

DIRTMAG[®] PRO

Dirt separator with dual magnetic fields



5463AM series

01386/22 NA

Replaces 01386/21 NA



Function

In hydronic systems, the circulation of water containing impurities may result in rapid wear and damage to components such as pumps and control valves. These impurities also cause blockages in the heat exchangers, heating elements and pipes, resulting in a lower thermal efficiency within the system. DIRTMAG[®] PRO removes both ferrous and non-ferrous dirt particles from the fluid, collecting them in a large collection chamber, from which they can be drained. This device is capable of efficiently removing even the smallest particles, with extremely limited head loss.

The DIRTMAG PRO dirt separator with dual magnet fields extends the Caleffi dirt separator family by adding a powerful neodymium magnetic pull rod inside a drywell inserted into the top of the body within the flow stream. Additional magnetic flux increases the speed of magnetite (ferrous impurities) removal from the hydronic fluid for maximum protection.

Insulation shells are available separately.

Product range

5463AM series DIRTMAG PRO dirt separator, with dual magnetic fields in brass. connections 1" to 2" NPT female; 1" to 2" integral sweat; 1" to 2" integral press

Technical specifications

- Materials:**
- Body, dirt collection chamber: brass
 - Internal element: glass reinforced nylon PA66G30
 - Hydraulic seal: peroxide-cured EPDM
 - Drain valve: brass
 - Magnets: neodymium rare-earth

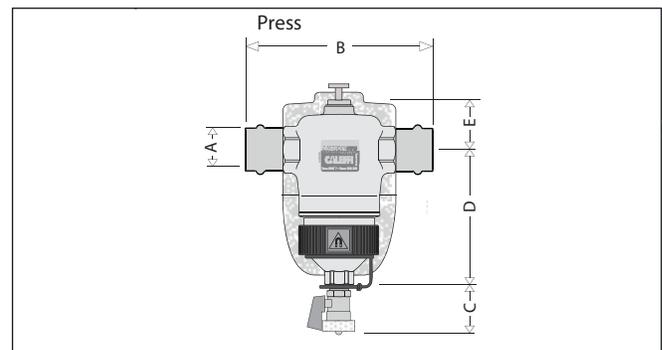
- Performance:**
- Suitable fluids: water, glycol solution
 - Max percentage of glycol: 50%
 - Max working pressure: 150 psi (10 bar)
 - Temperature range: 32 - 250°F (0 - 120°C)

- Particle separation capacity: to 5 µm (0.2 mil)
- Ferrous impurities separation efficiency: 100%

Connections:

- Main: 1", 1 1/4", 1 1/2", 2" NPT female
1", 1 1/4", 1 1/2", 2" integral sweat
1", 1 1/4", 1 1/2", 2" press
- Top magnet probe drywell: 1/2" straight thread with o-ring seal
- Drain: 3/4" garden hose connection
- Lay length (press connections): size 1 inch: 4 3/4"
size 1 1/4 inch: 5 1/8"
size 1 1/2 inch: 5 1/4"

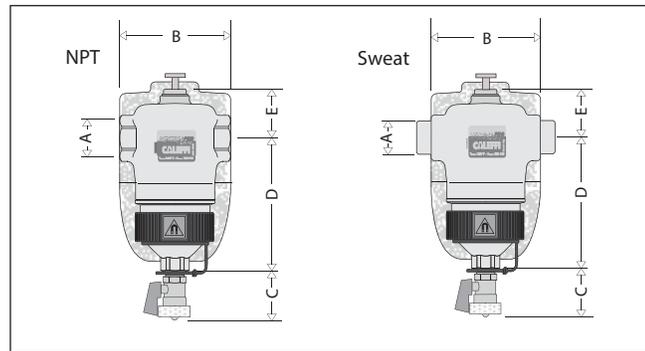
Dimensions



Code	A	B	C	D	E	Wt. lb (kg)
546366AM	1" press	6 3/16"	1 1/4"	5"	2"	4.5 (2.0)
546367AM	1 1/4" press	7 7/16"	1 1/4"	6"	2"	5.6 (2.5)
546368AM	1 1/2" press	8"	1 1/4"	6"	2"	7.0 (3.2)
546369AM	2" press	8 1/2"	1 1/4"	6"	2"	7.0 (3.2)

- Lay length:
- size 1 inch: 4 3/4"
 - size 1 1/4 inch: 5 1/8"
 - size 1 1/2 inch: 5 1/4"
 - size 2 inch: 5 5/8"

Dimensions



Code	A	B	C	D	E	Wt. lb (kg)
546306AM	1" FNPT	4 ⁵ / ₁₆ "	1 ¹ / ₄ "	5"	2"	4.7 (2.1)
546328AM	1" SWT	5 ¹ / ₁₆ "	1 ¹ / ₄ "	5"	2"	4.7 (2.19)
546307AM	1 ¹ / ₄ " FNPT	4 ⁷ / ₈ "	1 ¹ / ₄ "	6"	2"	5.8 (2.6)
546335AM	1 ¹ / ₄ " SWT	5 ³ / ₁₆ "	1 ¹ / ₄ "	6"	2"	4.7 (2.1)
546308AM	1 ¹ / ₂ " FNPT	4 ⁷ / ₈ "	1 ¹ / ₄ "	6"	2"	6.7 (3.0)
546341AM	1 ¹ / ₂ " SWT	5 ³ / ₄ "	1 ¹ / ₄ "	6"	2"	5.4 (2.4)
546309AM	2" FNPT	5 ¹ / ₈ "	1 ¹ / ₄ "	6"	2"	6.7 (3.0)
546354AM	2" SWT	6 ¹ / ₈ "	1 ¹ / ₄ "	6"	2"	6.0 (2.7)

The magnetic pull rod is 4¹/₂" (115 mm) long. The minimum required space to extract the rod for removing collected ferrous impurities (magnetite) is 4³/₄" (120 mm).

Construction details

Double the protection:

Captures two forms of debris that can damage or shorten the life of heat exchangers, circulators, valves and polymers: ferrous debris such as magnetite, and non-ferrous debris such as copper shavings, solder, lime-scale fragments, silica and pipe compound.

Unique dual magnetic fields:

Two powerful neodymium rare-earth magnetic fields attract and capture ferrous oxide impurities and allow simple blowdown - no disassembly required.

Increased power:

Powerful magnetic pull rod mounted inside drywell and positioned directly in fluid flow path, external magnetic barrel collar and newly designed collision media function together to increase magnetic debris removal efficiency by 40%.

Concentric pattern collision media:

Unique dirt collision media uses low-flow velocity, deflection and gravity to separate dirt particles as small as 5 microns from flow stream. Concentric pattern design has low flow resistance resulting in 85% less pressure drop compared to same size y-strainer.

Fast and easy clean hands purging:

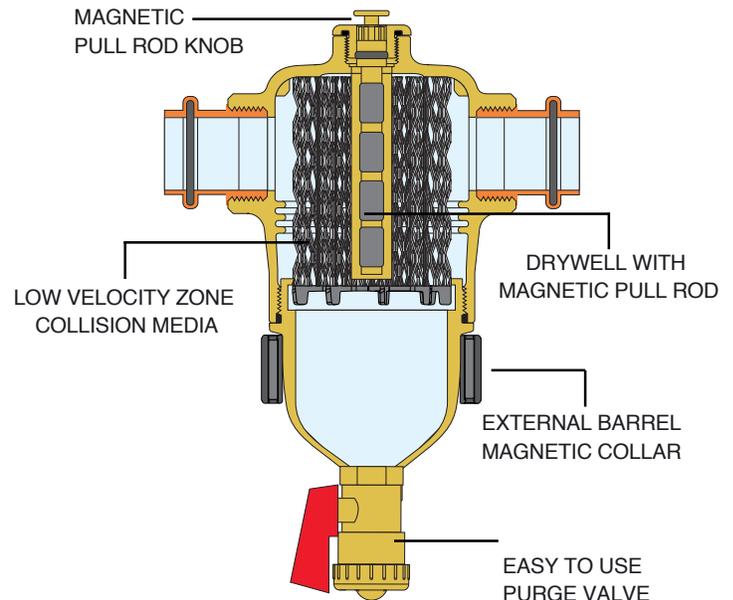
Pull out the magnetic pull rod from drywell on top, unclip the external barrel magnetic collar and open the purge valve to simply release the captured magnetic impurities and purge all of the dirt.

Corrosion resistant:

All components are highly resistant to hydronic chemical additives or unstable pH fluid.

Hydraulic seals:

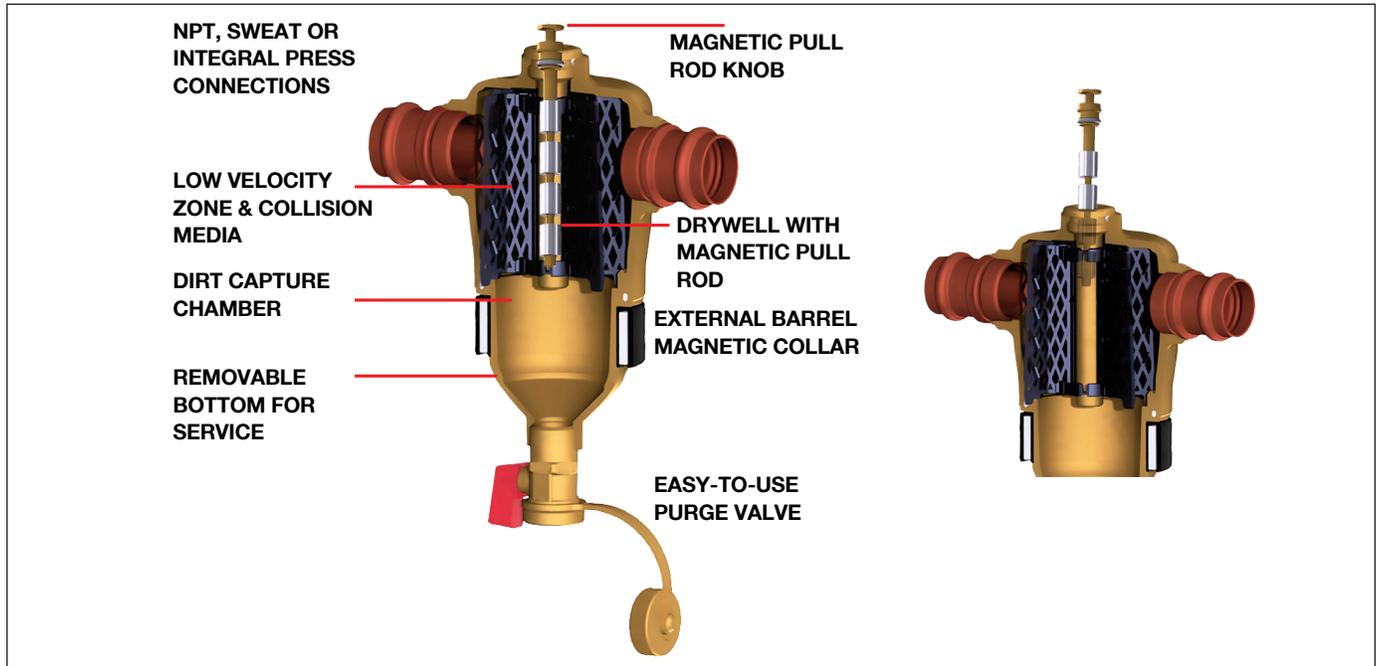
Peroxide-cured EPDM seals provide chlorine and chloramine resistance for long operating life.



Operating principle

The DIRTMAG PRO is an inline, multi-pass device that continuously removes impurities (a.k.a. “dirt”) with each pass of the hydronic system fluid. This dirt comes from pipes that are not properly cleaned and flushed before connection, and from installation scraps such as copper shavings, pipe tape and solder balls. Pipe scale and corrosion over time also create dirt, all which adversely affect heat transfer efficiency, component performance and reduce the life expectancy of mechanical system components such as valve and circulator bearings and seals.

The DIRTMAG PRO has two powerful magnetic fields to capture ferrous dirt, and a particle separation mesh to capture non-ferrous dirt. The dirt is then easily and quickly purged from the system using a simple “blow down” valve located at the bottom of the DIRTMAG PRO barrel. No disassembly or scraping magnetite from wetted magnets is needed, which means clean hands and fast easy servicing.



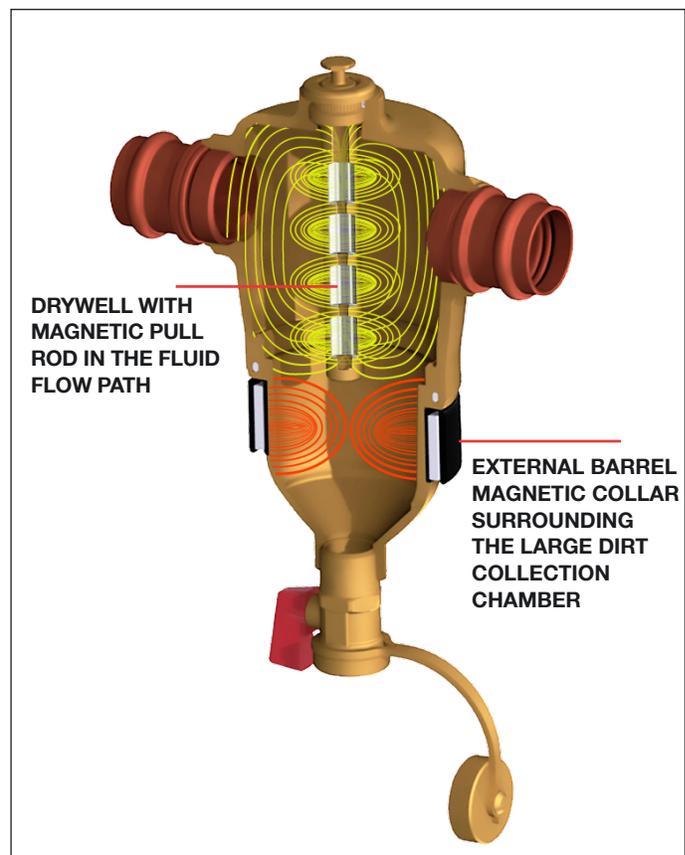
The DIRTMAG PRO patented technology includes unique dual magnetic fields, one in the flow path and another in the large-barrel low velocity zone. The dual fields increase ferrous particle removal efficiency by 40% which means faster removal of magnetite and other ferrous debris with each fluid pass. Faster removal increases protection for boiler heat exchangers, circulator bearings and valve seals. Up to 100% of ferrous debris is removed.

The flow path magnetic field comes from a powerful and unique retractable magnetic pull rod inside a top-mounted brass drywell. The magnets themselves are not wetted; when removed the ferrous material is released from the drywell exterior and falls to the bottom of the barrel until purged.

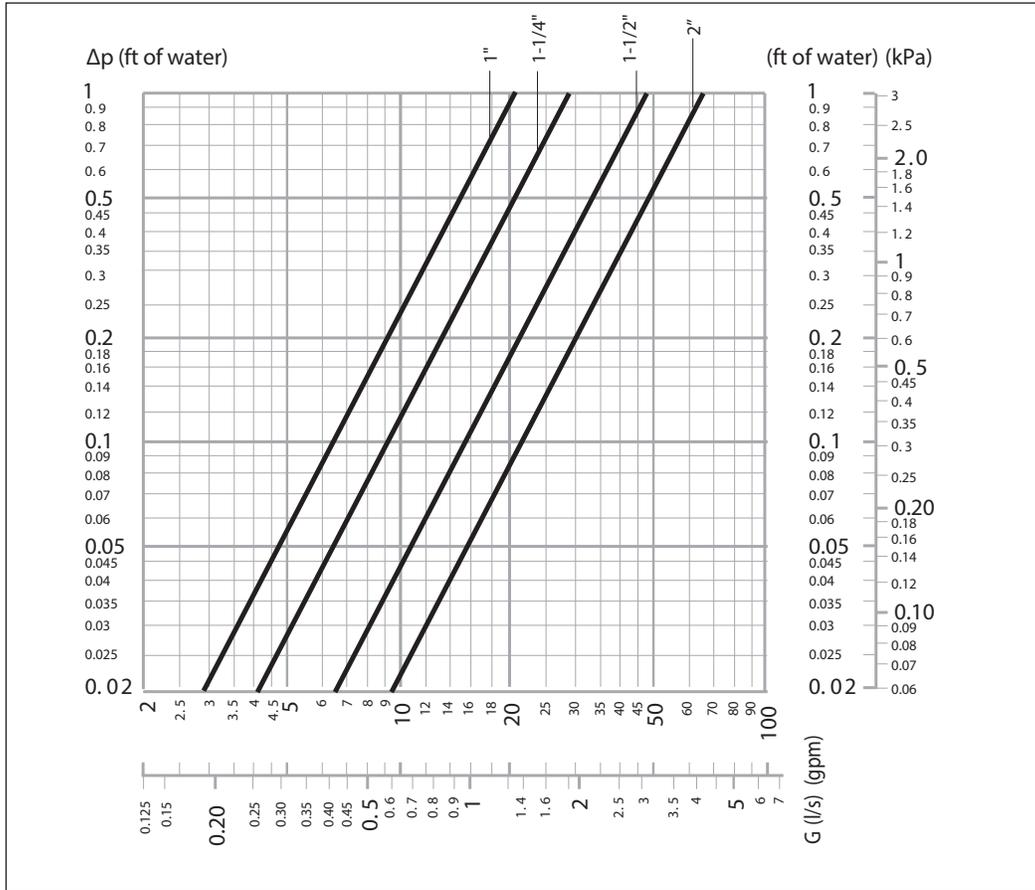
Unlike most “magnetic filters” on the market today, the DIRTMAG PRO also has a large concentric-pattern dirt separation mesh in the low-velocity flow path which removes non-ferrous debris as small as 5 microns. The mesh uses deflection and gravity to capture particles which then settle in the lower area of the barrel until they are easily purged from the system.

The DIRTMAG PRO efficiently removes all types of unwanted dirt, ferrous AND non-ferrous debris. It keeps the hydronic fluid clean so boilers, heat pumps and circulators (the most expensive equipment in the system) remain performing at high efficiency and will not suffer damage caused by poor fluid quality due to debris.

Relative to cost of ownership, blow down of the debris collected by the DIRTMAG PRO is fast and easy, especially when compared to the laborious and messy task of disassembling, cleaning and reassembling a wetted magnet device. Simply remove the magnetic pull rod from its drywell, unclip the external barrel magnetic collar, and open the integral purge valve. Once the fluid turns clear, close the purge valve, replace the magnets and the system is back in service. The “no-mess” task takes perhaps a minute or two, compared with 10 to 30 minutes required to do the same for a wetted magnet product. The system maintenance cost savings can be very significant and an otherwise dirty job becomes a clean and easy job for contractors.



Hydraulic characteristics

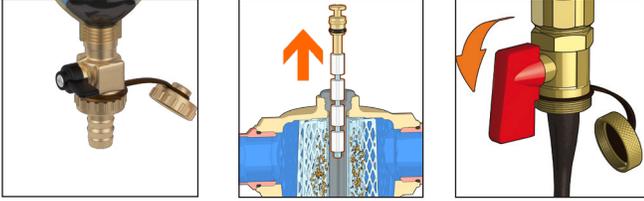


ft of water x .433 = psi

	MAX. FLOW RATE			
Size	1"	1¼"	1½"	2"
GPM	14	21	31	54
Cv	32	45	69	104

Draining off dirt and ferrous impurities

The dirt separator collection chamber has a drain valve. Using the handle provided it is possible to drain off the accumulated dirt particles. Turn off the circulator before blowdown.

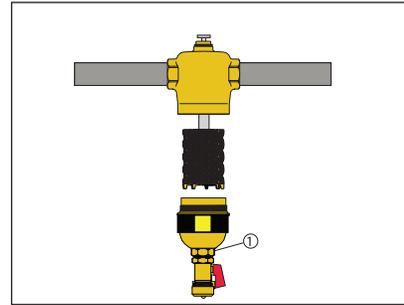


For the DIRTMAG PRO, captured impurities are easily flushed by unclamping the magnetic collar, pulling out the magnetic pull rod from the top-mounted brass dry-well and opening the drain valve. Allow for a minimum 4¾ inch space above the separator to completely remove the magnetic pull rod. Aided by the system pressure, the dirt and ferrous impurities, including magnetite, flushes out quickly and effectively.



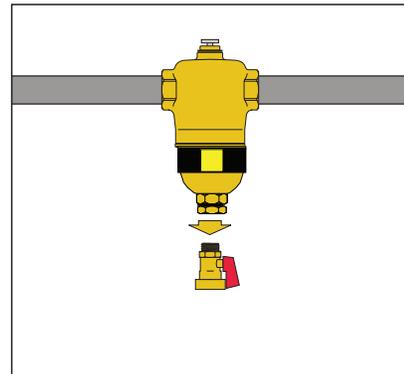
Maintenance

To perform annual inspection and maintenance, if needed, simply use a 26 mm hexagon wrench (1) to unscrew the dirt collection chamber, of the DIRTMAG PRO, to which the inner mesh element is connected for removal and cleaning.

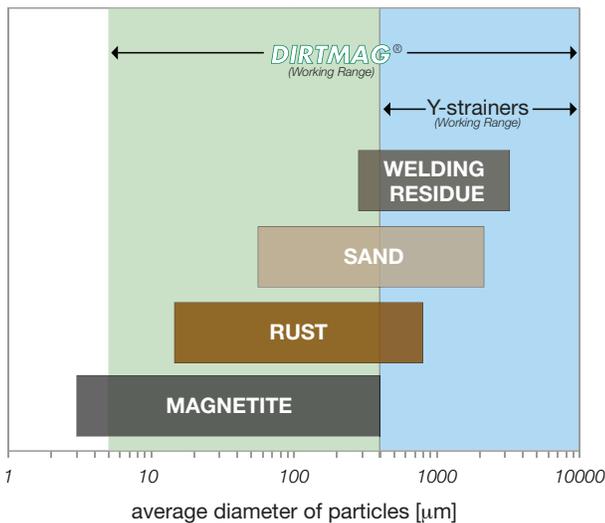


Bottom connection

The DIRTMAG PRO comes complete with a drain valve installed on the bottom port, Caleffi code 538402 FD.



Particle separation capacity – dirt separator efficiency



Separation efficiency

The capacity for separating the dirt in the medium circulating in the closed circuits of the hydronic systems depends on three factors:

1. It increases as the size and mass of the dirt particle increases. The larger and heavier dirt particles drop before the lighter ones.
2. It increases as the fluid velocity decreases. When the velocity decreases, there is a low-velocity-zone inside the dirt separator and the dirt particles separate more easily.
3. It increases as the number of recirculations increases. The medium in the circuit, flowing through the dirt separator a number of times during operation, is subjected to a continuous separation, until the dirt particles are completely removed.

The special design of the internal mesh element in the Caleffi DIRTMAG[®] PRO magnetic dirt separator is able to completely separate the dirt particles in the circuit down to a minimum particle size of 5 µm (0.2 mil). The adjacent graph illustrates how these separators quickly remove nearly all the dirt particles. After only 50 recirculations, approximately one day of operation, up to 100% is effectively removed from the circuit for particles of diameter greater than 100 µm (3.9 mil) and on average up to 80% taking account of the smallest particles. The continual passing of the medium during normal operation of the system gradually leads to complete dirt removal.

Insulation shells

The brass DIRTMAG PRO series 5463AM can be supplied with optional insulated covers, code CBN5462xx series purchased separately, to minimize heat loss.

Code	DIRTMAG PRO Size
CBN546205	For ¾" & 1"
CBN546207	For 1" & 1½"
CBN546209	For 2"



Technical specifications

Material:	closed cell expanded PE-X
Thickness:	25/64" (10 mm)
Density - inner part:	1.9 lb/ft ³ (30 kg/m ³)
- outer part:	3.1 lb/ft ³ (50 kg/m ³)
Thermal conductivity (DIN 52612):	
- at 32°F (0°C):	0.263 BTU·in/hr·ft ² ·°F (0.038 W/(m·K)
- at 104°F (40°C):	0.312 BTU·in/hr·ft ² ·°F (0.045 W/(m·K)
Coefficient of resistance to water vapor (DIN 52615):	>1,300
Working temperature range:	32–212°F (0–100°C)
Reaction to fire (DIN 4102):	class B2

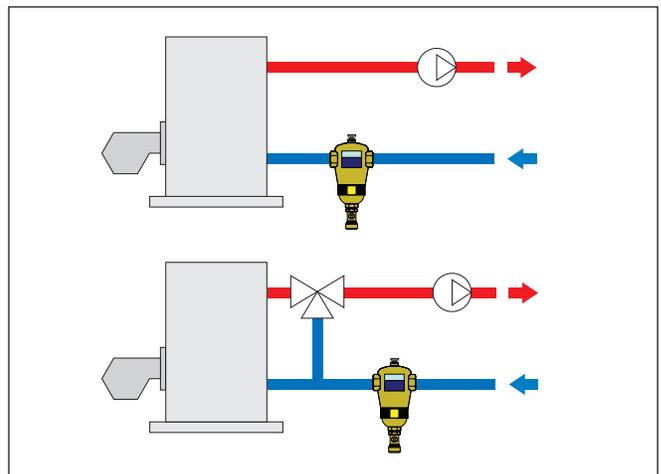
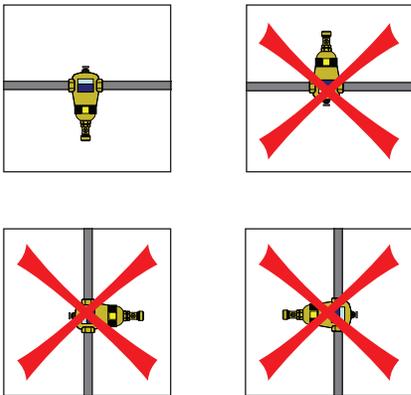
Removing insulation and draining impurities

1. Remove the insulation jacket upper and lower sections.
2. Turn off the circulator.
3. Pull out the magnetic pull rod from drywell on top, unclip the external barrel magnetic collar and open the purge valve to simply release the captured magnetic impurities and purge all of the dirt.
4. When finished, replace the magnets and insulation shells.

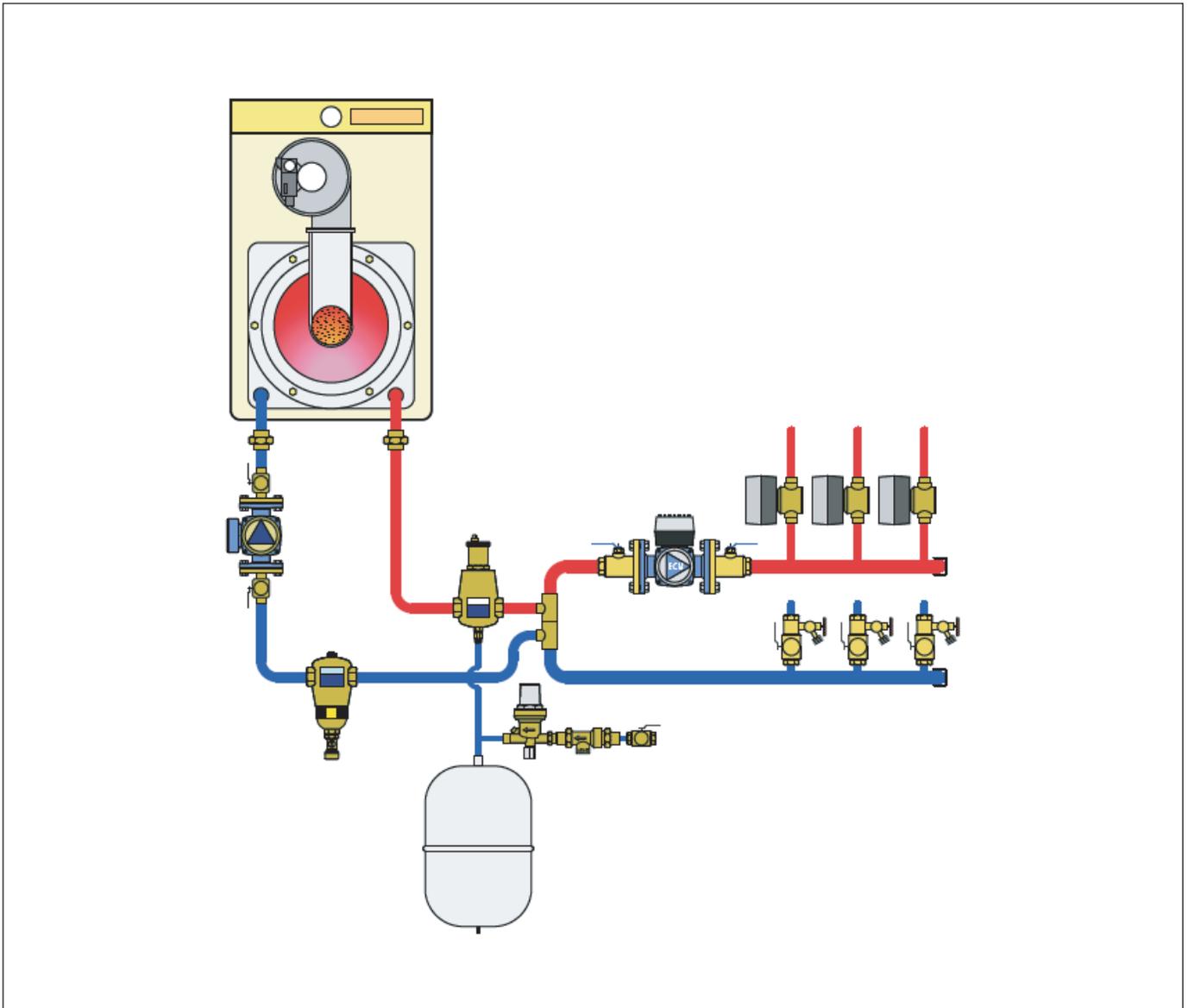


Installation

The dirt separator must always be installed in a vertical position, preferably on the return circuit upstream of the boiler (or chiller). This enables it to intercept dirt particles already present in the circuit, particularly when it is first started, before they reach the boiler (or chiller). Flow direction for the DIRTMAG PRO dirt separators is bi-directional; flow in either direction is permitted.



Application diagram



Accessories and Replacement parts



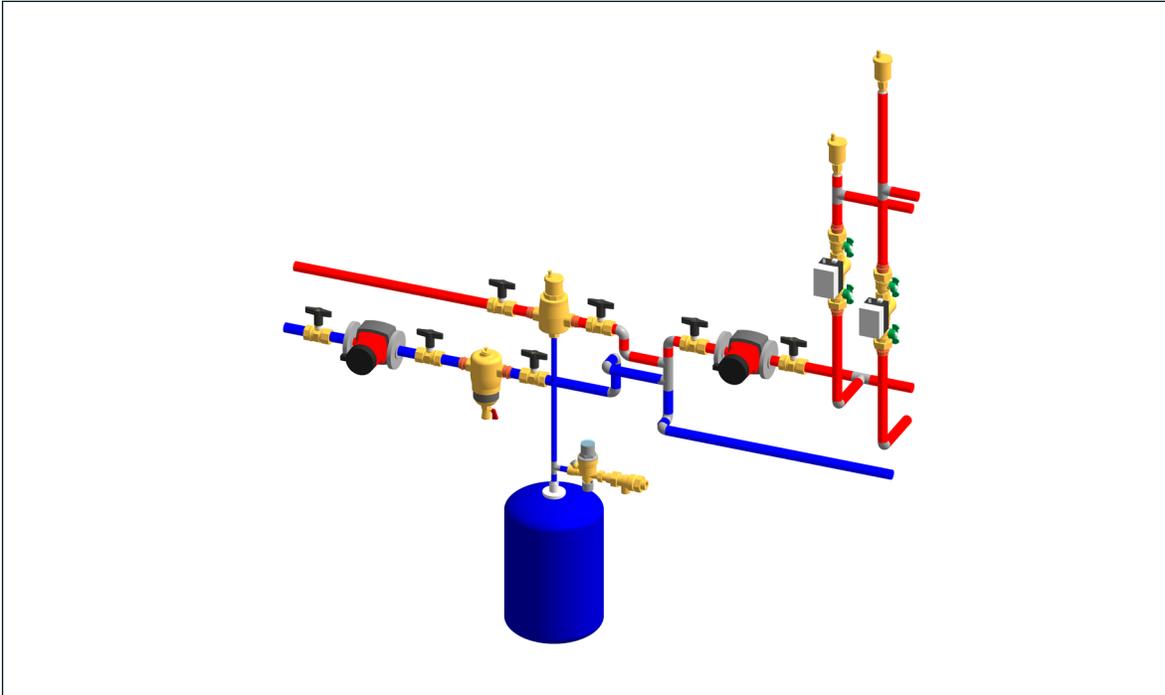
Replacement drain valve fits DIRTMAG PRO 5463 series.
 Brass body.
 Max. working pressure: 150 psi (10 bar)
 Max. working temperature: 250°F (120°C)



Replacement clip-on magnet belt for DIRTMAG PRO 5463 series.
 Brass body.

538402A.....1/2" x 3/4" GHT
 R49418.....Replacement GHT cap for 538402A drain valve

R39949.....Magnetic band



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SPECIFICATION SUMMARIES

5463AM Series DIRTMAG® PRO— Brass with Press, Sweat and NPT integral connections

Dirt separator with dual magnetic fields. NPT threaded and integral sweat or press connections 1" to 2". Top mounted dry-well with magnetic pull rod, neodymium rare-earth, in primary flow path. Internal mesh collision element of glass reinforced nylon PA66G30, removable for cleaning. Brass body with a removable external magnetic collar surrounding large dirt collection chamber, neodymium rare-earth. Drain valve with 3/4" garden hose connection. Peroxide-cured EPDM hydraulic seals. Suitable fluids: water or 50% maximum glycol solution. Maximum working pressure 150 psi (10 bar), Temperature range 32 to 250°F (0 to 120°C). Particle separation capacity: to 5 µm (0.2 mil). Ferrous impurities separation efficiency: up to 100% removal. Pre-formed insulation shells available separately for field installation.

We reserve the right to change our products and their relevant technical data, contained in this publication, at any time and without prior notice.



Caleffi North America, Inc.
 3883 W. Milwaukee Road
 Milwaukee, WI 53208
 Tel: 414-238-2360 · Fax: 414-238-2366
 sales@caleffi.com · www.caleffi.com
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