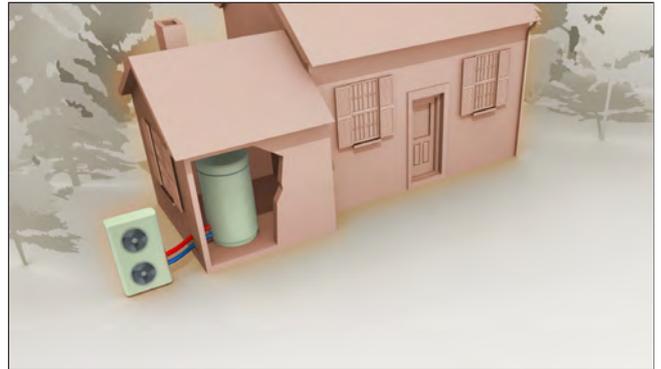# CALEFFI GEO

COMPONENTS FOR
HEAT PUMP SYSTEMS

2015

RENEWABLE ENERGY

Energy from the air

The outside air is a free source of energy that does not need to be extracted and is extremely easy to find: it is also heated directly by the sun. Systems that draw thermal energy from the air can be made with air-air or air-water heat pumps.

Energy from the ground

Soil contains an enormous amount of heat which comes from the earth's hot core or from other renewable sources, such as sun, wind and rain.
A water-water heat pump working in combination with geothermal probes will use low enthalpy geothermal energy for heating.
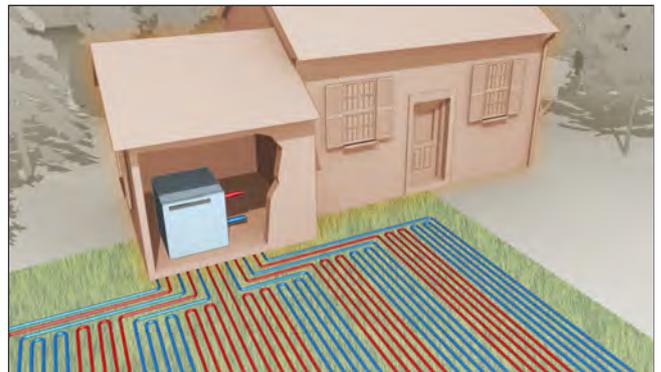
Energy from water

Groundwater temperature is usually between 8°C to 12°C and is particularly suitable for use with hydrothermal heat pumps. However, systems drawing heat from groundwater are subject to restrictions regarding both how the water is collected and how it is subsequently disposed of: for this reason, specific permits must be obtained.
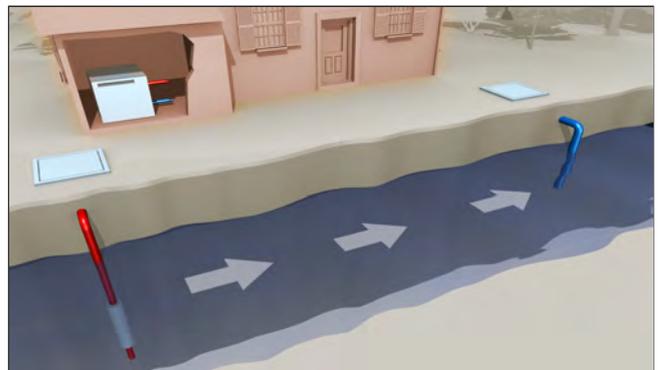
AIR-WATER heat pump operating principle
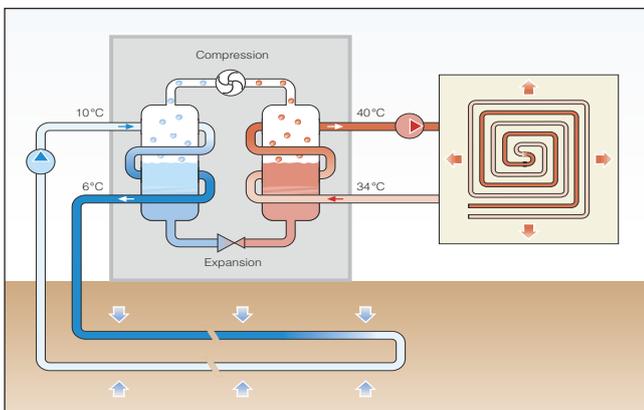
WATER-WATER heat pump operating principle
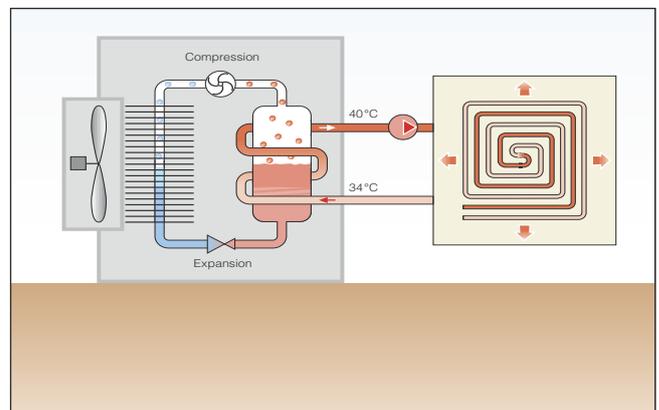
We reserve the right to modify our products, make tecnical improvements and developed them further.
None of illustrations, numerical data, etc., are binding.

CALEFFI GEO

The products in the CALEFFI GEO® series have been conceived specifically for use in heat pump systems.

The thermal medium in circuits with air source heat pump can reach very low temperatures; for this reason the components are made with high-performance materials and special solutions to prevent freezing are offered.

COMPONENTS FOR AIR SOURCE HEAT PUMP SYSTEMS

Air source heat pump systems offer huge benefits compared to the use of geothermal energy: they don't need any outside ground, any specific permits and any expensive digging work to bury the heat exchangers.

Nevertheless, there are some limits to be taken into consideration, such as the huge fluctuations in the temperature of the outside air.

The outside air can reach very low temperatures, making the pump work with somewhat limited COP values and overly high system running costs.

For these reasons, when the temperature of the air is very low, we recommend using boilers alongside the air-water heat pump, when necessary or as an alternative. The boilers can then switch on when the heat produced by the heat pumps is no longer cost-efficient.
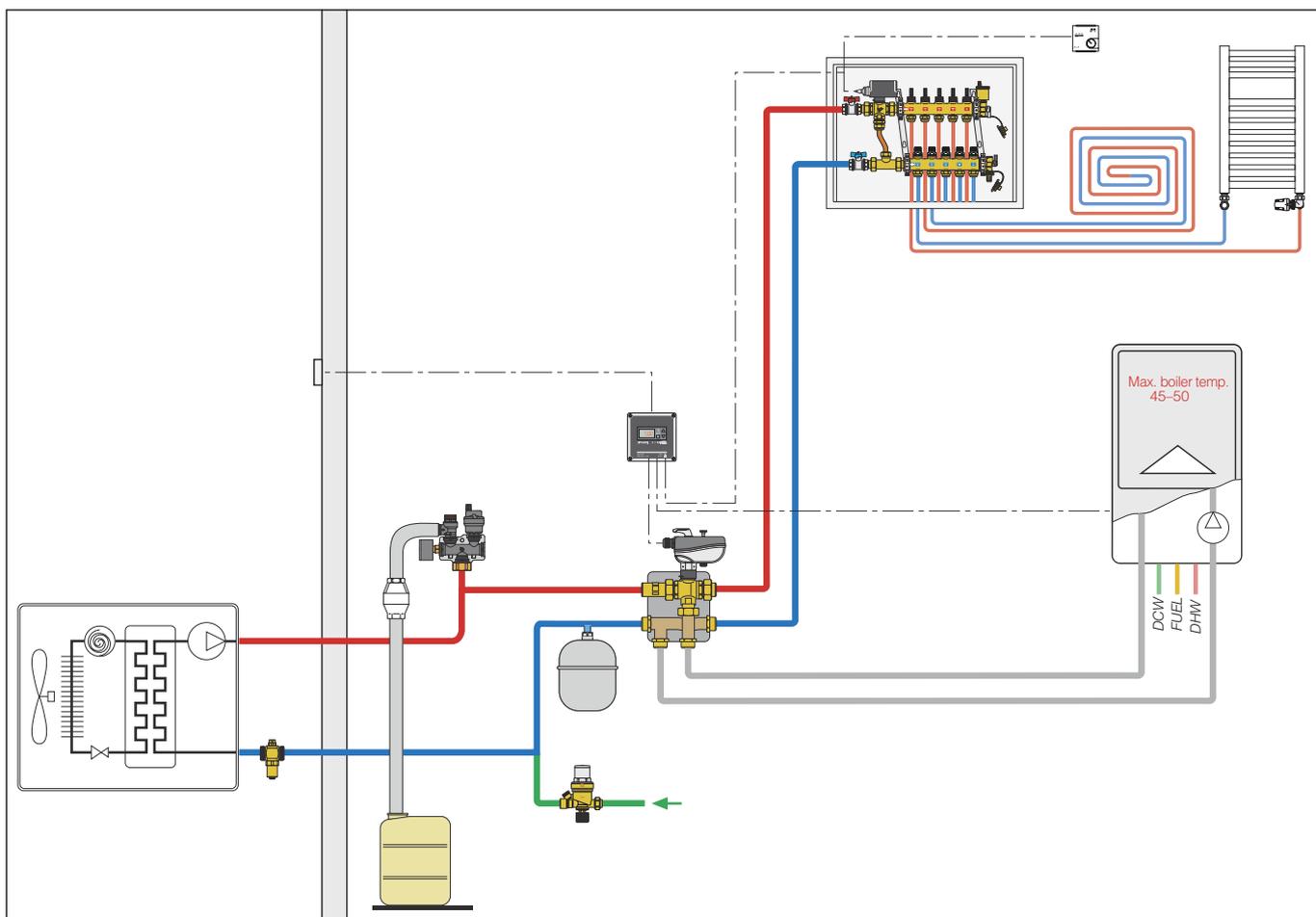
The integration unit joins the two different heat generation systems (boiler and air-water heat pump) with a simple, compact unit that can be also easily housed in a wall-mounting box. With this system, it is not forced the use of the same manufacturer for both the boiler and the heat pump: in fact, these two devices are technologically very different.

INTEGRATION UNIT

106 ⓖ **tech.broch. 01233**
HYBRICAL®

Heat pump-boiler integration unit.
With insulation.
Consisting of:
- diverter valve,
- connection kit,
- electronic regulator,
- outside probe.

CE

Code	Connection
106160	1"

106 ⓖ **tech.broch. 01233**
HYBRICAL®

Heat pump-boiler integration unit.
With insulation.
Consisting of:
- diverter valve,
- electronic regulator,
- outside probe.

CE

Codice	Attacco
106170	1 1/4"
106180	1 1/2"
106190	2

Performance

Diverter valve
Medium: water, glycol solutions.
Max. percentage of glycol: 50%.
Max. working pressure: 10 bar.
Max. differential pressure: 10 bar.
Connections: 1"–2" M (ISO 228-1)

Technical specifications of insulation
Material: closed cell expanded PE-X.
Thickness: 15 mm.
Density: - inner part: 30 kg/m³.
         - outer part: 80 kg/m³.
Thermal conductivity (DIN52612): - 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: -10–110°C.
Reaction to fire (DIN 4102): class B2.

Technical specifications of actuator
Synchronous motor.
Electric supply: 230 V (ac).
Power consumption: 6 VA.
Auxiliary microswitch: 6 (2) A (230 V).
Protection class: IP 65.
Operating time: 50 s (rotation 90°).
Supply cable length: 0,8 m.
Dynamic torque: 9 N·m.

Technical specifications of electronic regulator
Electric supply : 230 V (ac).
Power consumption: 7 VA.
Contact rating on switch-over: 2 A (230 V).
Protection class: IP 54.
Protection class: II.
Selectable temperature range: -60–150°C.
Intervention hysteresis: 2 K.
Intervention hysteresis range: 0,1–20 K.

Function

The integration unit provides a simple means of connecting the hydraulic circuits of the heat pump and boiler to the heating system terminals, using a special fitting that allows the three circuits to be joined together in a compact way.

Function is controlled by the electronic regulator which automatically activates and manages the heat pump or the boiler depending on the temperature of the outside air measured by the probe.

The regulator activates the heat pump when requested by the ambient regulator and the outside air temperature has risen above the preset switching temperature (setpoint temperature). It activates the boiler when requested by the ambient regulator and the outside air temperature is below the switching temperature.

The switching over is made by means of a diverter switch that closes the contact of the thermostat towards the boiler or the heat pump, through a relais if needed.
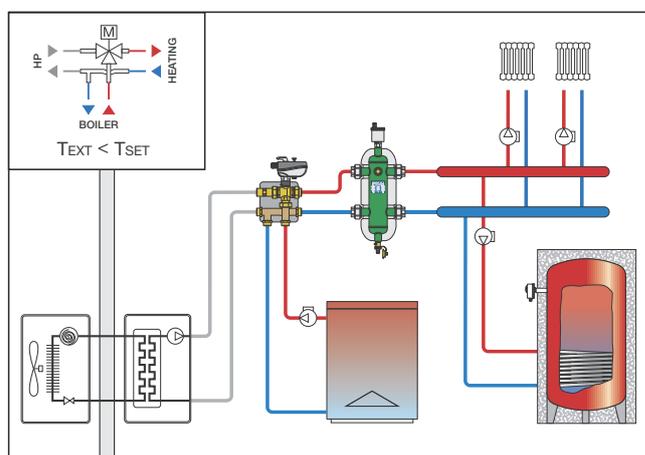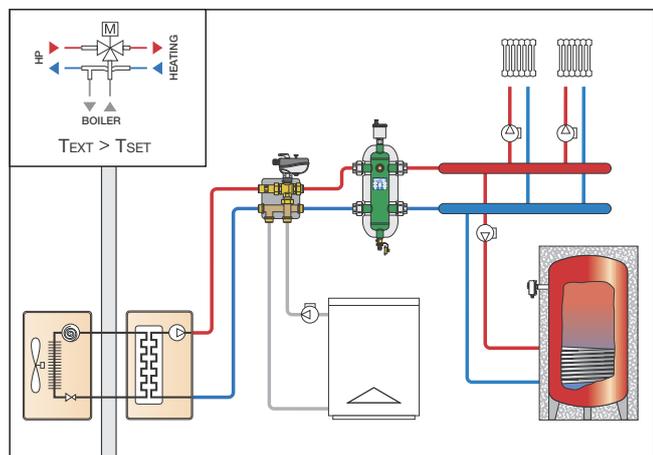
DIVERTER KIT

106
HYBRICAL®
Diverter kit for heat pump.
With insulation.
Consisting of:
- diverter valve,
- connection kit.

CE

Code	Connection
106060	1"

Function

The diverter kit allows to easily connect the 3 circuits together (2 inlets and 1 outlet) without having to overcome pipes.

The diverter valve has very low head losses, in relation to the rated flow rates normally used, and features short operating times: it allows therefore a fast system commissioning and prevents any water-hammer.

The valve is coupled to an actuator fitted with microswitches that can be used to activate and deactivate devices according to the working position of the valve.

Performance

Diverter valve
Medium: water, glycol solutions.
Max. percentage of glycol: 50%.
Max. working pressure: 10 bar.
Max. differential pressure: 10 bar.
Connections: 1" M (ISO 228-1).

Technical specifications of insulation
Material: closed cell expanded PE-X.
Thickness: 15 mm.
Density: - inner part: 30 kg/m³.
　　　　 - outer part: 80 kg/m³.
Thermal conductivity (DIN52612): - 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: -10–110°C.
Reaction to fire (DIN 4102): class B2.

Technical specifications of actuator
Synchronous motor.
Electric supply: 230 V (ac).
Power consumption: 6 VA.
Auxiliary microswitch: 6 (2) A (230 V).
Protection class: IP 65.
Operating time: 50 s (rotation 90°).
Supply cable length: 0,8 m.
Dynamic torque: 9 N·m.

Example of a hybrid system with dual reversible air source heat pump and boiler equipped with domestic hot water storage
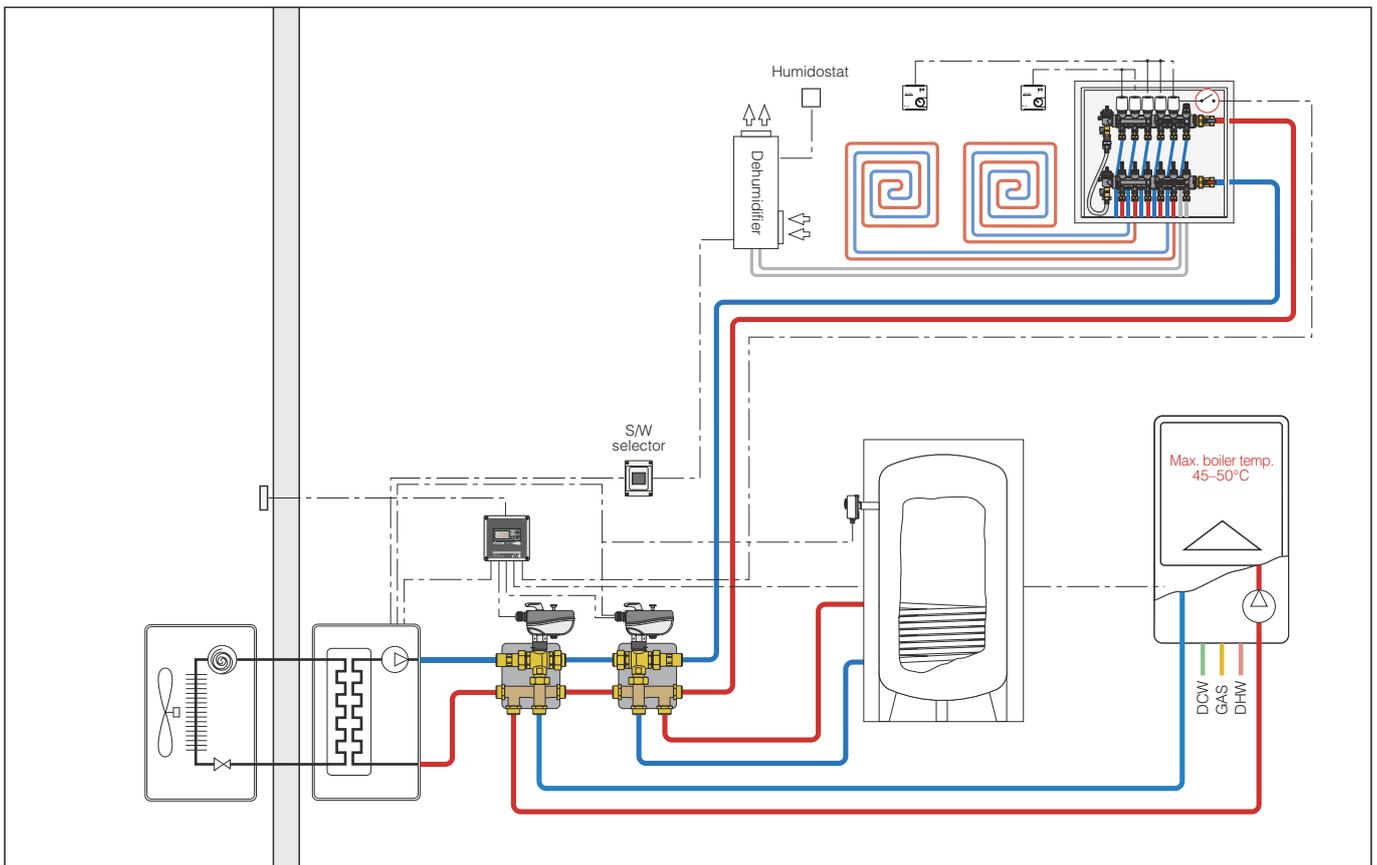
INSTRUMENT HOLDER IN COMPOSITE MATERIAL

305

Instrument holder in composite material for heating systems.
Equipped with air vent, safety relief valve in composite material and pressure gauge.
With insulation.
Temperature range: 5–90°C.
Up to 50 kW.

Code

305663	1"

305

Instrument holder in composite material for heating systems.
Equipped with air vent, brass safety relief valve and pressure gauge.
With insulation.
Temperature range: 5–90°C.
Up to 50 kW.

Code

305572	3/4" 2,5 bar TÜV
305671	1" 1,8 bar
305673	1" 3 bar NF

305

Instrument holder kit in composite material for heating systems.
Equipped with air vent, safety relief valve in composite material, pressure gauge, automatic shut-off cock for expansion vessel and fixing bracket.
With insulation.
Temperature range: 5–90°C.
Up to 50 kW.

Code

305503	3/4"
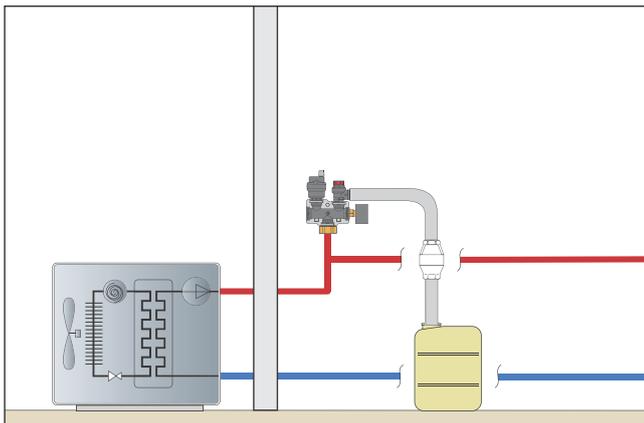
Characteristic components
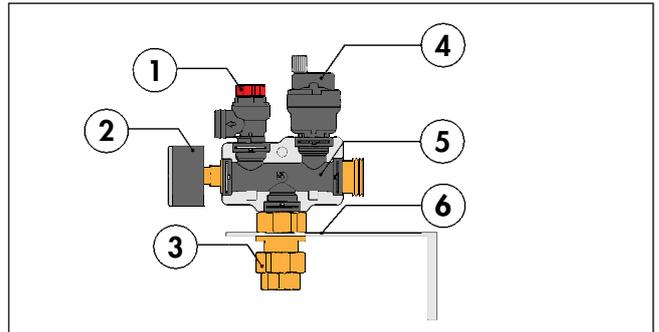
The unit is consisting of:

1 - Safety valve
2 - Pressure gauge
3 - Shut-off cock
4 - Air vent valve
5 - Polymer manifold
6 - Fixing bracket

Technical specifications of instrument holder
Manifold material: PA66G30
Air vent valve material: PA66G30
Insulation: self-extinguishing EPS DIN 4102-B1
Thickness: 15 mm.

Medium: water, glycol solutions.
Max. percentage of glycol: 50%.
Max. working pressure: 5 bar.
Max. working temperature: 90°C
110°C max. 5 min.
120°C max. 1 min.

Technical specifications of safety valve
Material: PA66G30 (code 305663; 305503)
brass (code 305572; 305671; 305673)
PN 10
Discharge overpressure: 20%
Closing differential: 20%

Application diagrams
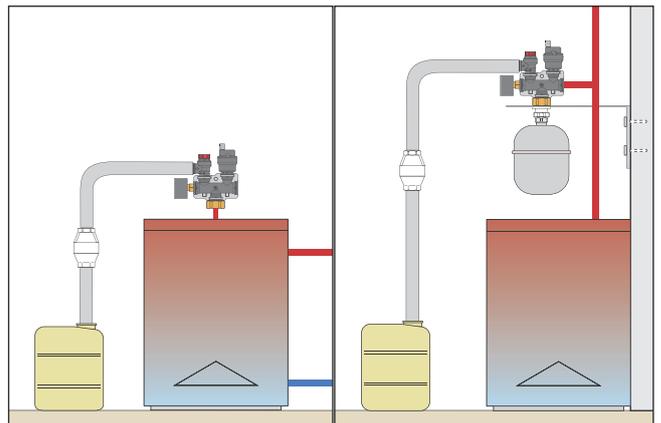
ANTI-FREEZE PROTECTION

109

Anti-freeze kit.
Max. hydraulic test pressure: 10 bar.
Max. working pressure: 10 bar.
Working temperature range: 0–65°C.
Ambient temperature range: -20–60°C.

Code	Connection
109611	1"

108

Anti-freeze valve. Brass body.
Max. working pressure: 10 bar.
Working temperature range: 0÷65°C.
Ambient temperature range: -30÷60°C.
Opening temperature: 3°C.
Closing temperature: 4°C.

Code	Connection
108601	1"
108701	1 1/4"
108801	1 1/2"

Characteristic components
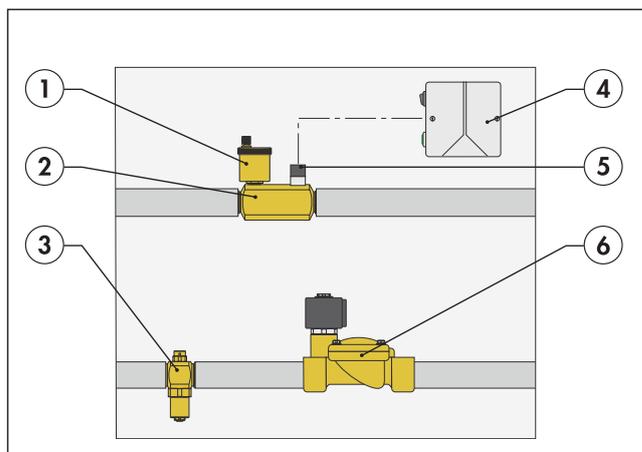
The unit is consisting of:

1) Automatic air vent valve.
2) Check valve, 1" male connections.
3) Anti-freeze valve, 1" male connections.
4) Control unit.
5) Minimum thermostat
6) NC solenoid valve, 230 V - 50 Hz.

Operating principle

The anti-freeze protection unit code 109611 can be installed when the heat pump has an internal circulator.

The system actuates in the event of failure of electric supply to the heating system or should the heat pump malfunction.

In the event of a electric supply failure, the system separates the internal part of the system from the outside part at the level of the check valve (2) and the normally-closed solenoid valve (6).

If the water temperature inside the pipes remains above 4°C, the anti-freeze valve obturator stays closed and the pipe remains in pressure.

When the water temperature in the pipes reaches 4°C, the thermostat in the anti-freeze valve (3) allows the obturator to open and drain the water in the outside part of the pipes.

When electric supply returns, the solenoid valve opens, the filling unit (7) recharges the system to the nominal pressure setting and the anti-freeze valve closes, allowing circulation in the system to restart: the air vent (1) and deaerator-dirt separator (8) remove any excess air.

In the event of a heat pump failure, with subsequent drop in the water temperature within the system (the circulation pump keeps running but there is no longer any heat exchange in the machine), the safety thermostat (5) would operate.
When the water reaches a temperature of 10°C, the thermostat (5) actuates and via the regulator (4) stops the electric supply to the solenoid valve, thereby triggering the procedure described above for electric supply failures..
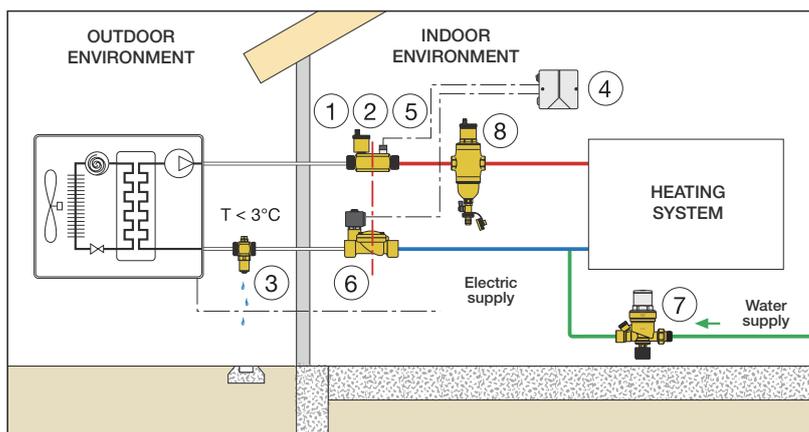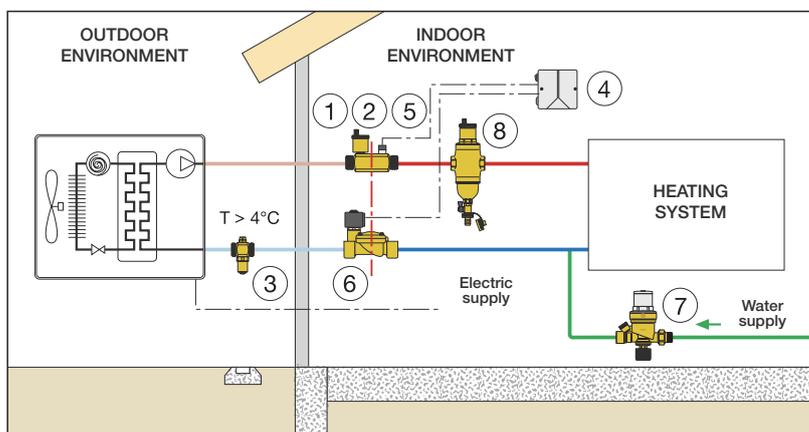
MULTIFUNCTION DEVICE IN COMPOSITE WITH DIRT SEPARATOR AND STRAINER

5453
tech. broch. 01258

DIRTMAGPLUS®

Multifunction device
with dirt separator and strainer.
Specific for the complete cleaning of the hydraulic circuit, to protect continuously generator and components.
Composite body.
Dirt separator with tecnopolimer internal element, **with magnet**.
Two inspectable strainers with stainless steel mesh:
1 for firts passage (blue colour) already installed,
1 for maintenance (grey colour) in package.
Shut-off valve with nut, brass body.
Adjustable for horizontal, vertical or 45° pipes.
Female connections.
Drain cock with hose connection.

Max. working pressure: 3 bar.
Temperature range: 0–90°C.

PCT
INTERNATIONAL
APPLICATION
PENDING

Code	
545375	3/4"
545376	1"
545372	Ø 22
545373	Ø 28

Cartridge strainer

The high-capacity strainer cartridge consists of two parts: an outer body with stainless steel mesh and a specially shaped internal element for collecting impurities.
The complete collection of impurities is always optimal, whether the installation is vertical, horizontal or 45°.

Dirt collector

First passage strainer mesh size Ø = 0,30 mm

Maintenance strainer mesh size Ø = 0,80 mm

Code	
F49474/BL	first passage strainer (blue colour)
F49474/GR	maintenance strainer (grey colour)
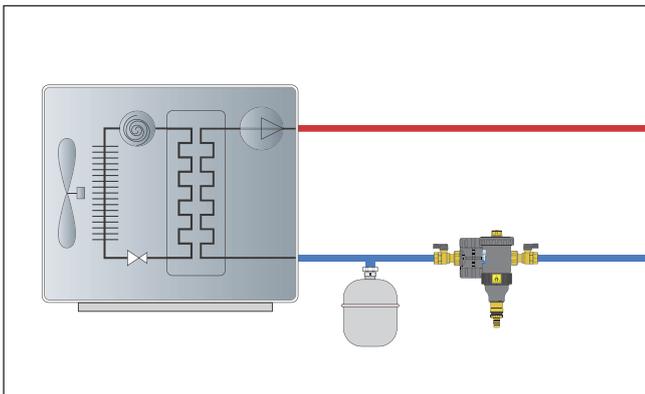
Problems caused by impurities in hydraulic circuits

The components of a heating and air conditioning system are exposed to degradation caused by the impurities contained in the system's circuit. If the impurities in the thermal medium are not removed, they can impair operation of the units or components, such as heat pumps or heat exchangers, especially in the commissioning stage, already from the initial passage. This latter problem must not be underestimated because generators manufacturers will frequently reject warranty claims if their product is not adequately protected by a strainer from the time of commissioning onwards.

Operating principle

The multifunction device is obtained by coupling a dirt separator and a cartridge strainer arranged in series.
The water circulating in the system flows, in sequence, first through the dirt separator and then through the cartridge strainer.

1. Elimination of particles even of small diameters (sizes of a few hundredths of a millimetre) is handled by the dirt separator due to the effect of collision of the particles with the internal element and **gravity decantation of sludge** in the collection chamber.
This result can be obtained only after some circulations of the medium and hence during operation of the system in steady-state conditions.

2. The total elimination of particles of diameters measured in tenths of a millimetre, right from **the first passage of the medium** (system commissioning), is guaranteed by the mesh strainer, which mechanically intercepts impurities carried by the thermal medium.
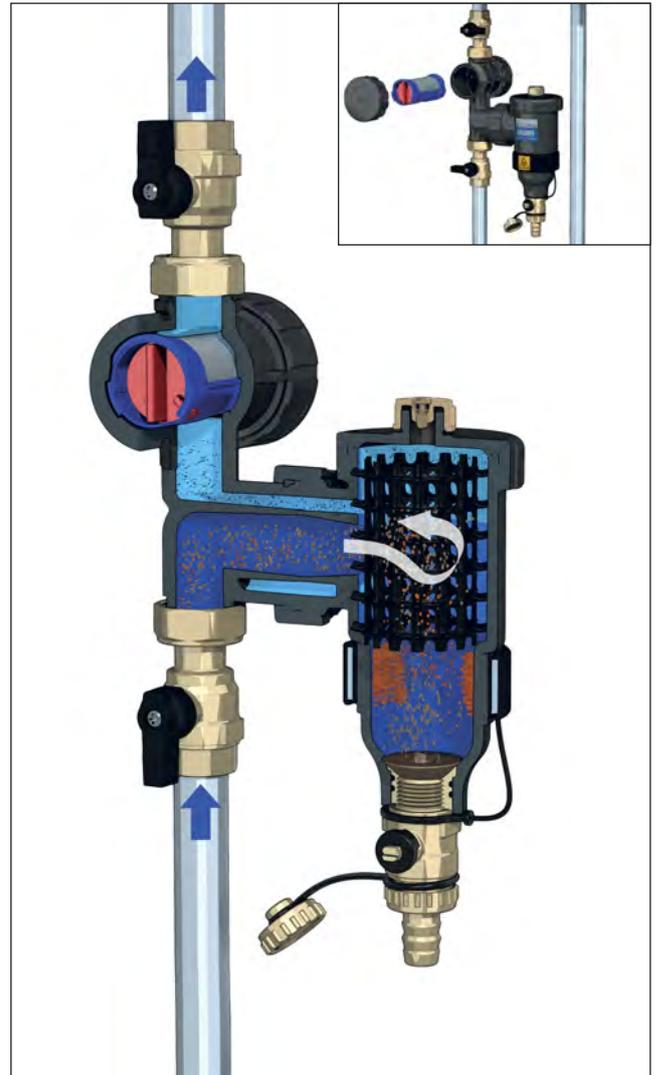
The products in the CALEFFI GEO® series have been conceived specifically for use in het pump systems. In **ground source heat pumps** a mixture of water and anti-freeze fluid is generally used to protect against freezing temperatures.
The components are made with high-performance materials for this type of applications.

COMPONENTS FOR GROUND SOURCE HEAT PUMP SYSTEMS

Systems with horizontal probes

Heat pump systems with horizontal probes use the heat that accumulates in the upper layers of the earth; this heat, down to 15 m deep, is basically supplied by the sun and rain. For this reason horizontal probes withstand fluctuations in surface temperature better and, to be installed, they need large areas clear of constructions, paving or vegetation that can prevent heat reaching the ground.
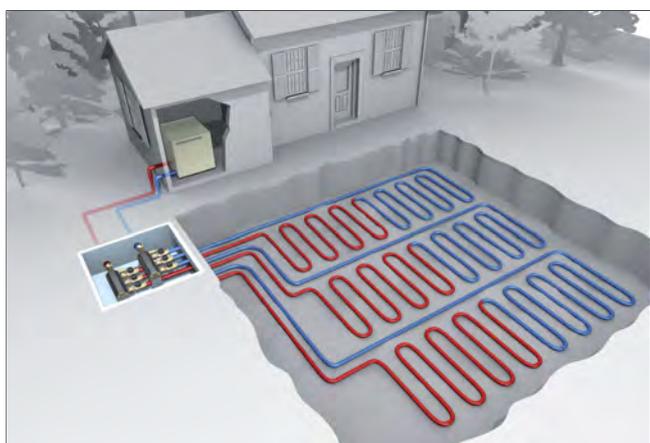
Systems with vertical probes

Systems with vertical ground source probes are based on the fact that, below a depth of 20 m, the temperature of the subsoil is constant; below 20 m, the temperature of the ground increases by approximately 3°C every 100 m in depth.
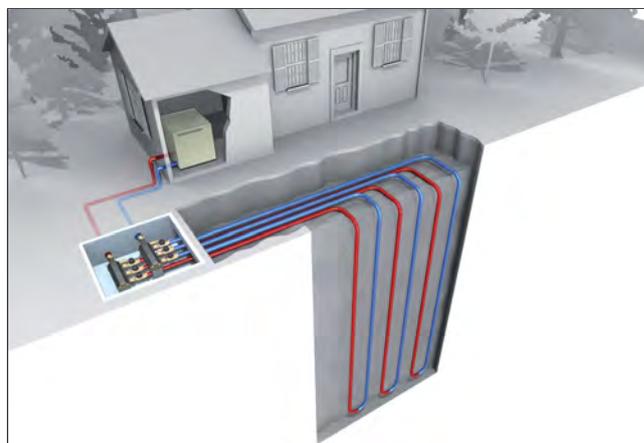
GEOTHERMAL SYSTEM COMPONENTS

Usually, geothermal probes are connected to the system via a manifold fitted with balancing valves: in fact, system balancing is necessary to guarantee proper heat exchange in the ground.
It is advisable to install all safety and control devices, normally used in closed circuit systems, between the geothermal manifold and the heat pump, to guarantee proper system and machine operation.
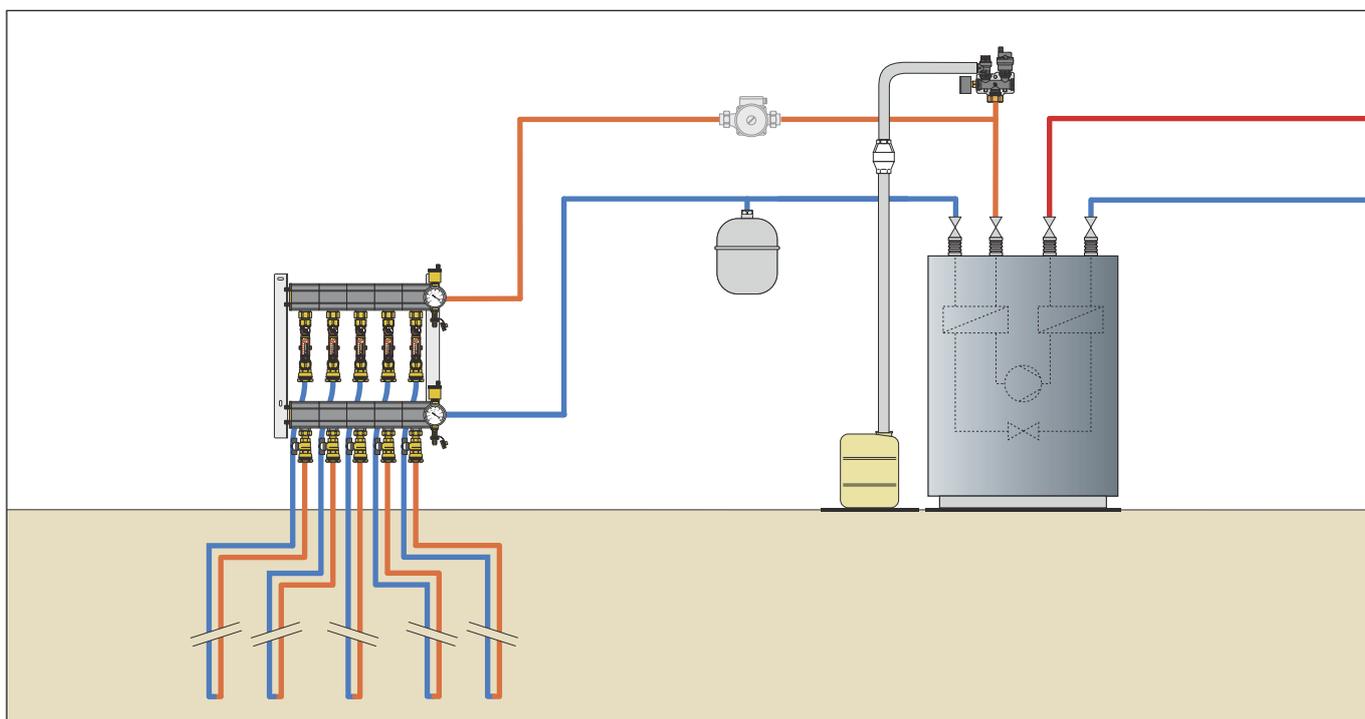
PREASSEMBLED GROUND SOURCE MANIFOLD

110   tech. broch. 01221

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;
- stainless steel 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.
Max. hydraulic test pressure: 10 bar.
Working temperature range: -10–60°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.
Manifold DN 50.
Max. flow rate: 7 m³/h.
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	
1107B5	2 circuits
1107C5	3 circuits
1107D5	4 circuits
1107E5	5 circuits
1107F5	6 circuits
1107G5	7 circuits
1107H5	8 circuits

For more than 8 outlet circuits, see the modular manifold

MODULAR GROUND SOURCE MANIFOLD

110   tech. broch. 01221

Modular manifold single module in polymer.

Body made of polymer PA66G30.
Max. working pressure: 6 bar.
Max. hydraulic test pressure: 10 bar.
Working temperature range: -10–60°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. 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.
Outlet connection: 42 p.2,5 TR.

Code	
110700	

110   tech. broch. 01221

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
110019	for manifold with 9 circuits
110020	for manifold with 10 circuits
110021	for manifold with 11 circuits
110022	for manifold with 12 circuits

110   tech. broch. 01221

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 (-30–50°C);
- No. 2 seals gaskets.

Max. working pressure: 6 bar.
System test max. pressure: 10 bar.
Working temperature range: -10–60°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.
Connections: 1 1/4" F.

Code	
110750	

110   tech. broch. 01221

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	

SYSTEM COMPOSITION EXAMPLE WITH CALEFFI 110 SERIES GEOTHERMAL MANIFOLD

111 series

Ball shut-off valve

Fitted for sensor with Vortex effect for integrated flow rate measuring

DN 25	DN 32	DN 40
Code 111620	Code 111630	Code 111640

Connection to manifold
42 p.2,5 TR

Pipe connection

Ø 25	Ø 32	Ø 40

Insulation

DN 25	DN 32	DN 40
Code 111001		Code 111003

Control lever

Code 111002

Flow rate measuring station

Code 111010

Flow rate electronic measuring station

Code 130010

112 series

Balancing valve with flow meter

With fitting for polyethylene pipe

DN 25	DN 32	DN 40
Code 112621	Code 112631	Code 111641

Connection to manifold
42 p.2,5 TR

Pipe connection

Ø 25	Ø 32	Ø 40

Insulation

DN 25	DN 32	DN 40
Code 112001		Code 112003

Balancing valve with flow meter

With ball valve and fitting for polyethylene pipe

DN 25	DN 32
Code 112622	Code 112632

Connection to manifold
42 p.2,5 TR

Pipe connection

Ø 25	Ø 32

Insulation

DN 25	DN 32
Code 112001	

113 series

Float flow meter

With fitting for polyethylene pipe

DN 25	DN 32
Code 113621	Code 113631

Connection to manifold
42 p.2,5 TR

Pipe connection

Ø 25	Ø 32

Insulation

DN 25	DN 32
Code 113001	

871 series

Ball valve

With fitting for polyethylene pipe

DN 25	DN 32	DN 40
Code 871025	Code 871032	Code 871040

Connection to manifold
42 p.2,5 TR

Pipe connection

Ø 25	Ø 32	Ø 40

Insulation

DN 25	DN 32
Code 111001	

SHUT-OFF AND BALANCING DEVICES
FOR GEOTHERMAL MANIFOLD 110 SERIES

111   tech. broch. 01234

Ball shut-off valve
fitted for integrated flow rate measuring sensor.
Complete with fitting for polyethylene pipe.
Brass body. Polymer top plug.
Connection to manifold:
female connection with captive nut 42 p.2,5 TR.
Max. working pressure: 6 bar.
Max. hydraulic test pressure: 10 bar.
Working temperature range: -10–40°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.

Code	Connection
111620	42 p.2,5 TR x Ø 25
111630	42 p.2,5 TR x Ø 32
111640	42 p.2,5 TR x Ø 40

111   tech. broch. 01234

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

Code	Use
111001	Ø 25 - Ø 32
111003	Ø 40

130   tech. broch. 01234

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 direct reading of flow rate
and sensor with Vortex effect: ±10%.
Protection class: IP 44.

Code
130010

111   tech. broch. 01234

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

Code
111010

111   tech. broch. 01234

Control lever for shut-off valves.
Polymer body.

Code
111002

Using Vortex effect sensor

Sensors use the "von Kármán vortex tail" effect that allow to measure the average speed of a circulating medium.
The shut-off valve is fitted for installing the integrated flow-rate measuring Vortex-effect sensor.
The sensor is fitted to a body in composite material, similar to the cap that can be therefore replaced with the sensor during flow-rating reading and balancing phase. The ball was in fact designed to accommodate the sensor.
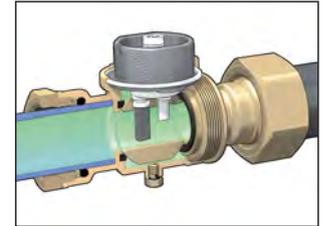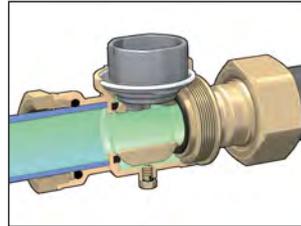
The cap can be replaced with the sensor while the system is still running: close the valve using the provided knob, remove the lock and the clip then pull out the cap.
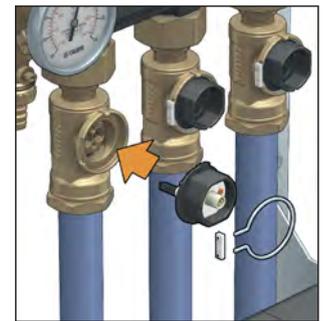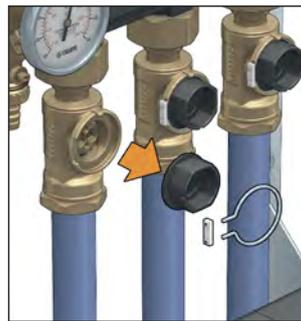
This is an innovative measurement system:
- the measurement and regulation device does not remain installed in the system but can be removed once the system has been balanced and can be kept by the installer;
- during normal operation, there are no moving parts subject to wear over time, and there are negligible head losses;
- the measuring device is not affected by changes in temperature, pressure or viscosity;
- the accuracy of flow rate measurement is greater than in other balancing systems.

The measuring device contains details of the passage surface of the medium and conversion factors, allowing the instantaneous flow rate to be calculated.
By browsing the menu, it's possible to select the unit of measure for flow rate (l/h – l/min – GPM) and the type of liquid circulating inside the pipe (water or glycol solutions in different percentages).

SHUT-OFF AND BALANCING DEVICES
FOR GEOTHERMAL MANIFOLD 110 SERIES

112
tech. broch. 01235

Balancing valve with flow meter.
Complete with fitting for polyethylene pipe.
Direct reading of flow rate.
Ball valve for flow rate balancing.
Graduated scale flow meter
with magnetic movement flow rate indicator.
Brass valve body and flow meter.
Connection to manifold:
female connections with captive nut 42 p.2,5 TR.
Max. working pressure: 10 bar.
Working temperature range: -10–40°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.
Accuracy: ±10%.

Code	Connection	Scale (m³/h)
112621	42 p.2,5 TR x Ø 25	0,3–1,2
112631	42 p.2,5 TR x Ø 32	0,3–1,2
112641	42 p.2,5 TR x Ø 40	0,3–1,2

112
tech. broch. 01235

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	Use
112001	Ø 25 - Ø 32
112003	Ø 40

112
tech. broch 01235

Balancing valve with flow meter
with ball shut-off valve
and fitting for polyethylene pipe.
Direct reading of flow rate and balancing via
upper ball valve.
Graduated scale flow meter with magnetic
movement flow rate indicator.
Brass valve body and flow meter.
Connection to manifold:
female connection with captive nut 42 p.2,5 TR.
Max. working pressure: 10 bar.
Working temperature range: -10–40°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.
Accuracy: ±10%.

Code	Connection	Scale (m³/h)
112622	42 p.2,5 TR x Ø 25	0,3–1,2
112632	42 p.2,5 TR x Ø 32	0,3–1,2

Operating principle

The balancing valve is an hydraulic device that allows to regulate the medium flow rate passing through.
The regulating action is made by a ball obturator (1), operated by a control stem (2). The flow rate is controlled by mens of a flow meter (3) housed in a by-pass circuit, on the valve body, that can be shut off during normal functioning. The flow rate value is indicated by a metal ball (4), sliding within a transparent guide (5), marked alongside by a graduated scale (6).
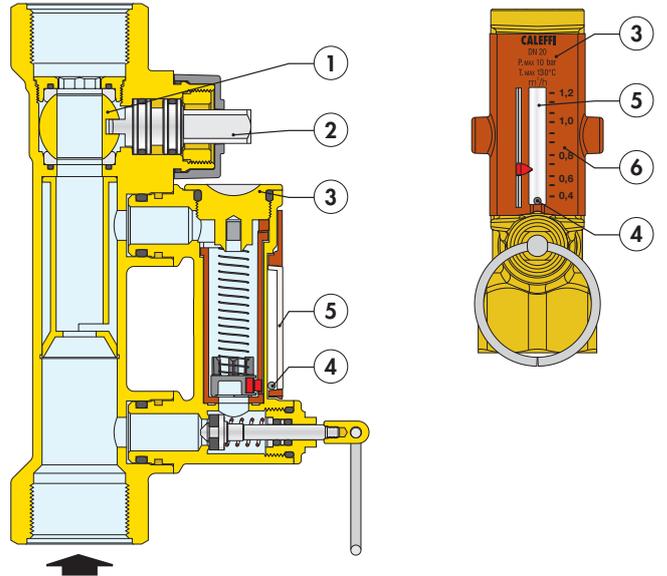
Flow setting

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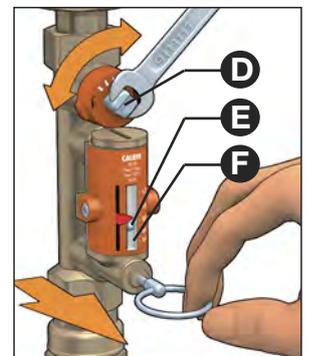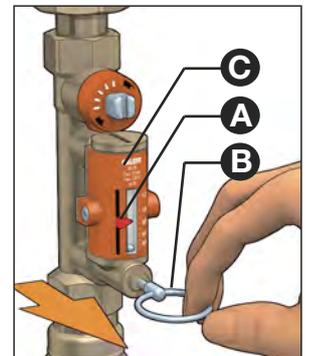
5. On completing the adjustment, the indicator (A) can be used to keep the setting memory, in case checks need to be made over time.

Version code 112..2, complete with ball valve, allows to shut off the individual outlet while maintaining the flow rate balancing: this is an advantage for system maintenance.

SHUT-OFF AND BALANCING DEVICES
FOR GEOTHERMAL MANIFOLD 110 SERIES

113

tech. broch. 01236

Float flow meter.
Complete with fitting for polyethylene pipe.
Direct reading of flow rate.
Ball valve for flow rate balancing.
Brass body.
Connection to manifold:
female connection with captive nut 42 p.2,5 TR.
Max. working pressure: 10 bar.
Working temperature range: -10–40°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.
Accuracy: ±10%.

Code	Conn.	Scale (m³/h)
113621	42 p.2,5 TR x Ø 25	0,3–1,2
113631	42 p.2,5 TR x Ø 32	0,3–1,2

113

tech. broch. 01236

Pre-formed insulation for float flow meter.
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.
Rection to fire (DIN 4102): class B2.

Code	Use
113001	Ø 25 - Ø 32

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.
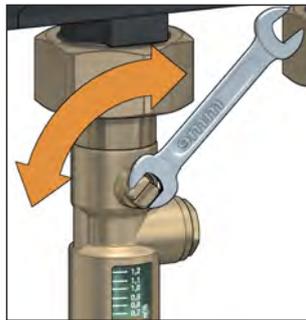
Full closing and opening of the valve

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

Fully closed

A

Fully open

B
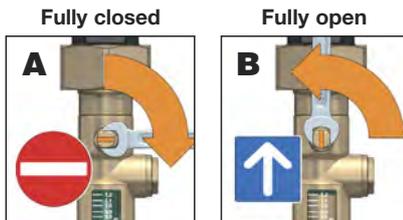
Correction for liquids with different densities

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%

Operating principle

The flow meter (or variable cross-section flow meter) consists of a transparent, longitudinal tapered cross-section PSU pipe, containing a cylindrical-tapered floating device featuring a slightly smaller diameter than the pipe's minimum diameter.
Operation is only permitted when the flow meter is vertical, with the widest internal diameter at the top. The medium flows vertically from the bottom toward the top, exerting a pressure on the floating device, pushing it upwards until a balance is reached.
The flow rate is indicated by the upper edge of the float and can be read using the graduated scale printed on the plastic pipe.

Captive nut for connection to the geothermal manifold

Flow rate balancing

Floating device

Fitting for polyethylene pipe Ø 25 - Ø 32

Since the flow meter must only be installed vertically, the geothermal manifold cannot be installed horizontally.

871

Ball valve complete with fitting for polyethylene pipe.
Brass body.
Connection to manifold:
female connection with captive nut 42 p.2,5 TR.
Max. working pressure: 16 bar.
Working temperature range: -10–40°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.

Code	Connection
871025	42 p.2,5 TR x Ø 25
871032	42 p.2,5 TR x Ø 32
871040	42 p.2,5 TR x Ø 40

110

Union with gasket.
Max. working pressure: 16 bar.
Max. working temperature: 40°C.

Code	Connection
110050	42 p.2,5 TR x 3/4"
110060	42 p.2,5 TR x 1"

DEVICES FOR GENERIC GEOTHERMAL MANIFOLDS

112

Balancing valve with flow meter.
Direct reading of flow rate.
Ball valve for flow rate balancing.
Graduated scale flow meter with magnetic movement flow rate indicator.
Brass body valve and flow meter.
Connection to manifold:
female connection with captive nut.
Max. working pressure: 10 bar.
Working temperature range: -10–110°C.
Ambient temperature range: -20–60°C.
Medium: water, glycol solutions, saline solutions.
Max. percentage of glycol: 50%.
Accuracy: ±10%.

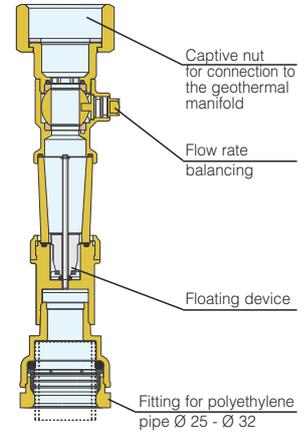| Code	Connection	Scale (m³/h)
112660	1" F x 1" F	0,3–1,2
112670	1 1/4" F x 1" F	0,3–1,2

861

tech. broch. 01037

Male fitting. In brass.
For polyethylene pipes.
Max. working pressure: 16 bar.
Max. working temperature: 40°C.

Code	
861625	Ø 25 x 1" M
861632	Ø 32 x 1" M

862

tech. broch. 01037

Reduced male fitting.
In brass.
For polyethylene pipes.
Max. working pressure: 16 bar.
Max. working temperature: 40°C.

Code	
862640	Ø 40 x 1" M

942

Sleeve fitting.

Code	
942560	3/4" x 1"

871

tech. broch. 01037

Fitting with ball valve.
In brass.
For polyethylene pipes.
Max. working pressure: 16 bar.
Max. working temperature: 40°C.

Code	
871525	Ø 25 x 3/4" F
871532	Ø 32 x 3/4" F

SYSTEM COMPOSITION EXAMPLE WITH GENERIC GEOTHERMAL MANIFOLDS

112 series

Balancing valve with flow meter

Code **112**660	Code **112**670
Connection 1" F x 1" F	**Connection** 1 1/4" F x 1" F

Fitting for polyethylene pipe

DN 25	DN 32	DN 40
Code **861**625	Code **861**632	Code **862**640

Balancing valve connection 1" M

Piping connection

Ø 25	Ø 32	Ø 40

Fitting for extra ball valve

Code **942**560

Balancing valve connection 1" M

Ball valve connection 3/4" M

Insulation for balancing valve

DN 25	DN 32	DN 40
Code **112**001		Code **112**003

Ball valve complete with fitting for polyethylene pipe

DN 25	DN 32
Code **871**525	Code **871**532

Fitting connection 3/4" F

Piping connection

Ø 25	Ø 32

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.

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