

Thermostatic regulating unit for heating systems

166 series



01238/17 GB
replaces dp 01238/15 GB



Function

The thermostatic regulating unit performs the function of **keeping the flow temperature constant, at the set value, for the medium** distributed in a low temperature system for underfloor radiant panels or radiator system.

Complete with high-efficiency pump, thermostatic three-way mixing valve with built-in temperature sensor, flow and return temperature gauges, secondary circuit shut-off valves and pre-formed shell insulation.

The unit is reversible: in fact, the flow direction can be inverted from right to left, depending on installation requirements.

This unit can be coupled to the 559 series SEPCOLL separator/distribution manifold with 125 mm centre distance connections.

The differential by-pass valve (code 519006), safety thermostat (code 165004) and mounting bracket (code 165001) are optional.



Product range

Code 166600A2L	Thermostatic regulating unit. With UPM3 Auto L 25-70 pump. Centre distance 125 mm. Working temperature range 25–50°C	_____ size DN 25 (1")
Code 166605A2L	Thermostatic regulating unit. With UPM3 Auto L 25-70 pump. Centre distance 125 mm. Working temperature range 40–70°C	_____ size DN 25 (1")
Code 166601UPM	Thermostatic regulating unit. With UPML 25-95 pump. Centre distance 125 mm. Working temperature range 25–50°C	_____ size DN 25 (1")

Technical specifications

Materials

Thermostatic three-way valve

Body:	brass EN 1982 CB753S
Obturator:	PSU
Springs:	stainless steel EN 10270-3 (AISI 302)
Seals:	EPDM

Connection pipes

Material:	steel Fe 360
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Check valve

Body:	brass EN 12164 CW614N
Obturator:	PPAG40

Shut-off valves

Body:	brass EN 12165 CW617N
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Performance

Medium:	water, glycol solutions
Max. percentage of glycol:	30%
Maximum working pressure:	1000 kPa (10 bar)
Minimum working pressure:	80 kPa (0,8 bar)
Adjustment temperature range:	25–50°C
	40–70°C (code 166605A2L)
Adjustment accuracy:	±2°C
Maximum primary inlet temperature:	100°C
Connections:	- system side: 1" F (ISO 228-1)
	- boiler side: 1 1/2" M (ISO 228-1)
	- connection centre distance: 125 mm

Insulation

Material:	EPP
Average thickness:	30 mm
Density:	45 kg/m ³

Working temperature range:	-5–120°C
Thermal conductivity:	0,037 W/(m·K) at 10°C
Reaction to fire (UL94):	class HBF

Pump

High-efficiency pump: models:	UPM3 Auto L 25-70
	UPML 25-95 (code 166601 UPM)

Body:	cast iron GG 15/20
Electric supply:	230 V - 50/60 Hz
Max. ambient humidity:	95%
Max. ambient temperature:	UPM3 Auto L 25-70: 70°C
	UPML 25-95: 55°C

Protection class:	UPM3 Auto L 25-70: IP 44
	UPML 25-95: IPX2D

Pump centre distance:	130 mm
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Pump connections:	1 1/2" (ISO 228-1) with nut
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Temperature gauges

Double scale:	0–80°C (32–176°F)
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Safety thermostat kit code 165004 (optional)

Setting temperature:	55°C
Protection class:	IP 65
Contact rating:	10 A/ 240 V

Differential by-pass code 519006 (optional)

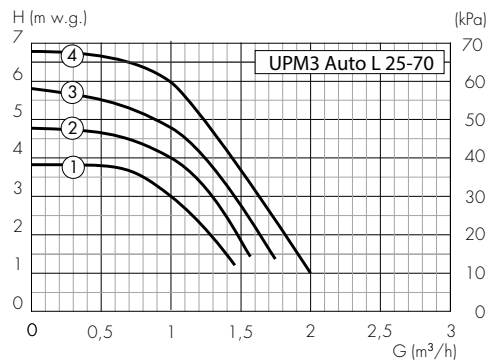
Body:	brass EN 1982 CB753S
Obturator:	EPDM
Spring:	stainless steel EN 10270-3 (AISI 302)
Seals:	EPDM
Maximum working pressure:	10 bar
Maximum working temperature:	100°C
By-pass setting range:	2–30 kPa (0,2–3 m w.g.)
Connections:	1" M x 1" M (ISO 228-1)

Mounting bracket code 165001 (optional)

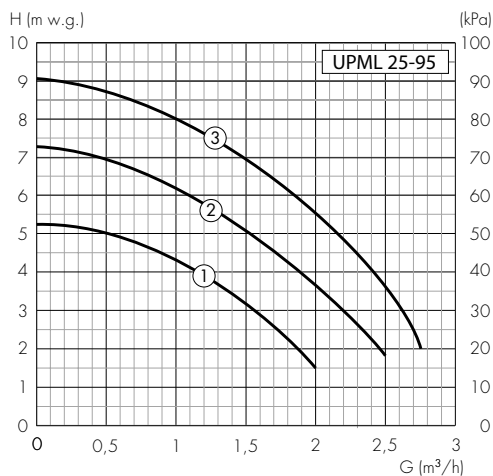
Material:	stainless steel
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Head available at the regulating unit connections

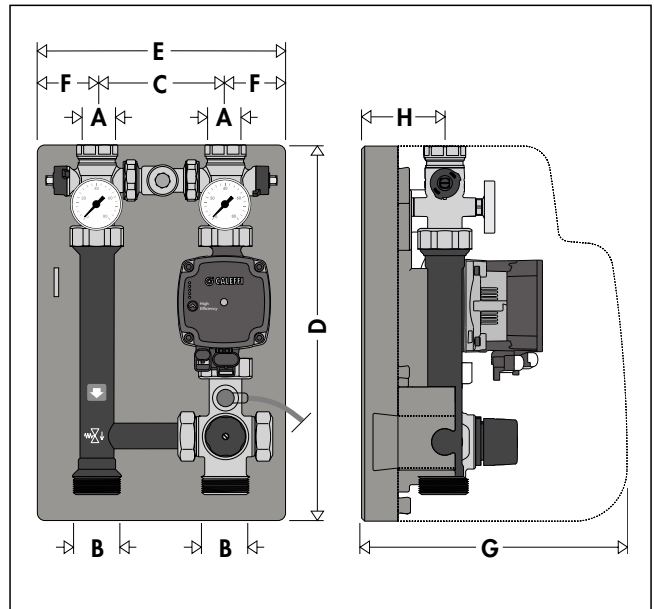
Test performed with constant speed control



Test performed with constant pressure control



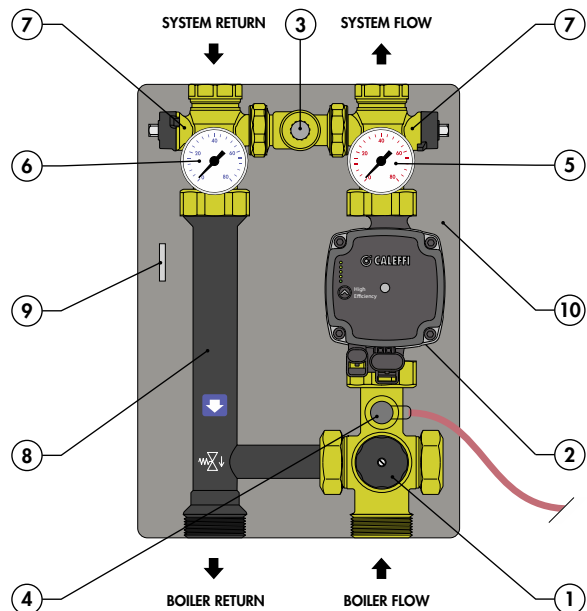
Dimensions



Code	A	B	C	D	E	F	G	H	Mass (kg)
16660.A2L	1"	1 1/2"	125	360	250	62,5	255	80	7,1
166601UPM	1"	1 1/2"	125	360	250	62,5	255	80	9,0

Note:

The pumps can operate with constant speed control (UPM3 only), constant or proportional pressure control, which adapts the performance to system requirements. For further details, see the installation instruction sheet of the pump supplied in the package.

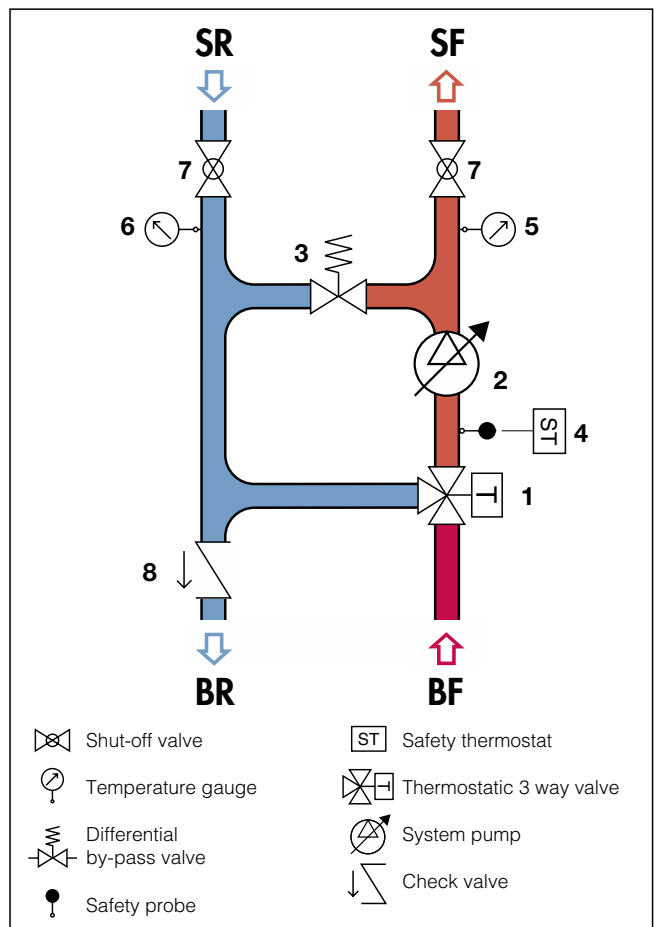


Characteristic components

- 1 Thermostatic three-way valve with built-in temperature sensor
- 2 High-efficiency pump UPM3 Auto L 25-70 or UPLM 25-95
- 3 Differential by-pass valve (optional)*
- 4 Safety thermostat kit (optional)
- 5 Flow temperature gauge
- 6 Return temperature gauge
- 7 Secondary circuit shut-off valves
- 8 Connection pipe (with check valve)
- 9 Operating spanner for shut-off valves on secondary circuit
- 10 Insulation

*The factory setup includes installation of a blind spacer (closed)

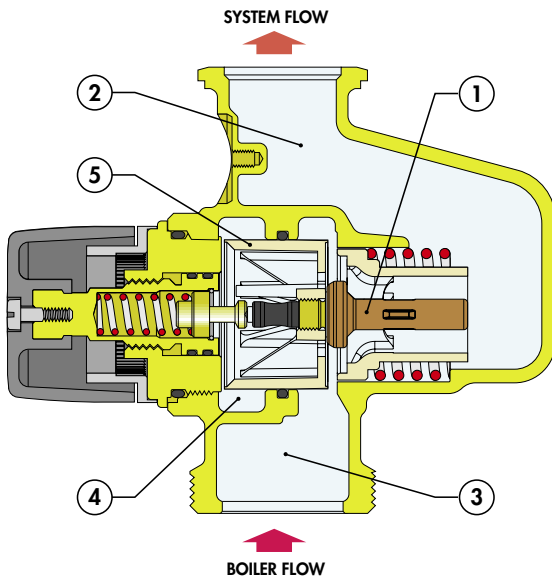
Hydraulic diagram



Operating principle

The regulator element inside the thermostatic three-way valve consists of a temperature sensor (1) fully immersed in the mixed water outlet chamber (2). By expanding and contracting, it continuously ensures a correct proportioning of hot water (3), coming from the boiler, and water returning from the panel circuit (4). The water intake is regulated by a shaped obturator (5) that slides inside a special cylinder placed between the hot water flow and the water returning from the circuit.

Even if the thermal load of the secondary circuit or the inlet temperature from the boiler changes, the mixing valve automatically adjusts the flow rates until it obtains the set temperature.



Construction details

Low-inertia thermostatic sensor

The temperature-sensitive element, the "engine" of the thermostatic three-way 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.

Temperature adjustment

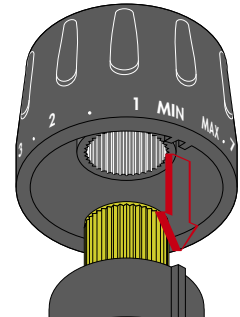
The temperature is set at the desired value using the control knob with the graduated scale on the three-way mixing valve.

Code / temp.	Min.	1	2	3	4	5	6	7	Max.
166600A2L (°C) 166601UPM	22	25	30	35	40	43	46	50	55
166605A2L (°C)	40	45	50	54	57	60	65	70	72

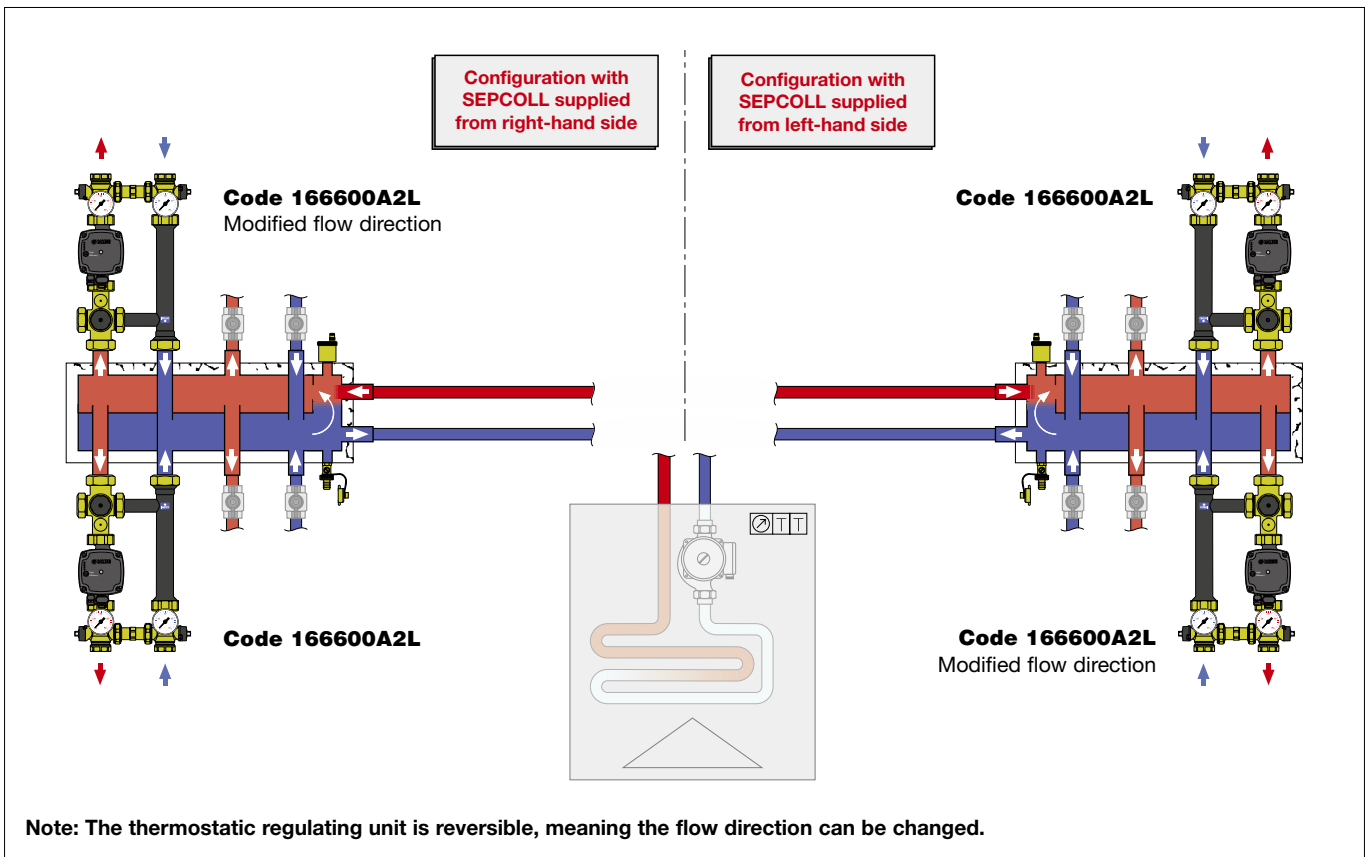
Reference conditions: - code 166600A2L and 166601UPM: $T_{boiler} = 70^{\circ}\text{C}$
- code 166605A2L: $T_{boiler} = 80^{\circ}\text{C}$

Adjustment locking

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 protrusion on the knob holder nut.



Installation



Right hand-left hand reversibility

The unit is assembled in the factory with RH side flow and upward flow (equivalent to LH side flow and downward flow). If necessary, the flow direction can be exchanged. For this reason, the nuts on the unit are not fully tightened in the factory, making it easier to carry out this procedure if required.

We recommend always checking that the nuts have been fully tightened during installation.

To make the exchange, proceed as follows:

1. Remove the insulation: the front and rear shells are easy to remove as they are slightly restrained to each other.



2. Completely unscrew the captive nuts (using suitable spanners) located underneath the flow and return shut-off valves. Unscrew the captive nuts on the mixing valve, then remove the valve and the pump.



3. Unscrew the cap on the right-hand side of the mixing valve and screw it onto the opposite side.



4. Position the connecting pipe on the right-hand side, rotating it on its axis by 180°.

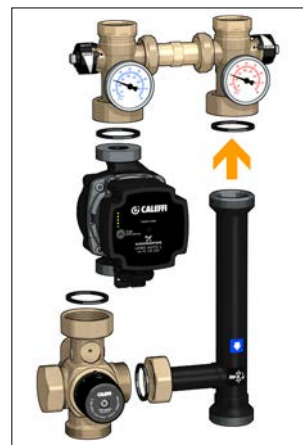


In versions with UPML 25-95 pump, it is necessary to rotate the electronic part of the pump, unscrewing the four screws, as indicated by the arrows, and turning the body anticlockwise by 90°. If this step is not performed, it will not be possible to fit the unit back inside the insulation.

In A2L versions with UPM3 Auto L pump no changes are required for the circulation pumps.



5. Reassemble the unit as indicated in the figure, fully tightening the captive nuts and taking care to position the seals in the correct way.

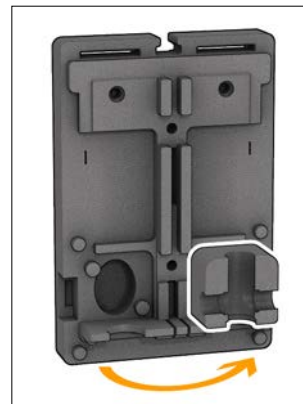


6. Invert the flow and return temperature gauges.



7. Move the square spacer and fit it on the right-hand side.

Note: The central notch in the insulation can be used to house the circulation pump and safety thermostat electrical wiring cables.



8. Reassemble the insulation.



Accessories

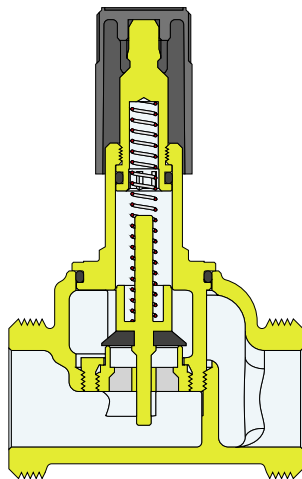
Differential by-pass



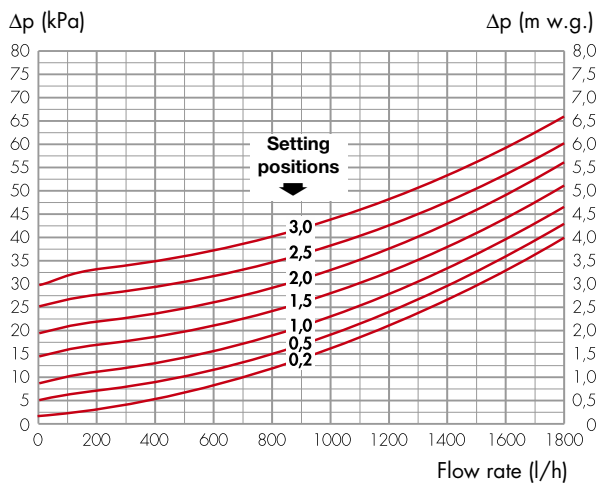
519006

Differential by-pass.
 Max. working pressure: 10 bar.
 Max. working temperature: 100°C.
 Setting range: 2–30 kPa (0,2–3 m w.g.).
 Connections 1" M x 1" M.

The differential by-pass valve is used to control the head to which the secondary distribution circuit is subjected. When the differential pressure setting value is reached, the obturator opens and allows the medium to pass from the flow to the return line of the circuit, limiting the differential pressure at the set value. This action is particularly useful when single circuits are shut off by automatic two-way ON/OFF, modulating or thermostatic valves.



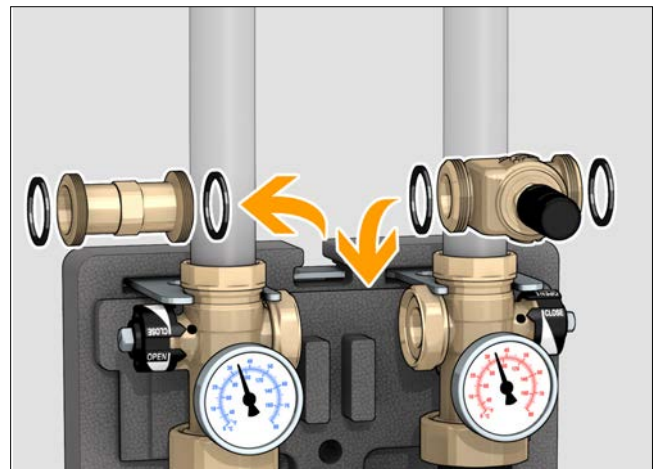
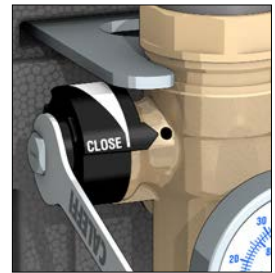
Hydraulic characteristics



The hydraulic characteristics are calculated while taking account of the ball shut-off valves fitted.

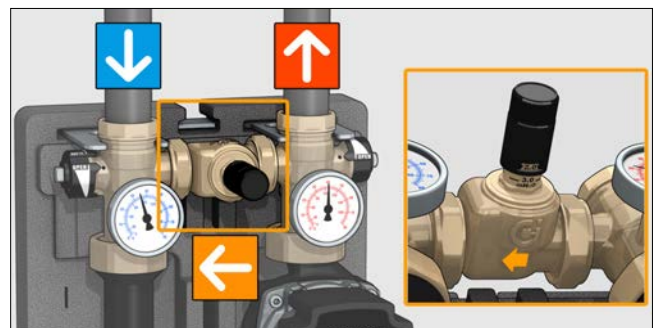
Installation of the differential by-pass valve

To fit the differential by-pass, it should be applied in place of the by-pass spacer template. After shutting off the ball valves using the specific supplied spanner, unscrew the captive nuts as illustrated in the following figures.

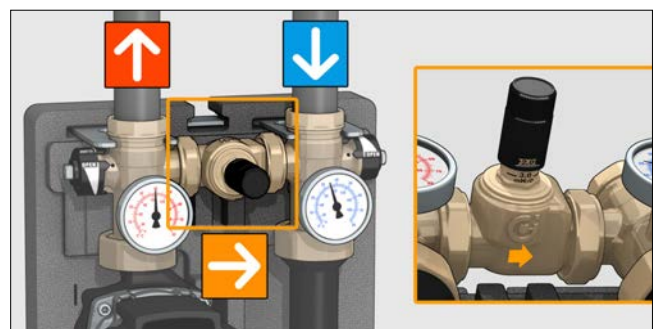


Installation differs depending on the supply direction in the flow circuit:

- by-pass installation in the version with RH side flow and upward flow (equivalent to LH side flow and downward flow);




- by-pass installation in the version with LH side flow and upward flow (equivalent to RH side flow and downward flow).



Separators - manifold

559222 SEPCOLL 2+2


 [tech. broch. 01084](#)



Hydraulic separator-manifold for heating systems.
Centre distance: 125 mm.
Steel body, PN 6. **With insulation.**
Main connections 1 1/4" F.

Outlet connections 1 1/2" with captive nut:
two at the top and two at the bottom.
Working temperature range: 0–110°C.
Complete with mounting brackets.

559231 SEPCOLL 3+1


 [tech. broch. 01084](#)



Hydraulic separator-manifold for heating systems.
Centre distance: 125 mm.
Steel body, PN 6. **With insulation.**
Main connections 1 1/4" F.
Outlet connections 1 1/2" with

captive nut: three at the top and one at the bottom (or viceversa).
Working temperature range: 0–110°C.
Complete with mounting brackets.

559221 SEPCOLL 2+1

 [tech. broch. 01084](#)



Hydraulic separator-manifold for heating systems.
Centre distance: 125 mm.
Steel body, PN 6. **With insulation.**
Main connections 1" F.

Outlet connections: two at the top, 1 1/2" with captive nut,
and one at the side, 1" F.
Working temperature range: 0–110°C.
Complete with mounting brackets.

559220 SEPCOLL 2

 [tech. broch. 01084](#)



Hydraulic separator-manifold for heating systems.
Centre distance: 125 mm.
Steel body, PN 6. **With insulation.**
Main connections 1" F.

Outlet connections: two at the top, 1 1/2" with captive nut.
Working temperature range: 0–110°C.
Complete with mounting brackets.

Mounting bracket

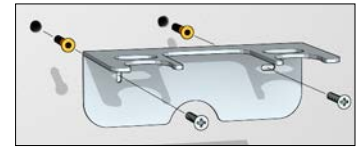


165001

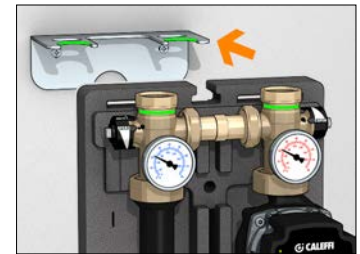
Mounting bracket.
In stainless steel.

Bracket installation

The mounting bracket for wall installation must be secured using wall anchors, using the corresponding holes on the base.



The unit should be applied to the bracket, using the corresponding seats under the hexagonal part of the shut-off valves.



Safety thermostat kit



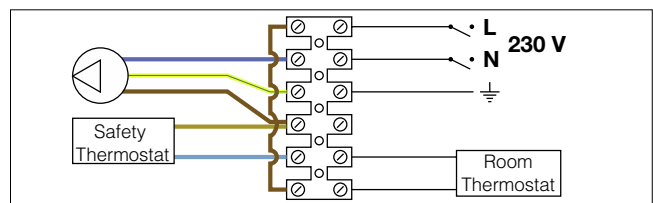
165004

Safety thermostat kit for heating.
Setting temperature 55°C ±3.
Protection class: IP 65. M4 threading.

The safety thermostat kit is used to control the maximum flow temperature to the system. In the event of a fault, it stops circulation by shutting off the pump, thus preventing the system from being damaged. The bulb should be screwed into the corresponding seat on the mixing valve flow.



Wiring diagram



Accessories



165003

Sensor holder extension.
Connections 1" M x 1" F.
Side connections M4 F x M4 F x 1/8" F x 1/4" F



165006

Pair of eccentric tailpieces.
Centre distance: 105–145 mm.
Connections: 1 1/2" F with captive nut x 1" F.



559001

Pair of plugs with gaskets for unused outlets.



559002

Pair of fittings with gaskets.

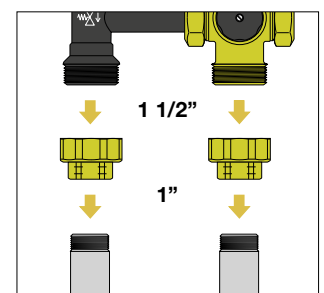


165002

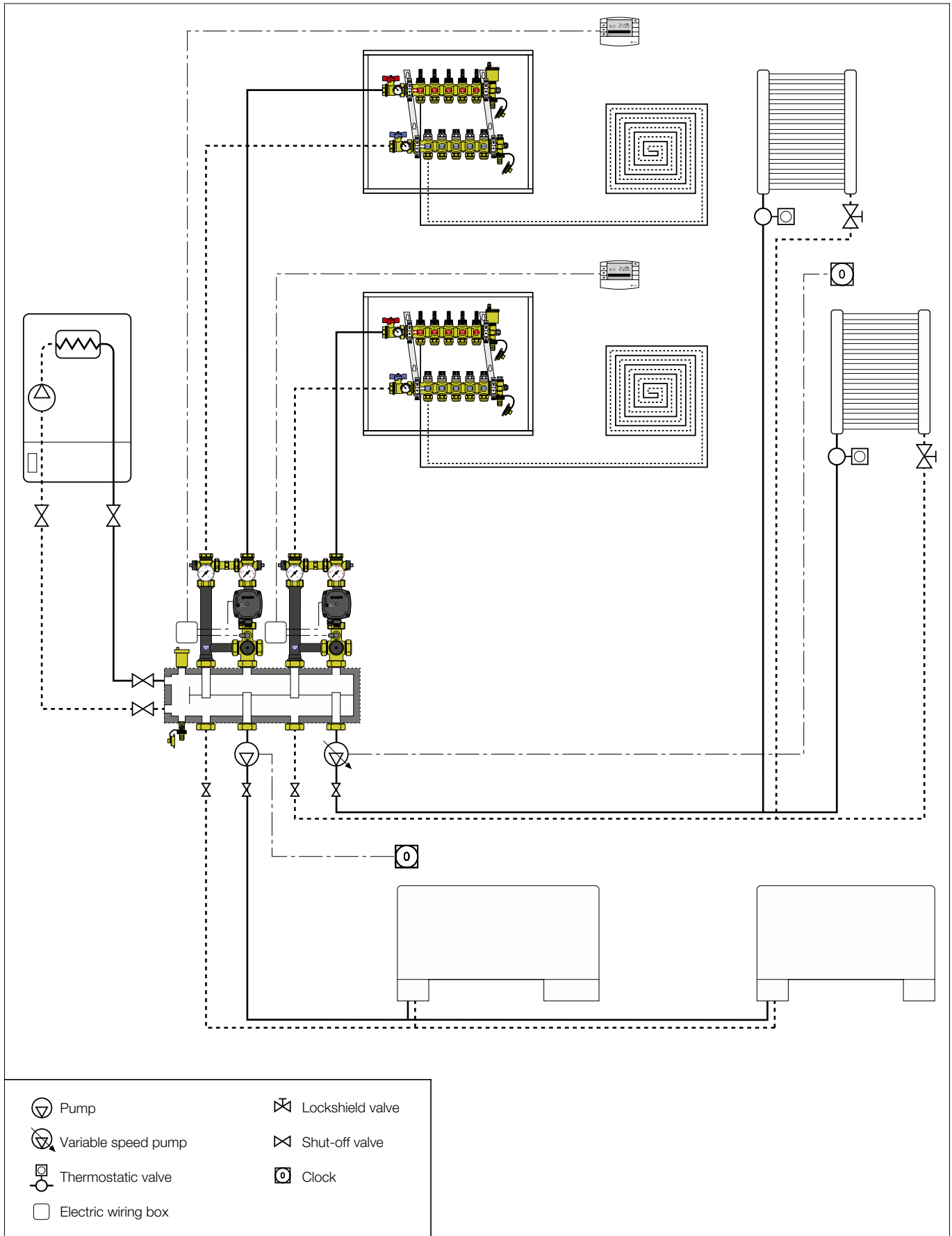
Female union with captive nut,
complete with seal.
Connections: 1 1/2" F with captive nut x 1" F.

Installation example

The union with captive nut allows installation of the 166 series unit on any 1" M pipe.



Application diagrams



SPECIFICATION SUMMARY

166 series

Thermostatic regulating unit for heating systems, can be coupled to 559 series SEPCOLL. Configuration with upward flow and RH side flow, or viceversa. Connections to primary circuit 1 1/2" M (ISO 228-1). Connections to secondary circuit 1" F (ISO 228-1). Connection centre distance 125 mm. Adjustment temperature range 25–50°C (and 40–70°C). Adjustment accuracy $\pm 2^\circ\text{C}$. Maximum primary inlet temperature 100°C. Maximum working pressure 1000 kPa (10 bar). Minimum working pressure 80 kPa (0,8 bar). Complete with: thermostatic three-way valve with built-in sensor, PSU obturator, stainless steel springs, EPDM seals. High-efficiency pump UPM3 Auto L 25-70 (and UPML 25-95 only for code 166601UPM), protection class IP 44 (UPML 25-95 IPX2D). Temperature gauges with double scale 0–80°C (32–176° F). Secondary circuit shut-off valves. Connection pipe in Fe360 steel. Check valve with brass body, obturator in PPAG40. With pre-formed shell insulation in EPP.

Code 165004

Safety thermostat kit for heating, setting temperature 55°C $\pm 3^\circ\text{C}$, protection class IP 65.

Code 519006

Differential by-pass valve. Brass body. Connections 1" M x 1" M. Stainless steel spring. Setting range from 0,2 to 3 m w.g. (2–30 kPa). Maximum working pressure 10 bar. Maximum working temperature 100°C.

Code 165001

Stainless steel mounting bracket.

Code 165002

Female union with captive nut, complete with seal. Connections 1 1/2" F with captive nut x 1" F.

Code 165006

Pair of eccentric tailpieces. Connections 1 1/2" F with captive nut x 1" F (ISO 228-1). Centre distance 105–145 mm.

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.
