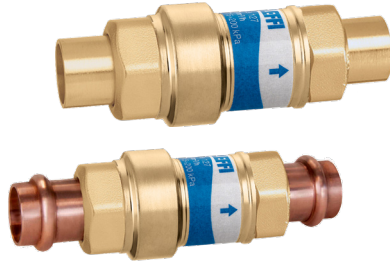


# FlowCal™ compact dynamic automatic flow balancing valve

## 127 series



### Function

The FlowCal™ compact dynamic automatic flow balancing valve is pressure independent and maintains a fixed flow rate within varying system differential pressure ranges. It eliminates the need for onsite measurements and trial and error flow rate settings as required with manual calibration valves.

The design incorporates an exclusive flow cartridge, made of an anti-scale, low noise polymer and a compact low-lead brass valve body for use in hydronic and domestic water systems.

The FlowCal balancing valve is available with NPT male, sweat, press, PEX crimp and PEX expansion union connections. The union nut makes installation and maintenance fast, easy and efficient for a variety of tailpiece options.

### Product range

127 series FlowCal™ compact dynamic automatic flow balancing valve, with polymer cartridge .....  
 sizes 1/2", 3/4", 1" with NPT male, sweat, press, PEX crimp or PEX expansion union connections

### Technical specifications

#### Materials

Body: DZR low-lead brass (<0.25% Lead content)  
 Flow cartridge: anti-scale polymer  
 Spring: stainless steel  
 Seals: peroxide-cured EPDM

#### Performance

Medium: water, glycol solutions

Max. percentage of glycol: 50%  
 Max. working pressure: 232 psi (16 bar)

Working temperature range: 32-212° F (0-100° C)  
 Connections: 1/2", 3/4" and 1" NPT male, sweat or press union  
 Lay length (press connection): size 1/2 and 3/4 inch: 3 5/8"  
 size 1 inch: 4 1/16"

Flow Rate: 21 fixed flow rate settings  
 ranging from 0.35 - 10 GPM

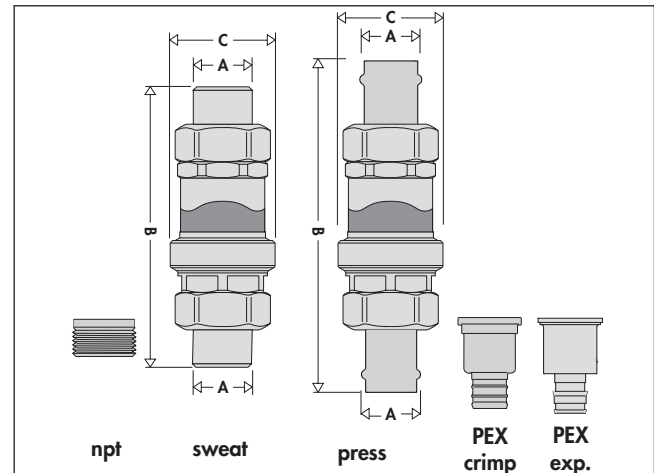
Flow Accuracy: ±10%  
 Differential Pressure Control Ranges: 2-14, 2-32, 4-34, 5-35 psid

### Certifications

1. NSF/ANSI 372, Drinking Water System Components-Lead Content Reduction of Lead in Drinking Water Act, California Health and Safety Code 116875 S.3874, Reduction in Drinking Water Act, Vermont Act 193 - The Lead in Plumbing Supplies Law and Maryland's Lead Free Law HB.372, certified by ICC-ES, file PMG-1360.
2. PEX crimp fittings certified to ASTM F 1807.
3. PEX expansion fittings certified to ASTM F 1960.

US Patent: 7,246,635 B2.

### Dimensions



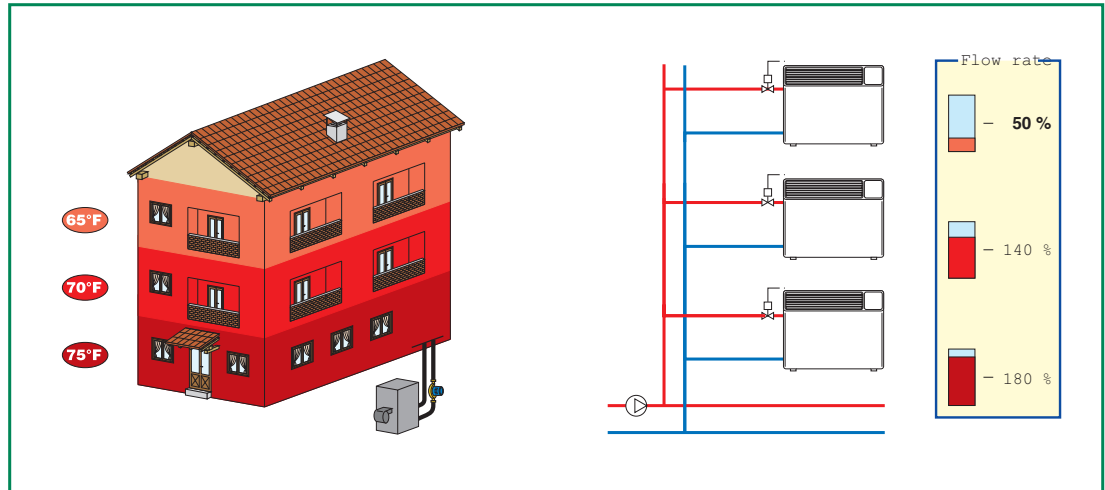
| Code        | A                  | B        | C       | Weight (lb) |
|-------------|--------------------|----------|---------|-------------|
| 127341AF... | 1/2" npt male      | 5 13/16" | 1 9/16" | 1.0         |
| 127349AF... | 1/2" sweat         | 4 1/4"   |         | 0.8         |
| 127346AF... | 1/2" press         | 5 1/8"   |         | 1.0         |
| 127347AF... | 1/2" PEX crimp     | 6 1/4"   |         | 1.0         |
| 127342AF... | 1/2" PEX expansion | 6 3/8"   |         | 1.0         |
| 127351AF... | 3/4" npt male      | 5"       |         | 1.0         |
| 127359AF... | 3/4" sweat         | 4 13/16" |         | 0.8         |
| 127356AF... | 3/4" press         | 5 5/8"   |         | 1.0         |
| 127357AF... | 3/4" PEX crimp     | 6 5/16"  |         | 1.0         |
| 127352AF... | 3/4" PEX expansion | 7 1/16"  |         | 1.0         |
| 127361AF... | 1" npt male        | 5 5/8"   |         | 1.2         |
| 127369AF... | 1" sweat           | 6"       |         | 1.0         |
| 127366AF... | 1" press           | 5 13/16" |         | 1.3         |
| 127367AF... | 1" PEX crimp       | 6 3/8"   |         | 1.3         |
| 127362AF... | 1" PEX expansion   | 7 3/8"   |         | 1.3         |

## Circuit balancing

Modern heating and air-conditioning systems have to guarantee a high level of thermal comfort with a low energy consumption. This means supplying the system terminals with the correct design flow rates, to produce balanced hydraulic circuits.

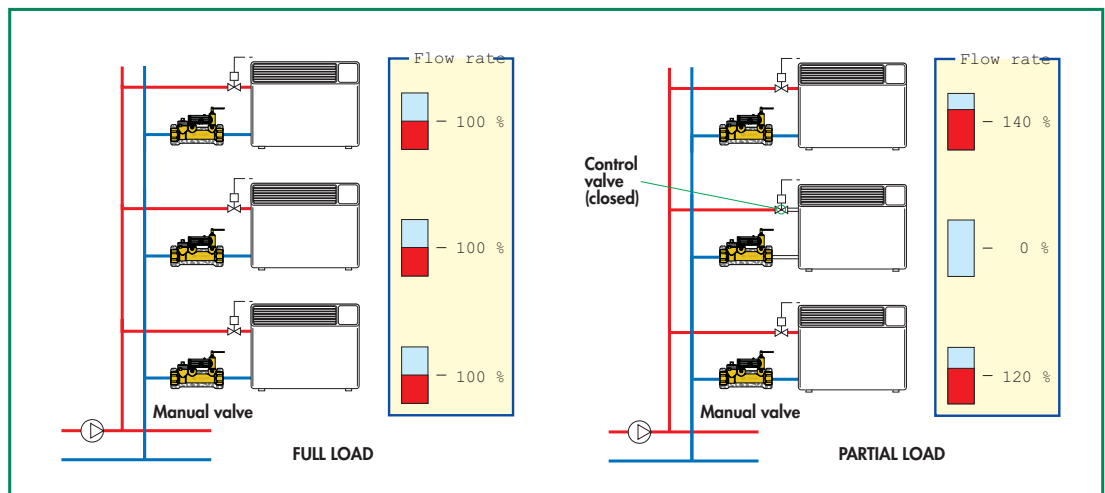
### Unbalanced circuits

In case of an unbalanced circuit, the hydraulic imbalance between emitters creates areas with temperatures which are not uniform, and, as a consequence, problems with thermal comfort and high energy consumption.



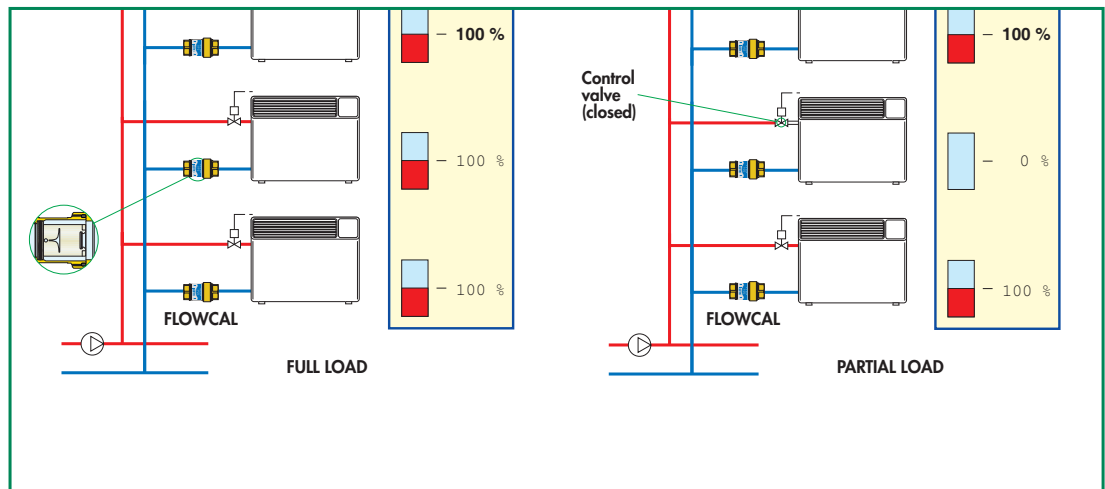
### Circuits balanced with manual valves

Traditionally, hydraulic circuits are balanced using manual calibration valves. With these static-type devices, such circuits are difficult to balance perfectly and have operating limitations in case of partial closure by means of the control valves. The flow rate in the open circuits **does not remain constant at the nominal value.**



### Circuits balanced with FlowCal

FlowCal balances the hydraulic circuit by automatically controlling the design flow rate to each emitter. Even with some circuits partially closed by the control valves, the flow rates in the open circuits **remain constant at the nominal value.** The system always provides the greatest comfort and the highest energy savings.



# FlowCal Compact Dynamic Automatic Flow Balancing Valves

## Function

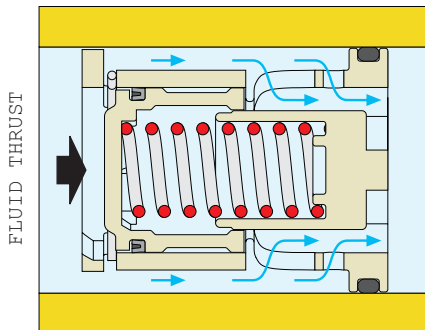
The FlowCal automatic flow balancing valve guarantees a constant flow rate when the upstream/downstream pressure differential varies.

It is therefore necessary to refer to the  $\Delta p$  vs. flow rate diagram and to a basic diagram illustrating the operation methods and the relevant variable effects.

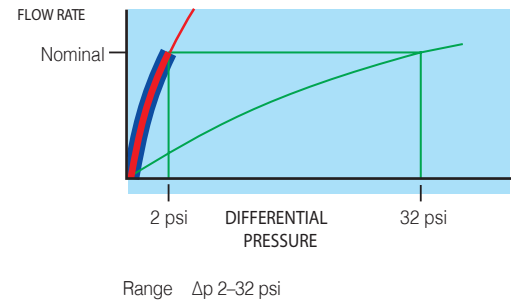
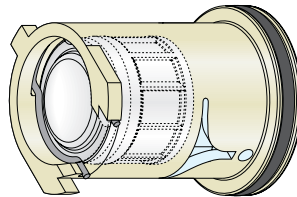
## Operating principle

The FlowCal flow cartridge is composed of a cylinder, a spring-loaded piston, and a combination of fixed and variable geometric orifices through which the fluid flows. These variable orifice sizes increase or decrease by the piston movement, contingent on the system's fluid thrust. A specially calibrated spring counteracts this movement to regulate the amount of fluid which may pass through the valve orifices, maintaining a balanced system. FlowCal valves are high performance automatic flow balancing valves which control selected flow rates within a tight tolerance (approximately 10%) and offer a wide range of operation.

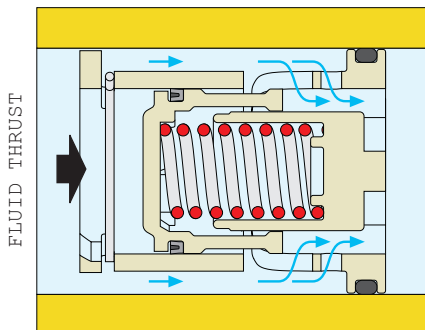
### Below the differential pressure control range (< 2 psid)\*



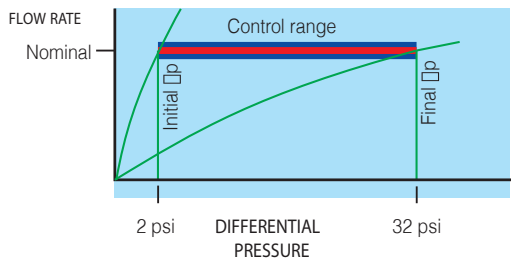
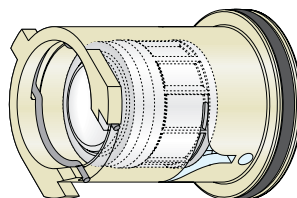
In this case, the spring-loaded regulating piston remains in equilibrium without compressing the spring and gives the fluid the maximum free flow area. When below the differential pressure control range the piston acts as a fixed orifice and thus the flow rate through the FlowCal depends only on the differential pressure.



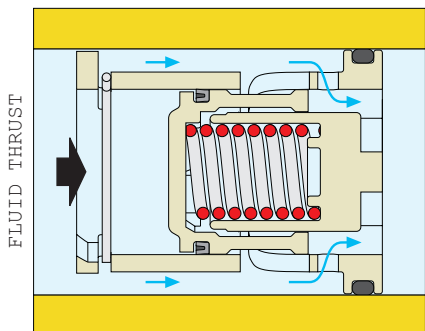
### Within the differential pressure control range (2 - 32 psid)\*



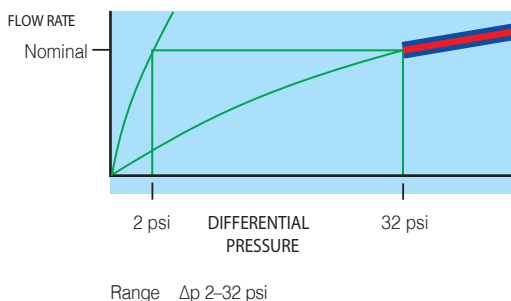
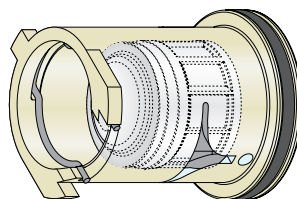
If the differential pressure is within the control range, the spring-loaded piston is positioned to give the fluid a free flow area permitting regular flow at the **nominal rate** for which the FlowCal is set up.



### Above the differential pressure control range (> 32 psid)\*



In this case, the spring-loaded piston fully compresses a spring and leaves only the fixed orifice for the fluid to pass through. The flow rate through the FlowCal depends only on the differential pressure.

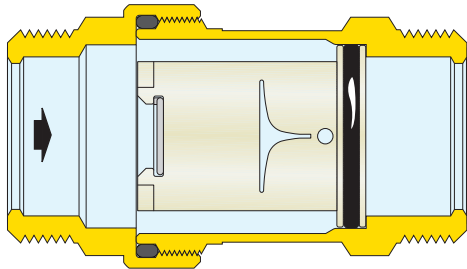


\*These values are for this example. The same logic applies to the other Differential Pressure Control Ranges: 2 - 14, 4 - 34, and 5 - 35 psid.

Construction details

Polymer flow cartridge

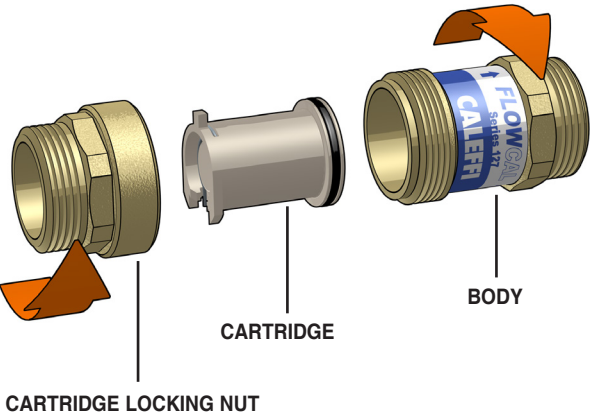
The flow rate cartridge is made of an anti-scale polymer, specially engineered for use in cooling, heating and domestic water systems, to prevent mineral buildup in a wide range of working temperatures. It features high resistance to the abrasion caused by continuous fluid flow, is insensitive to the deposit of scale and is fully compatible with glycols and additives used in circuits.



Exclusive design

With its exclusive design, the flow cartridge is able to accurately control the flow rate in a wide range of operating pressures. A special internal chamber acts as a damper for the vibrations triggered by the fluid flow, allowing low noise operating conditions to the device.

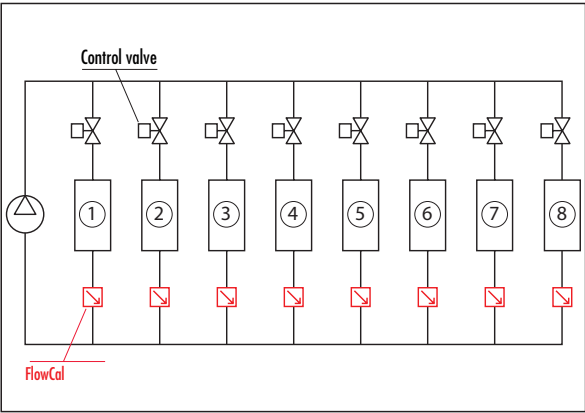
For these reasons it can be used in systems on zone branch circuits or directly at the terminals.



Pump Sizing using FlowCal

Size the hydronic system with FlowCal automatic balancing valves as follows:

1.  $\Delta P_{MAXCIRCUIT}$   
Determine the pressure head loss for the zone circuit with the greatest pressure drop (flow resistance). This is true for any hydronic system with supply and return headers. As an example, this would be circuit #8 for the 2-pipe direct return system with circuits having identical resistance, illustrated to the right, as it is farthest from the pump. If, however, all circuits are not identical, choose the circuit with the greatest pressure drop.
2.  $\Delta P_{MINFlowCal}$   
Add the minimum differential operating pressure (2, 4, or 5 psid) required for the FlowCal™ model selected for the circuit with the greatest pressure drop.
3.  $PUMP\ HEAD = \Delta P_{MAXCIRCUIT} + \Delta P_{MINFlowCal}$



Flow rate table

| Code                 | Size | Flow rates (gpm)                                                                                                              |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|----------------------|------|-------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| <b>12734</b> xAF ... | 1/2" | 0.35; 0.50; 0.75; 1.00; 1.30; 1.50; 1.75; 2.00; 2.20; 2.50; 2.60; 3.00; 3.50; 4.00; 4.50; 5.00; 6.00; 7.00; 8.00; 9.00; 10.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>12735</b> xAF ... | 3/4" | 0.35; 0.50; 0.75; 1.00; 1.30; 1.50; 1.75; 2.00; 2.20; 2.50; 2.60; 3.00; 3.50; 4.00; 4.50; 5.00; 6.00; 7.00; 8.00; 9.00; 10.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| <b>12736</b> xAF ... | 1"   | 0.35; 0.50; 0.75; 1.00; 1.30; 1.50; 1.75; 2.00; 2.20; 2.50; 2.60; 3.00; 3.50; 4.00; 4.50; 5.00; 6.00; 7.00; 8.00; 9.00; 10.00 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

$\Delta p$  range (psid)

|      |
|------|
| 2-14 |
| 2-32 |
| 4-34 |
| 5-35 |

Minimum differential pressure required

This is equal to the minimum working  $\Delta p$  of the FlowCal cartridge: 2, 4 or 5 psi (13, 27 or 31 kPa).

## Order Code Numbering for FlowCal 127 series



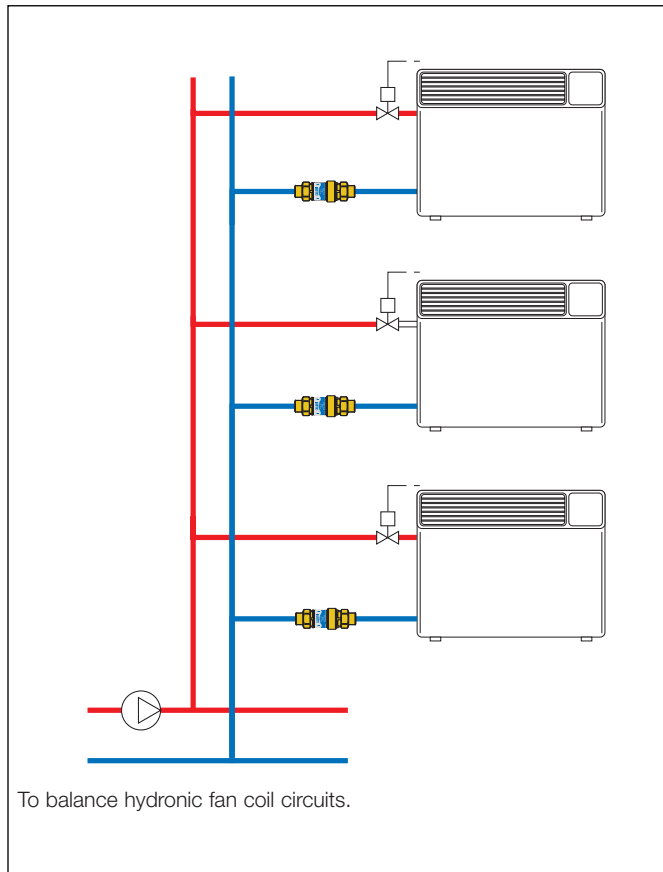
| *Code      | Description    | *Code      | Description    | *Code      | Description  |
|------------|----------------|------------|----------------|------------|--------------|
| 127341AF.. | 1/2" npt male  | 127351AF.. | 3/4" npt male  | 127361AF.. | 1" npt male  |
| 127342AF.. | 1/2" PEX exp.  | 127352AF.. | 3/4" PEX exp.  | 127352AF.. | 1" PEX exp.  |
| 127346AF.. | 1/2" press     | 127356AF.. | 3/4" press     | 127366AF.. | 1" press     |
| 127347AF.. | 1/2" PEX crimp | 127357AF.. | 3/4" PEX crimp | 127367AF.. | 1" PEX crimp |
| 127349AF.. | 1/2" sweat     | 127359AF.. | 3/4" sweat     | 127369AF.. | 1" sweat     |

All fittings are union style.

| Flow rate (GPM) | Last 3 digits<br>*(AF__) | $\Delta P$ control<br>ranges (psid) |
|-----------------|--------------------------|-------------------------------------|
| 0.35            | G35                      | 2 - 14                              |
| 0.50            | G50                      |                                     |
| 0.75            | G75                      |                                     |
| 1.00            | 1G0                      | 2 - 32                              |
| 1.30            | 1G3                      |                                     |
| 1.50            | 1G5                      |                                     |
| 1.75            | 1G7                      |                                     |
| 2.00            | 2G0                      |                                     |
| 2.20            | 2G2                      |                                     |
| 2.50            | 2G5                      |                                     |

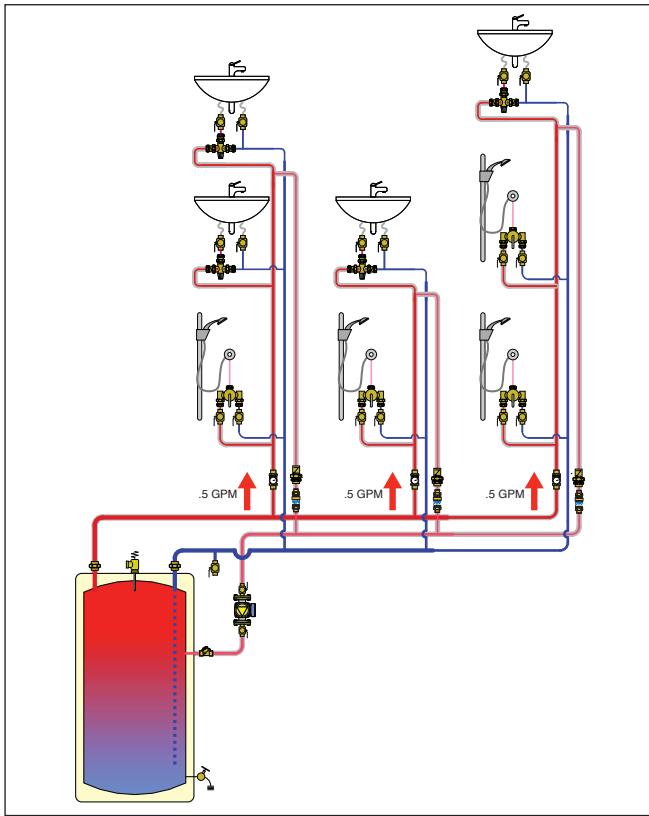
| Flow rate (GPM) | Last 3 digits<br>*(AF__) | $\Delta P$ control<br>ranges (psid) |
|-----------------|--------------------------|-------------------------------------|
| 2.60            | 2G6                      | 2 - 32                              |
| 3.00            | 3G0                      |                                     |
| 3.50            | 3G5                      |                                     |
| 4.00            | 4G0                      |                                     |
| 4.50            | 4G                       |                                     |
| 5.00            | 5G0                      | 4 - 34                              |
| 6.00            | 6G0                      |                                     |
| 7.00            | 7G0                      |                                     |
| 8.00            | 8G0                      | 5 - 35                              |
| 9.00            | 9G0                      |                                     |
| 10.00           | 10G                      |                                     |

## Application Diagram

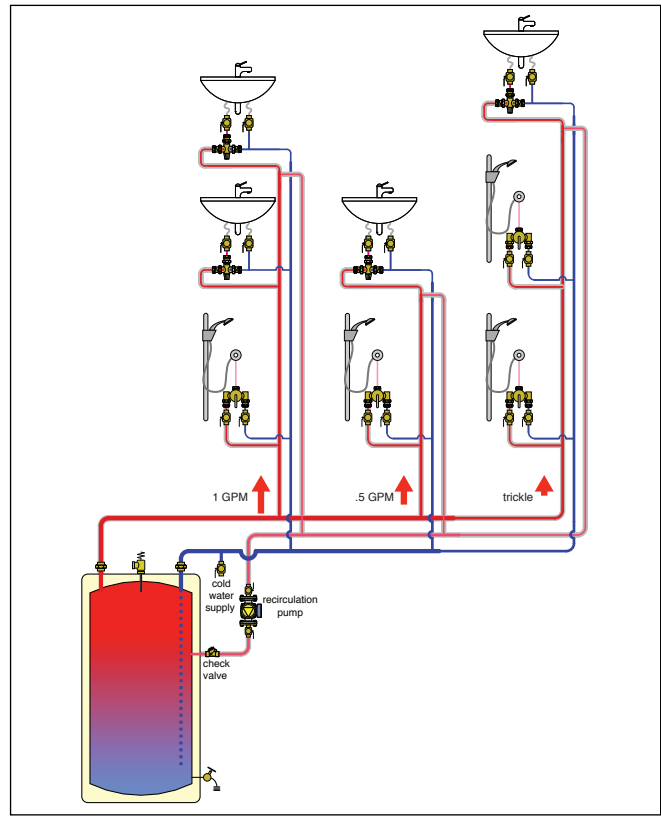


## Hot water recirculation

### Balanced example



### Unbalanced example



### Balancing made fast, easy, and accurate with the Caleffi FlowCal 127 series balancing valve

Hot water recirculation systems are designed to minimize wait time for hot water to arrive when a fixture is opened. Systems left unbalanced or improperly balanced result in wasted water down the drain, a costly and environmentally unfriendly situation - not to mention the undesired annoyance placed on building occupants. Multiple hot and cold water risers are supplied from common hot and cold water mains. The number and type of fixtures served by each set of risers will often be different. A recirculation riser accompanies each set of hot and cold risers. A single circulator provides recirculation flow through the entire system. This type of piping network is similar to a 2-pipe direct return distribution system for hydronic heating. Because of differences in the lengths or sizes of both the main piping and riser piping, the recirculation flow through each set of risers is likely to be different. This can lead to different temperature drops between the beginning of a given hot water riser and the end of its associated return riser. This may cause the hot water temperature arriving at a distant fixture to be insufficient for the intended usage. This situation can be corrected by "balancing" the recirculation flow between the various sets of risers. The goal of such balancing is to establish recirculation flow rates that create equal temperature drop between the start of each hot water riser and the end of its associated return (recirculation) riser.

Balancing is enabled with the FlowCal pressure independent low-lead balancing valve, with fixed flow rate, presuming riser flow rates have been computed in advance. These valves will control to the design flowrate without the worry of pressure differentials. For added convenience to properly install this system as depicted, Caleffi offers a union with temperature gauge, code NA102 series, to be installed on each riser, and an in-line flow check valve, code NA510 series, to be installed ahead of each FlowCal balancing valve on the return line, pictured in the "balanced" diagram above.

## SPECIFICATION SUMMARY

### 127 series

Compact dynamic automatic pressure independent flow balancing valve with polymer flow cartridge FlowCal™. Connections ½", ¾", 1" NPT male, sweat, press, PEX crimp and PEX expansion union. PEX crimp fittings must comply with ASTM F 1807. PEX expansion fittings must comply with ASTM F 1960. DZR low-lead brass body (<0.25% lead content) certified by ICC-ES file PMG-1360. Anti-scale polymer cartridge. Stainless steel spring. Peroxide-cured EPDM seals. Water and up to 50% maximum glycol solutions. Maximum working pressure 232 psi (16 bar). Working temperature range 32 to 212 degrees F (0 to 100 degrees C). Δp range 2–35 psi. Range of available flow rates for all connection sizes 0.35 - 10.00 gpm. Accuracy ±10%.

*We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.*



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