

Thermostatic regulating unit for heating systems



01399/23 EN

replaces 01238/17 EN
and 01378/21 EN

166 series



Function

The thermostatic regulating unit keeps the flow temperature constant, at the set value, for the medium distributed in a low-temperature system for radiant floor panels or for radiators. 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 with the SEPCOLL 559 series 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 UPM3S Auto 25-60 pump. Centre distance 125 mm. Setting temperature 25–50 °C | DN size 25 (1") |
| Code 166605A2L | Thermostatic regulating unit. With UPM3S Auto 25-60 pump. Centre distance 125 mm. Setting temperature 40–70 °C | DN size 25 (1") |
| Code 166601UPM | Thermostatic regulating unit. With UPML 25-105 pump. Centre distance 125 mm. Setting temperature 25–50 °C | DN size 32 (1 1/4") |
| Code 166600HE3 | Thermostatic regulating unit. With PARA 25/7 pump. Centre distance 125 mm. Setting temperature 25–50 °C | DN size 25 (1") |
| Code 166600HE5 | Thermostatic regulating unit. With EVOSTA2 70/130 pump Centre distance 125 mm. Setting temperature 25-50 °C | DN size 25 (1") |

Technical specifications

Materials

Three-way thermostatic valve

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

Connection pipes

| | |
|-----------|--------------|
| Material: | Fe 360 steel |
|-----------|--------------|

Check valve

| | |
|------------|-----------------------|
| Body: | brass EN 12164 CW614N |
| Obturator: | PPAG40 |

Shut-off valves

| | |
|-------|-----------------------|
| Body: | brass EN 12165 CW617N |
|-------|-----------------------|

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) |
| Accuracy: | ± 2 °C; |
| Maximum primary inlet temperature: | 100 °C |
| Connections: | - system side: (code 166600A2L - 166605A2L) 1" F (ISO 228-1) (code 166601UPM) 1 1/4" F (ISO 228-1) (code 166600HE3) 1" F (ISO 228-1) (code 166600HE5) 1" F (ISO 228-1) - boiler side: 1 1/2" M (ISO 228-1) - connection centre distance: 125 mm |

Insulation

Material: EPP
 Average thickness: 20 mm
 Density: 45 kg/m³
 Working temperature range: 5–120 °C

Thermal conductivity: 0,037 W/(m·K) at 10 °C
 Reaction to fire (UL94): HBF class

Pump C€

High efficiency pump: - code 166600A2L UPM3S Auto 25-60
 - code 166605A2L UPM3S Auto 25-60
 - code 166601UPM UPML 25-105
 - code 166600HE3 PARA 25/7
 - code 166600HE5 EVOSTA2 70/130

Body: cast iron
 Electric supply: 230 V - 50/60 Hz
 Maximum ambient temperature/humidity: refer to specific instruction sheet
 Protection class: UPM3S Auto 25-60: IP 44
 UPML 25-105: IPX2D
 PARA 25/70: IPX4D
 EVOSTA2: IPX5

Pump centre distance: 130 mm

Pump connections: 1 1/2" M (ISO 228-1)

Temperature gauges

Double scale: 0–80 °C (32–176 °F)

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)

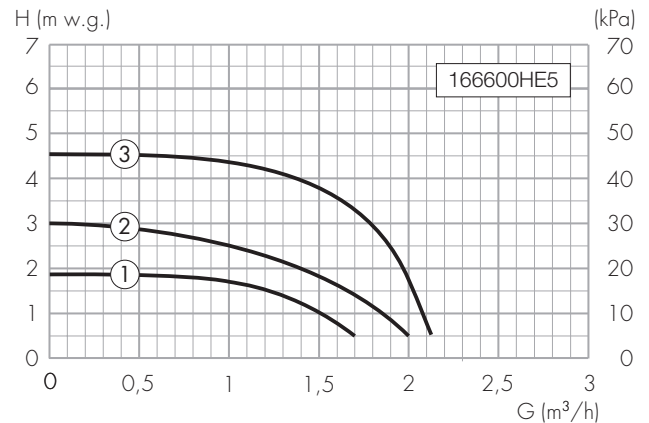
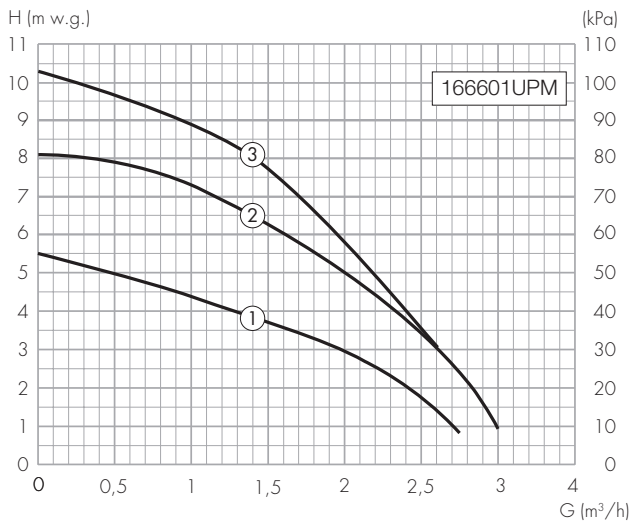
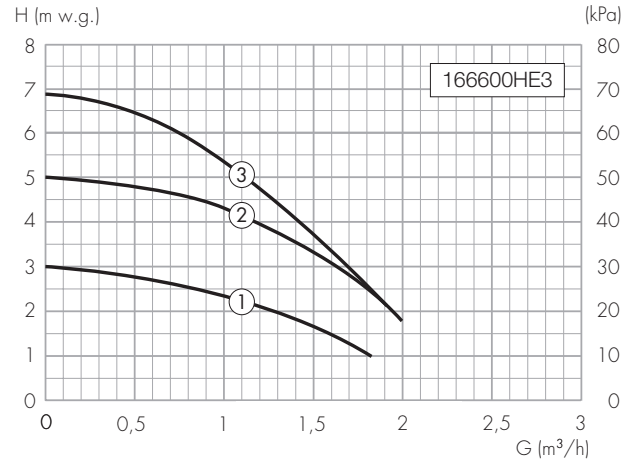
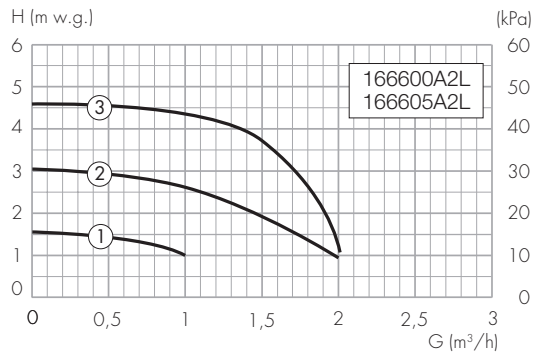
Body: brass EN 1982 CB753S
 Obturator: EPDM
 Spring: stainless steel EN 10270-3 (AISI 302)
 Seals: EPDM
 Maximum working pressure: 10 bar
 Maximum working temperature: 100 °C
 By-pass setting range: 10–60 kPa (1–6 m w.g.)
 Connections: 1" M x 1" M (ISO 228-1)

Mounting bracket code 165001 (optional)

Material: stainless steel

Available head at unit connections

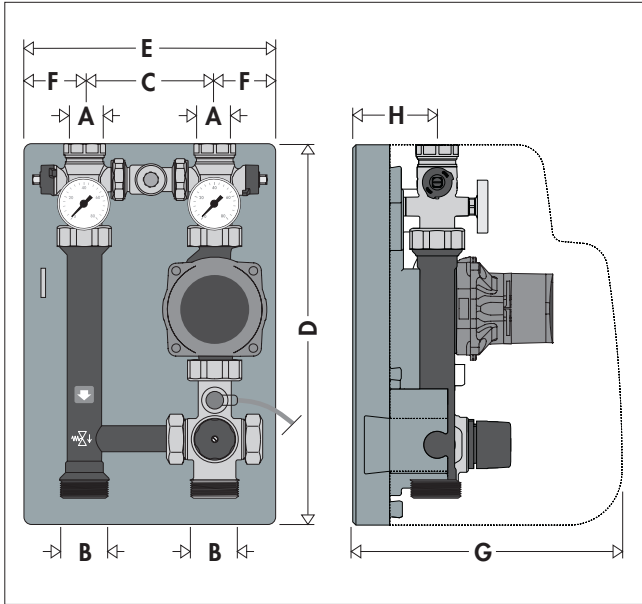
Tests carried out with constant pump head.



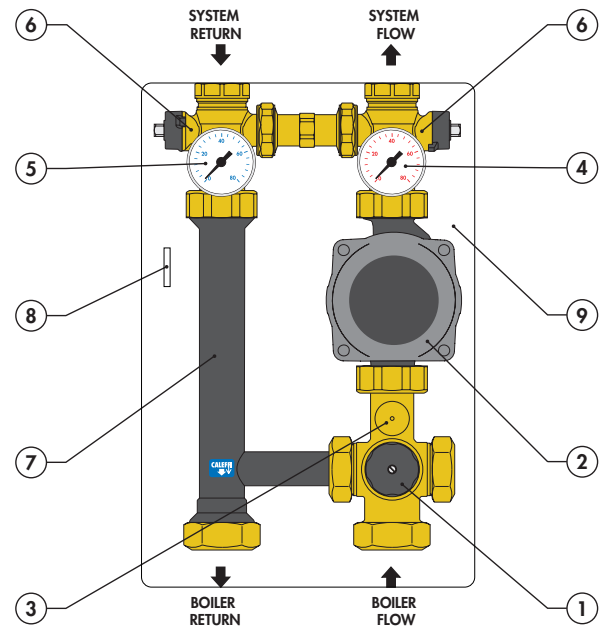
Note:

The pumps can operate at constant speed (UPM3, PARA and EVOSTA2 only) with constant or proportional pressure control, which adapts the performance to the system requirements.
 For further details, see the installation instruction sheet of the pump supplied in the package.

Dimensions



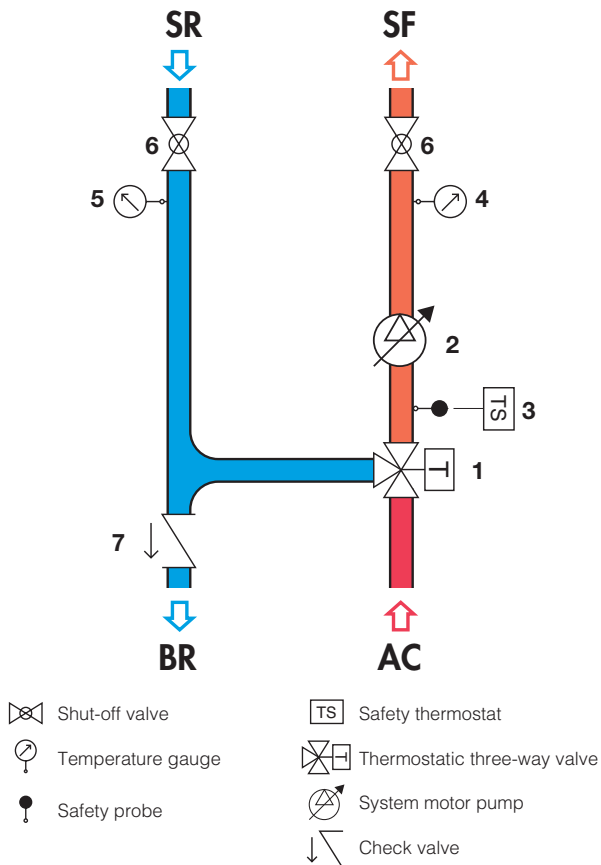
| Code | A | B | C | D | E | F | G | H | Mass (kg) |
|-----------|--------|--------|-----|-----|-----|------|-----|----|-----------|
| 166600A2L | 1" | 1 1/2" | 125 | 360 | 250 | 62,5 | 255 | 80 | 6,6 |
| 166605A2L | 1" | 1 1/2" | 125 | 360 | 250 | 62,5 | 255 | 80 | 6,6 |
| 166601UPM | 1 1/4" | 1 1/2" | 125 | 379 | 250 | 62,5 | 255 | 80 | 7,1 |
| 166600HE3 | 1" | 1 1/2" | 125 | 360 | 247 | 61 | 255 | 80 | 7,1 |
| 166600HE5 | 1" | 1 1/2" | 125 | 360 | 247 | 61 | 255 | 80 | 7,4 |



Characteristic components

- 1 Three-way thermostatic valve with built-in temperature sensor
- 2 High-efficiency pump
- 3 Safety thermostat kit (optional)
- 4 Flow temperature gauge
- 5 Return temperature gauge
- 6 Shut-off valves on secondary circuit
- 7 Connection pipe (with check valve)
- 8 Operating wrench for secondary circuit shut-off valves
- 9 Insulation

Hydraulic diagram



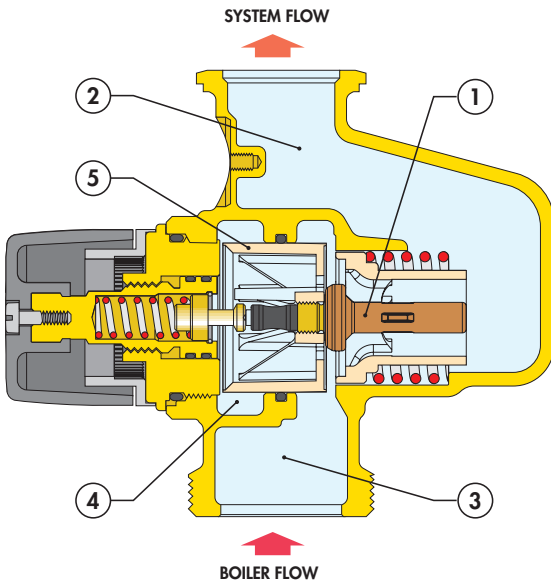
- Shut-off valve
- Temperature gauge
- Safety probe
- Safety thermostat
- Thermostatic three-way valve
- System motor pump
- Check valve

Operating principle

The regulating element inside the three-way thermostatic 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 “actuator” of the three-way thermostatic 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 a tamper-proof system 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 166601UPM (°C) | 22 | 25 | 30 | 35 | 40 | 43 | 46 | 50 | 55 |
| 166605A2L (°C) | 40 | 45 | 50 | 54 | 57 | 60 | 65 | 70 | 72 |
| 166600HE3 (°C) | 22 | 25 | 30 | 35 | 40 | 43 | 46 | 50 | 55 |
| 166600HE5 (°C) | 22 | 25 | 30 | 35 | 40 | 43 | 46 | 50 | 55 |

Reference conditions:

- code 166600A2L - 166601UPM:

$T_{boiler} = 70\text{ °C}$

- code 166600HE3 - 166600HE5:

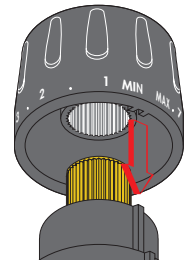
$T_{boiler} = 70\text{ °C}$

- code 166605A2L:

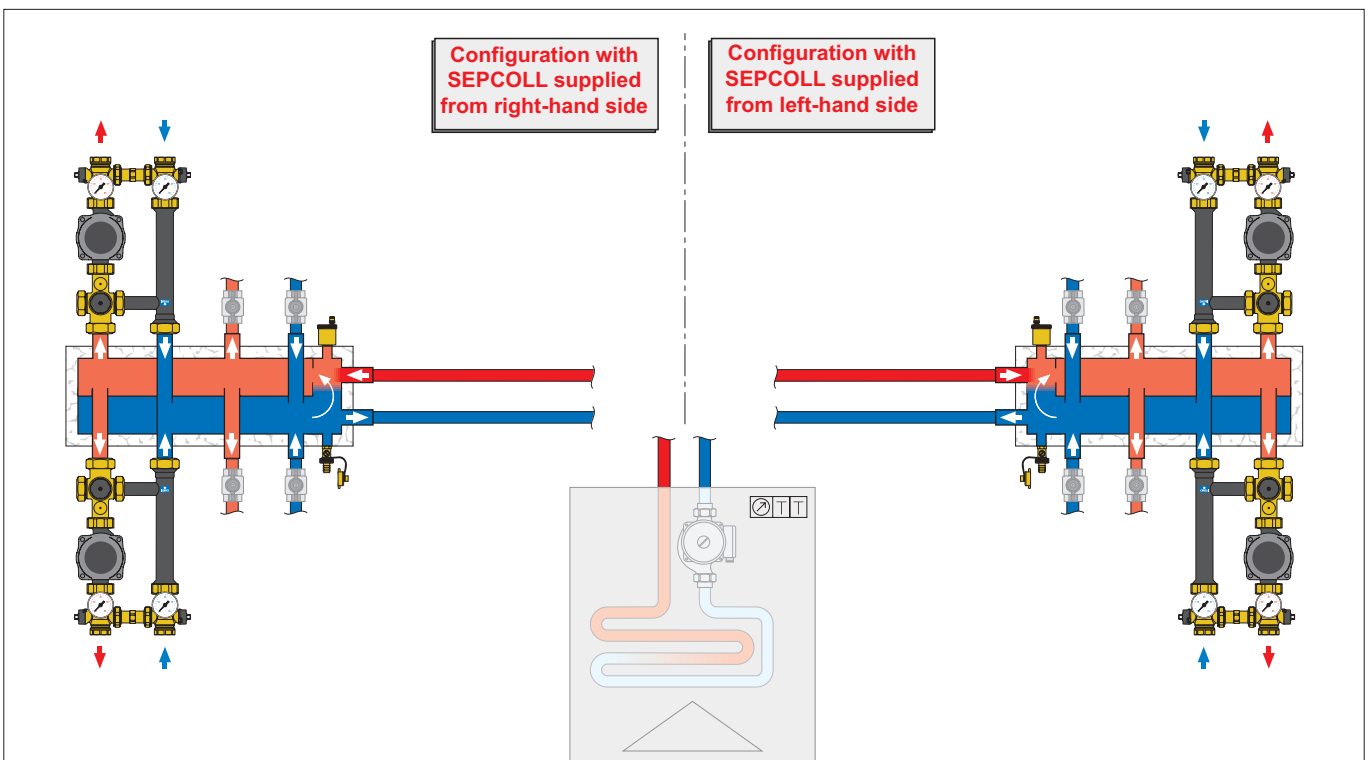
$T_{boiler} = 80\text{ °C}$

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



Note: The thermostatic regulating unit is reversible, meaning the flow direction can be changed.

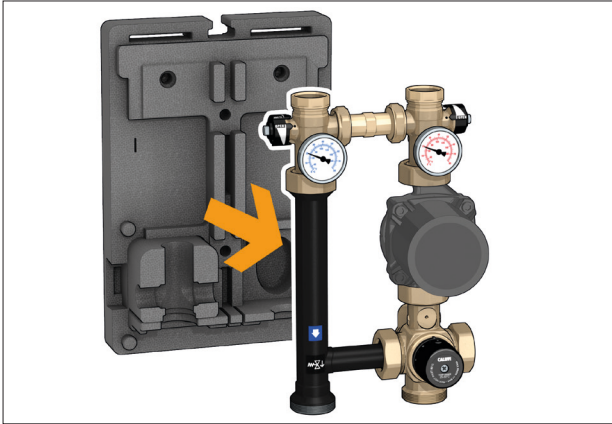
Right hand-left hand reversibility

The unit is assembled in the factory with right-hand side upward flow (equivalent to left-hand side 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.

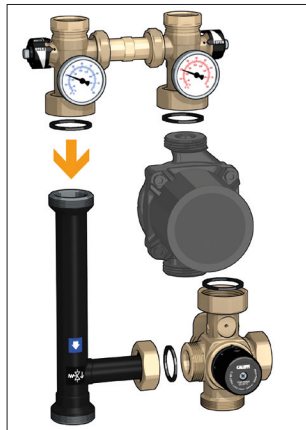
We recommend always checking that the nuts have been fully tightened during installation.

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 one another.



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



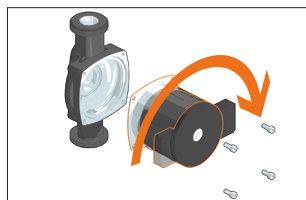
3. Unscrew the cap on the right-hand side of the mixing valve and screw it onto the opposite side.



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

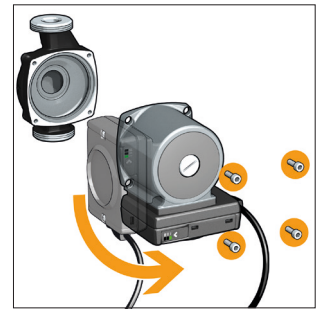


In versions with a EVOSTA2 pump, the electronic part of the pump must be rotated by unscrewing the four screws, as indicated by the arrows, and turning the body clockwise by 180°. If this step is not performed, it will not be possible to fit the unit back inside the insulation.

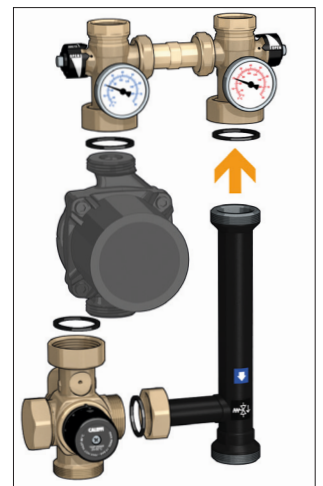


In versions with a UPML 25-105 pump, the electronic part of the pump must be rotated by unscrewing the four screws, as indicated by the arrows, and turning the body anticlockwise by 90°. If this step is not performed, it will not be possible to fit the unit back inside the insulation.

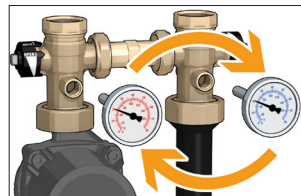
In A2L versions with a UPM3 Auto L pump, no changes to the circulators are required.



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

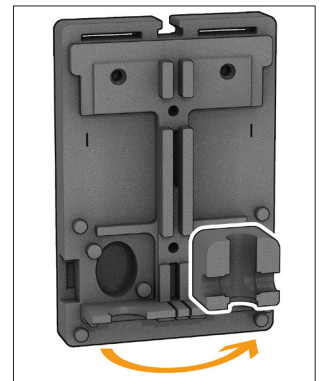


6. Invert the flow and return temperature gauges.

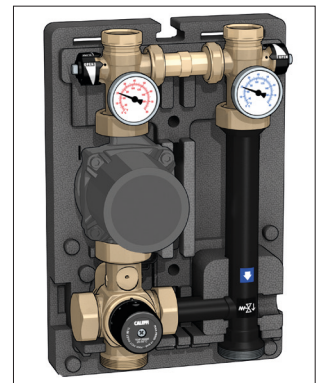


7. Move the square spacer and fit it on the right-hand side.

Note: The central notch in the insulation can be used to house the circulator and safety thermostat electrical connection cables.



8. Reassemble the insulation.



Mounting bracket

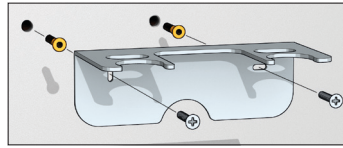


165001

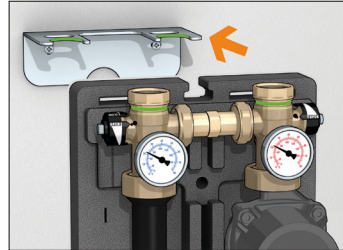
Mounting bracket.
In stainless steel.

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.



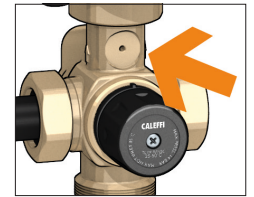
Safety thermostat kit



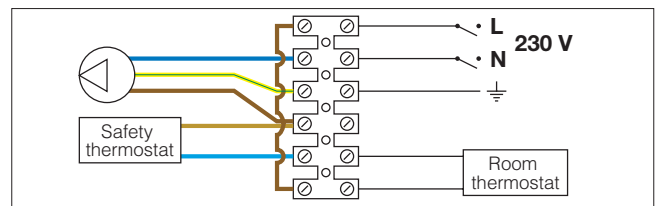
165004

Safety thermostat kit for heating.
Setting temperature $55\text{ }^{\circ}\text{C} \pm 3$.
Protection class: IP 65. M4 thread.

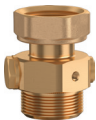
The safety thermostat kit is used to control the maximum flow temperature to the system. In the event of a fault, it stops circulation by shutting off the pump, thus preventing the system from being damaged. The bulb should be screwed into the corresponding seat on the mixing valve flow.



Electrical connection



Accessories



165003

Sensor holder extension.
 $1\text{'' M} \times 1\text{'' M}$ connections.
Side connections:
 $M4\text{ F} \times M4\text{ F} \times 1/8\text{'' F} \times 1/4\text{'' F}$



165006

Pair of eccentric tailpieces.
Centre distance: 105–145 mm.
Connections: 1'' F with captive nut $\times 1\text{'' F}$.

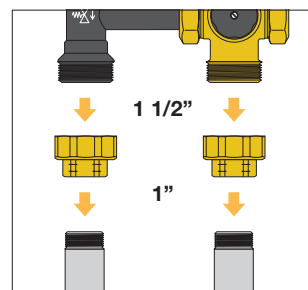


165002

Female union with captive nut, complete with seal.
Connections: 1'' F with captive nut $\times 1\text{'' F}$.

Installation example

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



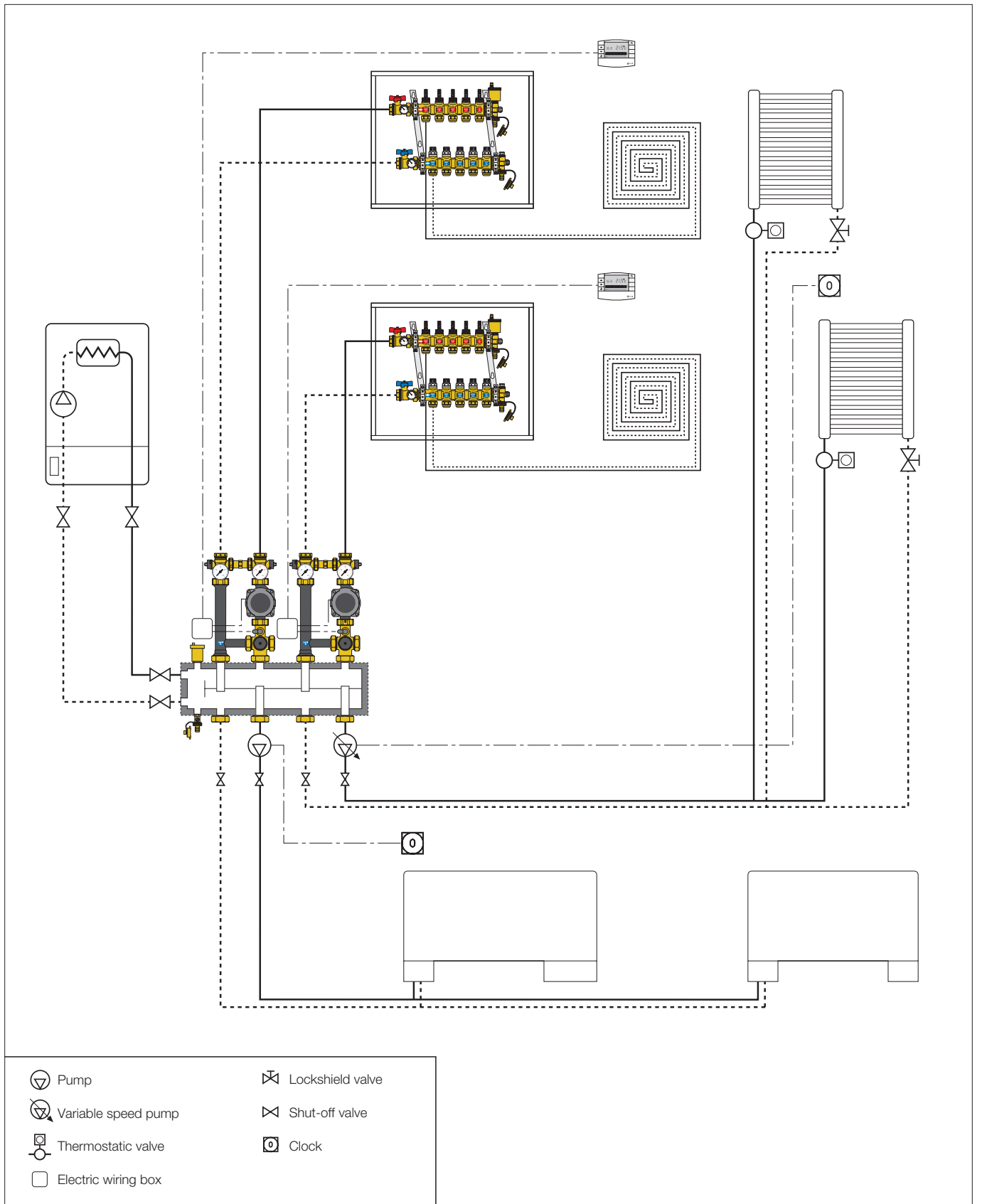
519

Differential by-pass for 165, 166 and 167 series units.
Setting range: 1–6 m w.g.
Maximum working pressure: 10 bar.
Maximum working temperature: $100\text{ }^{\circ}\text{C}$.

Code

519006

Application diagrams



SPECIFICATION SUMMARY

166 series (code 166600A2L - 166605A2L - 166601UPM)

Thermostatic regulating unit for heating systems, can be coupled with 559 series SEPCOLL. Configuration with upward flow and right-hand side flow, reversible. Connections to primary circuit 1 1/2" M (ISO 228-1). Connections to secondary circuit 1" F (ISO 228-1) (code 166600A2L - 166605A2L); 1 1/4" F (ISO 228-1) (code 166601UPM). Connections centre distance 125 mm. Adjustment temperature range 25–50 °C (and 40–70 °C for code 166605A2L). Adjustment accuracy ± 2 °C. Maximum inlet temperature at primary circuit 100 °C. Maximum working pressure 1000 kPa (10 bar). Minimum working pressure 80 kPa (0,8 bar). Complete with three-way thermostatic valve with built-in sensor, PSU obturator, stainless steel springs, EPDM seals. High-efficiency pump UPM3S Auto 25-60 (and UPML 25-105 only for code 166601UPM), protection class IP 44 (UPML 25-105, IPX2D). Dual-scale temperature gauges 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.

166 series (code 166600HE3)

Thermostatic regulating unit for heating systems, can be coupled with 559 series SEPCOLL. Configuration with upward flow and right-hand side flow, reversible. Connections to primary circuit 1 1/2" M (ISO 228-1). Connections to secondary circuit 1" F (ISO 228-1). Connections centre distance 125 mm. Adjustment temperature range 25–50 °C. Adjustment accuracy ± 2 °C. Maximum inlet temperature at primary circuit 100 °C. Maximum working pressure 1000 kPa (10 bar). Minimum working pressure 80 kPa (0,8 bar). Complete with three-way thermostatic valve with built-in sensor, PSU obturator, stainless steel springs, EPDM seals. PARA 25/7 high-efficiency pump, protection class IPX4D. Dual-scale temperature gauges 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.

166 series (code 166600HE5)

Thermostatic regulating unit for heating systems, can be coupled with 559 series SEPCOLL. Configuration with upward flow and right-hand side flow, reversible. Connections to primary circuit 1 1/2" M (ISO 228-1). Connections to secondary circuit 1" F (ISO 228-1). Connections centre distance 125 mm. Adjustment temperature range 25–50 °C. Adjustment accuracy ± 2 °C. Maximum inlet temperature at primary circuit 100 °C. Maximum working pressure 1000 kPa (10 bar). Minimum working pressure 80 kPa (0,8 bar). Complete with three-way thermostatic valve with built-in sensor, PSU obturator, stainless steel springs, EPDM seals. EVOSTA2 70/130 high-efficiency pump, protection class IP X5. Dual-scale temperature gauges 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 165001

Stainless steel mounting bracket.

Code 165002

Female union with captive nut, complete with seal. Connections 1 1/2" F captive nut x 1" F (ISO 228-1).

Code 165004

Safety thermostat kit for heating, setting temperature 55 ± 3 °C, protection class IP 65.

Code 165006

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

Code 519006

Differential by-pass valve. Brass body. Connections 1" M x 1" M. Stainless steel spring. Setting range 1–6 m w.g. (10-60 kPa). Maximum working pressure 10 bar. Maximum working temperature 100 °C.

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