XF Xtra filtration magnetic dirt separator

577 series

01391/24 NA

AHR EXPO 2024 INNOVATION AWARDS FINALIST

Product range

577 Series	NPT male union	size 1”
	NPT female union	sizes 1-1/4”, 1-1/2”
	Press, sweat union	sizes 1”, 1-1/4”, 1-1/2”

Technical specifications

Materials

Body:	PA66G30
Upper cap:	brass EN 12164 CW617N
Purge screw:	brass EN 12164 CW617N
Locking nut for tee fitting:	
size 1”:	PPSG40
sizes 1-1/4” and 1-1/2”:	brass EN 12420 CW617N
Tee fitting:	brass EN 1982 CB 753S
Internal element:	PA66
Hydraulic seals:	peroxide-cured EPDM
Posi-Stop™ union embedded o-ring seal:	peroxide-cured EPDM
Internal brushes:	PA66
Magnets:	neodymium rare-earth

Performance

Suitable fluids:	water, glycol solutions
Maximum percentage of glycol:	30%
Maximum working pressure:	45 psi (3 bar)
Operating temperature range:	32 to 195 °F (0 to 90 °C)
Body internal volume:	
size 1”:	18 fluid ounces (0.53 liter)
sizes 1-1/4” and 1-1/2”:	21.3 fluid ounces (0.63 liter)
Filter mesh size:	160 µm
Magnetic induction:	3 x 0.475 T

Connections

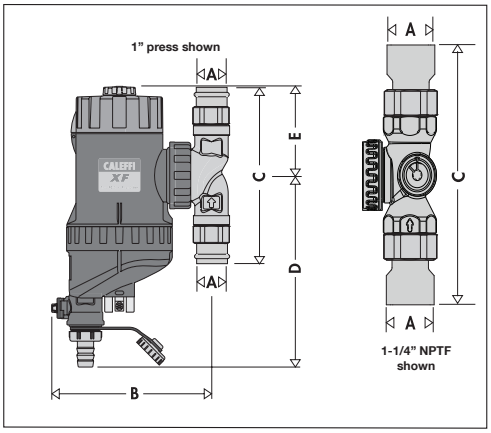
size 1”:	NPT male union
sizes 1-1/4” and 1-1/2”:	NPT female union
sizes 1”, 1-1/4” and 1-1/2”:	press, sweat union

***Lay length for press:**
size 1”: 5 1/16 inch
size 1-1/4”: 9 11/16 inch
size 1-1/2”: 8 5/16 inch

Function

The Caleffi XF “Xtra Filtration” magnetic dirt separator safeguards components within hydronic systems by ensuring a hydronic fluid free from impurities, maximizing heat transfer efficiency. This compact device integrates three distinct separation methods: collision media for large non-magnetic debris, a central magnet for capturing ferrous material, and a 160 µm mesh filter for trapping remaining fine particle impurities. Efficient separation commences at the initial pass, effectively removing a substantial amount of debris during system startup.
Designed for applications such as heat pumps and boilers, where critical components like heat exchangers are sensitive to debris and magnetic impurities, the XF provides top-notch performance. The XF’s top cap rotates to control an internal brush that cleans the fine mesh filter by dislodging debris and directing it toward the purge valve. Removing the central magnet facilitates the release of ferrous material. Simple hassle-free inline maintenance is made possible by purging the XF through its hose barb blowdown port.
Featuring Caleffi’s Posi-Stop™ union o-ring technology, the XF’s inlet and outlet ports eliminate the need for fiber gaskets. Additionally, the connection points incorporate a rotating collar that connects to the main body, allowing for installation flexibility in both horizontal and vertical piping orientations. In 1-1/4” and 1-1/2” models, the XF includes a partial bypass feature to continue removing impurities without significant head loss after startup debris removal.

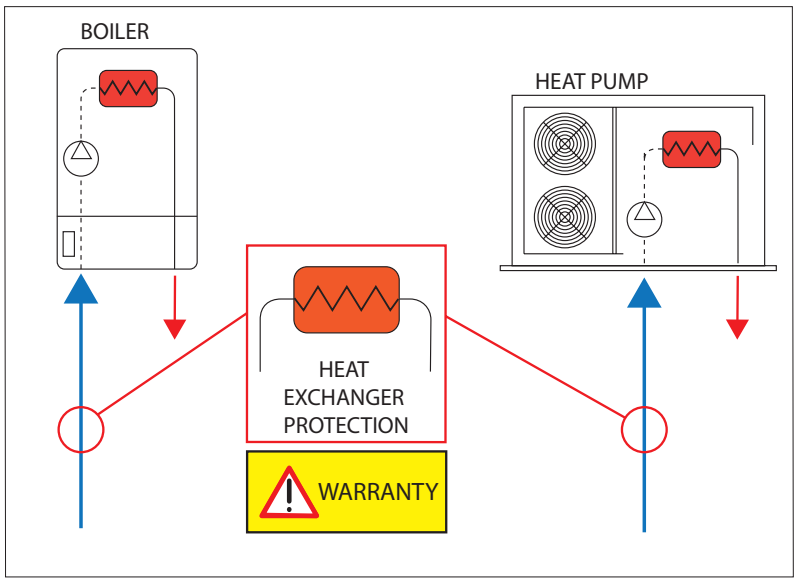
Dimensions



Code	A	B	C	D	E	Wt. (lb/kg)
NPT female threaded connections						
577870A	1¼"	7 5/16”	10 15/16”	7¼”	5½”	8/7/4.0
577980A	1½”	7 5/16”	8 13/16”	7¼”	4 3/8”	8.4/3.8
NPT male threaded connections						
577660A	1”	6¼”	6 13/16”	7¼”	3 3/8”	4.3/2.0
Sweat connections						
577669A	1”	6¼”	6 13/16”	7¼”	3 3/8”	4.3/2.0
577879A	1¼"	7 5/16”	9 7/16”	7¼”	4 11/16”	8/7/4.0
577989A	1½”	7 5/16”	8 9/16”	7¼”	4 5/16”	8.0/3.6
Press connections*						
577666A	1”	6¼”	6 15/16”	7¼”	3½”	4.3/2.0
577876A	1¼"	7 5/16”	13½”	7¼”	5 15/16”	8.9/4.0
577986A	1½”	7 5/16”	13 3/16”	7¼”	6 5/8”	7.8/3.5

Problems caused by impurities in hydronic systems

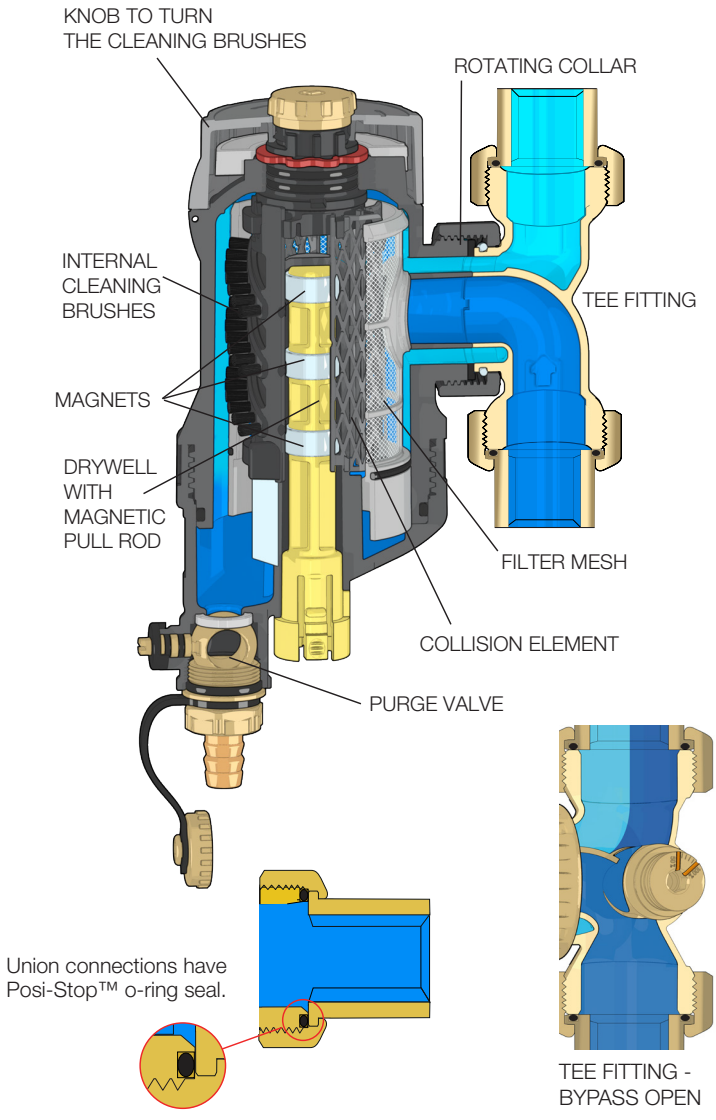
The most critical and expensive components of a hydronic heating or cooling system are the heat exchangers in heat pumps and boilers, the terminal units located in the zones being conditioned, and the fluid circulators. Today's high efficiency heat exchangers have narrow flow passages that are very sensitive to dirt and scale buildup; they can quickly lose their design heat transfer performance when fouled. Some component warranties may even be deemed null and void if excessive impurities cause premature failure.



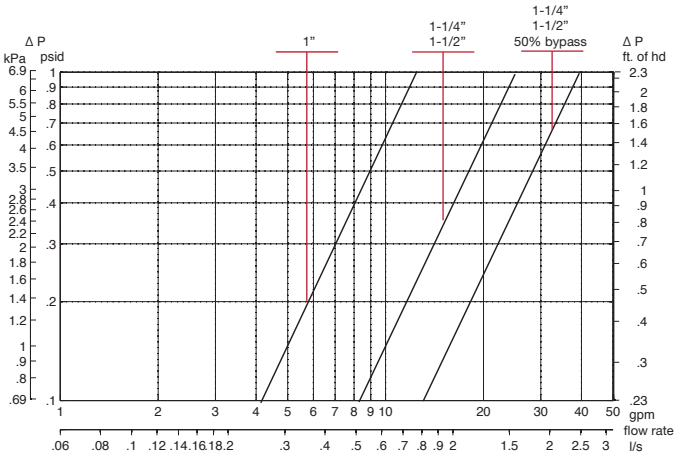
Modern ECM (electrically commutated motors) circulators have permanent magnet motors which attract magnetite. That magnetic material will accumulate over time and can cause the circulator to lose efficiency or potentially seize. Magnetite and other forms of corrosion create abrasive debris which causes friction, reduced performance, and damage to any moving part in a hydronic system, including costly control valves.

Some popular magnet-only separators require system isolation, disassembly and messy manual cleaning which is time consuming, expensive and inefficient. The XF Xtra Filtration magnetic separator keeps equipment running at peak efficiency over time.

Characteristic components



Hydraulic characteristics

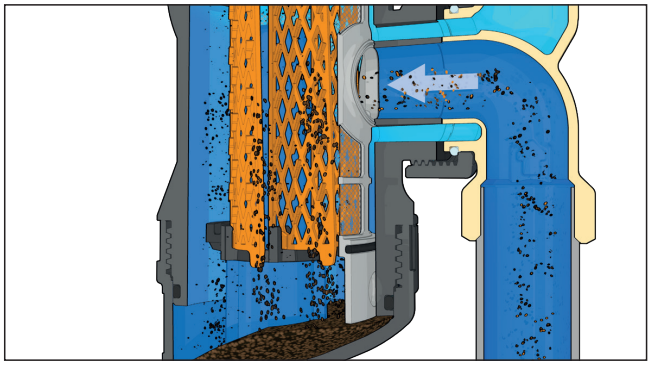


	MAX. FLOW RATE		
Size	1"	1¼"	1½"
GPM	13	26	26
Cv	12	27	27
Cv 50% bypass	--	46	46

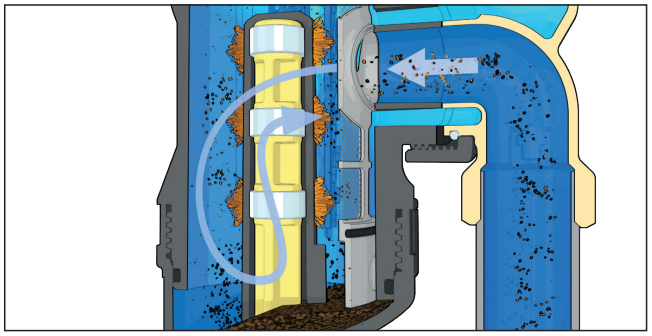
Principle of Operation

Water treatment in the system takes place in three separate stages:

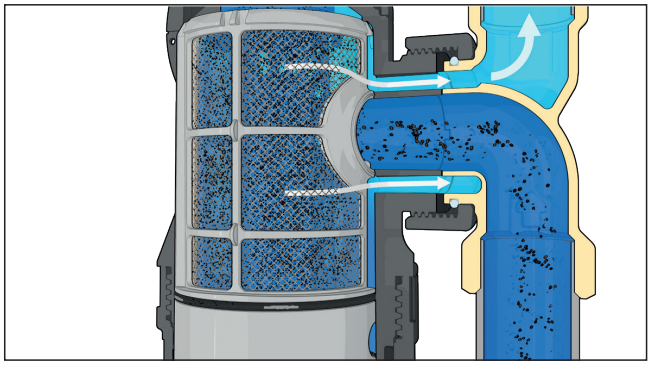
1. The water enters at the center of the device and comes into contact with the internal element, which consists of a set of concentric mesh surfaces. The microparticles are separated by the joint action of the large chamber and the mesh surfaces.



2. The magnets positioned on the central stem capture and trap the ferrous impurities, down to the smallest size.



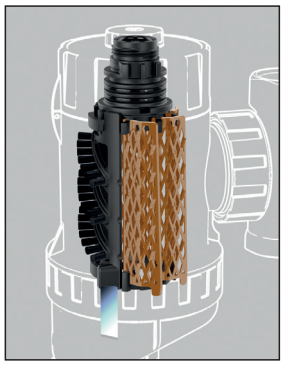
3. At the device outlet, the water passes through a filter mesh, which retains the residual impurities by mechanically selecting the particles according to their size. The large filter mesh surface with a mesh size of 160µm makes it less prone to clogging.

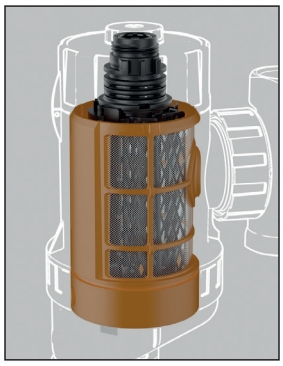


Construction details

Dual filtering effect

The Caleffi XF magnetic filter contains two devices that remove impurities. The first is an internal mesh element, composed of a set of concentric surfaces that cause particles up to 5µm to precipitate. The second is an outlet filter with a large surface, which obstructs and retains impurities by size (160 µm).





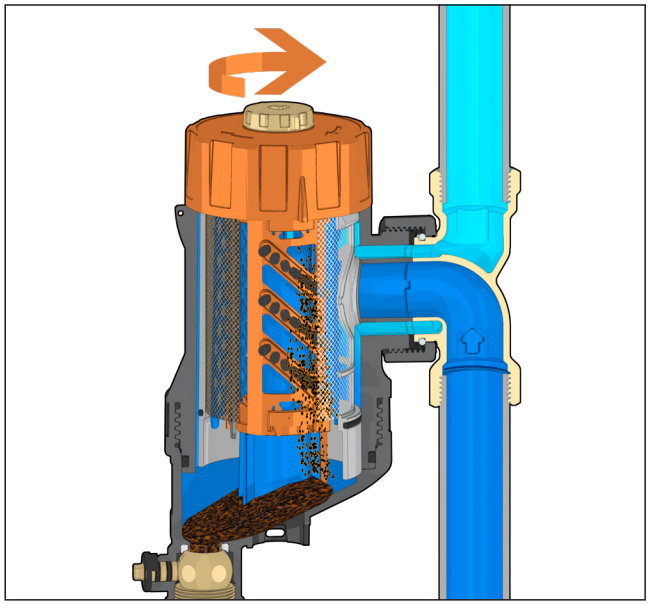
Filter mesh

The Caleffi XF magnetic filter is made using a technopolymer selected for heating and cooling system applications. Its basic features are:

- high resistance to plastic deformation;
- good resistance to crack propagation;
- very low humidity absorption, for consistent mechanical behavior;
- high resistance to abrasion caused by continuous medium flow;
- constant performance as temperature varies;
- compatibility with the glycol and additives used in circuits.

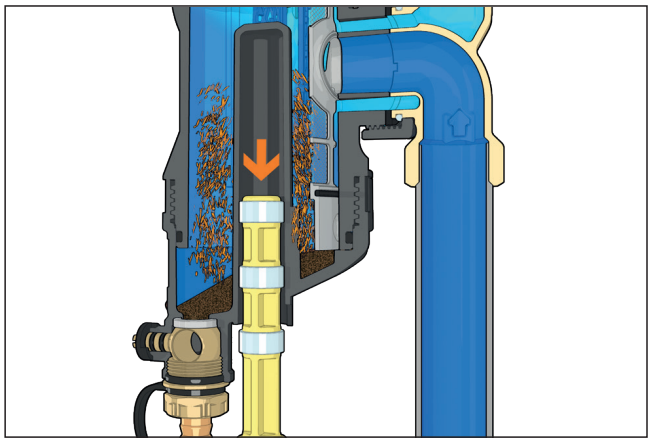
These basic features, combined with the appropriate shapes of the most highly stressed areas, make it comparable with the metals typically used in the construction of filters.

To clean the Caleffi XF magnetic filter with the circulator off, there is no need to disassemble the component because it contains a mechanism with brushes to clean the filter mesh.



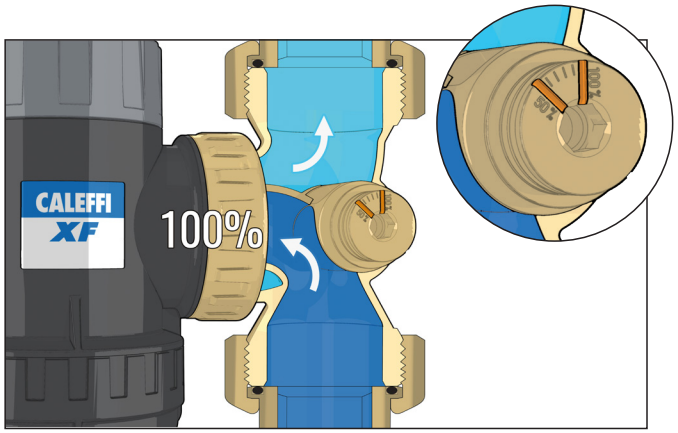
Separation of ferrous impurities

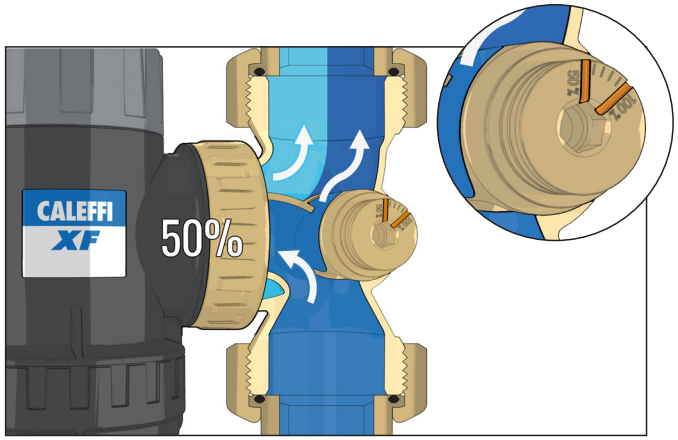
The central magnets offer greater efficiency in the collection of ferrous impurities. They are captured by the strong magnetic field in the central part of the body.
Simply remove the central magnet holder stem from the body to allow the impurities to settle, so that they can be expelled without disassembling the dirt separator filter.



Adjustable by-pass

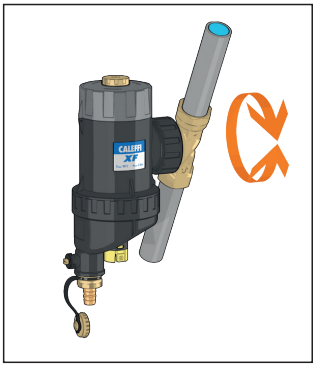
Sizes 1-1/4" and 1-1/2" come with a by-pass to restrict the flow rate passing through the Caleffi XF magnetic filter and thereby increase the Cv value. However, 0% by-pass is recommended during commissioning and for the first few weeks of system operation. Then, during the "constant" phase, the XF magnetic filter can be set to operate with by-pass to achieve a higher Cv. This reduces the pressure drop and puts less demand on the system circulators.

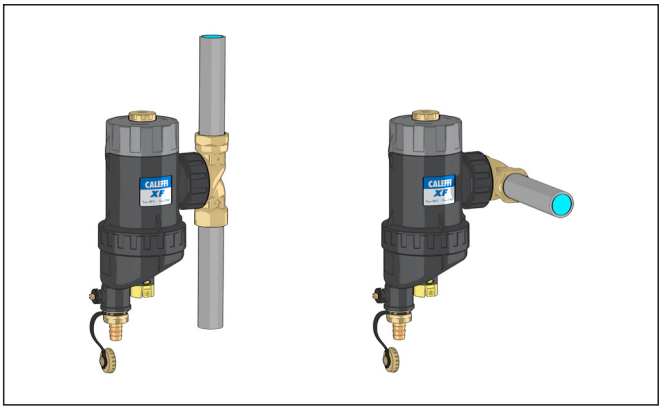


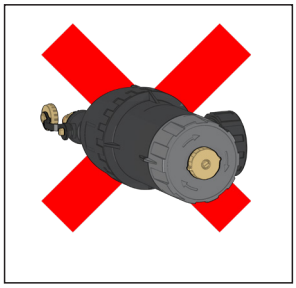


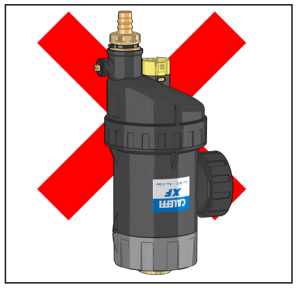
Installation on horizontal and vertical pipes

The Caleffi XF magnetic filter is adjustable so that it can be installed in both horizontal and vertical pipe orientations.
Do not install the XF body horizontally or upside-down, see warning figure below.
Use the special tightening wrench to screw and unscrew the locking nut.
The functional and fluid dynamic characteristics remain unchanged in both configurations.



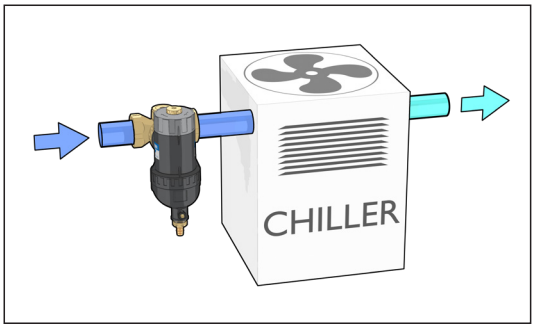


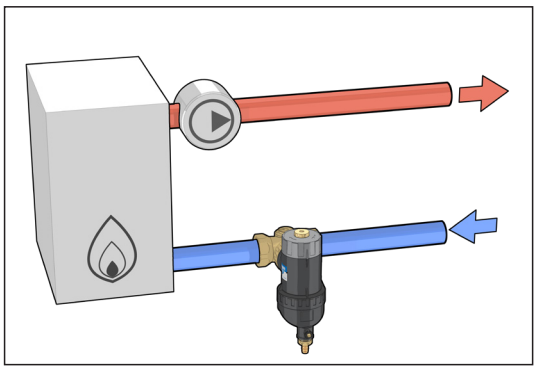


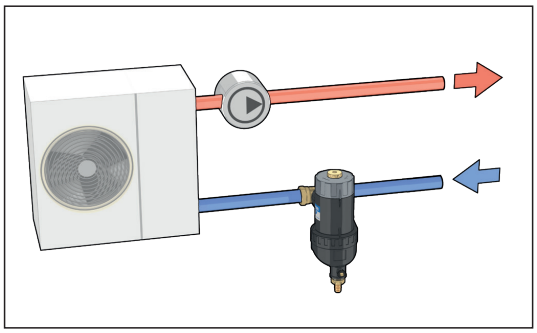


Installation

The Caleffi XF magnetic filter must be installed in accordance with the flow direction indicated by the arrow on the tee fitting.
It is preferable to install it upstream of the equipment or heating and cooling equipment and circulator.

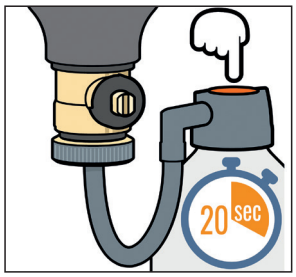




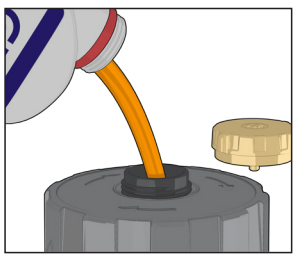


Additives dosing

The Caleffi XF magnetic filter can also be used as an access point to inject chemical additives into the circuit in order to protect the system.



Additives can be injected using pressurized canisters.

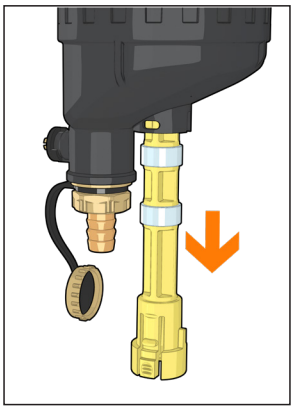


Liquid additives can only be added if shut-off valves have been installed downstream and upstream of the device.

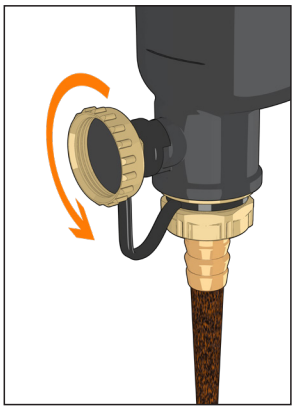
Maintenance and dirt discharge

The filter mesh cleaning mechanism with special brushes means that the Caleffi XF magnetic filter does not have to be disassembled in order to carry out maintenance. It is sufficient to leave the system filling unit in

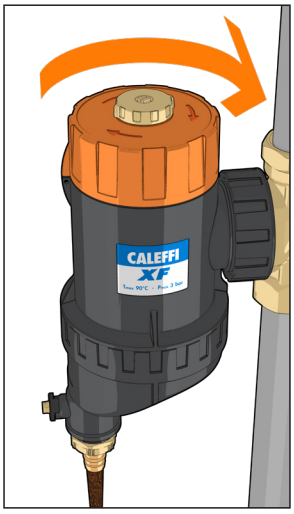
1. Switch off the circulator and remove the central magnet holder stem.



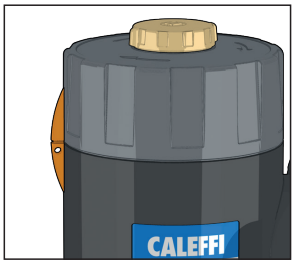
2. Drain the impurities with the filling unit active.



3. Turn the top knob clockwise to clean the filter mesh with the special internal brushes. Turn a few times to clean properly.

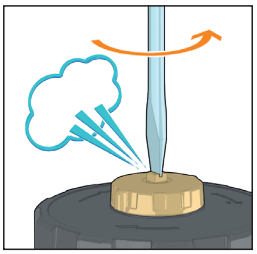


4. After cleaning, align the indicator on the top knob with the reference mark on the device body.
Close the purge valve and start the system.

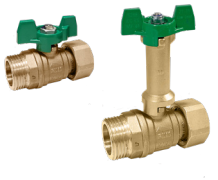


Air vent

The air that builds up at the top of the body can be purged by unscrewing the manual vent cap with a screwdriver or butterfly key.



Accessories



Union isolation ball valve.
Low lead Male x Female union fits 1" valves between body and tailpiece. See below.
For isolating size 1" 577 XF magnetic separator.

Code	Description	Lbs
290030	Isolation ball valve 1" M x 1" F union	1.0
290031	Isolation ball valve 1" M x 1" F union with extended handle	1.0

For more information, consult Technical Brochure 1397 NA at www.caleffi.com

NPT full port isolation ball valve with extended handle.
Install with separatley sourced NPT nipples.See below.
For isolating code 577870A and 577980A magnetic separators.

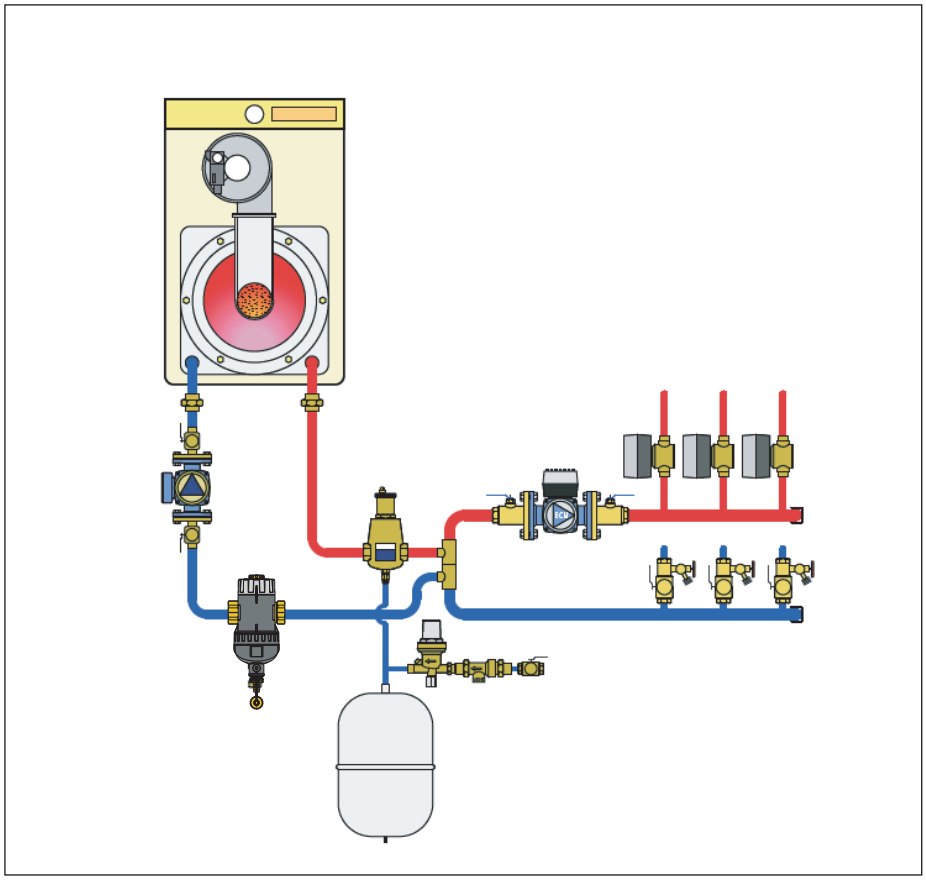
Code	Description	Lbs
NA10927	1 1/4" FNPT ball valve	1.6
NA10928	1 1/2" FNPT ball valve	1.9
NA10937	1 1/4" NPT nipple	0.3
NA10938	1 1/2" NPT nipple	0.3

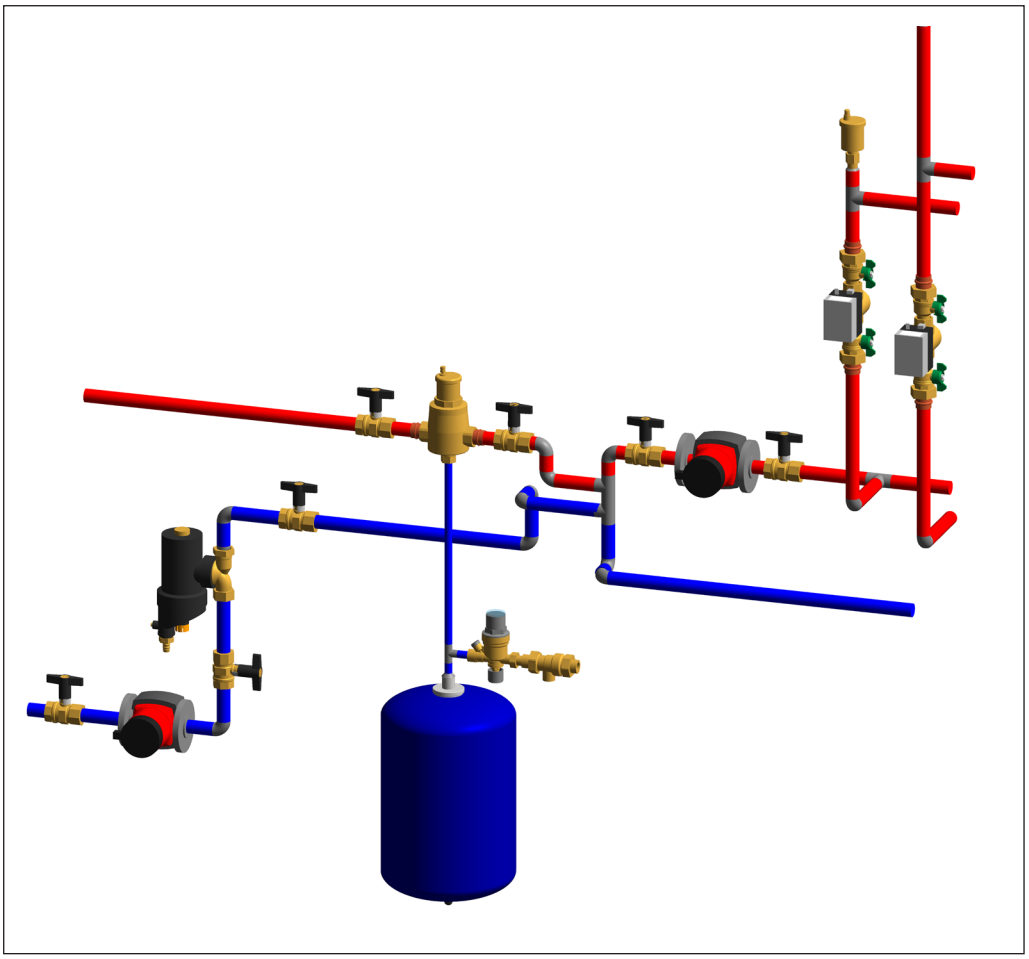
For more information, consult Technical Brochure 1396 NA at www.caleffi.com

Isolation ball valves, installed on 1" 577 XF.

Isolation ball valves, installed on 1 1/4" and 1 1/2" 577 XF. with NPT female connections.

Application diagram





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SPECIFICATION SUMMARY

577 series Caleffi XF

Xtra filtration magnetic dirt separator. NPT male threaded union connection size 1”, NPT female union connection sizes 1-1/4” and 1-1/2”, Press and Sweat union connection sizes 1”, 1-1/4” and 1-1/2”. Composite body PA66G30. Upper cap and purge screw brass EN 12164 CW617N. PA66 filter. Peroxide-cured EPDM hydraulic seals and Posi-Stop union embedded o-ring seal. Locking nut for tee fitting in PPSG40. Tee fitting brass EN 1982 CB 753S. Complete with internal PA66 brushes. Neodymium rare-earth magnets (3), 3 x 0.475 T magnetic induction. Purge valve with hose connection. Suitable fluids: water and glycol solutions; maximum percentage of glycol 30%. Maximum working pressure 45 psi (3 bar). Operating temperature range 32 to 195 °F (0–90 °C). Filter mesh size 160 µm. Device internal volume 18 fluid ounces (0.53 liter) for size 1” and 21.3 fluid ounces (0.63 liter) for sizes 1-1/4” and 1-1/2”. Rated flow: Cv 12 for size 1”; Cv 27 for sizes 1-1/4” and 1-1/2”. Cv with 50% bypass 46. Provide with optional inlet and outlet isolation ball valves, code 290031, for size 1”, NA108 series with threaded nipples for sizes 1-1/4” and 1-1/2”, separately sourced, field installed.

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