Hydraulic separator and multi-function hydraulic separator

548 - 5495 series

01404/24 EN



Function

The hydraulic separator combines different functional components, each of them to satisfy the specific needs of heating and cooling system circuits. It is supplied complete with hot pre-formed shell insulation to ensure perfect thermal insulation when used with both hot and chilled water. The device is designed to carry out the following functions:

- **Hydraulic separation**
  To keep connected hydraulic circuits totally independent from each other.
- **Automatic air vent (548 series)**
  For automatic venting of any air contained in the circuits. Equipped with an interceptable connection for any necessary maintenance operations.
- **Deaeration (5495 series)**
  The combined action of several physics principles is utilised: the widening of the cross section decreases the flow velocity and the composite mesh creates whirling movements so as to facilitate the release of micro-bubbles. The bubbles, fusing with each other, increase in volume and, rising towards the top of the unit, are released through a float-operated automatic air vent.
- **Dirt separation**
  The dirt separator separates and collects the impurities present in the circuits as they collide with the surface of the internal element.
- **Removal of magnetic particles (5495 series)**
  The special patented magnetic system also attracts ferromagnetic impurities in the water: the ferromagnetic particles are trapped in the collection zone, meaning they are prevented from being recirculated.

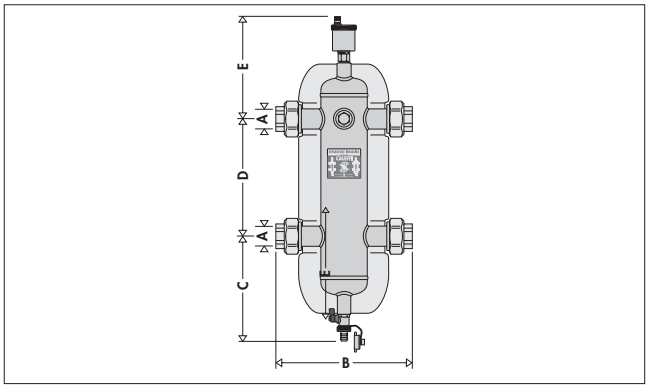
Product range

548 Series	Threaded multi-function hydraulic separator with pre-formed shell insulation	sizes DN 25 (1”), DN 32 (1 1/4”), DN 40 (1 1/2”), DN 50 (2”)
548 series	Flanged hydraulic separator with pre-formed shell insulation	sizes DN 50, DN 65, DN 80, DN 100, DN 125, DN 150
548 series	Flanged hydraulic separator with floor supports	sizes DN 200, DN 250 and DN 300
5495 series	Multi-function hydraulic separator with pre-formed shell insulation	sizes DN 25 (1”), DN 32 (1 1/4”), DN 40 (1 1/2”), DN 50 (2”)

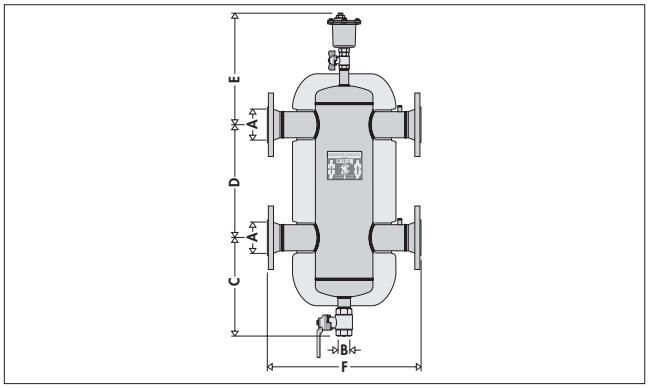
Technical specifications

Series	548 threaded	548 flanged	5495
Materials			
Separator body:	epoxy resin coated steel	epoxy resin coated steel	epoxy resin coated steel
Automatic air vent body:	brass EN 12165 CW617N, chrome plated	brass EN 12165 CW617N	brass EN 12165 CW617N
Aut. air vent float:	PP	stainless steel	PP
Aut. air vent hydraulic seals:	EPDM	VITON	EPDM
Drain valve body:	brass EN 12165 CW617	brass EN 12165 CW617	brass EN 12165 CW617
Shut-off valve body:	-	brass EN 12165 CW617	-
Performance			
Medium:	water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC	water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC	water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC
Maximum percentage of glycol:	30 %	50 %	50 %
Max. working pressure:	10 bar	10 bar	10 bar
Working temperature range:	0–110 °C	0–110 °C	0–110 °C
Connections			
Separator:	1”, 1 1/4”, 1 1/2”, 2” F with union	DN 50 - 65 - 80 - 100 - 125 - 150, PN 16 DN 200 - 250 - 300, PN 10 to be coupled with counterflanges EN 1092-1	1”, 1 1/4”, 1 1/2”, 2” (ISO 7/1) F with union
Probe holder:	front 1/2” F	inlet/outlet 1/2” F	front 1/2” F - maximum useful length: 35 mm (DN 25, DN 32) 50 mm (DN 40, DN 50)
Automatic air vent:	1/2” M	3/4” F	-
Automatic air vent discharge:	-	3/8” F	-
Drain valve:	hose connection	DN 50–DN 150: 1 1/4” F DN 200–DN 300: 2” F	hose connection

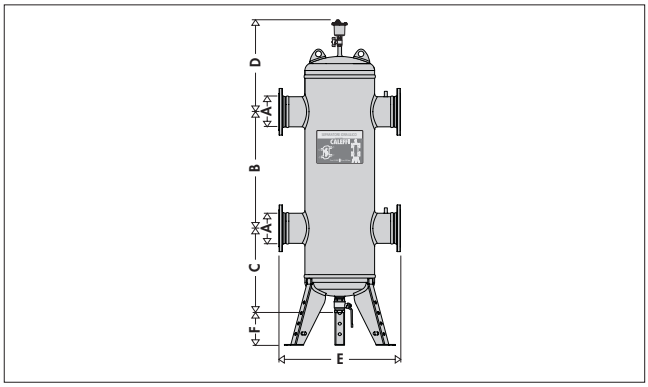
Dimensions



Codice	A	B	C	D	E	Massa (Kg)
548006	1″	225	195	220	204	2,7
548007	1 1/4″	248	225	240	214	3,8
548008	1 1/2″	282	235	260	224	5,7
548009	2″	315	281	300	230	11,8

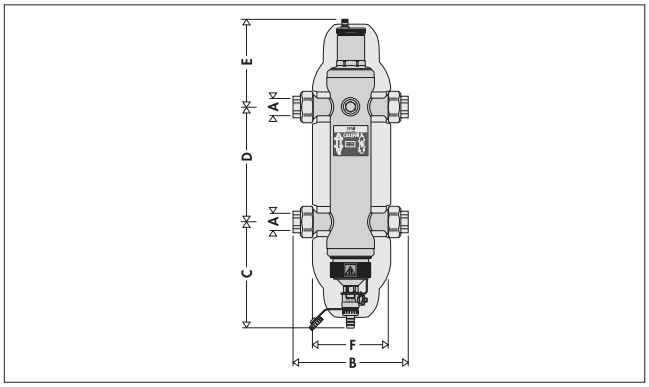


Code	A	B	C	D	E	F	Mass (kg)
548052	DN 50	1 1/4″	341	330	398	460	34,5
548062	DN 65	1 1/4″	341	330	398	460	39
548082	DN 80	1 1/4″	389	450	440	526	51
548102	DN 100	1 1/4″	389	450	440	529	55
548125	DN 125	1 1/4″	374	560	499	670	104
548152	DN 150	1 1/4″	374	560	499	670	108



Code	A	B	C	D	E	F	Mass (kg)
548200	DN 200	1000	610	400	900	250	255
548250	DN 250	1100	660	460	1060	250	410
548300	DN 300	1200	710	500	1180	250	600

Without insulation



Code	A	B	C	D	E	F	Mass (kg)
549506	1″	225	202	220	154	120	4
549507	1 1/4″	248	202	240	144	120	5
549508	1 1/2″	282	242	260	180	180	10
549509	2″	315	236	300	184	180	14

Volumes

Size	DN 25 (1")	DN 32 (1 1/4")	DN 40 (1 1/2")	DN 50 (2")	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300
Volume (l)	1,7	2,6	4,8	13,5	15	15	30	30	85	88	394	778	990

Technical specifications of insulation for flanged models from DN 50 to DN 100

Inner part

Material: rigid closed cell expanded polyurethane foam
Thickness: 60 mm
Density 45 kg/m³
Thermal conductivity (ISO 2581): 0,023 W/(m·K)
Working temperature range: 0–105 °C

External cover

Material: embossed unfinished aluminium
Thickness: 0,7 mm
Reaction to fire (DIN 4102): class 1

Head covers

Heat moulded material: PS

Insulation technical specifications for threaded and DN 125/ DN 150 flanged models

Inner part

Material: closed cell expanded PE-X
Thickness: - threaded 20 mm
- flanged 60 mm
Density: - inner part: 30 kg/m³
- outer part: 50 kg/m³ (threaded), 80 kg/m³ (flanged)
Thermal conductivity (ISO 2581): - 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

External covering (for DN 125 and DN 150 flanged models)

Material: embossed unfinished aluminium
Thickness: 0.70 mm
Reaction to fire (DIN 4102): class 1

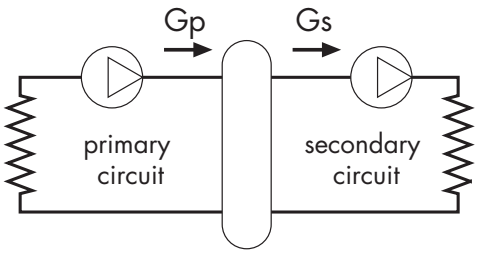
Operating principle

When a single system contains a primary production circuit, with its own pump (or more than one), and a secondary user circuit, with one or more distribution pumps, operating conditions may arise in the system whereby the pumps interact, creating abnormal variations in circuit flow rates and head values.

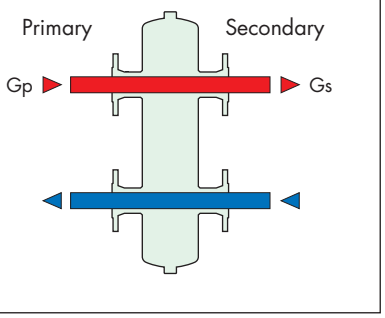
The hydraulic separator creates a low pressure drop zone, which enables the primary and secondary circuits connected to it to be hydraulically independent of each other; **the flow in one circuit does not create a flow in the other if the pressure drop in the common section is negligible.**

In this case, the flow rate in the respective circuits depends exclusively on the flow rate characteristics of the pumps, preventing reciprocal influence caused by connection in series.
Therefore, using a device with these characteristics means that the flow in the secondary circuit only circulates when the relevant pump is on, permitting the system to meet the specific load requirements at that time.
When the secondary pump is off, there is no circulation in the secondary circuit; the whole flow rate produced by the primary pump is by-passed through the separator.

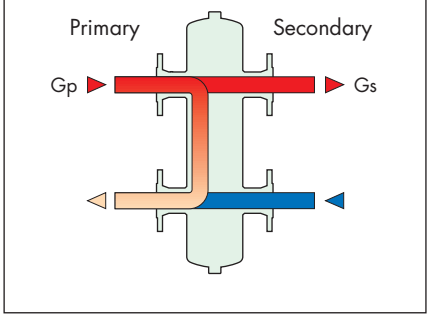
With a hydraulic separator, it is therefore possible to have a production circuit with a constant flow rate and a distribution circuit with a variable flow rate; these operating conditions are typical of modern heating and cooling systems.



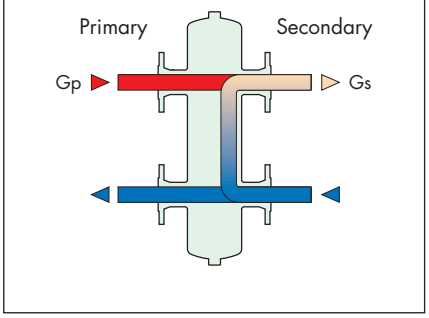
Three possible hydraulic balance situations are shown below. **For more detailed information regarding temperature variations caused by the separators, we recommend you consult the Caleffi Idraulica magazine no. 18, pages 7 to 11.**



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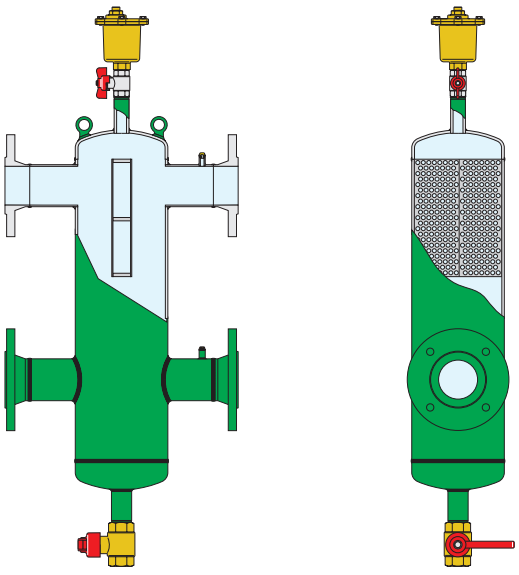


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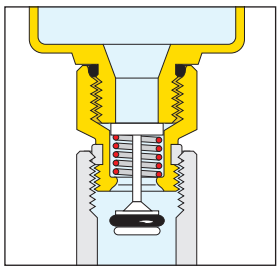


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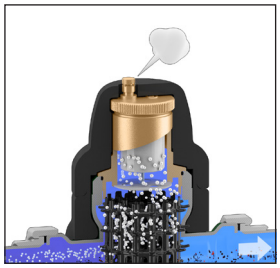
Construction details



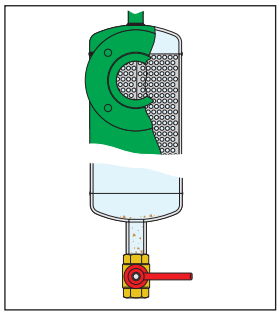
Shutting off the air vent (548)
In flanged separators, the automatic air vent is shut off manually using a ball valve. In threaded separators, however, the air vent body is automatically isolated by the built-in valve, which closes when the air vent body is removed.

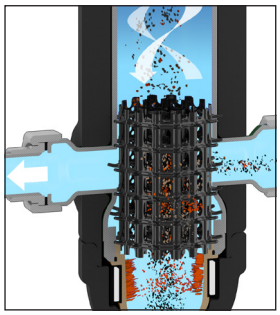


Deaerator element (5495)
At the top of the device a deaerator element is able to separate air particles within the system, right down to micro-bubble level. Air release takes place via the automatic air vent positioned at the top of the multi-function separator.

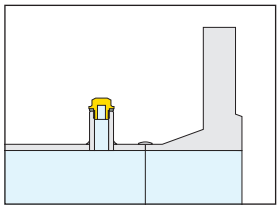


Dirt separator element (5495)
Another function of the hydraulic separator is carried out by the dirt separator element inside the device. This is used to separate and collect any impurities present in the system.
These impurities are eliminated via the drain valve at the bottom (this can be opened while the system is operating), which can be connected to a discharge pipe.





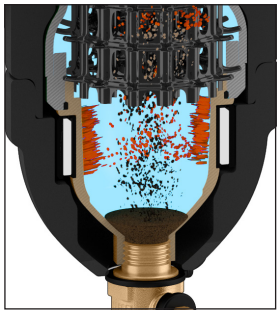
Probe holder connections
The range of separators is supplied with 1/2" probe holder connections, which can be used with temperature probes or temperature gauges.
Flanged models have a connection on both flow and return channels, as they are important points at which readings should be taken. As the separator connections are reversible on the primary or secondary circuit, the temperature reading options for the medium are expanded.



Insulation

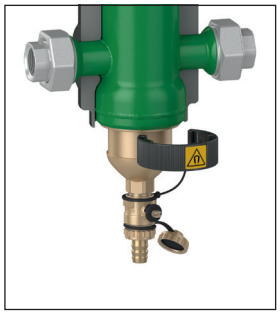
Construction details

Magnetic element (5495)
The magnet positioned towards the bottom of the device offers greater efficiency in the separation and collection of ferrous impurities. The impurities are trapped inside the separator body by the strong magnetic field created by the magnets inserted in the special outer ring. The outer ring can also be removed from the body to allow the decantation and subsequent expulsion of sludge while the system is still running. Since the magnetic ring is positioned outside the separator body, the hydraulic characteristics of the device are not altered.



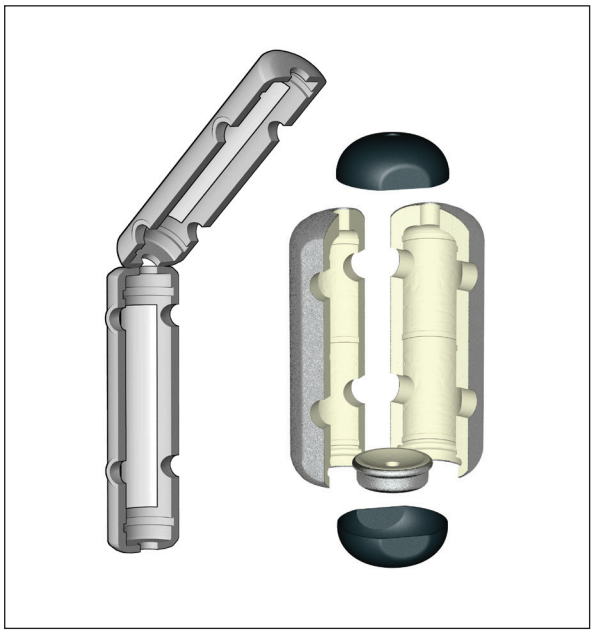
Sludge drain (5495)
To drain sludge, simply remove ring (A) housing the magnets which captured the ferrous impurities during the dirt separation phase. Next, carry out the drain procedure by opening ball shut-off cock (B) using the special key provided (C).

Sludge drain (548)
Carry out the drain procedure by opening the ball shut-off cock.



Insulation

The separators are supplied complete with insulation which, for the flanged series up to DN 100, consists of a polyurethane foam shell covered with a sheet of aluminium. Threaded and flanged versions from DN 125 to DN 150 have hot pre-formed shell insulation in closed cell expanded PE-X.
These types of insulation ensure not only perfect thermal insulation, but also the watertightness required to prevent atmospheric water vapour from entering the unit. For these reasons, these types of insulation may also be used in cooling water circuits as they prevent condensation from forming on the surface of the valve body.

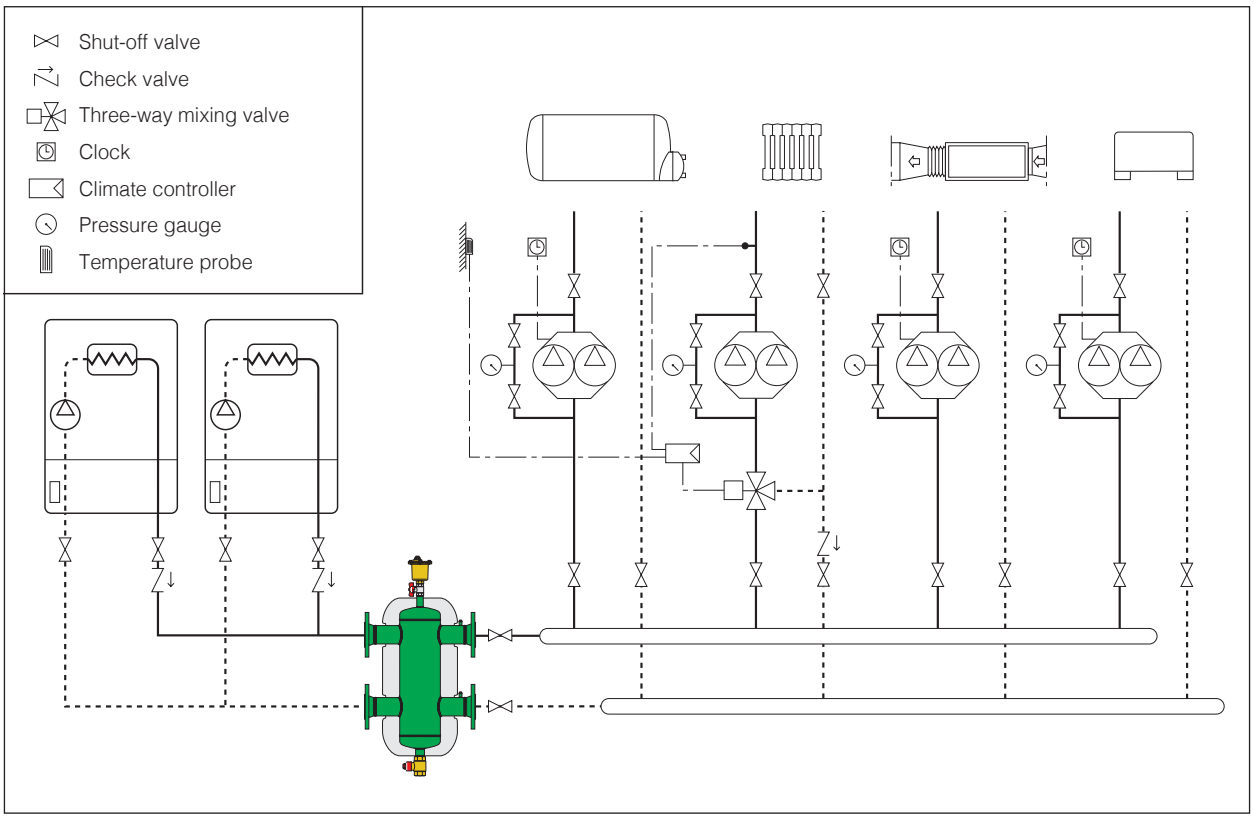


Hydraulic characteristics

The hydraulic separator should be sized in accordance with the maximum recommended flow rate value at the inlet. The selected value should be the sum of the primary circuit flow rates or the sum of the secondary circuit flow rates, whichever is greater.

Size	DN 25 (1")	DN 32 (1 1/4")	DN 40 (1 1/2")	DN 50 (2")	DN 50	DN 65	DN 80	DN 100	DN 125	DN 150	DN 200	DN 250	DN 300
Flow rate (m^3/h)	2,5	4	6	8,5	9	18	28	56	75	110	180	300	420

Application diagram



SPECIFICATION SUMMARY

548 series

Hydraulic separator. Connections 1” F (from 1” to 2”) with union. Epoxy resin coated steel body. Medium water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC. Max. percentage of glycol 30 %. Maximum working pressure 10 bar. Working temperature range 0–110 °C.
Complete with:
- Automatic air vent. 1/2” M connection. Chrome plated brass body. PP float. EPDM hydraulic seals.
- Drain valve. Hose connection. Brass body.
- 1/2” F front probe holder connection.
- Hot pre-formed shell insulation in expanded closed cell PE-X. Working temperature range 0–100 °C.

548 series

Hydraulic separator. Flanged connections DN 50 (from DN 50 to DN 150), PN 16, DN 200 (from DN 200 to DN 300) PN 10, for coupling with flat counterflange EN 1092-1. Epoxy resin coated steel body. Medium water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC. Max. percentage of glycol 50 %. Maximum working pressure 10 bar. Working temperature range 0–110 °C.
Complete with:
- Automatic air vent. Connection 3/4". Drain connection 3/8” F. Brass body. Stainless steel float. VITON hydraulic seals.
- Drain valve. Connection 1 1/4" F. Brass body; 2” F for DN 200–DN 300.
- 1/2” F inlet/outlet probe holder connections.
- Rigid closed cell expanded polyurethane foam insulation for sizes up to DN 100 (closed cell expanded PE-X for DN 125 and DN 150). Embossed unfinished aluminium external cover. Working temperature range 0–105 °C (0–100 °C for DN 125 and DN 150).
- Floor supports for sizes DN 200–DN 300.

5495 series

Multi-function hydraulic separator. Size DN 25 (from DN 25 to DN 50). Connections 1” (ISO 7/1) F (from 1” to 2”) with union. Epoxy resin coated steel body. Medium water and non-hazardous glycol solutions excluded from the guidelines of directive 67/548/EC. Max. percentage of glycol 50 %. Max. working pressure
10 bar. Working temperature range 0–110 °C.
Complete with:
- automatic air vent. Brass body. PP float. EPDM hydraulic seals;
- drain valve. Hose connection. Brass body;
- 1/2” F front probe holder connection;
- hot pre-formed shell insulation in expanded closed cell PE-X. Working temperature range 0–100°C.

We reserve the right to make changes and improvements to our products and the related technical data in this publication, at any time and without prior notice. The website www.caleffi.com always has the most up-to-date version of the document, which should be used for technical verifications.

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