjustable cartridge: PSU  
 Springs: stainless steel EN 10270-3 (AISI 302)  
 Hydraulic seals: EPDM  
 Adjustment knob: ABS

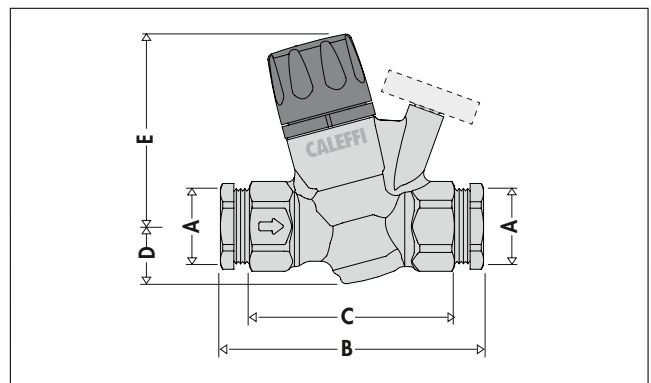
#### Performance:

Medium: drinking water  
 Max. working pressure: 16 bar  
 Max. differential pressure: 1 bar  
 Max. inlet temperature: 90 °C  
 Adjustment temperature range: 40–65 °C  
 Factory setting: 58 °C  
 Kv max (m³/h): 1,8  
 Kv min (m³/h): 0,3 ± 20 %  
 Kv (Δt=5K) (m³/h): 0,6  
 Certification: WRAS, KIWA UK  
 Connections: Ø 15 (DN 15) - Ø 22 (DN 20) (EN 10226-1)  
 1/2" F - 3/4" F (EN 10226-1)  
 Temperature gauge/probe pocket: Ø 10 mm  
 Minimum tightening torque for compression fitting (hard copper): 50 N·m

#### Temperature gauge code 116010

Scale: 0–80 °C  
 Diameter: Ø 40 mm  
 Stem diameter: Ø 9 mm

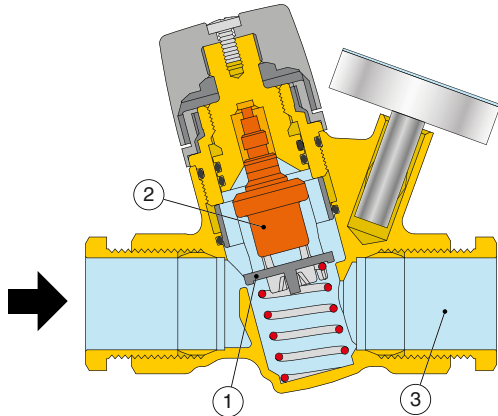
### Dimensions



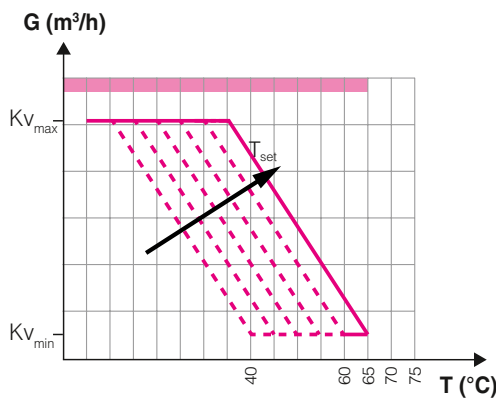
Code	DN	A	B	C	D	E	Mass (kg)
116420	20	Ø22	98	76,5	21,5	74,5	0,509
116450	20	3/4"	—	76,5	21,5	74,5	0,442
116451	20	3/4"	—	76,5	21,5	74,5	0,472
116415	15	Ø15	95,5	66,5	21,5	74,5	0,530
116440	15	1/2"	—	66,5	21,5	74,5	0,425
116441	15	1/2"	—	66,5	21,5	74,5	0,460

## Operating principle

In domestic hot water distribution circuits, it is essential to ensure that all sections are kept at the correct temperature. The recirculation network must be balanced, to avoid non-uniform temperature distribution. The thermostatic regulator, installed on each branch of the recirculation circuit, automatically maintains the set temperature. This device modulates the medium flow rate in accordance with the water inlet temperature by means of the action of a dedicated internal thermostatic cartridge. When the water temperature approaches the set value, the obturator progressively reduces the passage. The medium flow rate supplied by the recirculation pump is thus distributed to the other network branches, resulting in effective automatic thermal balancing.



## Hydraulic characteristics

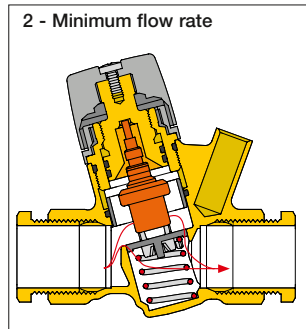
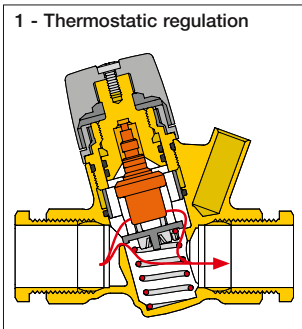


The graph shows the variation of the Kv value depending on the device configuration and on the inlet temperature of the domestic water.

## Function - Temperature control

$$Kv_{max} = 1,8 \text{ m}^3/\text{h}$$

On reaching the set temperature, the obturator (1), governed by the thermostatic sensor (2), modulates the closure of the hot water outlet (3), thereby aiding circulation towards the other connected circuits. If the temperature decreases, there is the opposite action and the passage reopens, so as to ensure that all the branches of the system reach the required temperature. The characteristic curve of the valve is shown in the previous diagram.



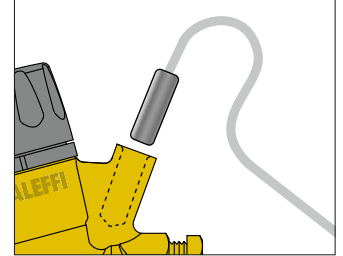
## Construction details

### Alloy CR with very low lead content

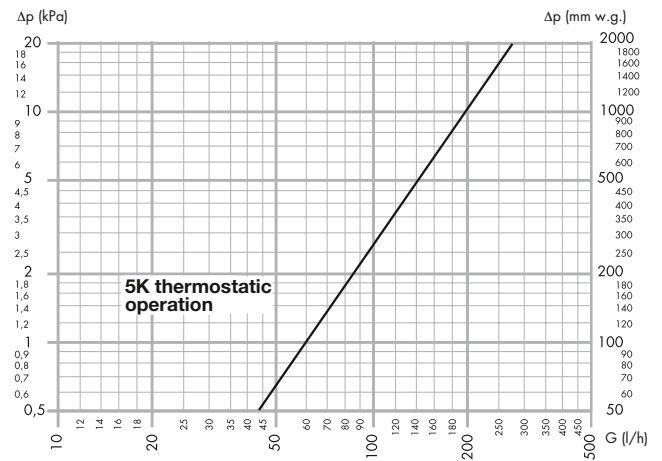
The material used to make the regulator body is perfectly in line with the new normative provision concerning contact with potable water. This is an innovative alloy with very low lead content and dezincification resistant properties.

The regulator can be equipped with a temperature gauge for measuring and controlling the temperature of the hot water in the circuit, code 116010.

The temperature gauge pocket can also be used for inserting a special immersion probe (with  $\varnothing < 10 \text{ mm}$ )



## Medium dynamic characteristics



To choose the recirculation pump head, the head loss at the valve should be added to the head loss in most disadvantaged circuit.

## Example

Recirculation circuit calculated for an average dispersion of  $12 \text{ W/m}$  and a temperature difference of  $2\text{K}$  between the starting point and the most unfavourable delivery point, at the top of a column  $20 \text{ m}$  in height. Thermostatic regulator located at the base of the column.

Flow rate for the column, which therefore passes through the thermostatic regulator.

$$G = 12 \cdot 20 \cdot 0,860/2 = 103 \text{ l/h}$$

Thermostatic regulator setting temperature:

$$T_{reg} = 55 \text{ }^\circ\text{C}.$$

The graph shows the head loss at the valve, in thermostatic operation:  $\Delta p_{reg} = 2,8 \text{ kPa}$ .

From calculations based on the nominal flow rates, the head loss of the most disadvantaged circuit pipes and circuit components, such as storage, mixing valve, valves can be found.

Let us suppose that this value is known:

$$\Delta p_{circuit} = 14 \text{ kPa}$$

Pump head at nominal flow rate:

$$H = \Delta p_{circuit} + \Delta p_{reg} = 14 + 2,8 = 16,8 \text{ kPa}.$$

## System sizing

The thermostatic regulators are used for automatic balancing of the various branches of domestic hot water recirculation circuits, so as to ensure the required temperature in each section and limit heat dispersion. The recirculation circuits are generally sized according to the flow rate required for each branch, based on the allowed heat dispersion and the corresponding decrease in temperature along the pipe. Generally speaking, the maximum allowed temperature drop between the point of departure from the central system and the point of return to the latter is 5 °C. According to the flow rate, determined using the various calculation methods, it is possible to calculate the head loss caused by passage through the thermostatic regulator, using the graphs provided below. The head loss curves are shown with:

- valve in thermostatic operating mode. In this case, reference is made to an average aperture of 5K, between the valve set temperature and the incoming water temperature, bearing in mind the dispersion along the pipe. This value allows the head required for the recirculation pump to be limited. **It is also always necessary to ensure the minimum flow rate required by the mixing valves in the central system.**

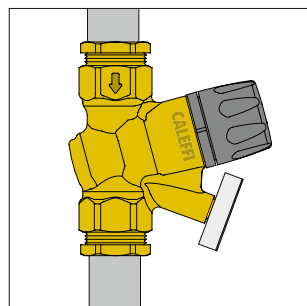
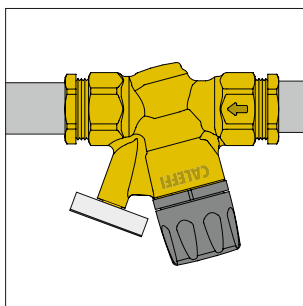
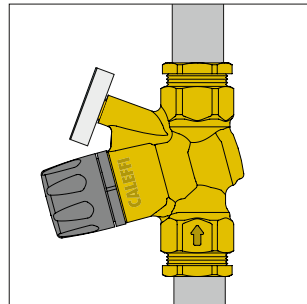
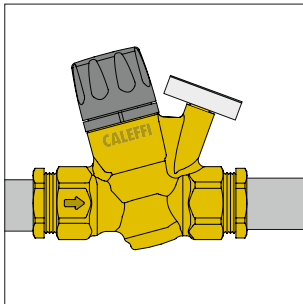
The suggested control range is from 55 °C to 60 °C (according to current standards). Factory setting 58 °C.

## Certification

The thermostatic regulator is approved by the WRAS - KIWA authority in the UK. The thermostatic regulator is made of materials certified for contact with drinking water, for use in the distribution circuits of water for human consumption.

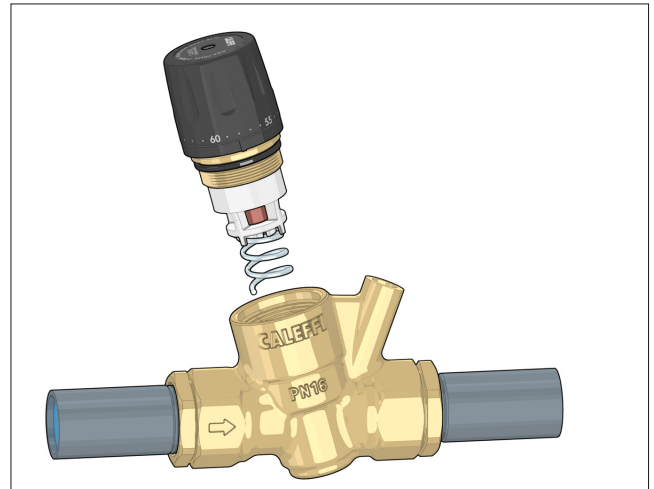
## Installation

Before fitting the thermostatic regulator, the pipes must be flushed to ensure that none of the impurities in circulation will reduce its performance. We recommend always installing strainers of sufficient capacity at the inlet from the water main. The thermostatic regulator can be fitted in any position, vertical or horizontal, by respecting the flow direction indicated by the arrow on the valve body. The thermostatic regulator must be installed according to the diagrams given in this manual. It must be installed in such a way as to allow free access to the device, for checking operation and maintenance.



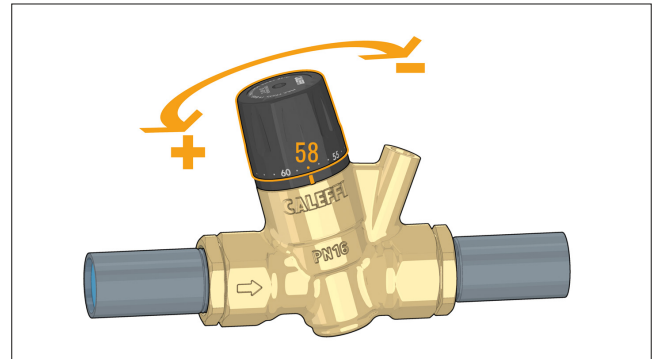
## Maintenance

The adjustment strainer can be removed from the valve body for checking, cleaning or replacement.



## Temperature adjustment

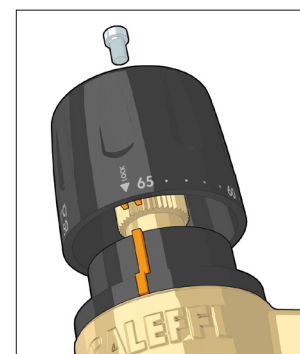
The temperature is set at the desired value by turning the upper screw with the special knob.



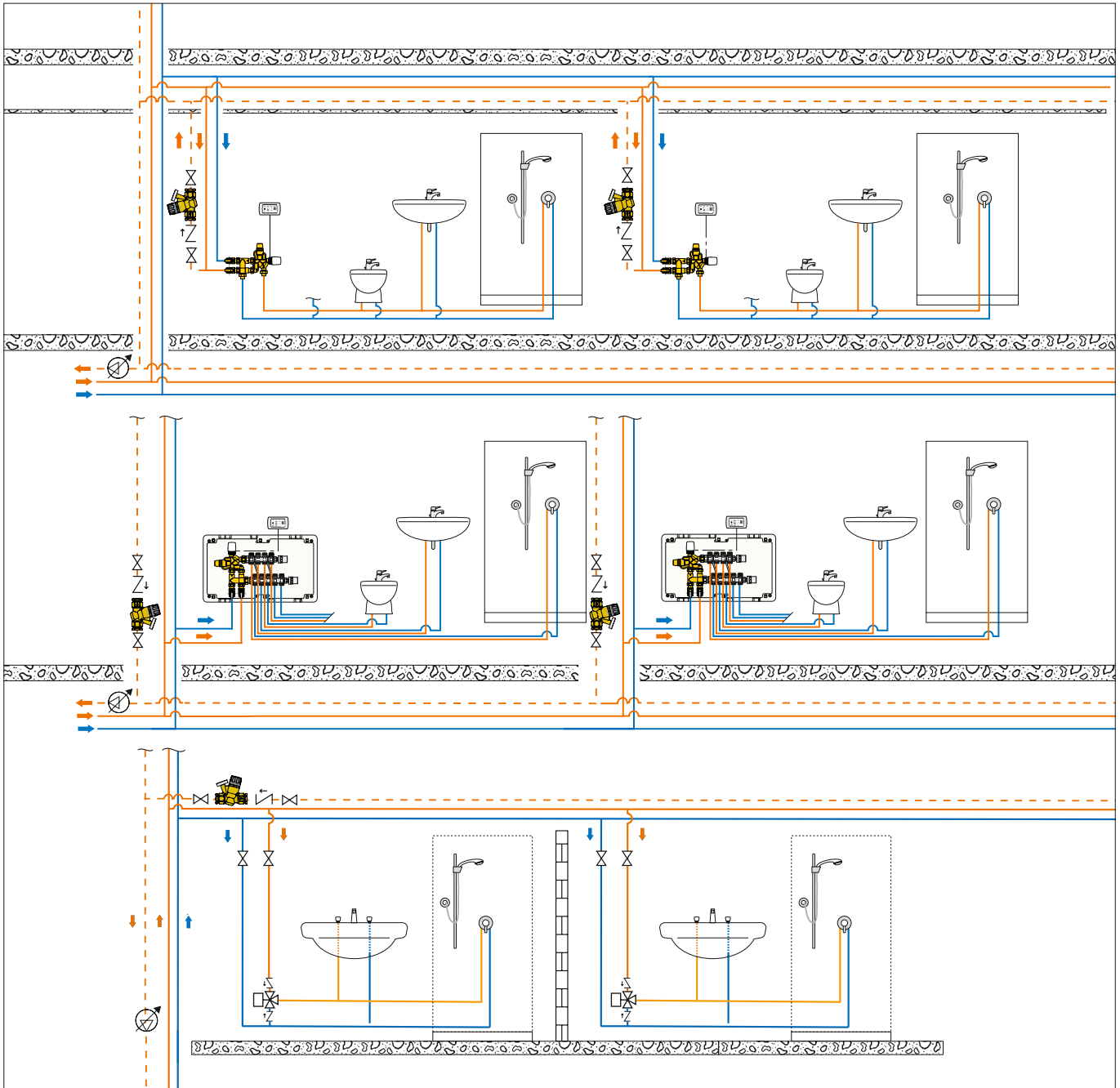
The graduated scale shows the temperatures at which the indicator can be set. It is recommended to set the valve temperature at a value about 5K greater than the water temperature at the valve inlet, taking into account the heat losses along the line, to limit the head required at the recirculation pump. Take care to ensure the minimum flow rate at the mixing valves in the central heating system.

## Adjustment locking

After adjusting the temperature, the setting can be locked at the desired value using the control knob. For this purpose, unscrew the locking screw at the top of the control knob, remove the knob and then put it back on so that the internal reference couples with the protrusion on the knob holder nut. When this block is used, the reference of the indication of the temperature values on the knob is lost. To restore it, completely unscrew the regulating headwork counter-clockwise. Reposition the knob on MAX value. Tighten the locking screw.



## Application diagrams



## SPECIFICATION SUMMARY

### Code 116415 / 116420

Thermostatic regulator for domestic hot water recirculation circuits. Dezincification-resistant “LOW LEAD” alloy body. Size DN 15 or DN 20. Connections  $\varnothing$  15 (DN 15) or  $\varnothing$  22 (DN 20) (EN 10226-1). Adjustable PSU cartridge. EPDM hydraulic seals. Temperature gauge/probe pocket  $\varnothing$  10 mm. Maximum working pressure 16 bar. Maximum differential pressure 1 bar. Adjustment temperature range 40–65°C. Factory setting 58 °C.

### Code 116440 / 116441 / 116450 / 116451

Thermostatic regulator for domestic hot water recirculation circuits. Temperature gauge 0–80 °C (only for code 116441 / 116451). Dezincification-resistant “LOW LEAD” alloy body. Size DN 15 or DN 20. Connections 1/2” F (EN 10226-1) or 3/4” F (EN 10226-1). Adjustable PSU cartridge. EPDM hydraulic seals. Temperature gauge/probe pocket  $\varnothing$  10 mm. Maximum working pressure 16 bar. Maximum differential pressure 1 bar. Adjustment temperature range 40–65 °C. Factory setting 58 °C.

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