

Modulating temperature regulating unit with distribution kit for primary circuit



01153/15 GB
replaces 01153/07 GB

171 series



Function

The temperature regulating unit with the distribution kit for the primary circuit is made to be used in mixed systems: radiant panels and radiators or fan coils, in combination with distribution manifolds for radiant panels.

The modulating temperature regulating unit, complete with digital temperature regulator, controls the temperature of the medium sent to the panels according to the actual thermal load.

In this particular series, the temperature is regulated by a dedicated hydraulic unit equipped with a specific motorised three-way valve.

The function of the kit is to distribute a portion of the medium flowing from the primary boiler circuit to the heating elements. It is supplied with manifolds with built-in shut-off and balancing valves and a differential by-pass kit for the primary circuit. This accessory is essential when there is a primary circuit circulation pump and the radiator circuits or fan coils are controlled by thermostatic or thermo-electric valves.

Reference Documentation

- Tech. brochure 01144 Pre-assembled distribution manifolds for radiant panel systems 668...S1 series



Product range

Code 1715.1A2L 003 Modulating temperature regulating unit with distribution kit for primary circuit, with ALPHA2 L 25-60 pump

Technical specifications

Materials

Regulating unit with motorised three-way valve

Body: brass EN 1982 CB753S
Headwork: brass EN 12164 CW614N
Obturator: stainless steel EN 10088-3 (AISI 303)
Seals: EPDM

Flow adapter unit

Body: brass EN 1982 CB753S

Primary circuit by-pass kit

Body: brass EN 1982 CB753S
By-pass valve: PA6G30
Spring: stainless steel EN 10270-3 (AISI 302)

Shut-off valves

Body: brass EN 12165 CW617N
Ball: brass EN 12164 CW614N, chrome plated

Primary circuit distribution manifolds

Flow manifold

Body: brass EN 1982 CB753S

Flow rate regulating valve

Obturator: brass EN 12164 CW614N
Hydraulic seals: EPDM

Return manifold

Body: brass EN 1982 CB753S

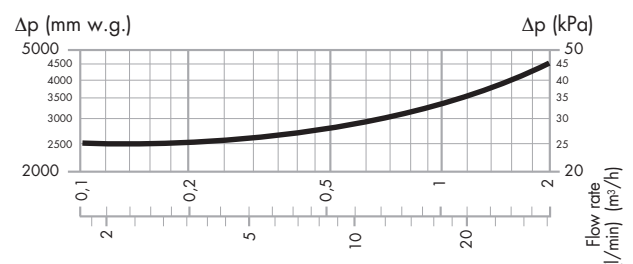
Shut-off valve

Stem: stainless steel EN 10088-3 (AISI 303)
Obturator and seals: EPDM
Springs: stainless steel EN 10270-3 (AISI 302)
Control knob: ABS

Performance

Medium:	water, glycol solutions
Max. percentage of glycol:	30%
Adjustment temperature range:	20–78°C
Primary inlet temperature range:	5–100°C
Max. working pressure:	1000 kPa (10 bar)
Min. working pressure:	80 kPa (0,8 bar)
Panel manifolds differential by-pass setting:	25 kPa (2.500 mm w.g.)
Primary circuit differential by-pass setting:	2–30 kPa (0,2–3 m w.g.)
Primary circuit manifold inside diameter:	Ø 27 mm
Temperature gauge scale:	0–80°C
Pressure gauge scale:	0–10 bar
Connections:	- primary circuit: 3/4" M (ISO 228-1)
	- to regulating unit: 1" F (ISO 228-1) with nut
	- panel circuit outlets: 3/4" M - Ø 18 mm
	- outlet centre distance: 50 mm
	- primary circuit manifold outlets: 3/4" M - Ø 18 mm
	- outlet centre distance: 50 mm

Panel circuit differential by-pass graph



Digital regulator

Three-point type
 Electric supply: 230 V - 50/60 Hz
 Power consumption: 3 VA
 Protection class: IP 40

Actuator

Three-point type
 Electric supply: 230 V - 50/60 Hz
 Operating time: 50 s (rotation 120°)
 Power consumption: 8 VA
 Auxiliary micro contact rating: 0,8 A
 Protection class: IP 44
 Max. ambient temperature: 55°C
 Protective cover: self-extinguishing VO

Flow/return temperature probes

NTC type
 Working range: -10–125°C
 Time constant: 2,5 s
 Response: 10.000 Ω at 25°C
 Two-wire cable with 1/8" M connection

Maximum temperature safety thermostat

Factory setting: 55°C ±3°C
 Protection class: IP 55
 Contact rating: 10 A / 240 V

Minimum temperature safety thermostat

Factory setting: 10°C ±3°C
 Protection class: IP 55
 Contact rating: 10 A / 240 V

Pump

High-efficiency pump: model ALPHA2 L 25-60
 Body: cast iron GG 15/20

Electric supply: 230 V - 50/60 Hz
 Maximum ambient humidity: 95%
 Max. ambient temperature: 40°C
 Protection class: IP 42
 Pump centre distance: 130 mm
 Pump connections: 1 1/2" F (ISO 228-1) with nut

Head available at the regulating unit connections



Note:

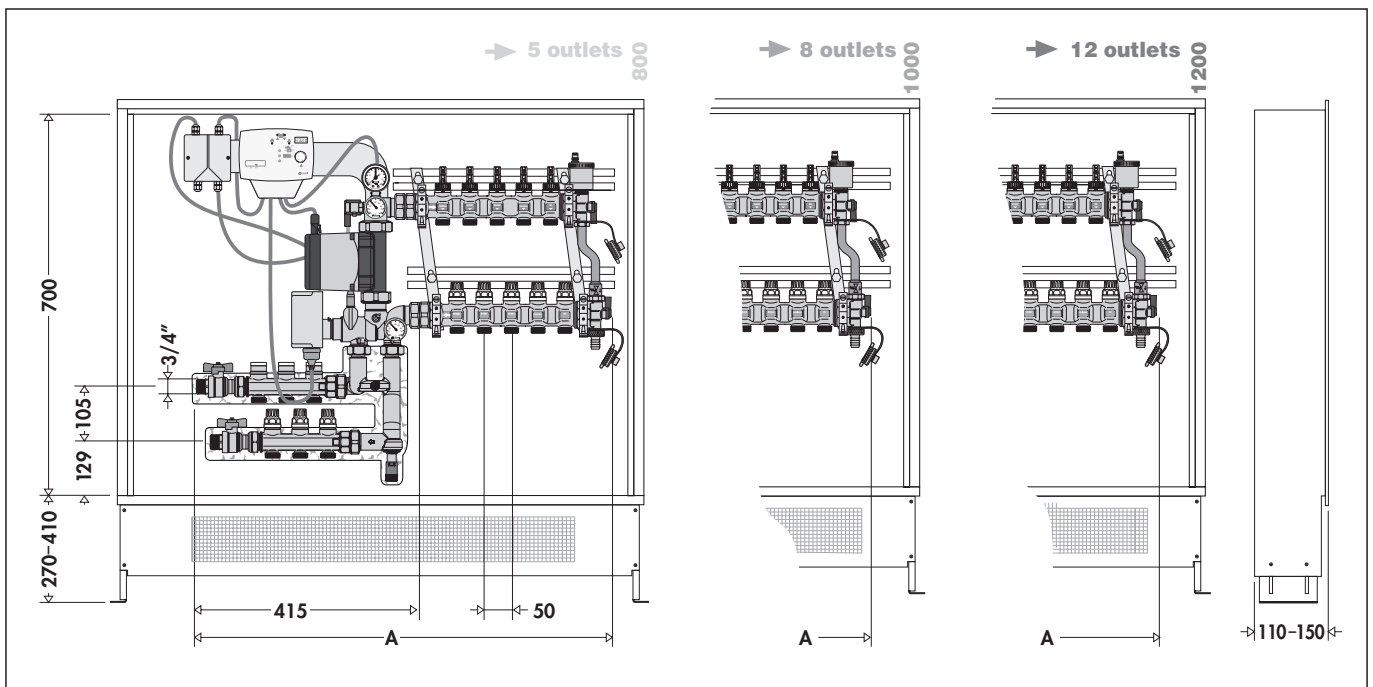
The pump can operate with constant or proportional pressure control which adapts the performance to the system requirements. For further details, see the pump installation instruction sheet supplied in the package.

Insulation

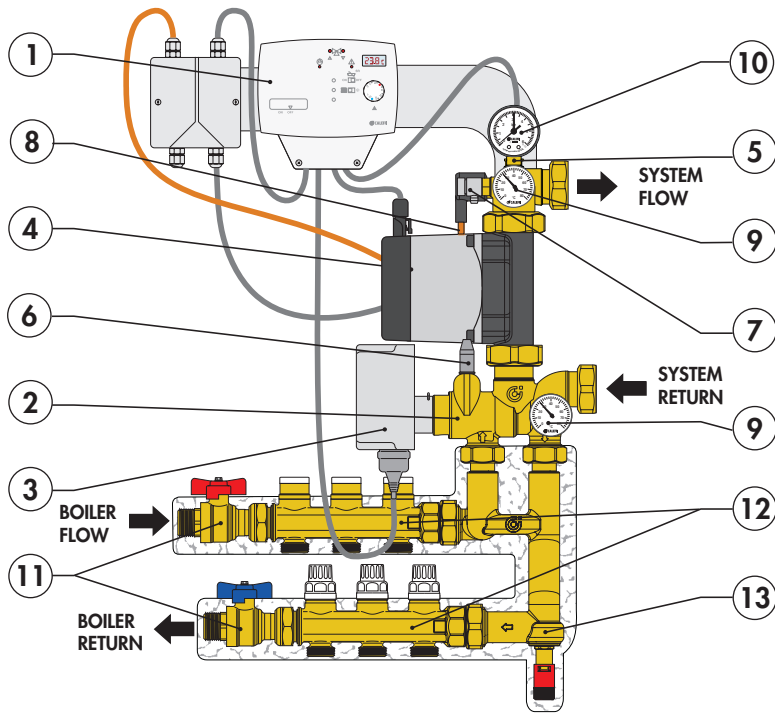
Material: closed cell expanded PE-X
 Thickness: 15 mm
 Density: - inner part: 30 kg/m³
 - outer part: 50 kg/m³
 Thermal conductivity (DIN 52612): 0°C: 0,038 W/(m·K)
 40°C: 0,045 W/(m·K)

Coefficient of resistance to the diffusion of water vapour (DIN 52615): >1300
 Working temperature range: 0–100°C
 Reaction to fire (DIN 4102): Class B2

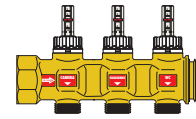
Dimensions



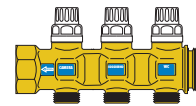
Code	1715E1A2L 003	1715F1A2L 003	1715G1A2L 003	1715H1A2L 003	1715I1A2L 003	1715L1A2L 003	1715M1A2L 003	1715N1A2L 003
Radiator outlets	3	3	3	3	3	3	3	3
Panel outlets	5	6	7	8	9	10	11	12
A	755	805	855	905	975	1025	1075	1125



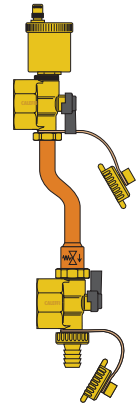
Flow manifold equipped with flow meters and balancing valves



Return manifold equipped with shut-off valves.



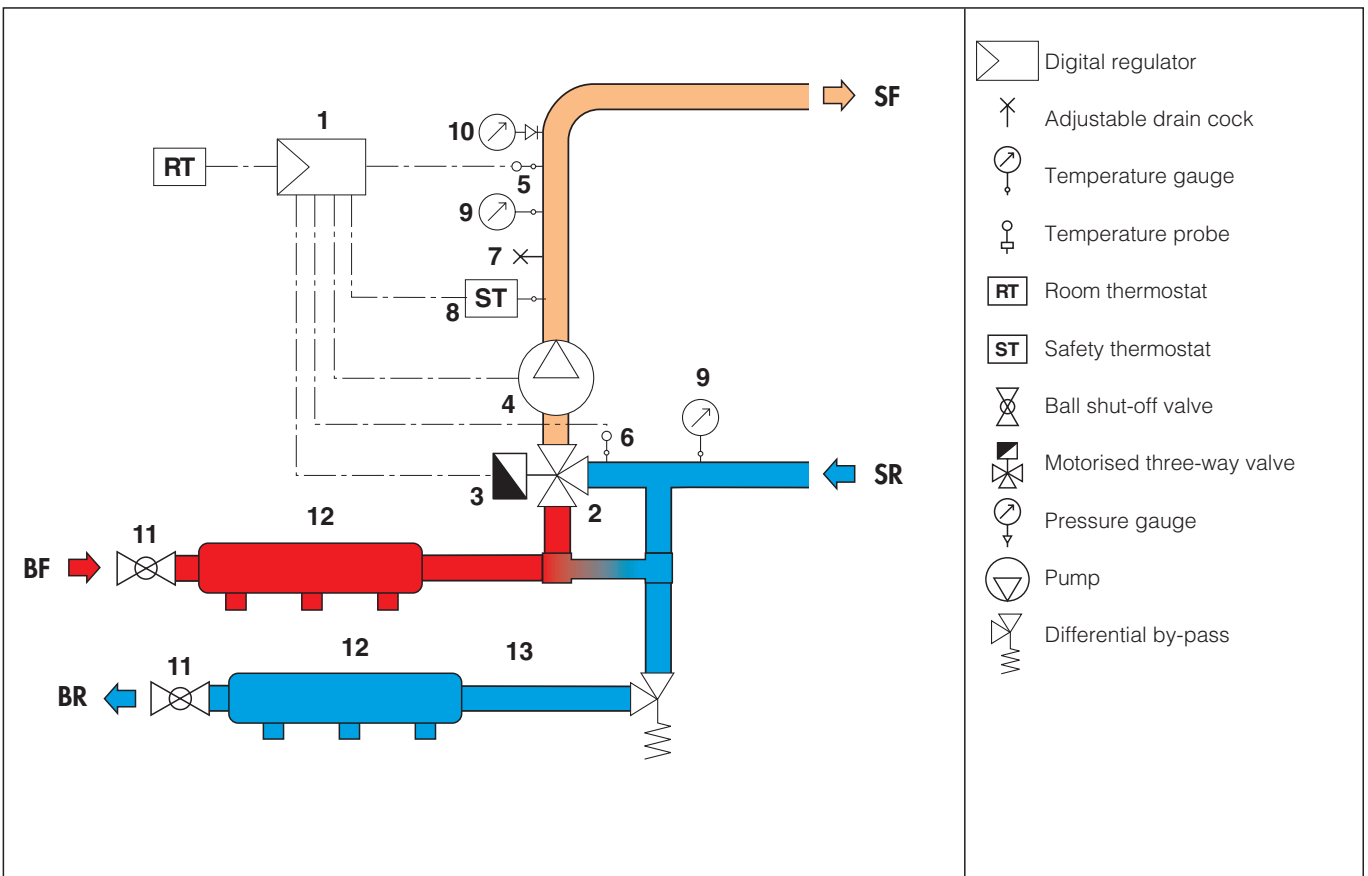
End fittings with multi-position ball valves, automatic air vent, differential by-pass kit and fill/drain hose connection.



Characteristic components

- | | |
|--|--|
| 1 Digital regulator for heating | 8 Safety thermostat |
| 2 Three-way mixing valve | 9 Flow and return temperature gauges with pocket |
| 3 Three-point actuator | 10 Pressure gauge |
| 4 High-efficiency pump, ALPHA2 L 25-60 | 11 Primary circuit shut-off valves |
| 5 Flow temperature probe | 12 Distribution manifolds with built-in valves for primary circuit |
| 6 Return temperature probe | 13 Primary circuit differential by-pass kit |
| 7 Adjustable drain cock | |

Hydraulic diagram



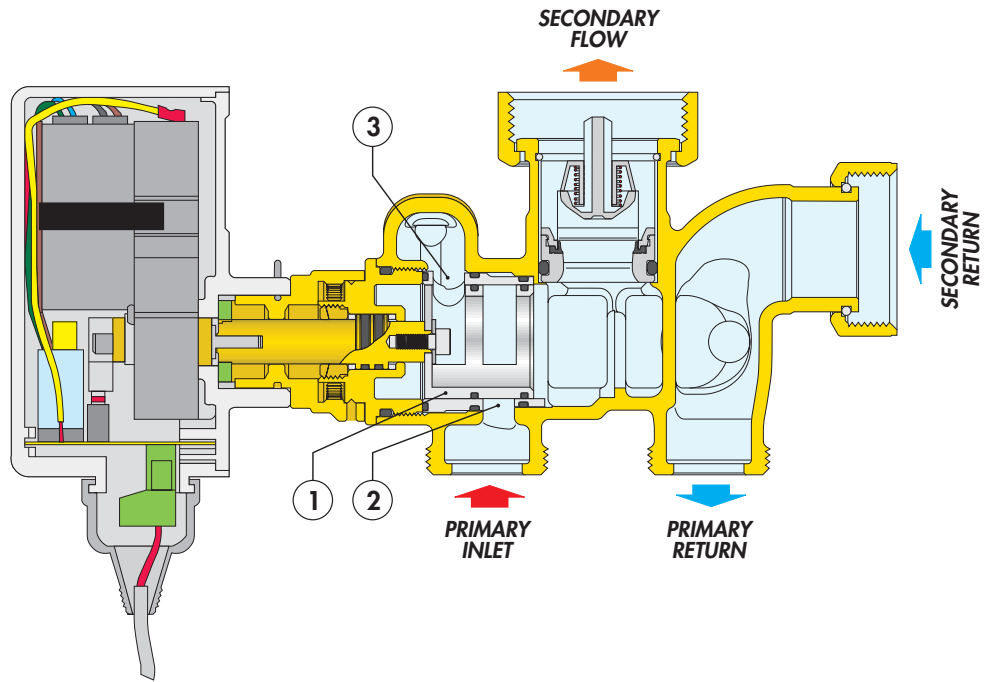
Operating principle

The medium temperature is regulated by a three-way mixing valve with a sector obturator comprehensive of an actuator managed by a specific digital controller.

The controller receives the signal from two probes, flow probe on the mixing valve outlet and probe from the panel circuit return, and it controls the movement of the valve.

The flow in the valve is regulated by a shaped obturator (1) that, by turning, closes or opens the hot water flow ports (2) and the water returning ports from the circuit (3) to adjust the desired flow temperature.

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



Construction details

Regulating unit body

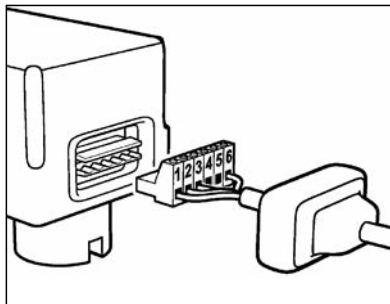
The valve body, containing the thermal regulating device, is made out of a single casting with connections to the primary and secondary circuits. A specific internal channel carries the system return medium to the regulating valve, making it possible for the unit to be smaller in size and easy to connect.

Reduced head losses

The three-way mixing valve is equipped with a special obturator acting on calibrated water orifices. This ensures a high flow rate and a reduced size, while maintaining accurate temperature control, with no swinging due to sudden changes in thermal load.

Electrical connections

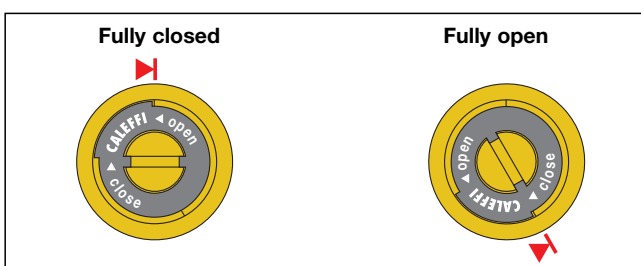
The actuator is electrically connected through an external plug-socket system with a protective rubber cap. This system does not require opening the lid to connect the cables. In this way, replacing the actuator (should this ever be necessary) is particularly easy to do.



Manual opening

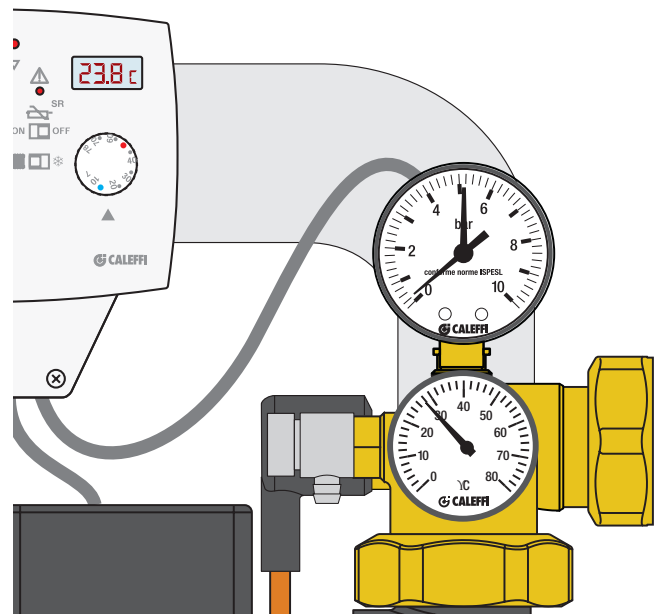
By removing the actuator, the valve can be opened-closed manually by using a screwdriver.

Regulating way - primary inlet



Flow unit

The flow unit is made out of a single casting with the necessary ports to connect with the functional components such as the safety thermostat, temperature gauge, pressure gauge, drain valve and flow temperature probe.

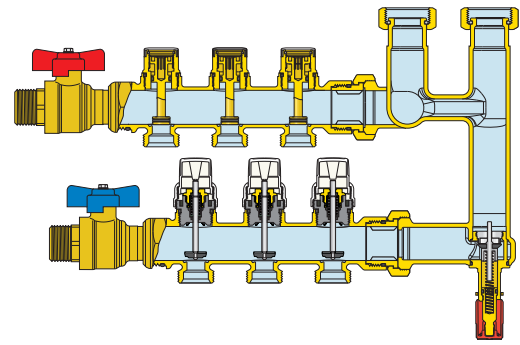


Distribution and differential by-pass kit for primary circuit

Operation

The distribution and differential by-pass kit for the primary circuit enables controlling the flow supplied to the heating or cooling elements connected before the outlet to the panel circuit regulating unit.

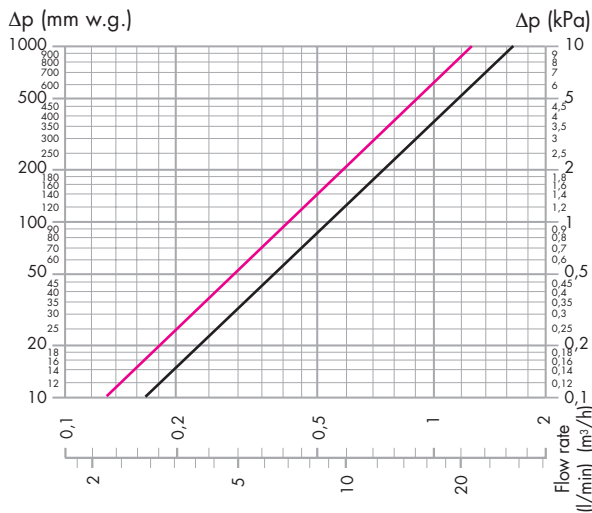
It is composed of distribution manifolds with built-in regulating and shut-off valves, and the differential by-pass kit for the primary circuit.



Primary circuit distribution manifolds

The distribution manifolds are equipped with:

- flow rate regulating valves built into the flow manifold. In this way it is possible to set the right flow rate and balance the various connected circuits.
- shut-off valves built into the return manifold. The same circuits can be automatically shut off by using the thermo-electric controls.

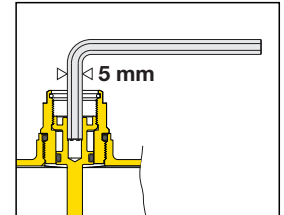


	Kv	Kv _{0,01}
Flow rate regulating valve fully open	5,40	540
Shut-off valve	4,10	410

- Kv = flow rate in m³/h for a loss of head of 1 bar
- Kv_{0,01} = flow rate in l/h for a loss of head of 1 kPa

Hydraulic characteristics of flow rate balancing valve

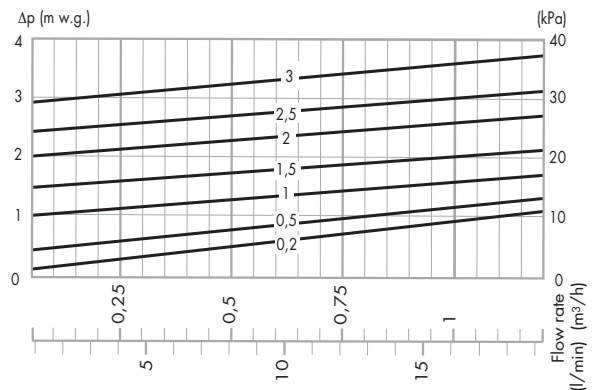
Adjustment position	Kv (m ³ /h)	Kv _{0,01} (l/h)
2 turns	0,22	22
3 turns	1,30	130
4 turns	3,20	320
5 turns	4,70	470
F.O.	5,40	540



Differential valve

The differential valve is used to control the head in the primary distribution circuit. It aids the flow circulation towards the heating elements and limits overpressure if there are thermostatic or thermo-electric valves.

The differential valve setting can be adjusted. It is preset to 5 kPa, the mean value for the loss of head in the primary circuit. If necessary, the trigger value can be adjusted within the range 2–30 kPa (0,2–3 m w.g.), using the corresponding knob with graduated scale.

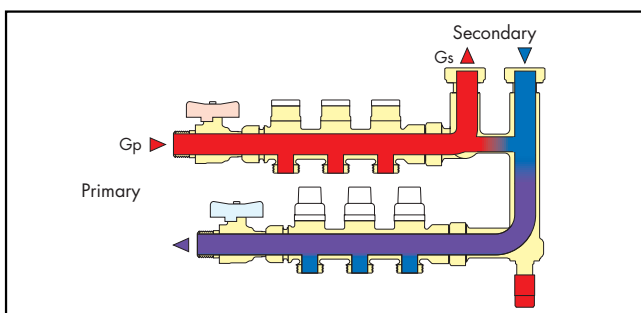


Primary circuit by-pass kit

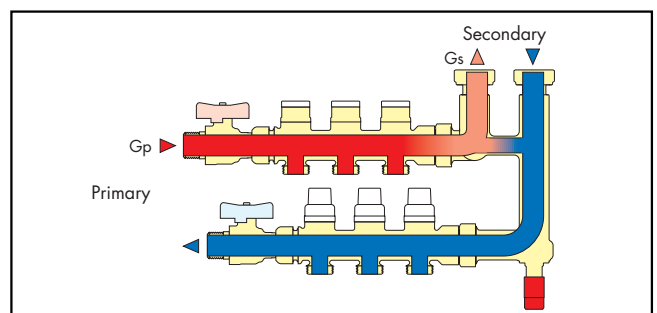
The by-pass kit permits hydraulic separation between the primary and secondary circuits. This hydraulic separation optimizes the operation of the secondary circuit at the panels thus preventing the influence on the secondary circuit by any primary circuit flow rate variation. In this case, the flow rate through the respective circuits depends solely on the pump flow rate characteristics, preventing reciprocal influence due to their coupling in series. Two possible conditions of hydraulic balance are described here. The component is typically sized in order to have the following working rate:

$$G_{\text{primary}} = G_{\text{secondary}} (\text{inlet to the mixing valve}) + G_{\text{heating elements}}$$

G_{primary} maximum recommended: 1,5 m³/h

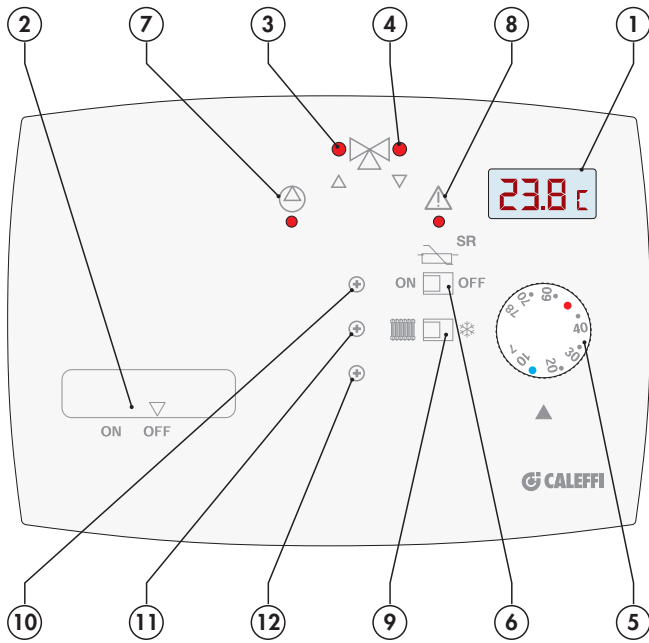


$G_{\text{primary}} > G_{\text{secondary}}$



$G_{\text{primary}} < G_{\text{secondary}}$

Digital regulator



The front panel identifies the following functions:

- 1) Three-digit LCD indicating: the measured or calculated temperature and the settings of the delays programmed in the system.
 - Temperature range displayed: 0–99°C with resolution 0,1°C.
- 2) Regulator ON/OFF function selector.
- 3) Mixer on opening: LED on.
- 4) Mixer on closing: LED on.
- 5) Selector for setting the flow temperature.
 - Temperature range 7–78°C
 - Factory configuration: - heating: max 50°C
 - cooling: min 14°C
- 6) Return probe selector.
 - Probe off: OFF
 - Probe on: ON
 - Factory configuration: **ON**
- 7) Pump working (ON): LED on steady.
- 8) T.S. LED safety temperature. Continuously ON when the limit signalled by the safety thermostat or by the **safety humidostat is reached**. Continuously ON even if the flow/return sensors malfunction (see flow/return sensor paragraph).
- 9) Heating/cooling function switch
- 10) Trimmer for maximum pulse duration on the valve. Adjustable 0,2–6 s. *Factory configuration: 2,5 s.* Pulse value calculation:

$$T_{\text{pulse}} \text{ (s)} = \frac{\text{Actuator rotation time (s)}}{40}$$

Example:

$$T_{\text{actuator rotation}} = 120 \text{ s}$$

$$T_{\text{pulse}} = 120/40 = 3 \text{ s}$$
- 11) Return probe reading delay time trimmer. Adjustable 1–360 s. *Factory configuration: 20 s.*
- 12) Valve-motor mechanical delay recovery trimmer. Adjustable 1–30 s. *Factory configuration: 13 s.*

Operation

The regulator receives the signal from the room thermostat to switch the pump on and to control the mixing valve. The regulator acts on the mixing valve following two operating logics, depending on the state of activation of the return sensor.

Set point regulation: return probe off. Selector 6) OFF.

In this case the flow temperature FT is kept constant at the value set with the selector 5) in both heating and cooling. This setting is shown on the display 1).

Modulating regulation: return probe on. Selector 6) ON.

In this case the flow temperature FT is changed according to the temperature measured by the return probe RT. In this way the actual thermal efficiency of the slab is kept under control and, as a result, the room's thermal load as well. This minimizes the system's thermal response times.

$$RT_{\text{set}} = FT_{\text{set}} - 35\% (FT_{\text{set}} - 20^\circ\text{C})$$

$$FT_{\text{calculated}} = FT_{\text{set}} + (RT_{\text{set}} - RT)$$

Example:

$$FT_{\text{set}} = 40^\circ\text{C}$$

$$RT_{\text{set}} = 40 - 0,35 \cdot (40 - 20) = 33^\circ\text{C}$$

$$FT_{\text{calculated}} = 40 + (33 - RT)$$

The new value of FT calculated is shown on the display 1) with a side bar.

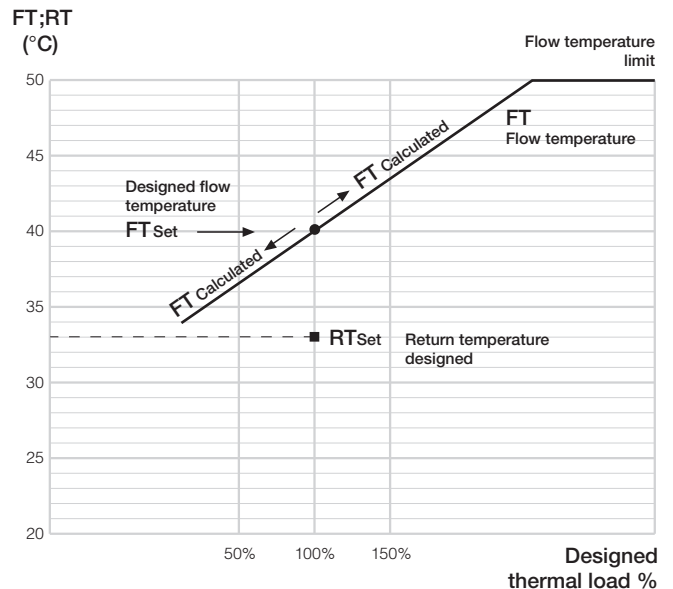
At each update of the FT calculated, the FT measured is displayed for 5 s, thereafter the new FT calculated is shown again.



FT modification stops when RT reaches RT_{set} .

The return probe is not active in the cooling function.

Curve correction graph with return probe

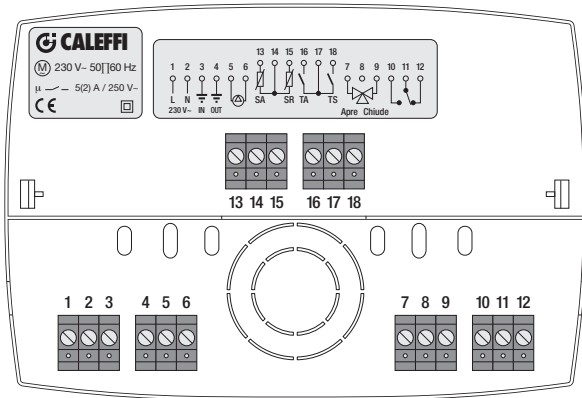


Display

The three-digit LCD displays the following parameters:

- flow temperature set with selector 5).
- After 5 s the measured flow temperature appears.
- measured flow temperature, with return sensor off.
- calculated flow temperature, with return sensor on.
- maximum duration of pulse on the valve, selectable via trimmer 10). Displayed for 5 s.
- return temperature acquisition delay time, selectable via trimmer 11). Displayed for 5 s.
- valve-motor mechanical delay recovery, selectable via trimmer 12). Displayed for 5 s

Back panel



On the back panel there are terminals for the electrical connections of the various components.

Electric supply

- 1 Electric supply 230 V~ "Live"
- 2 Electric supply 230 V~ "Neutral"
- 3 Ground/Earth

Pump command

- 4 Ground/Earth
- 5 Pump command 230 V~ "Live"
- 6 Pump command 230 V~ "Neutral"

Mixer command

- 7 Valve command for opening
- 8 Common C
- 9 Valve command for closing

Auxiliary microswitch

- 10 Auxiliary output N/O
- 11 Auxiliary output common C
- 12 Auxiliary output N/C

Flow/return probe

- 13 Flow temperature probe
- 14 Common C
- 15 Return temperature probe

Ambient thermostat/safety thermostat

- 16 Contact for ambient thermostat
- 17 Contact for common C ambient thermostat / Contact for common C safety thermostat
- 18 Contact for safety thermostat

Heating safety thermostat

If the safety thermostat trips, on detecting a higher flow temperature than the setting, the following state comes into operation: pump OFF, mixing valve closed. The thermostat contact is N/C; if the connection fails, the regulator is not on.

Auxiliary microswitch

The regulator is equipped with an auxiliary microswitch that can be used to control other devices.

Example:

When Heating, to turn the water heater on/off.

N/O contact - Pump stationary - ambient thermostat OFF or safety thermostat on (water heater off).

N/C contact - Pump on - ambient thermostat ON (water heater on).

Contact capacity: 5 A (230 V).

Flow/return probe

The flow/return temperature probes are the NTC type. If the probes detect an ohmic resistance corresponding to short circuiting, the following operating state comes into operation: pump OFF, mixing valve closed, LED 8) on steady.

Sensor resistance values table

°C	Ω	°C	Ω	°C	Ω	°C	Ω	°C	Ω
-20	97.060	10	19.903	40	5.327	70	1.752	100	680
-15	72.940	15	15.714	45	4.370	75	1.480	105	592
-10	55.319	20	12.493	50	3.603	80	1.255	110	517
-5	42.324	25	10.000	55	2.986	85	1.070	115	450
0	32.654	30	8.056	60	2.488	90	915	120	390
5	25.396	35	6.530	65	2.083	95	787	125	340

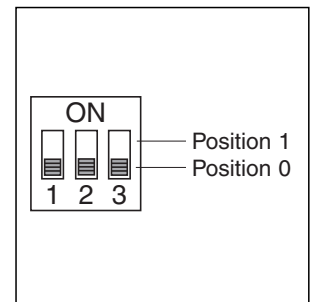
Flow temperature limit for heating

The regulator enables selecting the maximum flow temperature for heating. For this purpose, the regulator base contains specific dialswitches that enable setting different temperature limits.

Factory configuration: - heating max 50°C.

Dipswitch position-temperature limit table

Setting Dipswitch			Limit maximum
0	0	0	50
0	0	1	54
0	1	0	58
0	1	1	62
1	0	0	66
1	0	1	70
1	1	0	74
1	1	1	78



Accessories

738

Digital room chrono-thermostat.

4 operating programmes with ON/OFF spark advance.

Weekly programmable clock.

Fitted for phone programmer.

Three temperature levels + anti-freeze.

30-minute minimum programme.

ON/OFF function with adjustable differential from 0,2 to 2°C or proportional.

Adjustable temperature with 0,1°C steps.

SUMMER/WINTER switch.

1 changeover switch output contact: 8 (2) A.

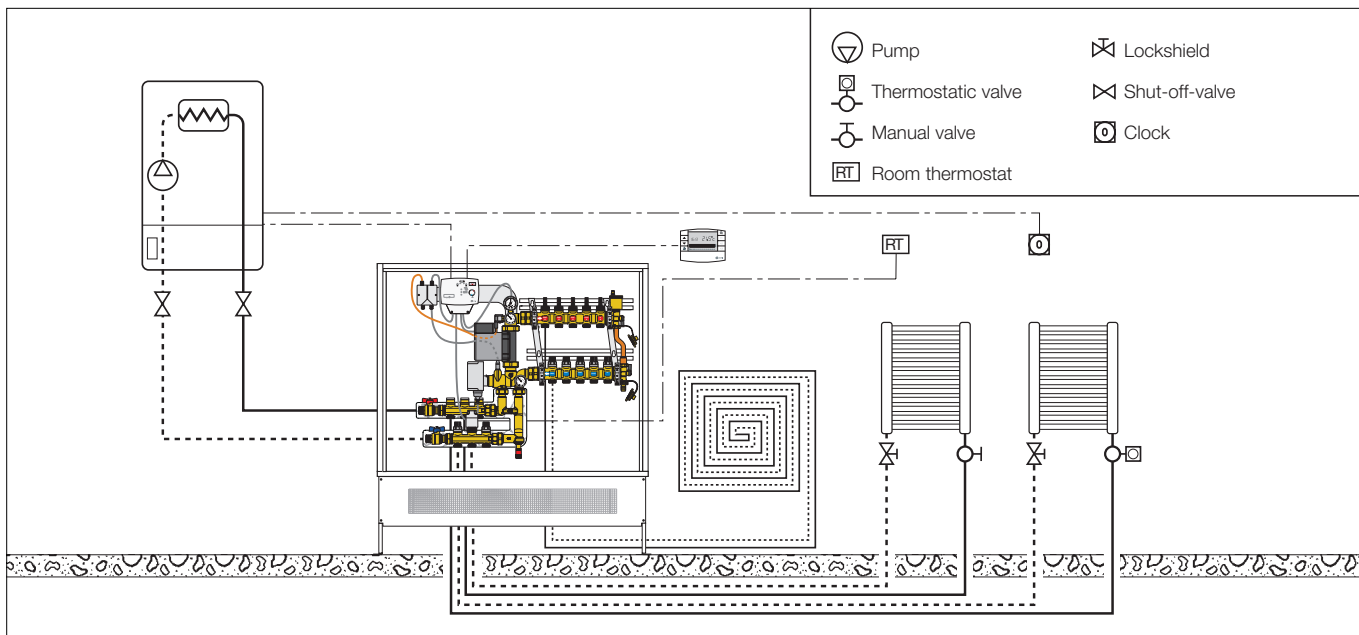
Protection class: IP 30.



Code

738207	120 x 81 x 29 mm	battery supply
738227	120 x 81 x 29 mm	electric supply 230 V
738217	120 x 81 x 29 mm	built-in GSM module - supply 230 V

Application diagram



SPECIFICATION SUMMARIES

Code 1715.1A2L 003

Modulating temperature regulating unit with distribution kit for primary circuit. Connections to the primary circuit 3/4" M (ISO 228-1). Connections to the regulating unit 1" F (ISO 228-1) with nut. Panel circuit outlet connections 3/4" M - Ø 18 mm. Primary circuit manifold outlet connections 3/4" M - Ø 18 mm. Medium: water and glycol solutions; maximum percentage of glycol 30%. Adjustment temperature range 20–78°C. Temperature range at primary circuit inlet 5–100°C. Maximum working pressure 1000 kPa (10 bar). Minimum working pressure 80 kPa (0,8 bar). Panel manifolds differential by-pass setting 25 kPa. Primary circuit differential by-pass setting 2–30 kPa. Temperature gauge scale 0–80°C. Pressure gauge scale 0–10 bar. Complete with: flow manifold for panel system with 5 outlets (from 5 to 12) with brass body, flow rate regulating valve with flow meter with a scale of 1–5 l/min; return manifold for panel system with 5 outlets (from 5 to 12) with brass body, shut-off valve. Regulating unit with motorised three-way valve, three-point actuator, electric supply 230 V - 50/60 Hz, protection class IP 44. Digital regulator, electric supply 230 V - 50/60 Hz, complete with probes measuring temperature of flow and return. Flow adapter unit with brass body. Primary circuit distribution manifolds with 3 outlets, brass body, flow rate regulating and shut-off valves. By-pass kit with brass body, PA6G30 differential by-pass valve and stainless steel spring. Shut-off valves with brass body and chrome plated brass ball. Maximum temperature safety thermostat: factory setting 55°C ±3°C; minimum temperature safety thermostat: factory setting 10°C ±3°C, protection class IP 55, contact rating 10 A / 240 V. High-efficiency ALPHA2 L 25-60 pump, protection class IP 42. Pre-formed PE-X shell insulation for primary circuit. Supplied preassembled in a painted plate box with lock, depth adjustable from 110 to 150 mm, including floor supports adjustable in height from 270 to 410 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.