

Multi-function compact unit for temperature control, thermal disinfection and distribution for hydraulic and domestic water system

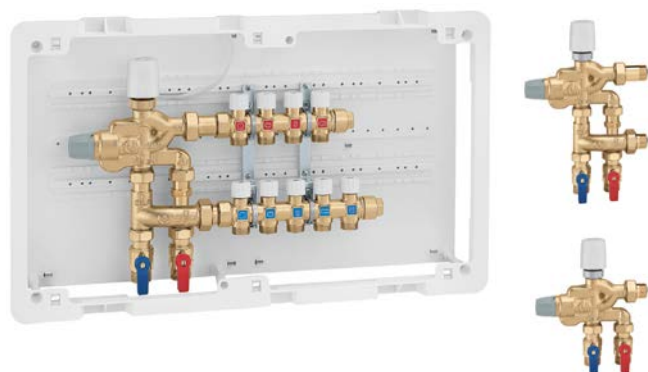
6005 series



01160/19 GB

replaces dp 01160/17 GB

LEGIOFLOW



Function

The multi-function unit is used in hydraulic and domestic water systems to control the hot and cold water delivered to user taps, serving a bathroom or a dwelling.

A high-performance adjustable thermostatic mixing valve keeps the hot water temperature at the desired level and protects the user from the danger of scalding.

A flushing valve is used for thermal disinfection of the circuit all the way to the tap, in compliance with anti-Legionella regulations. The version with a cold water outlet kit is used in domestic systems with a push-button tap or similar, where there is no need to perform additional water mixing at the point of use.

PATENTED



Product range

Code 600500/1 unit with cold water circuit outlet kit	size DN 20 (3/4") M
Code 600530/1 unit with manifolds and box with 3 cold and 2 hot outlets	size DN 20 (3/4") M - outlets 23 p.1,5
Code 600540/1 unit with manifolds and box with 4 cold and 3 hot outlets	size DN 20 (3/4") M - outlets 23 p.1,5
Code 600550/1 unit with manifolds and box with 5 cold and 4 hot outlets	size DN 20 (3/4") M - outlets 23 p.1,5
Code 600502/3 unit without cold water circuit outlet kit	size DN 20 (3/4") M - outlets 23 p.1,5

Codes ending with a 1 and 3 without thermo-electric actuator

Technical specifications

Materials

Mixing valve

Body:	dezincification resistant alloy CR EN 1982 CC770S
Obturator:	PSU
Springs:	stainless steel EN 10270-3 (AISI 302)
Seal elements:	EPDM
Cover:	ABS

Flushing valve

Control stem:	stainless steel EN 10088-3 (AISI 303)
Obturator:	EPDM
Control stem seal:	EPDM
Manual control knob:	ABS

Cold water circuit outlet kit

Body:	dezincification resistant alloy CR EN 1982 CC770S
Check valve:	POM
Retaining spring:	stainless steel EN 10270-3 (AISI 302)

Shut-off valves with strainer

(with check valve only for code 600502/3)

Body:	brass EN 12165 CW617N
Check valve:	POM
Retaining spring:	stainless steel EN 10270-3 (AISI 302)
Strainer:	stainless steel AISI 304
Strainer seal:	EPDM
Control lever:	PA

Thermo-electric actuator

Protective shell:	self-extinguishing polycarbonate
Colour:	white RAL 9010

Manifolds

Body:	dezincification-resistant alloy CR EN 12165 CW602N
Obturator stem:	brass EN 12165 CW614N
Headwork:	brass EN 12164 CW614N
Hydraulic seals:	EPDM
Knob:	PA6GF
Mounting brackets:	galvanised steel

Box

Material:	Impact-resistant PV - anti UV
Colour:	white RAL 9010
Useful dimensions:	560 x 330 mm, depth 80 mm

Performance

Multi-function unit

Medium:	drinking water
Adjustment range:	30–50°C
Factory setting:	43°C
Accuracy:	±2°C
Max. working pressure (static):	10 bar
Max. working pressure (dynamic):	5 bar
Max. inlet temperature:	85°C
Max. inlet pressure ratio (H/C or C/H):	2:1
Min. temperature difference between inlet hot water and outlet mixed water to ensure anti-scald performance:	15°C
Min. flow rate for stable operation:	6 l/min
Performance to standards:	NF 079 doc. 8, EN 1111, EN 1287
Connections:	inlet 3/4" M (ISO 228-1) and outlet 3/4" M (ISO 228-1) with union

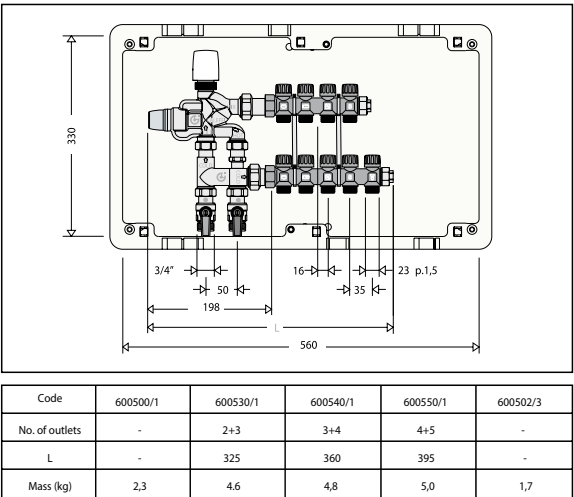
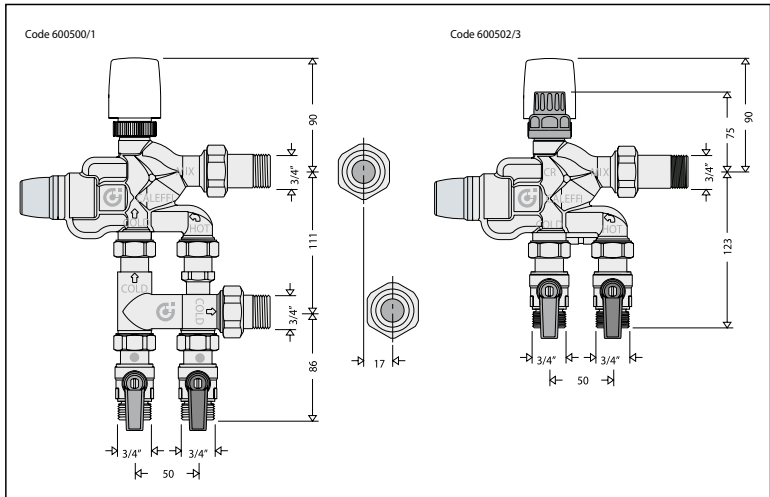
Thermo-electric actuator

Normally closed	
Electric supply:	230 V (ac)
Starting current:	≤ 1 A
Running current:	13 mA
Power consumption:	3 W
Protection class:	IP 44 (in vertical position)
Double insulation construction:	CE
Max. ambient temperature:	50°C
Operating time for start of flushing:	210 s
Electric supply cable length:	80 cm

Manifolds

Medium:	drinking water
Max. working pressure:	10 bar
Working temperature range:	5–100°C
Main connections:	3/4" F (ISO 228-1) x 3/4" M (ISO 228-1)
Outlet connections:	23 p.1,5 Ø 18
Outlet centre distance:	35 mm

Dimensions



Codes ending with a 1 and 3 without thermo-electric actuator

Legionella-scalding risk

In systems that produce hot water with storage for domestic purposes, in order to prevent the proliferation of dangerous 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. At this temperature, however, the water cannot be used directly.

As shown in the diagram and table provided, 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. On average, these times are halved for children and elderly people.

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

- reduce the temperature at the point of use to a value lower than that of the storage and make it suitable for sanitary use.
- keep the temperature constant in spite of variations in pressure and temperature at the inlet.
- prevent the water temperature at the outlet from reaching values above 50°C.
- offer an anti-scald safety function in the event of cold water supply failure at the inlet.

Thermal disinfection

To be more certain that there is no growth of Legionella, all sections of the network must be subjected to thermal disinfection. Even in the section downstream of the mixing valve, as far as the user tap, it must be possible to flush the system at temperatures exceeding 60°C. This means by-passing the thermostatic mixer valve, which is set at lower values, and activating another valve that allows the taps to be fed directly with the hot water from the distribution network.

Reference documents

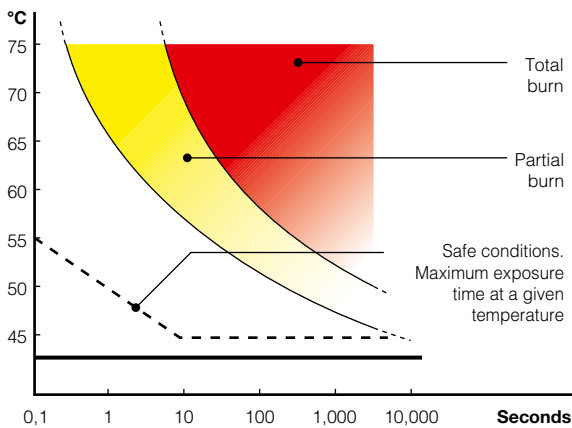
With regard to the prevention and control of Legionella, see the National Regulations and applicable Code of Practice.

1. "Guidelines for the prevention and control of Legionnaires' disease set out by the Ministry of Health and adopted by the Conference of State and Regional Authorities on 04/04/2000". Published in the Gazzetta Ufficiale (Official Gazette) No. 103 dated 5th May 2000.
2. "Guidelines giving information on Legionnaire's disease for managers of tourist, hospitality and spa facilities", Provisions dated 13th January 2005. Published in the Gazzetta Ufficiale (Official Gazette) No. 51 dated 3rd March 2005.
3. "Guidelines giving information for laboratories providing microbiological diagnosis and environmental controls for Legionella", Provisions dated 13th January 2005. Published in the Gazzetta Ufficiale (Official Gazette) No. 51 dated 3 March 2005.
4. "Guidelines for the prevention and control of Legionnaire's disease", Approved during the Conference of State and Regional Authorities in the session of 7th May 2015 - Italy

Applications

The temperature control and thermal disinfection unit is typically used in systems serving hospitals, nursing homes, sports and shopping centres, hotels, campsites and colleges. In these structures with their collective use, it is more than ever necessary to control and prevent legionnaire's disease in a programmed manner, allowing thermal disinfection to be carried out right up to the user tap if necessary.

Temperature - Exposure time

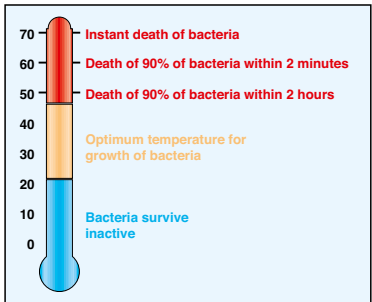


Exposure time to cause partial burns

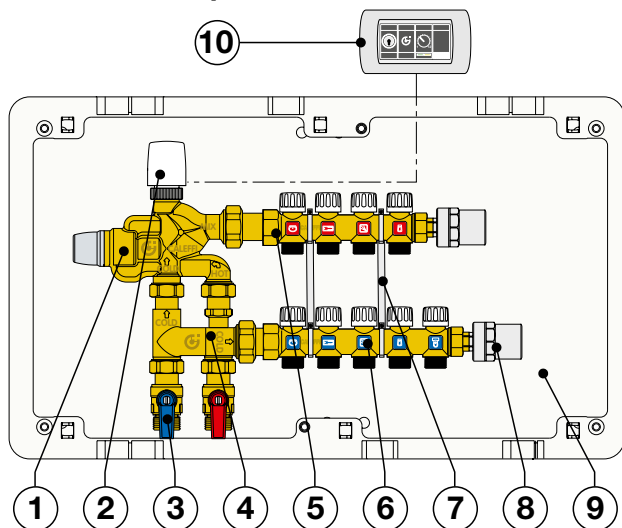
Temperature	Adults	Children 0-5 years
70°C	1 s	--
65°C	2 s	0,5 s
60°C	5 s	1 s
55°C	30 s	10 s
50°C	5 min	2,5 min

Thermal disinfection

The adjacent diagram shows the behaviour of *Legionella Pneumophila* bacteria as the temperature conditions of the water containing the bacteria vary. To ensure correct thermal disinfection, it is necessary to go up to values of at least 60°C.



Characteristic components

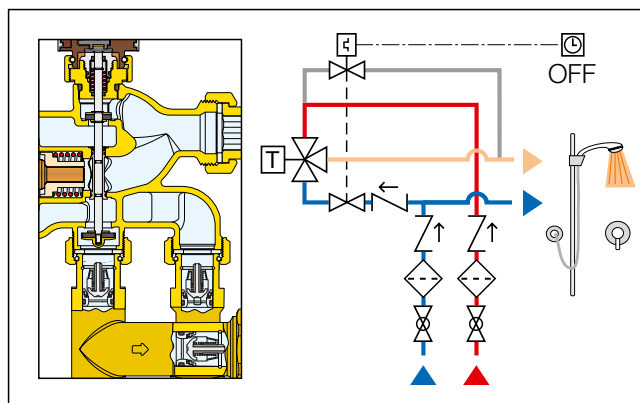


1. Anti-scald thermostatic mixing valve, adjustable with tamper-proof block for the temperature setting
2. Automatic flushing valve for thermal disinfection, for mixing valve by-pass and simultaneous cold water inlet shut-off
3. Ball shut-off valves with built-in strainers at the cold and hot water inlets (for codes 600502/03, valves complete with built-in check valves)
4. Cold water circuit outlet kit (not featured on codes 600502/03) and built-in check valves
5. Distribution manifold with built-in shut-off valves with control knob for hot water circuit
6. Distribution manifold with built-in shut-off valves with control knob for cold water circuit (not featured on codes 600502/03)
7. Stainless steel brackets
8. Water hammer arrester 525 series (accessory)
9. Ventilated plastic box
10. Timer with programmable key code 600200 (accessory)

Hydraulic diagram

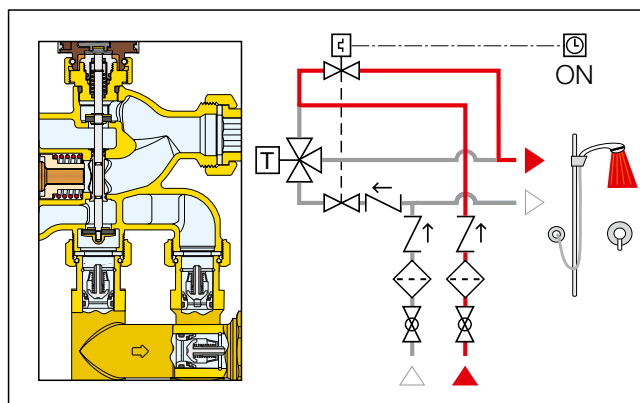
Operation with mixing

- Flushing valve closed
- Cold water valve open



Operation with thermal disinfection

- Flushing valve open
- Cold water valve closed



Thermal disinfection

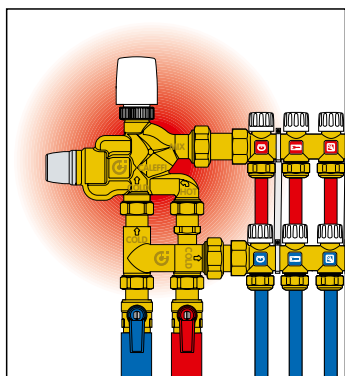
The temperatures and corresponding times for disinfection of the system must be selected according to the type of installation and its intended use. To meet the requirements of the most recent world legislation on this matter, the following criteria can generally be followed:

- T = 70°C for 10 minutes
- T = 65°C for 15 minutes
- T = 60°C for 30 minutes

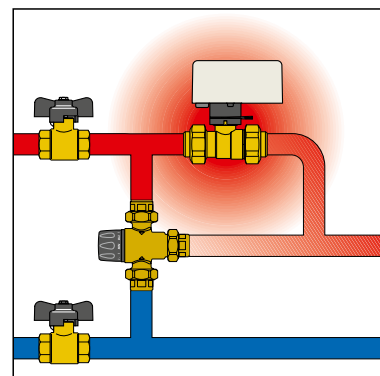
After turning the flow valve control switch on (approx. 210 s), the user cocks must be opened to carry out thermal disinfection using the hot water from the distribution network.

The tap opening times and their disinfection frequency will depend on how the system is run and on applicable regulations.

During thermal disinfection flushing, the high temperature hot water heats the monoblock body of the multifunction unit completely. In this way, even the body of the mixing valve itself is completely disinfected, making sure that there are no areas that remain at lower temperatures, where there would be a risk of Legionella formation.



This risk can exist in a traditional system consisting of a mixer and a flushing valve connected by pipe. Part of the mixing valve, as it is always in contact with the cold water, remains at a temperature that does not give the certainty of complete disinfection of all its parts.



Operating principle

Mixing valve

The thermostatic mixing valve mixes the hot and cold water at the inlet so as to maintain the mixed water constantly at the set temperature at the outlet. A thermostatic element (1) is fully immersed in the mixed water flow (2). It contracts or expands, moving an obturator (3) which controls the passage of hot or cold water at the inlet. If the inlet temperature or pressure changes, the internal element automatically reacts to restore the set temperature at the outlet.

Flushing valve

The flushing valve, which can be activated manually or automatically using a thermo-electric actuator, allows the hot water to pass directly to the unit outlet. Using the control stem (4) with double obturator (5), it opens the by-pass on the hot water inlet to the mixing valve, and at the same time intercepts the cold water inlet.

This prevents any mixing of hot and cold water during the flushing operation, with the taps open, as this would reduce the temperature of the water sent to perform thermal disinfection.

Construction details

Monoblock unit

The valve body, containing the temperature regulating and by-pass components, is made out of a single casting with connections to the hot water inlet, the cold water inlet and the mixed water outlet. A specific internal channel carries the hot water to the mixer inlet and to the flushing valve, making it possible for the unit to be smaller in size and easily connectable.

Anti-scale materials

The materials used in constructing the mixing valve were selected to eliminate seizing due to limescale deposits. All functional parts have been made using a special anti-scale material with low friction coefficient, which ensures over time performance.

Anti-scald safety function

As a safety measure, in case of failure of the cold water supply at the inlet, the valve immediately shuts off the flow of the hot water. This prevents dangerous burns. This performance is guaranteed if there is a minimum temperature difference between the inlet hot water and the outlet mixed water of 15°C (performance in compliance with French standards NF 079 Doc 8). Also in case of failure of the hot water supply, the valve shuts off the cold water port and thus the outlet mixed water to prevent dangerous thermal shocks.

Control stem

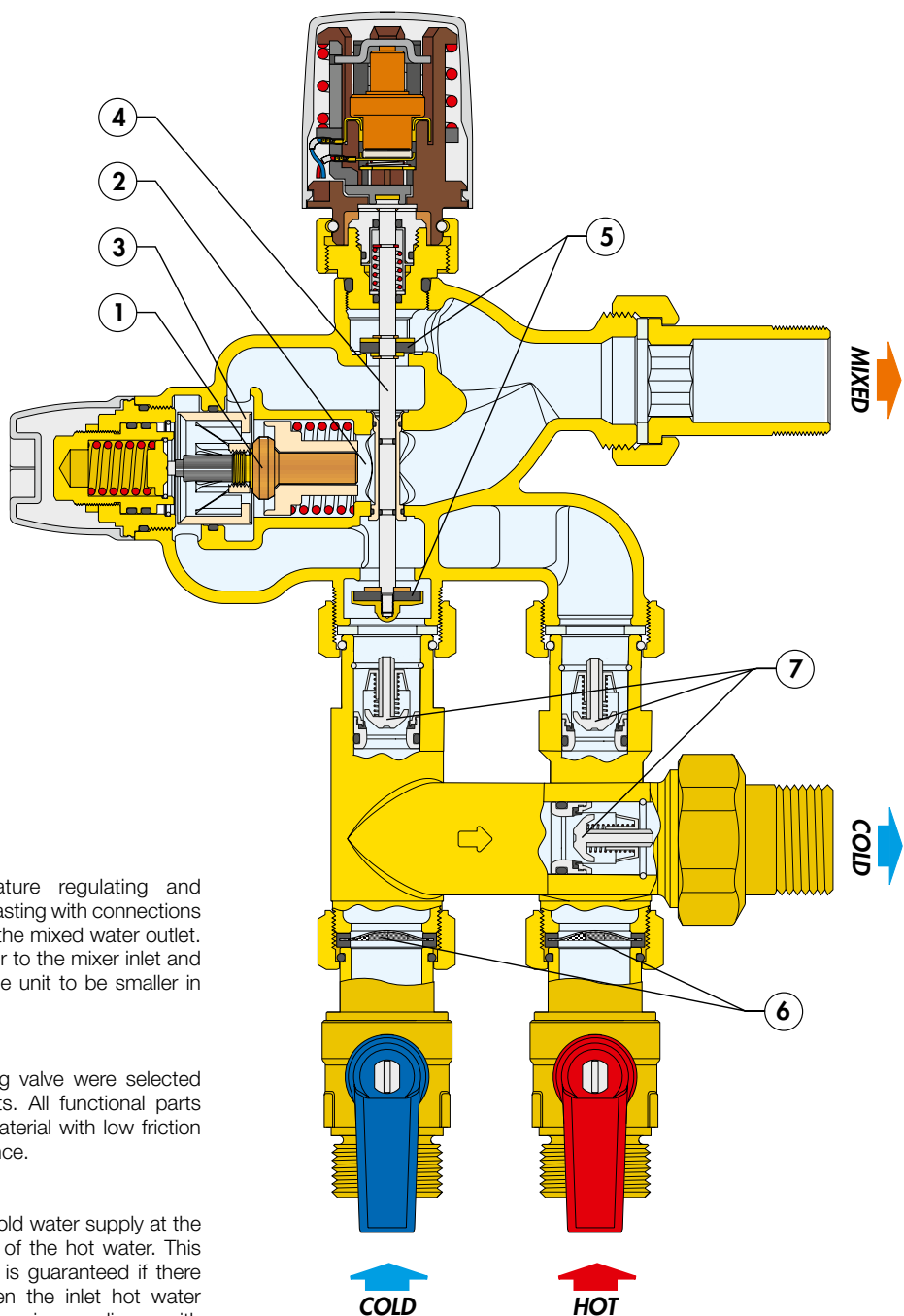
The flushing valve control stem (4) is made of stainless steel with a double EPDM O-ring seal (5). In this way the upper portion of the headwork can be replaced even with the system running.

Shut-off valves

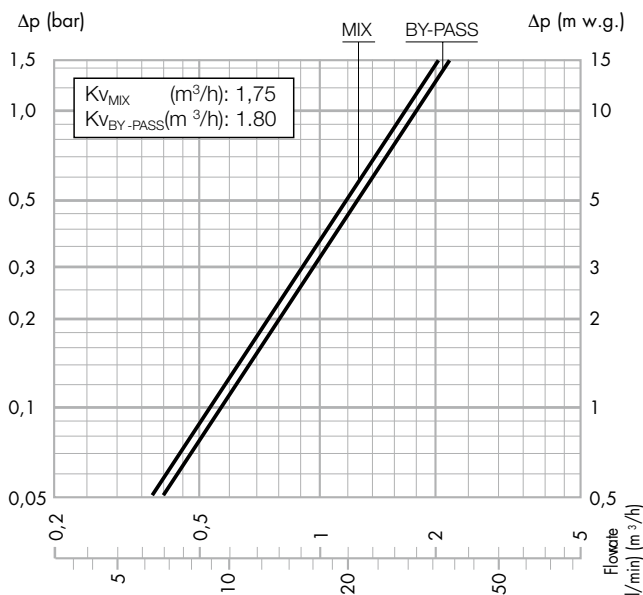
The hot and cold water inlet shut-off valves are fitted with stainless steel strainers (6) with EPDM seals (for codes 600502/03, valves complete with built-in check valves).

Check valve

Check valves (7) are fitted at the hot and cold water inlets.



Hydraulic characteristics



Utilisation

In view of its flow characteristics, the unit with thermostatic mixing valves can be used for application with a limited number of users, for example a bathroom.

For this reason, the flow rate passing through the mixing valve is generally the same passing through the end user outlet, for example the washbasin tap, shower, bidet, etc. To ensure optimal performance, a minimum flow rate of 6 l/min must be guaranteed to the mixing valve. The system must always be sized taking into account current legislation regarding the nominal flow rate for each user.

Public buildings, hospitals, kindergartens

In this type of application, the risk of scalding is extremely high because of the type of people using the hot water, like children, old people and invalids. In these installations, the two supply networks providing hot water from the boiler and cold water may have different origins and operate at different pressures. In the event of cold water supply failure, the mixing valve is able to shut off immediately the water outlet in order to prevent the risk of scalding.

Head loss check in the mixing valve

If the design flow rate is known, taking into account simultaneous use of the sanitary appliances, the head loss produced by the mixing valve is checked using the graph provided.

It is necessary to check the available pressure, the loss of head in the system downstream of the mixer and the residual pressure to be guaranteed to user appliances.

Installation

Before installing the unit with the mixing valve, the pipes must be washed out to ensure that no impurities in circulation will impair its performance.

We recommend always installing strainers of sufficient capacity at the inlet from the water main.

The mixer valve unit is fitted with shut-off valves with strainers on the hot and cold water inlets.

The mixing valve unit must be fitted according to the installation diagram provided on the instruction sheet or in this folder.

The unit can be installed in any position, vertical or horizontal.

The following indications are on the valve body:

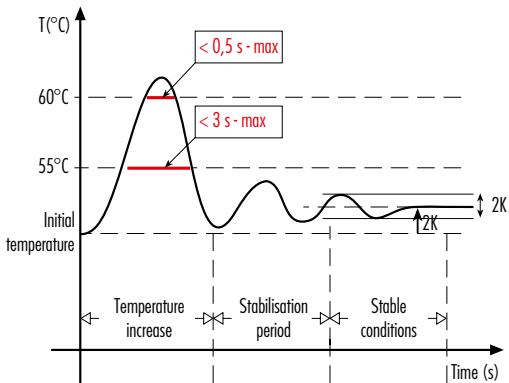
- hot water inlet, indicated by the word "Hot"
- cold water inlet, indicated by the word "Cold"
- mixed water outlet, indicated by the word "MIX".

Check valves

In systems with thermostatic mixing valves, check valves must be installed to prevent undesired backflow. The unit with mixer is equipped with built-in check valves.

Thermal transients

During the transient, as a consequence of rapid changes in pressure, temperature or flow rate, the temperature increases with respect to the initial set point and this increase must be of limited duration to guarantee safety.



Commissioning

In view of the special applications of the thermostatic mixing valve, it must be commissioned in accordance with current regulations by qualified technicians, using appropriate temperature measurement equipment. We recommend using a digital temperature gauge for measuring the mixed water temperature.

Recommended temperatures

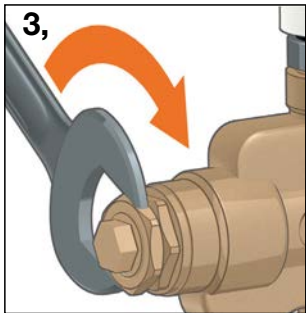
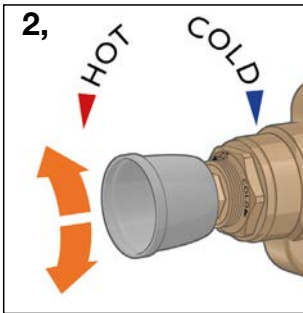
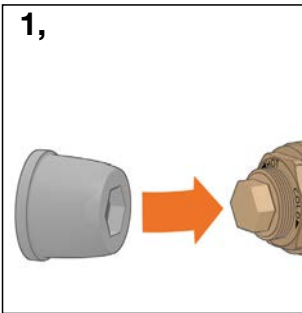
Given the specific use of this type of mixing valve, the following table lists the maximum tap water temperatures to prevent scalding.

Appliance	Tmax
Bidet	38°C
Shower/Washbasin	41°C
Bath	44°C

Temperature adjustment

The temperature is set at the desired value using the regulator screw. Temperature adjustment can then be locked by means of the tamper-proof locking nut.

1. Using the cover for temperature adjustment.
2. Temperature adjustment.
3. Adjustment locking using the locking nut.

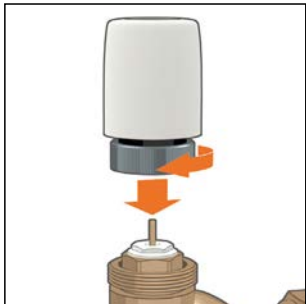
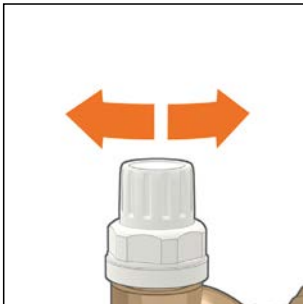


Manual opening

The flushing valve can be activated manually by means of the knob provided.

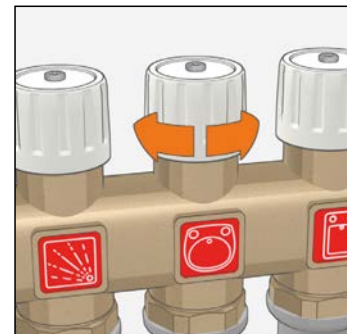
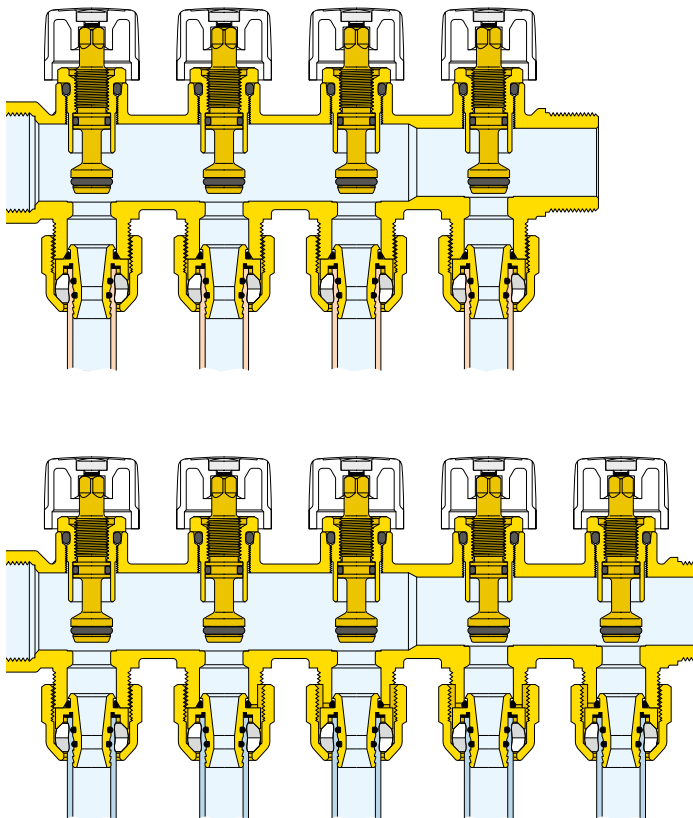
Thermo-electric actuator

The operating knob can be removed, by unscrewing the locking nut, and replaced by a thermo-electric actuator. This allows automatic operation of the valve, controlled by a suitable switch or timer.

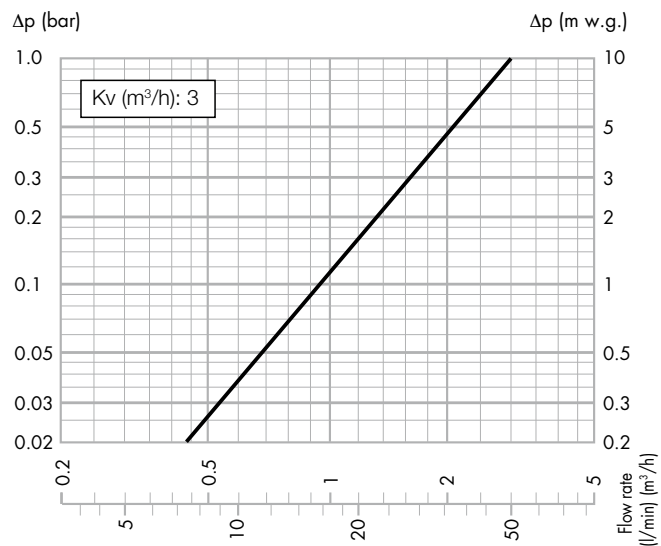


Manifolds

The hot and cold water distribution manifolds are fitted with shut-off valves with operating knobs for each circuit and identification tags for each of the appliances served. This creates balanced distribution of the water to the various user outlets, and enables the circuit supplying each individual appliance to be shut in order to carry out any maintenance.



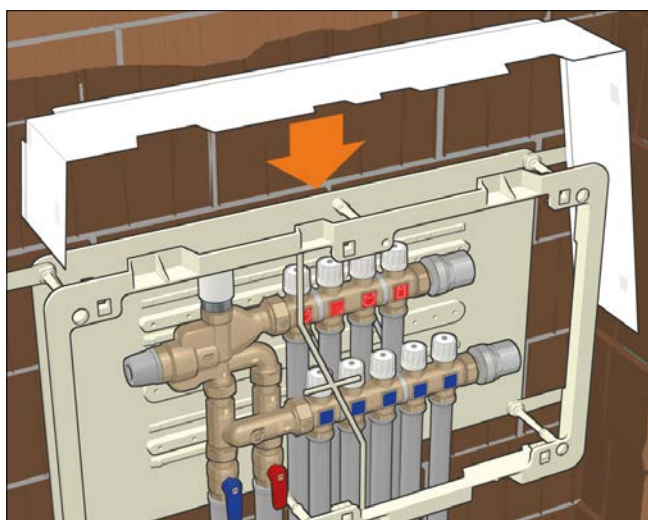
Hydraulic characteristics of outlet



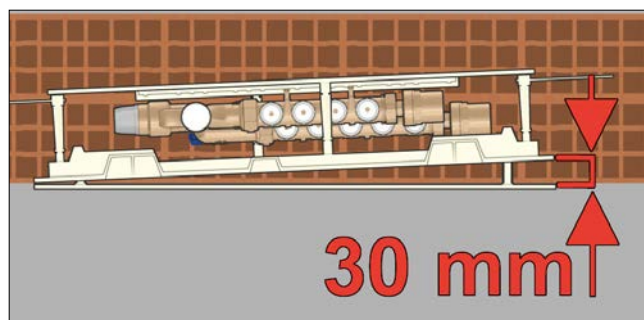
Manifold inner diameter: 20 mm

Box

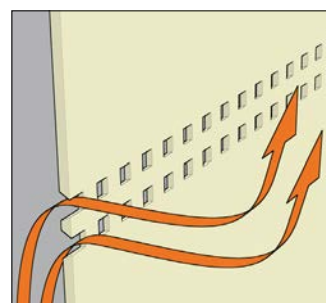
The box is supplied with protective elements to be placed at the sides where there are no pipes, to prevent mortar from falling inside and making the components dirty during the sealing process. The protective element should be applied to both narrow and wide sides, depending on whether the box has been installed horizontally or vertically.



The cover allows recovery of 30 mm depth, caused by possible errors in wall finishing.

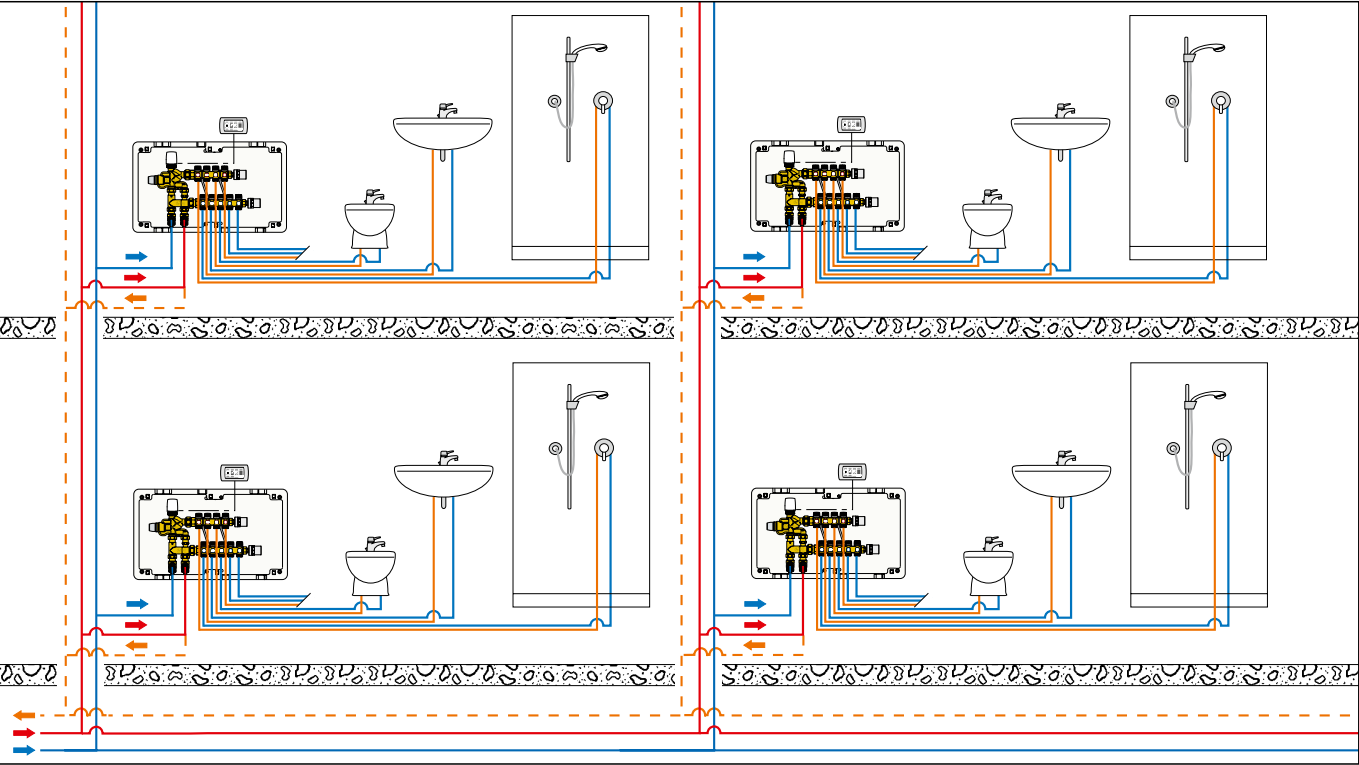


The particular shape of the ventilation holes in the cover give the air flowing out a speed and direction that ensure it will flow away from the cover itself quickly. This prevents the formation of unattractive stains on the wall.

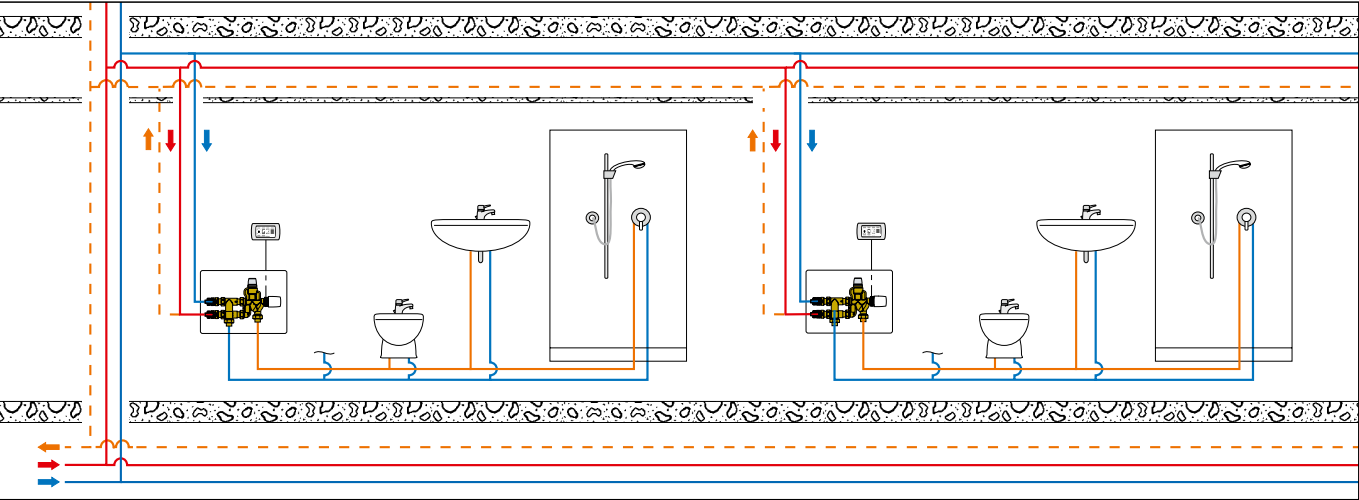


Application diagrams

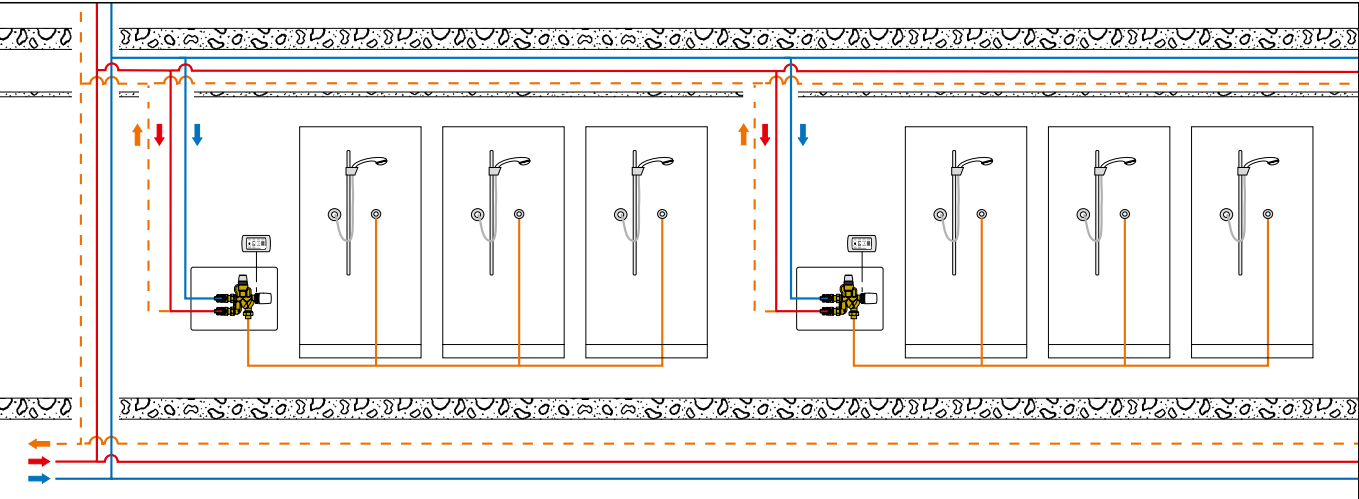
Unit with cold water outlet kit and manifolds



Unit with cold water outlet kit



Unit without cold water outlet kit



Accessories

6002



Timer with programmable key, settings from 0,25 to 15 minutes
To operate the valves used to carry out thermal disinfection of circuit sections, up to the outlet taps.
Electric supply: 230 V (ac).

Code

600200

525 ANTISHOCK

broch. 01020



Water hammer arrester.
Brass body. Chrome plated.
Max. working pressure: 10 bar.
Max. working temperature: 90°C.
PTFE seal on thread.



Code

525040 1/2"



3642

End fitting.

Code

364254 3/4" M x 1/2" F



3641

Plug

Code

364150 3/4" M



5991

End fitting.

Code

599154 3/4" F x 1/2" F



5993

Plug

Code

599350 3/4" F

SPECIFICATION SUMMARY

6005 series

Multi-function compact unit for temperature control, thermal disinfection with thermo-electric actuator code 600500. Without thermo-electric actuator code 600501. Multi-function compact unit for temperature control, thermal disinfection and distribution for hydraulic and domestic water system, pre-assembled in box with thermo-electric actuator (codes 600530 - 600540 - 600550). Without thermo-electric actuator (code 600531 - 600541 - 600551). Multi-function compact unit for temperature control, thermal disinfection without cold water circuit outlet kit, with thermo-electric actuator code 600502. Without thermo-electric actuator code 600503.

Composed of:

Multi-function monoblock unit with anti-scald thermostatic mixing valve and flushing valve for thermal disinfection of the circuit. Complete with shut-off valves, inspectable strainers and check valves at the hot and cold water inlets. Read for direct coupling to the distribution manifolds. With cold water circuit outlet kit (only code 600500/30/40/50). Size DN20. Inlet connections 3/4" M (ISO 228-1), outlet 3/4" M (ISO 228-1) with union. Dezincification resistant alloy body. Medium drinking water.

Anti-scald thermostatic mixing valve, with performance levels in compliance with standard NF 079 doc.08, EN 1111 and EN 1287. Equipped with tamper-proof temperature setting lock. PSU obturator. Stainless steel springs. EPDM seal elements. ABS cover. Maximum inlet temperature 85°C. Adjustment range from 30°C to 50°C. Accuracy $\pm 2^\circ\text{C}$. Maximum working pressure (static) 10 bar. Maximum working pressure (dynamic) 5 bar. Maximum inlet pressure ratio (H/C or C/H) 2:1 Flushing valve for mixing valve control by-pass and simultaneous cold water inlet shut-off, manual or automatic with thermo-electric actuator. Stainless steel control rod with double obturator in EPDM. Control stem seal with double EPDM O-Ring seal. Manual control knob in ABS. Shut-off valves and outlet kit with brass body. Inspectable stainless steel strainers with EPDM seal. Check valves with POM body and obturator and stainless steel spring.

Thermo-electric actuator. Normally closed. Electric supply 230 V (ac). Running power consumption 3 W. Starting current ≤ 1 A. Maintenance current 13 mA. Protection class IP 44 (in vertical position). Maximum ambient temperature 50°C. Operating time for start of flushing 210 seconds. Length of supply cable 80 cm.

Hot and cold water distribution manifolds fitted with shut-off valves with operating knobs for each circuit and identification labels for each of the appliances served. With 2+3 hot and cold water outlets (or 3+4 or 4+5). Size DN 20. Main connections 3/4" F (ISO 228-1), outlet connections 23 p. 1,5 mm. Centre distance 35 mm. Brass manifold body. Brass rod and headwork. EPDM hydraulic seals. Maximum working pressure 10 bar. Temperature range 5–100°C. PA6GF knob. Mounting brackets in galvanised steel.

Ventilated box. White RAL 9010. Useful dimensions 560 x 330 mm, depth 80 mm.

Code 525040

Water hammer arrester. Size DN 15. Threaded connections 1/2" M (ISO 228-1). Brass body. Chrome plated. Very high resistance polymer piston. Carbon steel spring. EPDM seals with anti-extrusion rings. Maximum working temperature 90°C. Maximum working pressure 10 bar. Maximum water hammer pressure: 50 bar.

Code 600200

Timer with programmable key, settings from 0,25 to 15 minutes. To operate the valves used to carry out thermal disinfection. Electric supply 230 V (ac).

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.