

# Multifunction device in composite with dirt separator and strainer *DIRTMAGPLUS*<sup>®</sup>



## 5453 series

01258/14 GB



### Function

The DIRTMAGPLUS<sup>®</sup> multifunction device is composed of two separate components arranged in series: a dirt separator and an interchangeable strainer.

The presence of these two components allows for continuous protection of the generator and devices from any impurities that form in the hydraulic circuit both at the time of system start-up and in normal operating conditions.

The impurities are first separated by the dirt separator and then collected in a large dirt collection chamber from which they can be discharged even when the system is running.

Ferrous impurities are also trapped inside the body of the device thanks to the action of the two magnets inserted in a special removable outer ring.

By means of mechanical selection, the mesh strainer completes the process of removing the present impurities, starting directly from the first passage. DIRTMAGPLUS<sup>®</sup> can be adjusted for horizontal, vertical and 45° installations and it is supplied complete with shut-off valves to facilitate maintenance procedures.



### Product range

5453 series DIRTMAGPLUS<sup>®</sup> multifunction device in composite with dirt separator and strainer with threaded connections \_\_\_\_\_ sizes DN 20 (3/4") and DN 25 (1")

5453 series DIRTMAGPLUS<sup>®</sup> multifunction device in composite with dirt separator and strainer with compression fittings \_\_\_\_\_ sizes DN 20 (Ø 22) and DN 25 (Ø 28) with fittings for copper pipe

### Technical specifications

#### Materials

Device body:	PA66G30
Dirt separator cover:	PA66G30
Top plug:	brass EN 12164 CW614N
Drain screw:	brass EN 12164 CW614N
Locking nut for device fitting tee:	PPSG40
Internal element:	HDPE
Impurity collector:	POM
Strainer:	POM - stainless steel EN 10088-2 (AISI 304)
Hydraulic seals:	EPDM
Drain cock with hose connection:	brass EN 12165 CW617N
Shut-off valves:	brass EN 12165 CW617N

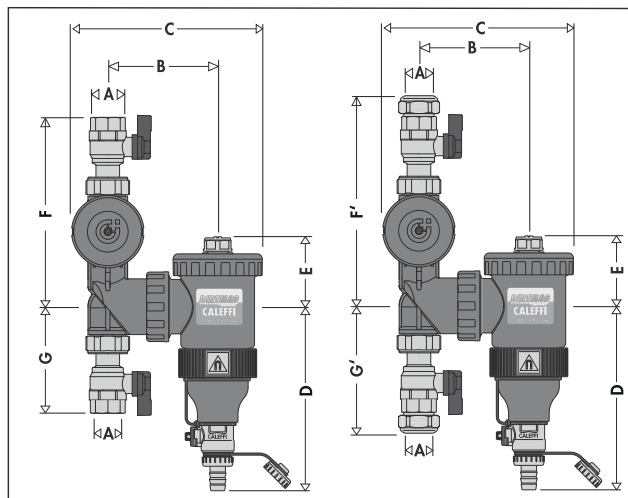
#### Performance

Medium:	water, glycol solutions
Max. percentage of glycol:	30%
Maximum working pressure:	3 bar
Working temperature range:	0-90°C
Ring system magnetic induction:	2 x 0,3 T
Initial cleaning strainer mesh size (blue supplied) Ø:	0,30 mm
Maintenance strainer mesh size (grey-spares part code F49474/GR) Ø:	0,80 mm
Device internal volume	0,4 l

#### Connections

Body:	3/4", 1" F (ISO 228-1)
	Ø 22 and Ø 28 mm for copper pipe

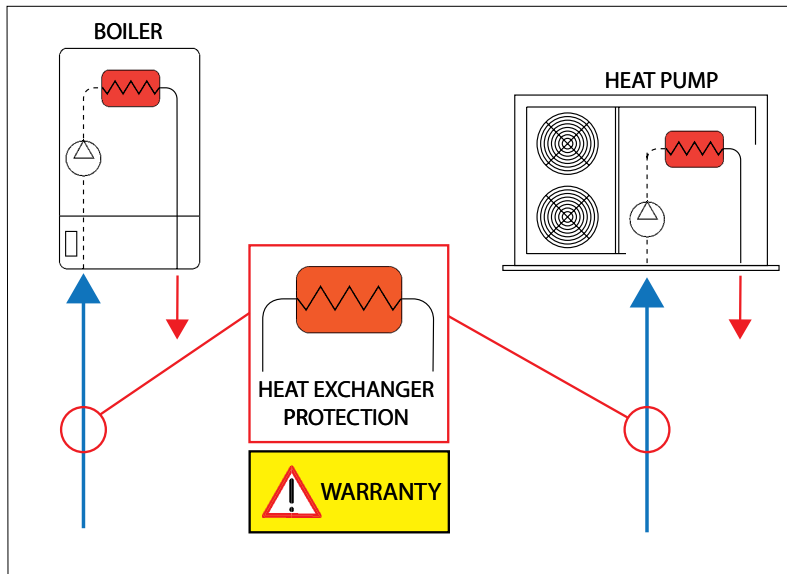
### Dimensions



Code	DN	A	B	C	D	E	F/F'	G/G'	Mass (kg)
545375	20	3/4"	106,5	182	172,5	65,5	178	101	1,5
545376	25	1"	106,5	182	172,5	65,5	182	105	1,5
545372	20	Ø 22	106,5	182	172,5	65,5	186	287	1,5
545373	25	Ø 28	106,5	182	172,5	65,5	190	293	1,6

## 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 boilers or heat exchangers, especially in the commissioning stage, already from the initial passage. This latter problem must not be underestimated because boiler manufacturers will frequently reject warranty claims if their product is not adequately protected by a strainer from the time of commissioning onwards.



Currently the dirt separators and strainers present on the market are unable to guarantee protection of the components in any stage of operation.

It is therefore necessary to use a multifunction device that can overcome all these problems by efficiently removing debris particles in all working conditions.

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 effectiveness of the strainer action is obtained with significant pressure drops and the need for frequent cleaning of the strainer mesh. This makes it necessary to provide a rapid strainer maintenance system or even the possibility to remove the strainer to limit pressure drops after the initial flushing stage.

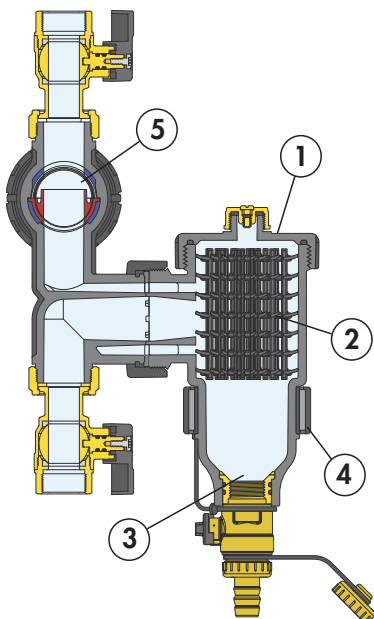
## Operating principle

The operating principle of the multifunction device is based on the combined action of two separate components arranged in series:

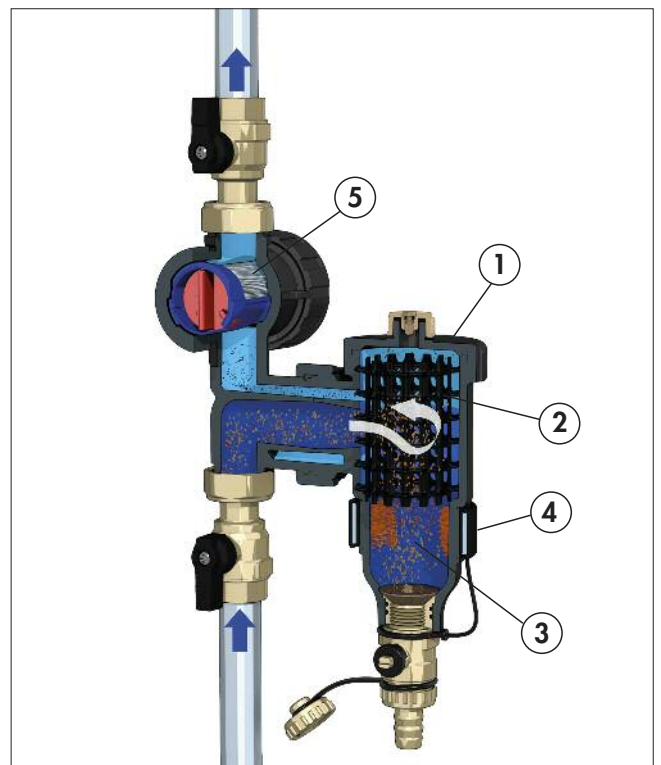
1. A dirt separator (1), that **separates** impurities contained in air conditioning systems.

The internal element (2) of the dirt separator consists of a set of radial reticular surfaces. On striking these surfaces the impurities in the water are separated out, dropping into the bottom of the body (3) where they are collected. Ferrous impurities are also trapped inside the dirt separator body, thanks to the action of the two magnets (4) inserted into a special removable outer ring. The large internal volume of the dirt separator slows down the flow speed of the medium thus helping, by gravity, to separate the particles it contains down to sizes in the order of one thousandth of a millimetre.

2. An interchangeable cartridge strainer (5) that **mechanically intercepts** the impurities contained in the thermal medium. The cartridge strainer intercepts impurities by means of mechanical selection of the particles in accordance with their size, by means of a special metal mesh.



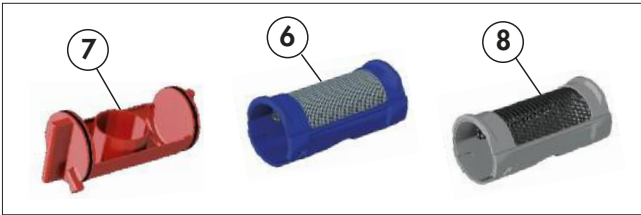
The water circulating in the system flows, in sequence, first through the dirt separator (1) and then through the cartridge strainer (5). The first passage through the dirt separator makes it possible to separate a high percentage of the impurities in the circulating water, down to minimal particle sizes. The medium then flows through the strainer in which 100% of the remaining particles, whose diameter is greater than the mesh size, are intercepted mechanically. The efficiency of the dirt separator is at its peak level after a small number of recirculations of the thermal medium up to the rated operating conditions of the system.



## Construction details

### Cartridge strainer

The high-capacity strainer cartridge consists of two parts: an outer body (6) with stainless steel mesh and a specially shaped internal element (7) for collecting impurities. The complete collection of impurities is always optimal, whether the installation is vertical, horizontal, or 45°.

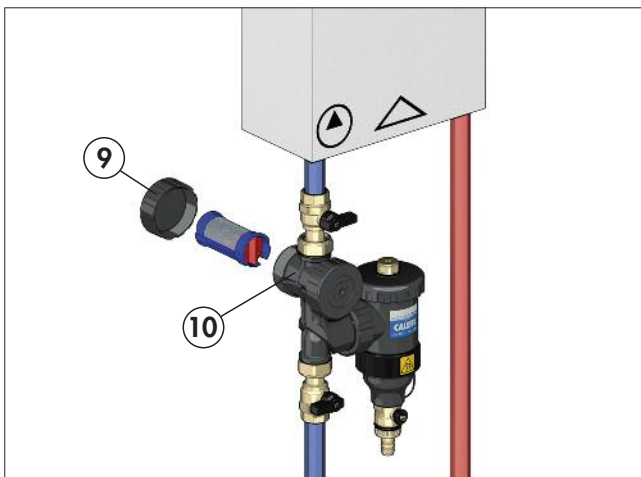
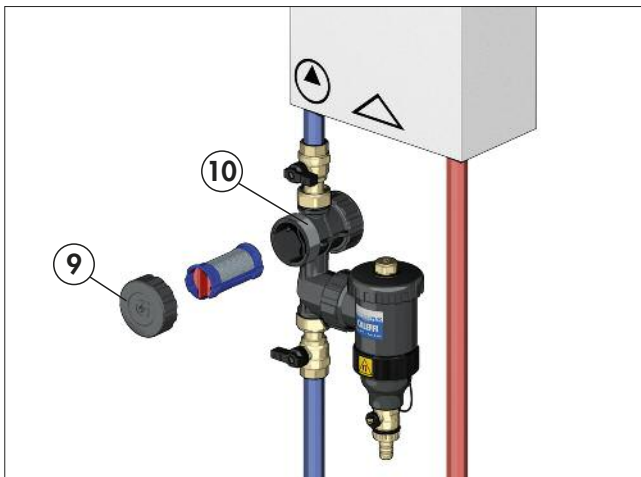


The strainer supplied (blue colour) is composed of a metal mesh with filtration capacity such as to entrap particles of diameter greater than 0,3 mm. This specific strainer mesh is able to intercept all particles remaining in circulation, thereby ensuring optimal initial cleaning of the pipes. After shutting off and draining the DIRTMAGPLUS® device, the strainer (6) can be easily inspected as follows:

- removal to clean the strainer from the impurities it has captured and that have accumulated in dirt collector (7)
- replacement with a maintenance strainer (grey colour) (8) (optional, code F49474/GR - filtration capacity such as to entrap particles of diameter greater than 0,8 mm)
- if appropriate, the multifunction device can function as a simple dirt collector by removing the supplied strainer.

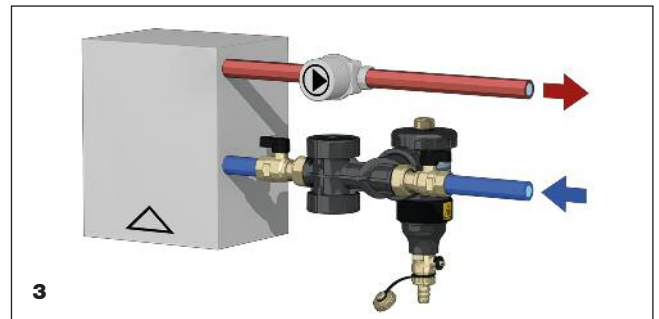
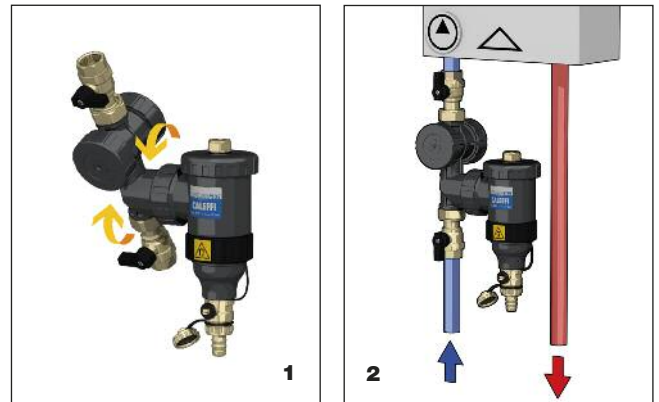
### Strainer accessible from both sides of the enclosure

The two closing plugs on each side (9) of the strainer enclosure (10) facilitate its extraction in accordance with the installation position of DIRTMAGPLUS®.



### Adaptation of body to horizontal and vertical pipes

Thanks to the special coupling of the tee fitting and locking nut, DIRTMAGPLUS® can be adjusted (fig.1) so that it can be fitted on vertical pipes (fig.2), horizontal pipes (fig.3), or 45° angled pipes, without affecting its functional characteristics.

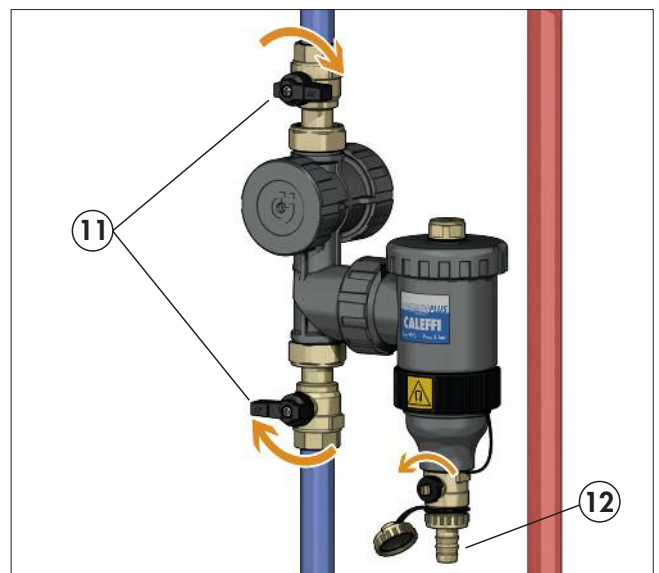


### Multifunctionality and practicality in reduced space

DIRTMAGPLUS® is a compact device designed to take up the minimum amount of space and to offer practicality and versatility for installation, maintenance and possible use for circuit filling and flushing procedures.

### Shut-off valves

To facilitate inspection and maintenance tasks the multifunction device is equipped with two shut-off valves (11) that allow the device to be not only isolated but also completely emptied by way of the drain cock (12).



### Technopolymer

The dirt separator is made of a technopolymer selected specifically for heating and cooling system applications. The main features of the technopolymer are:

- high strength to strain, while maintaining good ultimate elongation.
- good resistance to crack propagation.
- very low humidity absorption, for consistent mechanical behaviour.
- high resistance to abrasion caused by continuous medium flow.
- performance maintained over temperature variations.
- compatibility with glycols and additives used in circuits.

These basic material characteristics, combined with the appropriate shaping of the most highly stressed areas, enable a comparison with the metals typically used in the construction of dirt separators.

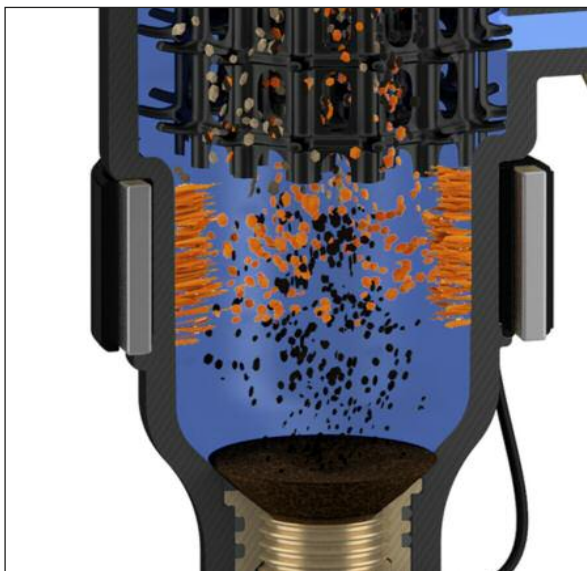
### Low head losses and performance maintained over time

The high performance of the dirt separator is based on the use of the internal element with reticular surfaces. The principle of collision and decantation of particles makes the dirt separation action more efficient if compared to the common strainers. This performance is constant over time, unlike common strainers which instead get clogged by the trapped sludge, thus changing the functional features.

### Separation of ferrous impurities

This series of dirt separators, fitted with a magnet, offer greater efficiency in the separation and collection of ferrous impurities. The impurities are trapped inside the dirt 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 their decantation and subsequent expulsion while the system is still running. Since the magnetic ring is positioned outside the dirt separator body, the hydraulic characteristics of the device are not altered.

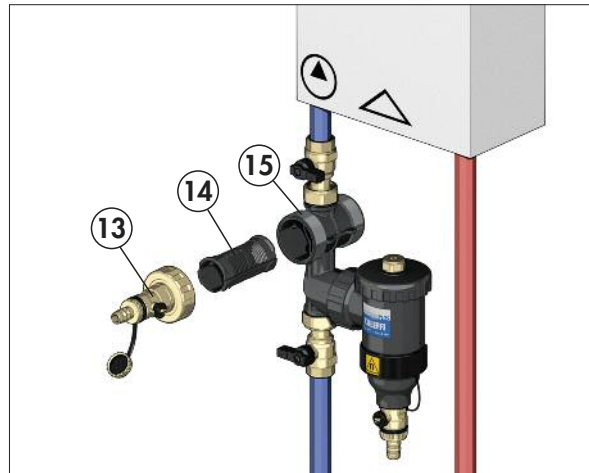


### Geometric structure and large dirt collection chamber

The dirt collection chamber has the following features:

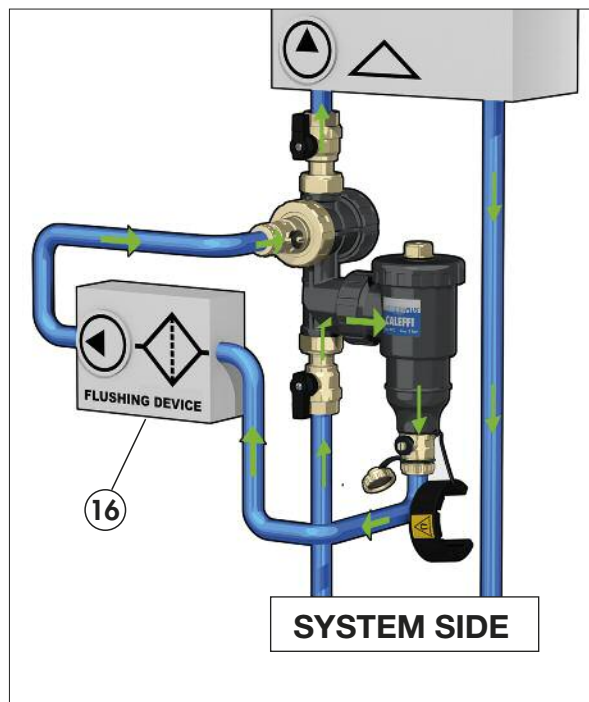
- it is located at the bottom of the device, at such a distance from the connections that the collected impurities are not affected by the swirling of the flow through the mesh;
- it is large enough to offer an increased amount of collected dirt, which means emptying/discharging procedures are required less often (in contrast to strainers, which need to be frequently cleaned);
- it is easy to inspect, by unscrewing it from the valve body for any servicing of the internal element required in the event of obstruction by fibres or large dirt particles.

### Accessory kit



The accessory kit for filling and flushing the circuit (code F49476) is composed of a plug with a drain cock (13) and a black coloured element (14) to be inserted in the strainer container (15) to separate the flows.

This kit can be used to connect a specific external system filling/flushing machine (16) in compliance with the specific commissioning prescriptions and procedures.

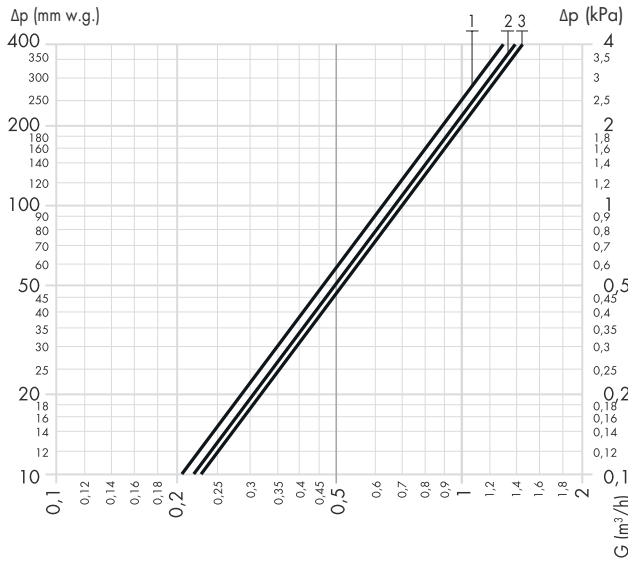


### Additives dosing



The multifunction device can also be used as an access point to inject into the circuit chemical additives designed to protect the system.

### Hydraulic characteristics



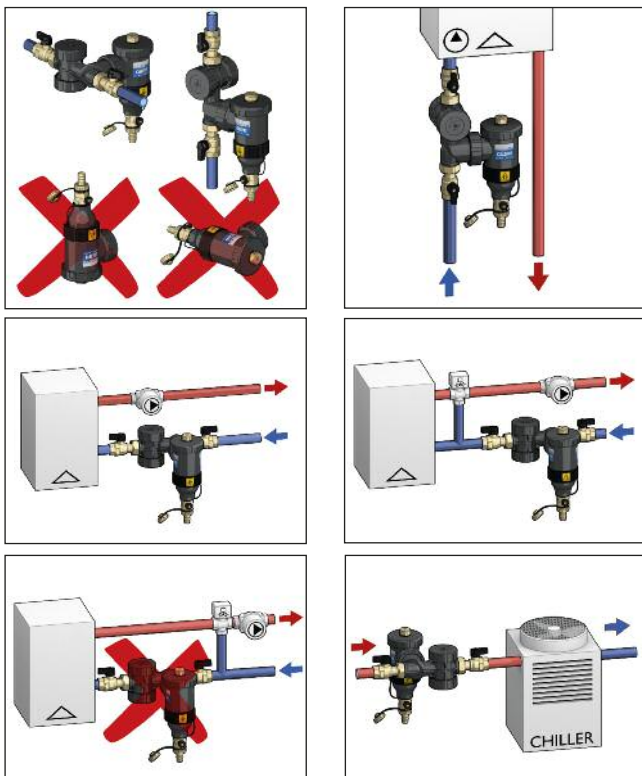
DN 20 - 25		
1	Device with blue strainer (supplied)	Kv (m³/h) = 6,3
2	Device with grey strainer (spare part)	Kv (m³/h) = 6,7
3	Device without strainer	Kv (m³/h) = 7,0

The maximum recommended flow velocity of the medium at the device connections is ~1 m/s. The following table shows the maximum flow rates in order to meet this requirement.

DN	l/min	m³/h
20 - 25	18,8	1,13

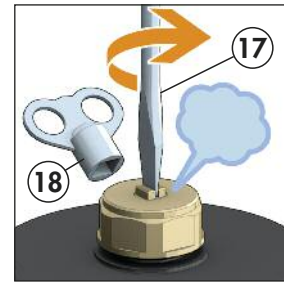
### Installation

The multifunction device must be installed in accordance with the flow direction indicated by the arrow on the tee fitting and, preferably, on the return circuit upstream of the boiler/chiller. The device should be preferably installed upstream of the pump and always with the body vertical, with the air vent facing upward.



### Air vent

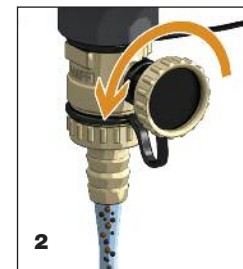
Use a screwdriver (17) or a butterfly key (18) to undo the screw on the top plug in order to purge any air that has collected at the top of the body.



### Sludge discharge

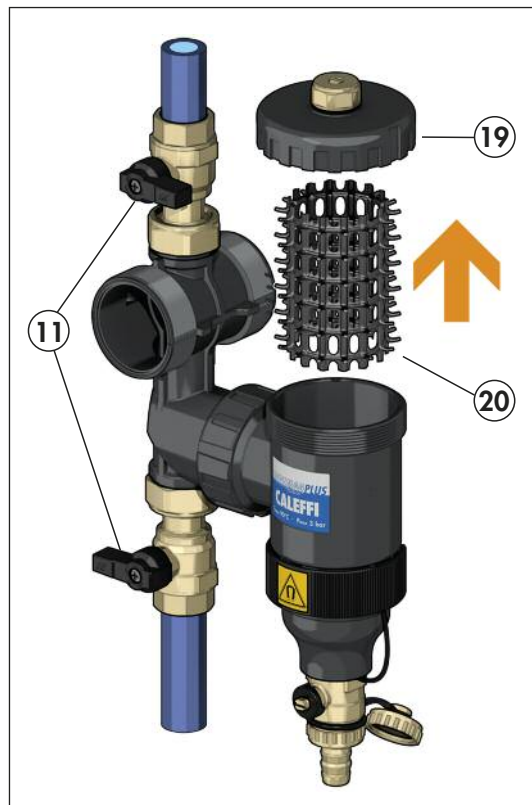


Remove the ring in which the magnets are housed (fig.1) and drain the impurities, even while the system is running, using the special key provided (fig.2).



### Maintenance

In case of maintenance of the dirt collection chamber, after shutting off the device with the specific valves (11), simply unscrew the top cover (19) using the provided key, then extract the internal element (20).



## Accessories



Accessory kit for circuit filling and flushing for series 5453 device.

Code

**F49476**

## Accessory strainers



First cleaning strainer  
Mesh size Ø = 0,30 mm



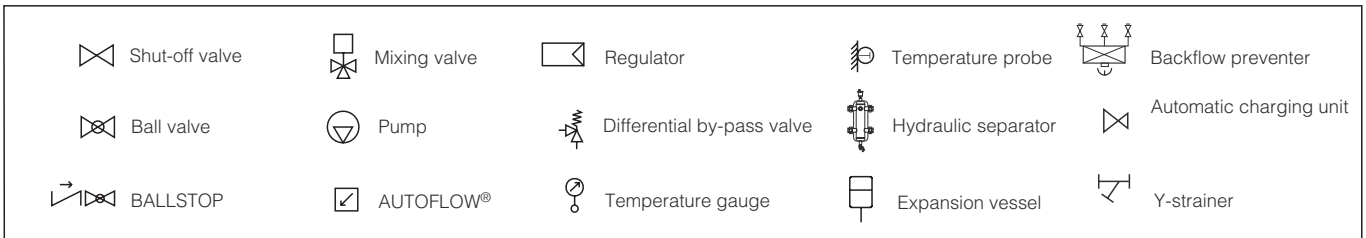
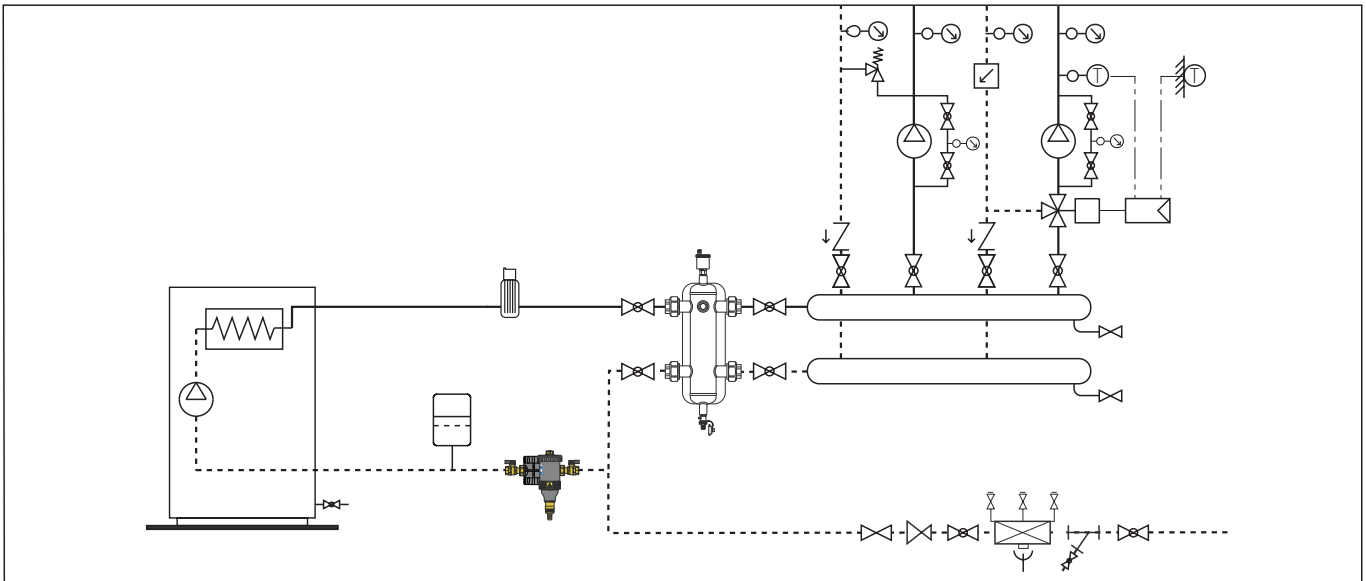
Maintenance strainer  
Mesh size Ø = 0,80 mm

Code

**F49474/BL** cleaning strainer (blue)

**F49474/GR** maintenance strainer (grey)

## Application diagram



## SPECIFICATION SUMMARY

### DIRTMAGPLUS® 5453 series

Multifunction device in composite with dirt separator and strainer. Dirt separator with magnets. Size DN 20 (and DN 25). Adjustable 3/4" (and 1") F connections (ISO 228-1). PA66G30 body and cover. HDPE internal element. EPDM hydraulic seals. Locking nut for tee fitting in PPSG40. Shut-off valves and drain cock with brass hose connection. Dirt collector in POM, strainer in POM and stainless steel. Medium water and glycol solutions; maximum percentage of glycol 30%. Maximum working pressure 3 bar. Working temperature range 0–90°C. Strainer mesh size Ø 0,30 mm. Device internal volume 0,4 l. PCT INTERNATIONAL APPLICATION PENDING.

### DIRTMAGPLUS® 5453 series

Multifunction device in composite with dirt separator and strainer. Dirt separator with magnets. Size DN 20 (and DN 25). Adjustable connections with compression ends for Ø 22 mm (and Ø 28 mm) copper pipe. Shut-off valves and drain cock with brass hose connection. PA66G30 body and cover. HDPE internal element. EPDM hydraulic seals. Locking nut for tee fitting in PPSG40. Shut-off valves and drain cock with brass hose connection. Dirt collector in POM, strainer in POM and stainless steel. Medium water and glycol solutions; maximum percentage of glycol 30%. Maximum working pressure 3 bar. Working temperature range 0–90°C. Strainer mesh size Ø 0,30 mm. Device internal volume 0,4 l. PCT INTERNATIONAL APPLICATION PENDING.

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