







## DISTRIBUTION MANIFOLD

The entire modular distribution manifold has been designed to be easily assembled on a bench and afterwards hooked onto wall brackets. This feature facilitates preparation of the probes and simple connection to the manifold. The manifold is modular to allow it to be adapted to small residential systems in which the number of probes generally vary from 2 to 8. The number of single modules used is defined by the number of probes. The manifold is also available in a preassembled version.



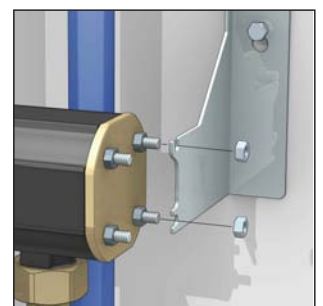
The modules have been designed to limit condensation. An air gap isolates the medium from the outside environment.

Two brass blind end plugs and four tie-rods permit compaction of the modules. A seal in between isolates the water duct and the single air chambers.



The manifold is reversible to adapt the position of the probes with respect to the heat pump.

The bracket can be secured to a wall with no manifold so as to facilitate connecting the probes.

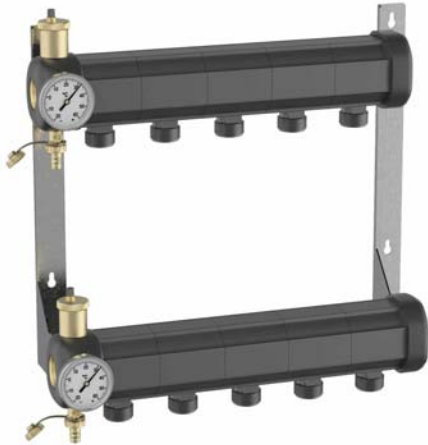


## DISTRIBUTION MANIFOLD

### 110

Preassembled ground source manifold.  
Complete with:

- automatic air vents;
- temperature gauges Ø 80 mm;
- fill/drain cocks;
- flow and return manifolds;
- blind end plugs with insulation;
- wall brackets;
- set of labels for direction of flow and circuit identification;
- wall fixing anchors.



Body made of polymer PA66G30.  
Max. working pressure: 6 bar.  
Pmax system test: 10 bar.  
Working temperature range: -10–60°C.  
Ambient temperature range: -20–60°C.  
Medium: water, glycol solutions, saline solutions.  
Maximum percentage of glycol: 50%.  
Manifold DN 50.  
End connection: 1 1/4".  
Outlet connection: 42 p.2,5 TR.  
Outlet centre distance: 100 mm.  
Outlet connections with mechanical seal for shut-off valves  
111 series, balancing valves 112 series and flow meters 113 series.

Code

<b>1107B5</b>	2 circuits
<b>1107C5</b>	3 circuits
<b>1107D5</b>	4 circuits
<b>1107E5</b>	5 circuits
<b>1107F5</b>	6 circuits
<b>1107G5</b>	7 circuits
<b>1107H5</b>	8 circuits



### 110

Modular manifold single module.

Body made of polymer PA66G30.  
Max. working pressure: 6 bar.  
Pmax system test: 10 bar.  
Working temperature range: -10–60°C.  
Ambient temperature range: -20–60°C.  
Medium: water, glycol solutions, saline solutions  
Maximum percentage of glycol: 50%.  
Manifold DN 50.  
Outlet connections with mechanical seal for shut-off valves  
111 series, balancing valves 112 series and flow meters 113 series.

Code

**110700**

### 110

Assembly kit for modular manifolds.



Complete with:

- brass end fitting with automatic air vent, fill/drain cock;
- brass blind end plug;
- pre-formed shell insulation;
- screws and bolts for tie-rods and brackets;
- set of labels for direction of flow and circuit identification;
- temperature gauge with pocket (-20–60°C);
- No. 2 seals gaskets.

Max. working pressure: 6 bar.

Pmax system test: 10 bar.

Working temperature range: -10–60°C.

Ambient temperature range: -20–60°C.

Medium: water, glycol solutions, saline solutions.

Maximum percentage of glycol: 50%.

Code

**110750**



### 110

Stainless steel tie-rods  
for assembling modular manifolds.  
M8 threaded stainless steel bar.

Code

**110012** for manifold with 2 circuits

**110013** for manifold with 3 circuits

**110014** for manifold with 4 circuits

**110015** for manifold with 5 circuits

**110016** for manifold with 6 circuits

**110017** for manifold with 7 circuits

**110018** for manifold with 8 circuits



### 110

Pair of stainless steel brackets  
to secure modular manifolds.  
Rapid wall coupling system.  
System for rapidly coupling  
the manifold on the brackets.  
With screws and plugs.

Code

**110001**

## SHUT-OFF AND BALANCING DEVICES



### 111

Ball shut-off valve fitted for integrated flow rate measuring sensor.  
 Brass body. Polymer top plug.  
 Female connections with captive nut and fitting for polyethylene pipe.  
 Max. working pressure: 6 bar.  
 Pmax system test: 10 bar.  
 Working temperature range: -10–60°C.  
 Ambient temperature range: -20–60°C.  
 Medium: water, glycol solutions, saline solutions.  
 Maximum percentage of glycol: 50%.  
 Connection to manifold: 42 p.2,5 TR.

**Patent application No. MI2010A000476.**

Code	Connection
111620	Ø 25
111630	Ø 32
111640	Ø 40



### 111

Pre-formed insulation for shut-off valves.  
 Material: closed cell expanded PE-X.  
 Thickness: 10 mm.  
 Density: inner part 30 kg/m<sup>3</sup>, outer part 80 kg/m<sup>3</sup>.  
 Thermal conductivity (DIN 52612):  
 at 0°C: 0,038 W/(m·K); at 40°C: 0,045 W/(m·K).  
 Coefficient of resistance to water vapour (DIN 52615): > 1.300.  
 Working temperature range: 0÷100°C.  
 Reaction to fire (DIN 4102): class B2.

Code	
111001	for Ø 25 - Ø 32
111003	for Ø 40



### 130

Flow rate electronic measuring station for connecting sensor with Vortex effect. Complete with:

- box;
- power supply unit;
- control lever;
- measuring sensor with Vortex effect;
- connecting cable;
- seal ring sensor.

Rechargeable battery NiMh 9 V.  
 Complete with battery charger.  
 Flow rate scale: l/h - l/min - GPM.  
 Flow rate range: 300÷1400 l/h.  
 Accuracy: ±10%.  
 Protection class: IP 44.

Code	
130010	



### 111

Integrated flow rate measuring sensor with Vortex effect.  
 Accuracy: ±10%.

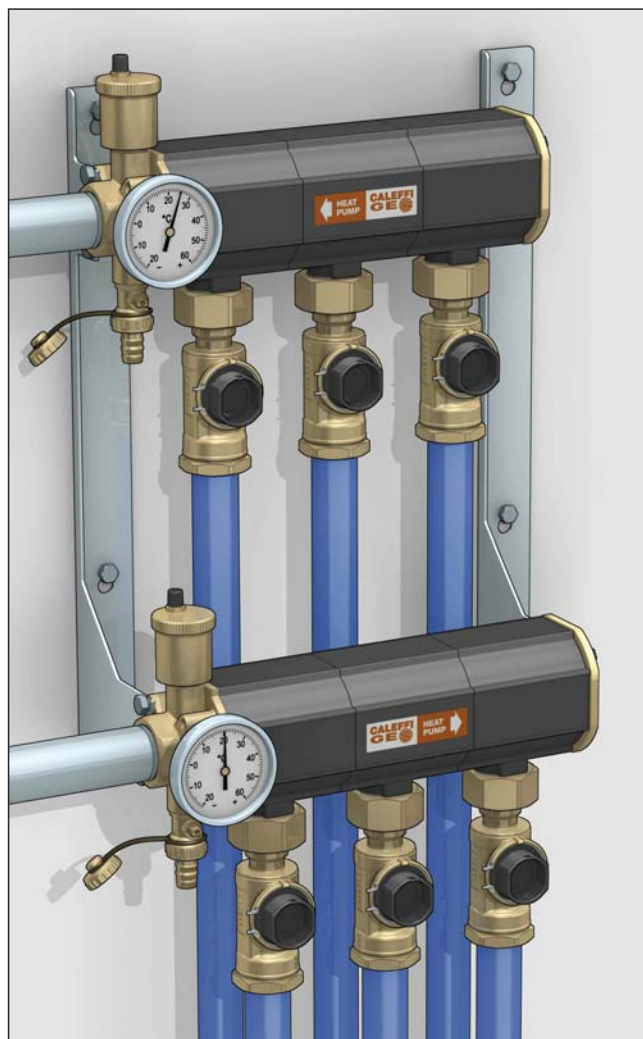
Code	
111010	



### 111

Control lever for shut-off valves.  
 Polymer body.

Code	
111002	



The manifold has been designed for both vertical use, anchored to a wall, and horizontal use, for example in a pit.



## SHUT-OFF AND BALANCING DEVICES

### Circuit balancing

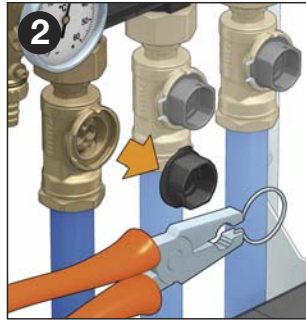
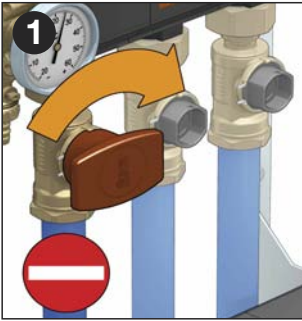
Flow rate balancing in the probes is essential to ensure correct thermal exchange. Before balancing it is necessary to insert the flow rate measuring sensor into each shut-off valve of the flow manifold. Each single valve is provided with a plug, anchored with an elastic ring that isolates the holes made in the ball.



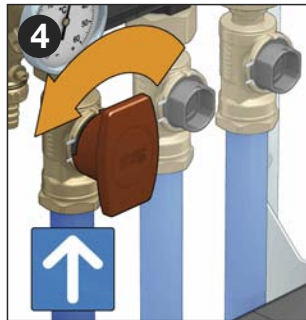
**ATTENTION: The plug and sensor can be removed with the valve in closed position only. In case of horizontal installations, drain pressure using the back cock, after valve closure.**

To swap this plug with the sensor you need to:

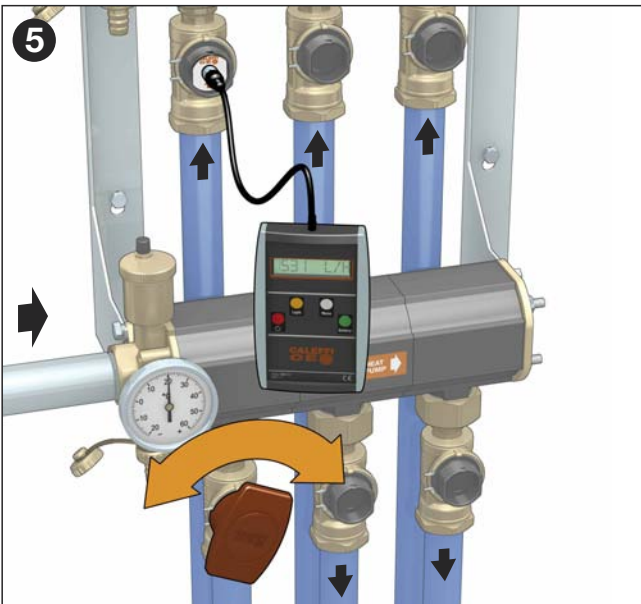
1. Close the valve with the knob.
2. Remove the seal and extract the plug.



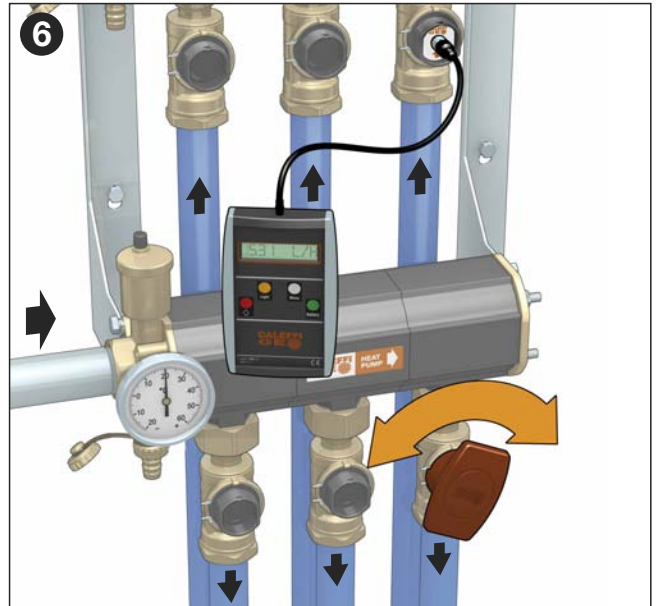
3. Insert the measuring sensor and retain it with the seal.
4. Reopen the valve with the knob.



5. After carrying out these operations on all the outlets it is possible to connect the electronic measurer to the sensor of the first branch and measure the corresponding flow rate. The flow rate is adjusted with the special knob to adjust the shut-off valve on the return manifold in correspondence with the same circuit until the instrument indicates the design setting.



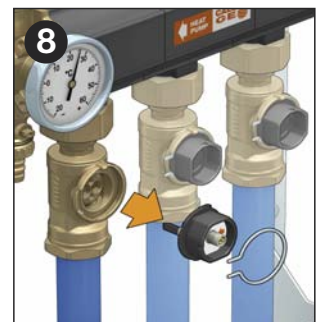
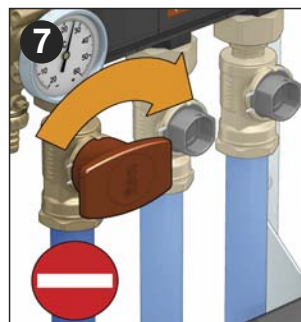
6. This operation must be repeated on the following branches to obtain the desired flow rate.



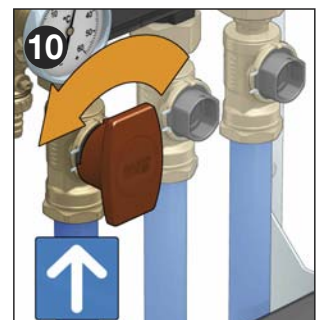
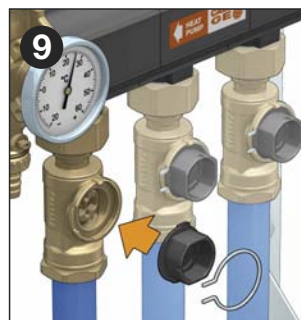
During the flow rate measurement, the sensor creates no significant head losses and therefore causes no significant changes in the actual flow rate.

After balancing, disconnect the electronic measurer and put the shut-off valves back into their standard operating condition as follows:

7. Close the valve with the knob.
8. Remove the seal and extract the sensor.



9. Fit the plug back in and secure it with the seal.
  10. Reopen the valve with the knob.
- Repeat the process for all the circuits.



## SHUT-OFF AND BALANCING DEVICES



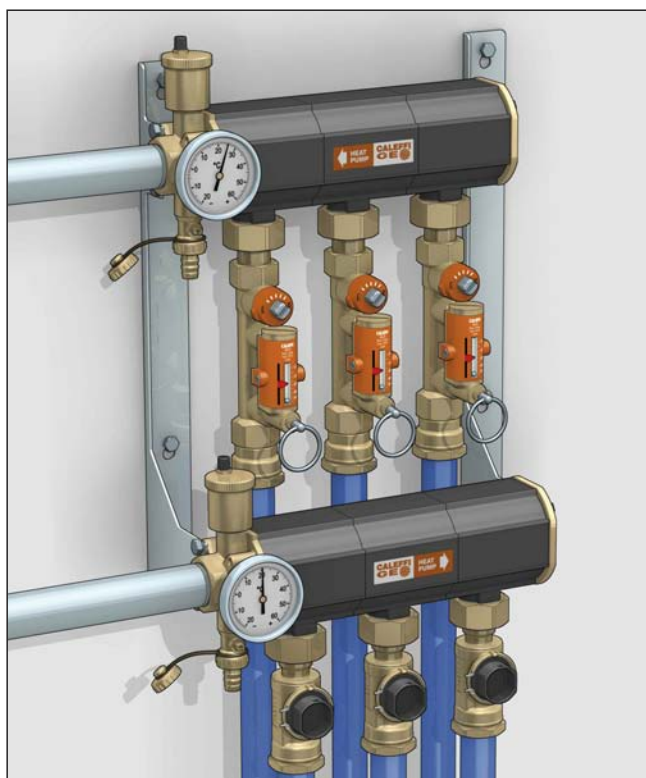
### 112

Balancing valve with flow meter.  
Direct reading of flow rate.  
Ball valve for flow rate adjustment.  
Graduated scale flow meter with magnetic movement flow rate indicator.  
Brass valve body and flow meter.  
Female connections with captive nut and fitting for polyethylene pipe.  
Max. working pressure: 10 bar.  
Working temperature range: -10–110°C.  
Ambient temperature range: -20–60°C.  
Medium: water, glycol solutions, saline solutions.  
Maximum percentage of glycol: 50%.  
Accuracy: ±10%.  
Connection to manifold: 42 p.2,5 TR.

Code	Connection	Scale (m³/h)
112621	Ø 25	0,3–1,2
112631	Ø 32	0,3–1,2
112641	Ø 40	0,3–1,2

#### Construction details

On 112 series valves, the flow rate reading is given directly by a flow meter, obtained with a by-pass on the body of the device, which can be automatically cut off during normal operation.



The use of a flow meter greatly simplifies the process of system balancing, since the flow rate can be measured and controlled at any time and there is no need for differential pressure gauges or reference charts.



### 112

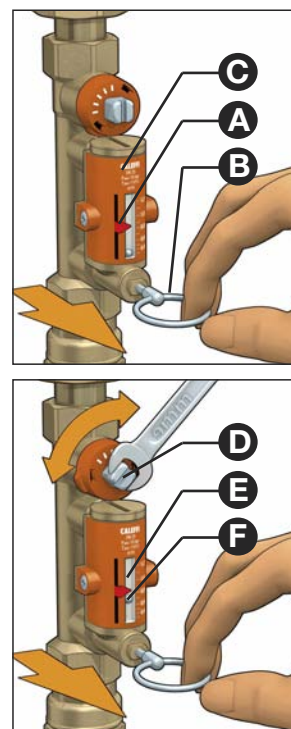
Pre-formed insulation for balancing valves.  
Material: closed cell expanded PE-X.  
Thickness: 10 mm.  
Density:  
inner part 30 kg/m³, outer part 80 kg/m³.  
Thermal conductivity (DIN 52612):  
at 0°C: 0,038 W/(m·K); at 40°C: 0,045 W/(m·K).  
Coefficient of resistance  
to water vapour (DIN 52615): > 1.300.  
Working temperature range: 0÷100°C.  
Reaction to fire (DIN 4102): class B2.

Code

112001	for Ø 25 - Ø 32
112003	for Ø 40

#### Flow rate adjustment

1. With the aid of the indicator (A), mark the reference flow rate at which the valve is to be set.
2. Use the ring (B) to open the obturator that shuts off the flow of medium in the flow meter (C) under normal operating conditions.
3. Keeping the obturator open, use a wrench on the valve's control stem (D) to adjust the flow rate.  
It is indicated by a metal ball (E) that runs inside a transparent guide (F) next to which there is a graduated scale in m³/h.
4. After completing the balancing, release the ring (B) of the flow meter obturator which, thanks to an internal spring, will automatically go back into the closed position.



5. On completing the adjustment, the indicator (A) can be used to keep the setting in memory, in case checks need to be made over time.

The versatility of the balancing valve in no way impairs installation with a horizontal manifold.



## SHUT-OFF AND BALANCING DEVICES



### 113

Float flow meter.  
Brass body.  
Female connections with captive nut and fitting for polyethylene pipe.  
Max. working pressure: 10 bar.  
Working temperature range: -10–110°C.  
Ambient temperature range: -20–60°C.  
Medium: water, glycol solutions, saline solutions.  
Maximum percentage of glycol: 50%.  
Connection to manifold: 42 p.2,5 TR.



### 113

Pre-formed insulation for float flow meter  
Ø 25 and Ø 32 mm.  
Material: closed cell expanded PE-X.  
Thickness: 10 mm.  
Density:  
inner part 30 kg/m<sup>3</sup>, outer part 80 kg/m<sup>3</sup>.  
Thermal conductivity (DIN 52612):  
at 0°C: 0,038 W/(m·K); at 40°C: 0,045 W/(m·K).  
Coefficient of resistance  
to water vapour (DIN 52615): > 1.300.  
Working temperature range: 0÷100°C.  
Reaction to fire (DIN 4102): class B2.

Code

**113001** for Ø 25 - Ø 32

Code	Connection	Scale (m <sup>3</sup> /h)
<b>113621</b>	Ø 25	0,3–1,2
<b>113631</b>	Ø 32	0,3–1,2

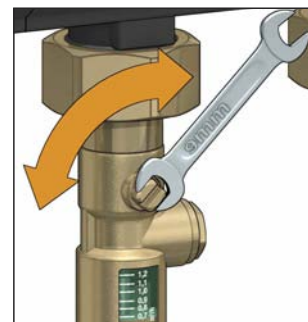
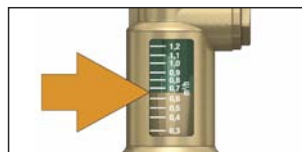
### Flow meter

The flow meter is a floating gauge that measures fluid movement, and has a built-in adjustable flow limiter. It works within a range of 0,3–1,2 m<sup>3</sup>/h.

**The flow meter must be fitted in a vertical position only.**



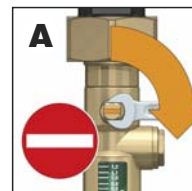
The flow rate in each probe is indicated by the top edge of the float and can be modified by turning a 9 mm spanner on the ball valve.



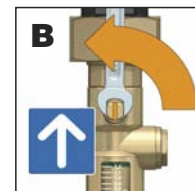
### Full closing and opening of the valve

The valve can be fully opened or closed. A slot on the obturator stem indicates the status of the valve.

**Fully closed**



**Fully open**



### Correction for liquids with different densities

To have the actual flow rate when using glycol solutions at low temperature it is necessary to multiply the reading of the float flow meter by a corrective factor of:

- 0,9 for concentrations of 20-30%
- 0,8 for concentrations of 40-50%

Horizontal installation of the manifold is not allowed when flow meters are used.



## INSTRUMENT HOLDER

### 115

Instrument and accessories holder for heat pumps complete with steel anchoring base.



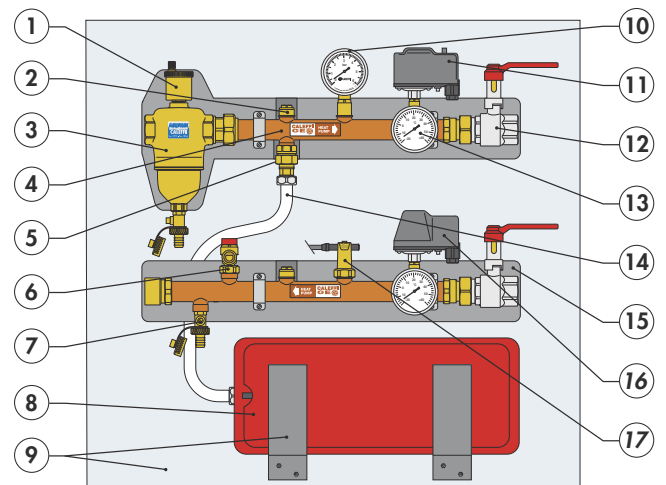
### 115

Box for coupling with instrument holder anchoring base 115 series. In painted steel. Inspection box and frame in white painted sheet steel,



Code	Dimensions (h x w x d)
115080	900 x 860 x 175

#### Characteristic components



Connections: female.  
 Max. working pressure: 3,5 bar.  
 Working temperature range: -20–90°C (temperature gauges 60°C).  
 Ambient temperature range: -10–55°C.  
 Medium: water, glycol solutions, saline solutions.  
 Maximum percentage of glycol: 50%.  
 A saline solution can be used as the medium, changing the provided pressure gauge with the steel one code 557596.

Code	
115700	1 1/4"

- 1) Automatic air vent
- 2) No. 2 1/2" pockets for temperature probes
- 3) Dirt separator with automatic air vent and drain cock
- 4) Copper instrument holder
- 5) Automatic shut-off cock, for expansion vessel
- 6) Safety valve with adjustable outlet
- 7) Fill/drain cocks
- 8) Expansion vessel capacity 7,5 litres
- 9) Anchoring plate (box bottom) complete with support brackets
- 10) Pressure gauge conforming to I.S.P.E.S.L.
- 11) I.S.P.E.S.L. approved minimum pressure switch
- 12) No. 2 shut-off valves with extended lever to facilitate use when there is insulation
- 13) No. 2 temperature gauges Ø 80 mm
- 14) Hose for connecting expansion vessel
- 15) Pre-formed shell insulation
- 16) Safety pressure switch 625 series (optional)
- 17) Flow switch 315 series (optional)

## INSTRUMENT HOLDER

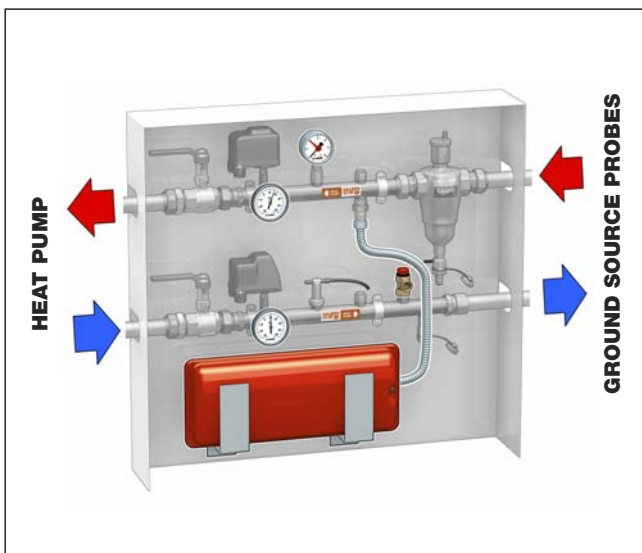
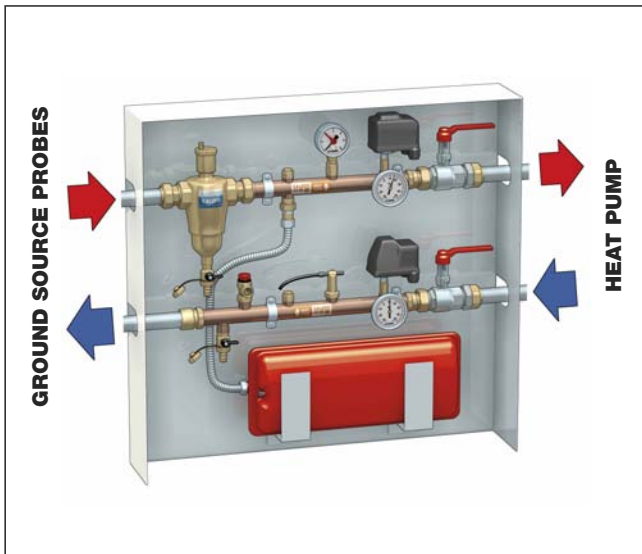
### Construction details

Compact unit to check and ensure the safety and correct operation of the heat pump and ground source probe system.  
Insulation with two shells completely encloses all the metal parts from condensation.  
Easy system filling and draining.  
The manifold can be shut off for maintenance.  
The manifold can be installed on a wall or in an exposed box.

Thanks to the combination of the dirt separator and the air vent it is possible to keep the medium circulating in the probes constantly clean and deaerated. This protects the heat exchanger from drops in output due to accumulated dirt and corrosion caused by the presence of air.

The manifold has been designed to be reversible to ensure right-hand or left-hand installation according to the position of the heat pump in relation to the probes.

It is sufficient to turn through 180° the installation of pressure gauge, temperature gauges, safety valve and expansion vessel.



## ACCESSORIES FOR INSTRUMENT HOLDER



### 315

Flow switch for heat pump instrument holder.  
Magnetic control contacts.  
Electric supply: 230 V - 0,02 A  
Max. working pressure: 6 bar  
Working temperature range: -20–100°C  
3/4" female connection.  
Protection class: IP 65.

Code	Flow rate (m <sup>3</sup> /h)	Contact opening (m <sup>3</sup> /h)	Contact closing (m <sup>3</sup> /h)
315050	0,5	0,53	0,44
315060	0,6	0,59	0,57
315070	0,7	0,70	0,64



### 625

Safety pressure switch.  
Up to 500 V three-pole - 16 A.  
Max. working pressure: 15 bar.  
Ambient temperature range: -10–55°C.  
Medium temperature range: 0–110°C.  
1/4" female connection.  
Protection class: IP 44.



Code	Adjustment range
625005	1– 5 bar
625010	3–12 bar



### 688

Temperature gauge.  
1/2" back connection.  
Galvanized steel body.  
With brass pocket, length 40 mm.  
Accuracy class: UNI 2.

Code	°C	Ø (mm)
688005	-20–60	80



### 557

Pressure gauge.  
3/8" radial connection.  
Accuracy class: UNI 2,5.  
**Conforms to I.S.P.E.S.L. standards.**

Code	bar	Ø (mm)
557706	0–6	80



### 557

Pressure gauge.  
3/8" radial connection.  
Stainless steel body.  
Accuracy class: UNI 1,6.

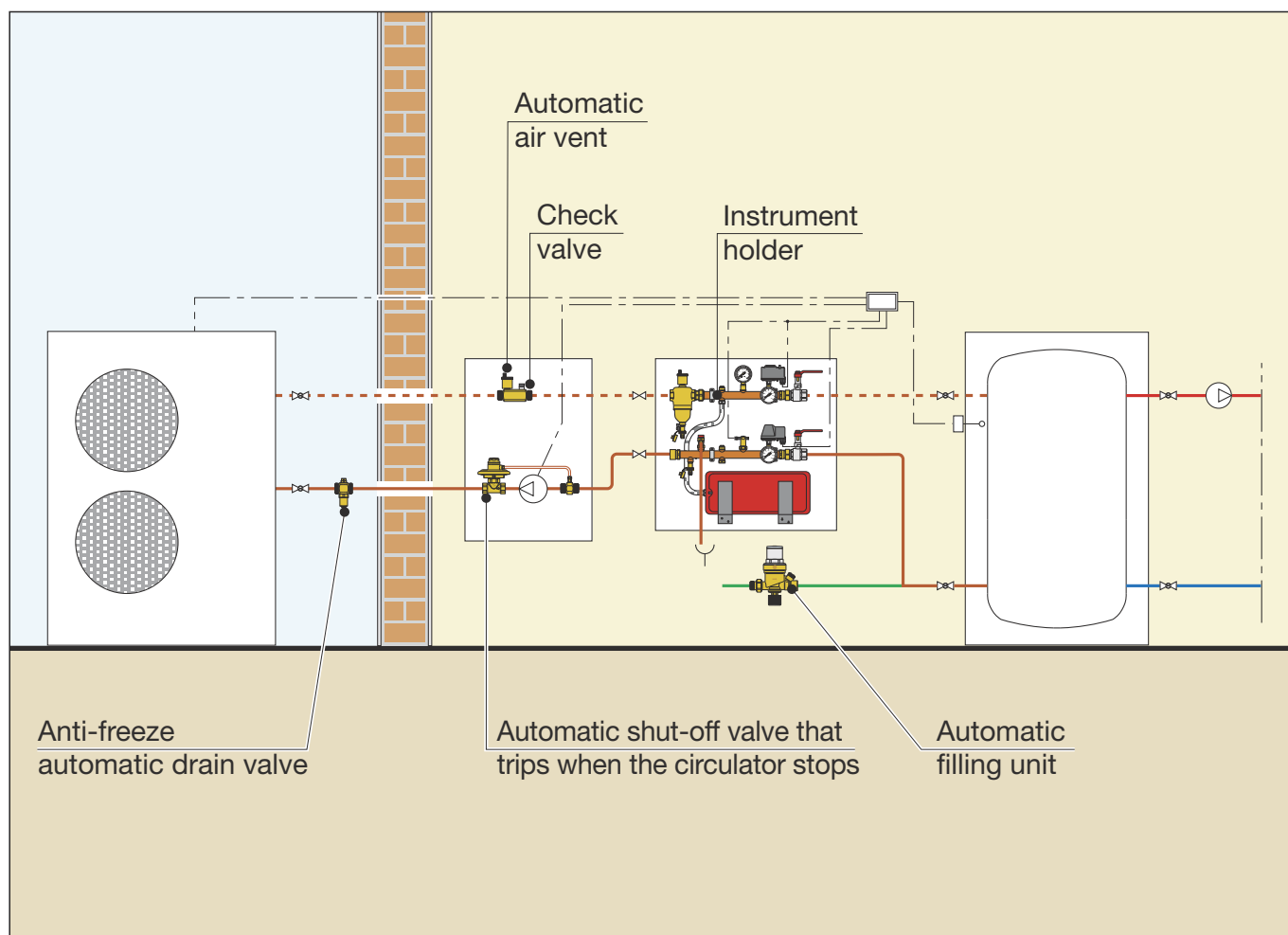
Code	bar	Ø (mm)
557596	0–6	63

The products in the CALEFFI GEO® series have been conceived specifically for use in heat pump systems. A system with an **air source heat pump**, in case of malfunctioning and outside conditions with temperature below 3°C, risks ice forming in the pipes.

The components are made with high-performance materials for this type of application.

## COMPONENTS FOR AIR SOURCE HEAT PUMP SYSTEMS

The following is an example of an air source heat pump system.



In the event of the pump malfunctioning or an electric supply failure, the external pipes are exposed to potential frost damage. To avoid this, it is possible to use anti-freeze solutions, heating cable protection or hydraulic systems.

Anti-freeze solutions significantly increase head losses of the medium. In addition, they require constant checks and servicing to prevent both the loss of the anti-freeze action and corrosion.

Heating cable protection, in this specific case, is not recommended because without electric power there can be no anti-freeze function.

Hydraulic anti-freeze systems do not increase the head losses of the medium, do not require constant checking and servicing and they are not made ineffective by electric power failure.

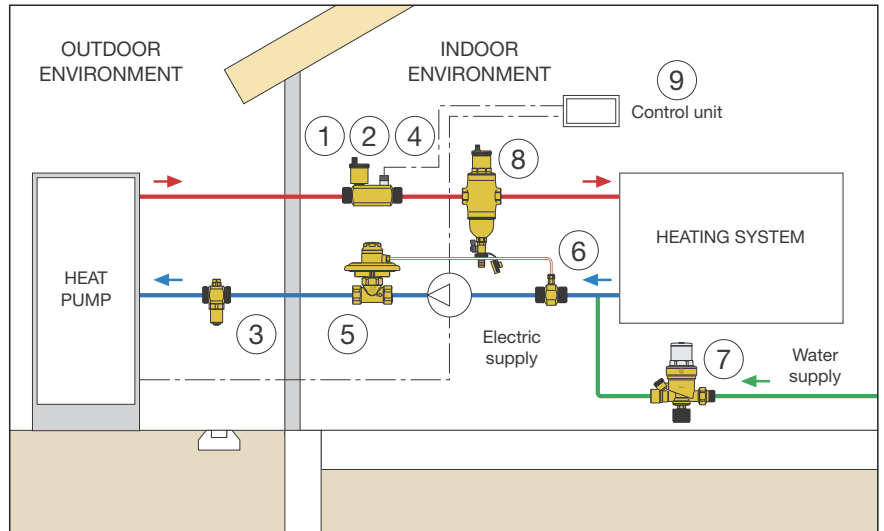
# ANTI-FREEZE PROTECTION

## Operating principle

The anti-freeze protection unit comes into effect in the event of failure of the electric supply of the heating system and heat pump, for an extended period, when the outside temperature is below 0°C.

Here we show the functional diagram of the protection unit composed of:

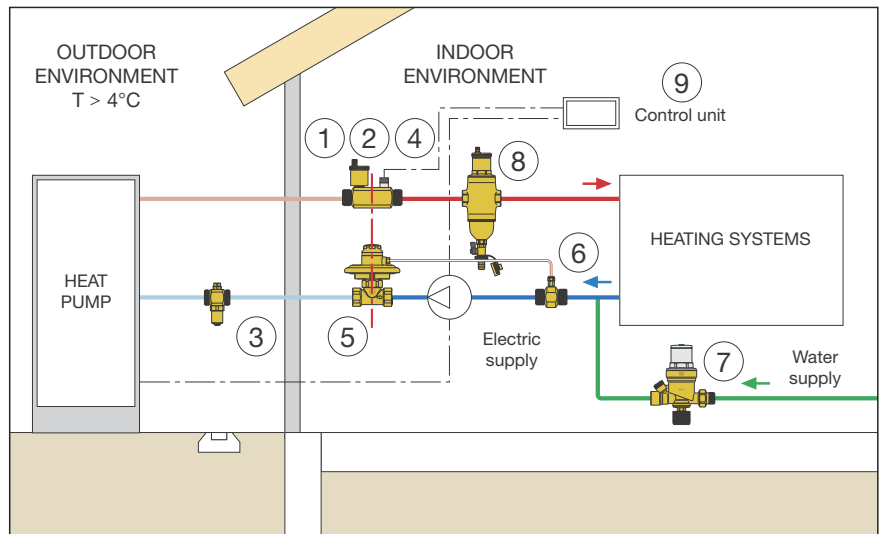
1. Air vent with dual function: besides the conventional use of venting air, it is also used to draw air into the system when the protection unit triggers.
2. Check valve with the function of isolating the system branch on the outside.
3. Anti-freeze valve sensitive to the system water temperature.
4. "Minimum temperature" safety thermostat.
5. Differential valve with the function of isolating the system branch on the outside.
6. Fitting acting as a pressure test point.
7. Filling unit to maintain the static pressure of the system and recharge the circuit after the protection unit has triggered.
8. Deaerator-dirt separator that continuously eliminates the air and debris contained in the circuit.
9. Control unit.



If there is no electric current but the outside conditions are not freezing ( $T > 4^{\circ}\text{C}$ ), the system will separate the internal part of the system from the external part at the differential valve (5) and check valve (2).

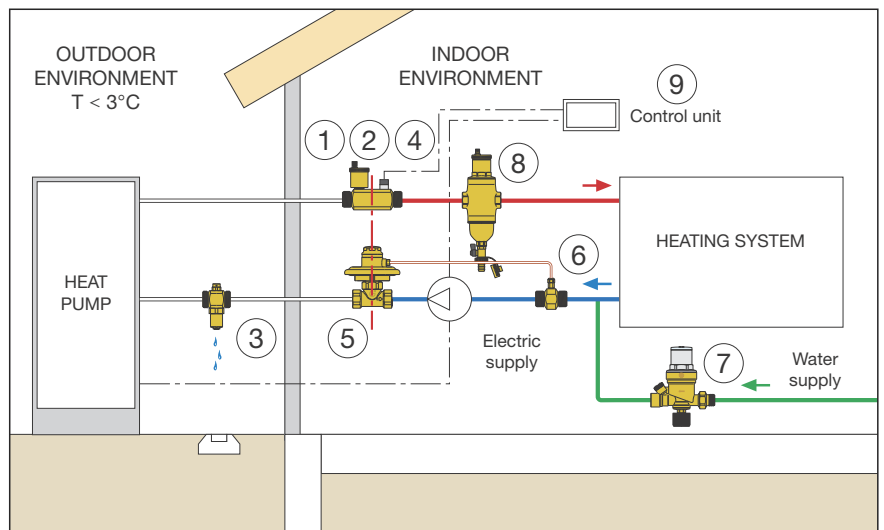
The water contained in the external part of the system is not discharged.

When the electric supply returns, the circulator will restart and the system recommence normal operation.



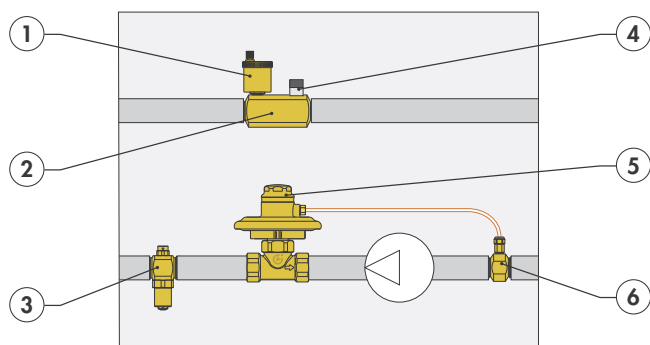
If there is no electric current and the water temperature is  $< 3^{\circ}\text{C}$  the unit will separate the external part from the internal one and the anti-freeze valve (3) will come into operation and drain the system.

When the electric supply returns, the circulator will restart and the filling unit will recharge the system to the nominal pressure setting.



# ANTI-FREEZE PROTECTION

## Characteristic components



- 1) Automatic air vent valve.
- 2) Check valve fitted for air vent and minimum thermostat, 1" male connections.
- 3) Anti-freeze valve, 1" male connections.
- 4) Sensor for connection to control unit.
- 5) Differential valve complete with capillary pipe for connecting to the pressure test point, 1" female connections.
- 6) Fitting with pressure point, 1" male connections.

## 109

Anti-freeze kit.



Max. working pressure: 3 bar  
 Working temperature range: 0–65°C  
 Ambient temperature range: -20–60°C  
 Patent pending.

Code	Connection
109600	1"

## 108

Anti-freeze valve.  
 Brass body.  
 Max. working pressure: 3 bar.  
 Working temperature range: 0–65°C.  
 Ambient temperature range: -20–60°C.  
 Opening temperature: 3°C.  
 Closing temperature: 4°C.  
 Patent pending.

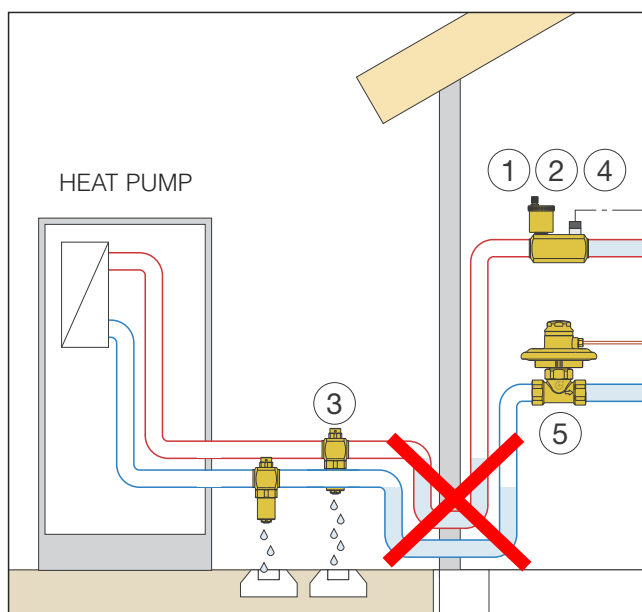


Code	Connection
108600	1"

If the heat pump has both circuit connections at the bottom. Installing just one anti-freeze valve will not ensure complete drainage of the external part of the system since the connections with the exchanger are at the top of the machine.

With this configuration it is necessary to install two anti-freeze valves at the bottom of each branch so as to ensure correct operation of the protection unit.

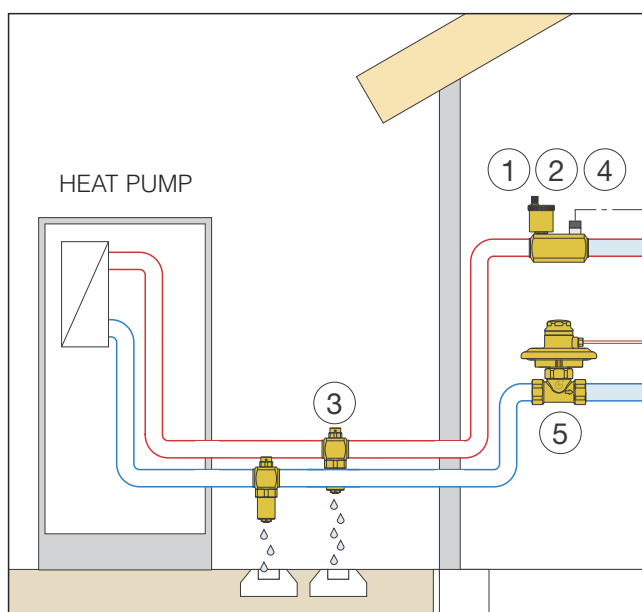
The pipe connecting the anti-freeze valve and the air vent must not create a siphon effect and prevent draining part of the piping.



For optimal operation of the protection unit it is advisable to use a buffer vessel upstream from the circulator to aid filling the external part of the system that may have been drained by the protection unit coming into operation.

The anti-freeze valves must be positioned in the coldest part of the system or well away from any sources of heat that could impair operation and at least 15 cm off the ground.

The pressure point must be positioned immediately upstream from the circulator while the differential valve is installed immediately downstream.



## ACCESSORIES

### 115

Instrument and accessories holder for heat pumps complete with steel anchoring base.



Connections: female.  
 Max. working pressure: 3.5 bar.  
 Working temperature range: -20–90°C (temperature gauges 60°C).  
 Ambient temperature range: -10–55°C.  
 Medium: water, glycol solutions, saline solutions.  
 Maximum percentage of glycol: 50%.  
 A saline solution can be used as the medium, changing the provided pressure gauge with the steel one code 557596.

Code	
115700	1 1/4"

### 115

Box for coupling with instrument holder anchoring base series 115. In painted steel. Composed of outer casing and door.



Code	Dimensions (h x w x d)
115080	900 x 860 x 175

### 546 DISCALDIRT®

tech. broch. 01123

Deaerator-dirt separator.  
 Brass body.

#### Female connection.

Drain cock with hose connection.  
 Max. working pressure: 10 bar.  
 Max. discharge pressure: 10 bar.  
 Temperature range: 0–110°C.  
 Particle separation rating down to 5 µm.  
 Patented.



Code	
546005	3/4"
546006	1"

### 553

tech. broch. 01061

Pre-adjustable automatic filling unit, anti-scale, inspectionable with pressure setting indicator, manual cock, strainer and check valve.  
 Setting pressure range range: 0,2–4 bar.  
 Max. inlet pressure: 16 bar.  
 Max. working temperature: 65°C.



Code	
553540	1/2" with pressure gauge connection
553640	1/2" with pressure gauge

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