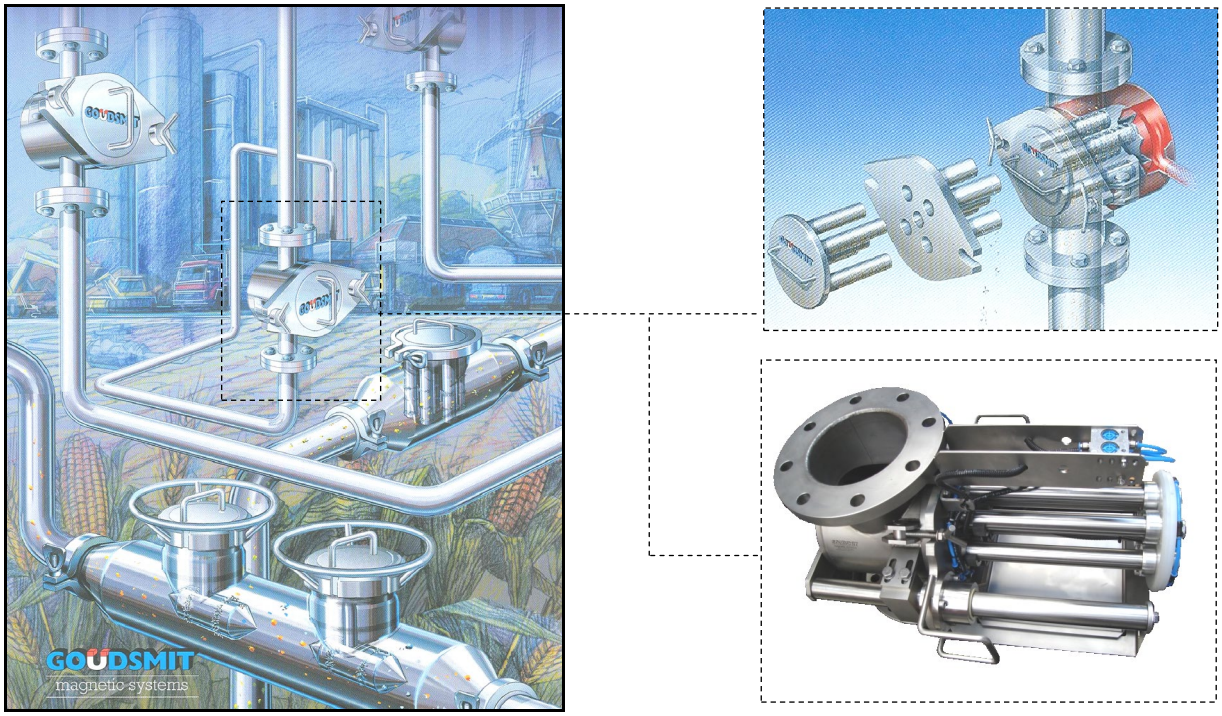
GOUDSMIT MAGNETICS

User Manual

Neoflux® quick-cleaning magnetic filter, series SxFN / SxFD…

For separation of ferromagnetic parts out of fluid & powder flows under pressure



The descriptions and pictures in this manual, used for explanation, may differ from your execution.
We have enclosed the as-built drawing of the delivered article.

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CE

Version 2.4 – august 2014

Version overview of standard manual

Version	Date	Description
1.2	04-1997	First saved version of the English version of the user manual.
2.0	01-2004	Complete renewed version of the manual.
2.1	11-2006	1. Revisions page added. 2. Atex remarks added to pages 7, 8, 9, 12, 16 and 18
2.2	08-2009	Specification sheet and declaration by manufacturer separated from manual
2.3	12-2009	CE sign removed from front page and CE remark added to id. Plate on page 7
2.4	08-2014	Adapted ATEX remarks for EX equipment w.o. own ignition sources

Introduction

Read this manual and make sure that you fully understand its contents before commissioning and operating the machine.

If you have any queries or require further explanation regarding any subject related to the machine, please do not hesitate to contact **GOUDSMIT Magnetic Systems B.V.**

The user manual can be ordered together with the device description and/or the article number as well as the order number (ORxxxxxx).

- This manual and the declaration by the manufacturer are part of the machine.
- They must remain with the machine, even if it is sold.
- The manual must be made available to all operators, service technicians, and others who work with the machine throughout its life cycle.

List of contents

General

This manual contains information for the correct operation and maintenance of your device. It also contains instructions for avoiding possible injury and serious damage and it allows a safe and as trouble-free functioning of the product as possible. Read this manual thoroughly before putting the device into operation, familiarise yourself with the operation and control of the device and follow all instructions precisely.

- *The data published in this manual is based on the available information at the time of delivery. This is issued subject to later amendment.*
- *We retain the right to amend or modify the construction and/or model of our products at any time whatsoever without any obligation to modify any previously supplied products accordingly.*

Ferromagnetism

The working principle of the device rests on (Ferro)magnetism.

Ferromagnetism is the basic mechanism by which certain materials such as iron cobalt and nickel can get magnetized when exposed to an externally applied magnetic field. Materials that remain magnetized after the external magnetic field is removed, are called permanent magnets. Most magnetic materials lose their magnetism after the external magnetic field is removed. Most alloys of iron, cobalt and nickel are magnetic. However, some stainless steel alloys like AISI304 or AISI316 are only slightly magnetic.

Because in most cases it will be Fe parts that will be Ferro-magnetically influenced, we will use the term ‘Fe’ in this user manual when we mean ferromagnetic material

Conditions of supply and guarantee

The conditions of supply are the **"General Conditions for the supply and erection of mechanical, electrical and electronic products" (SE01)**, published by ***Orgalime***, in Brussels.
These conditions can also- if desired – be requested by writing to Goudsmit Magnetic Systems B.V., as also mentioned in our written quotation.

The guarantee prescriptions are mentioned in these conditions.

The guarantee on your equipment will be void if:

- Service and maintenance are not performed in accordance with the instruction manual or by servicemen who are not especially trained to do the work. We strongly recommend that specific magnetic service and maintenance be carried out by Goudsmit personnel).
- Modifications are made to the equipment without our prior written permission.
- Non-original parts or non 100% exchangeable parts are used.
- Lubrication products other than those prescribed are used.
- The equipment is used injudiciously, incorrectly, negligently or not in accordance with its intent and/or purpose (see chapter "Intended use / user instructions").

All parts that are subject to wear are excluded from the guarantee.

Remaining remarks / warnings

- Use the device only for the application for which it has been designed (see chapter *"Intended use / user instructions"*).
- Use the device only when it is in technically perfect condition, and ensure that all protective hoods or inspection covers, including all safety circuits, have been fitted and installed in the correct manner.
- Ensure that device maintenance is appropriate and in accordance with the instructions provided in this user manual.
- Any eventual faults, in particular those that may influence safety, should be attended to immediately and remedied before renewed operation. Should you, after estimating the risks of an unsolved fault, still think it is safe to keep the device into operation, then warn the operators and maintenance staff of these faults and the danger(s) caused by these faults.

Delivery

General

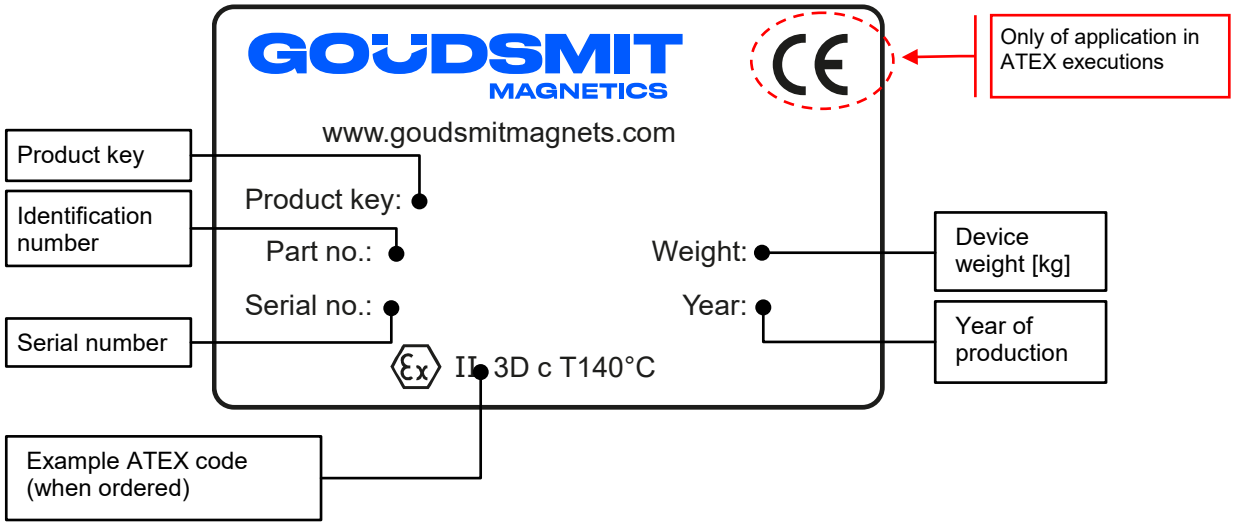
Check the shipment immediately on delivery for:

- Possible damage and/or shortcomings as a result of transport. If so, ask the transporter to draw up a transport damage report.
- Completeness of the delivery/deliveries, the absence of anything (additionally) ordered.

Always immediately contact **GOUDSMIT magnetic systems** in the event of any damage and/or mistaken delivery.

Identification plate

On the device you will find an identification plate as pictured below. **Information on this plate is of great importance in case of service**. That is why we advise to maintain this plate on the device at all times. Ensure that it is always legible by cleaning regularly.



Don't forget to make note of both the Serial and the Identification number in case of breakdowns or delivery of spare parts.
If your identification plate is damaged, contact us and we will send a new one as soon as possible.

Description ATEX certification

If the device is ordered for use in an explosive (dust) zone and with ATEX certification, then a Ex marking is added to the identification data which describes the category to which the device complies:

- Code example: Ex II 3D c T140°C
- Explanation:

  II ➔ explosion group (I is underground mining, II is other)

  3D ➔ Category (1 = very high, 2 = high, 3 = normal) (D = dust)

  Zone (20, 21, 22) (zone covered by ATEX)

  c ➔ Type of explosion protection used by Goudsmit

  T140°C ➔ Maximum permitted surface temperature

  If the device complies to category 1D or 2D, then the name and number of the certifying entity are also added to the identification plate, as also the certification number of the device.

The final ATEX classification of the composed apparatus can be lower than the ATEX marking indicated on the main identification plate, if the mounted parts have a lower ATEX marking.

ATEX explosive zone measures

- If the device has been ordered for use in a potentially explosive area, make sure that no higher surface temperature arises then permitted by ATEX.

  The ATEX marking on the Goudsmit identification plate only applies to the product produced by Goudsmit Magnetic Systems B.V.

  Make sure no particles > 10 mm are present in the product flow.
  These can damage the magnet or extractor bars or cause impact sparks.
  If necessary install a mechanical filter (sieve) before the separating equipment!

- The ATEX certified magnetic device requires additional purchase parts to be certified to the ATEX Directive. This includes control units, connection box(es), switch(es), sensor(s) and pneumatic parts, etc. Make sure that these are fitted by qualified personnel!
- If the device is placed in storage or has a longer standstill, make sure the device is emptied and cleaned.
- The device must be grounded, if a gasket is used between the device and the larger installation. Attach a metal strip between the housing of the device and the installation, to make sure the device is grounded.
- All screw connections inside the device must be secured against loosening.

  The ATEX purchase parts are provided with their own ATEX markings.

Safety

Regularly check that all warning pictograms are still present and legible, and clean if necessary. Make sure that new pictograms are applied at their correct locations if they have been lost or damaged.

General

The device is provided with safeguards where necessary. Make sure every person who comes in contact with the device, wears adequate personal protection (overalls, safety glasses, hearing protectors, helmet, steel-toed safety shoes etc.).
Areas of the device considered dangerous are marked with warning pictograms.
If the device remains easily accessible to persons, then extra safety precautions (e.g. fencing) must be installed. When safeguards are not possible, make sure clear instructions are given to people using the device.

Danger of dust explosion

If this device is made according to an EX dust category (1D/2D/3D, acc. to ATEX equipment directive 2014/34/EU) it can accordingly be used in a dust zone (20/21/22, acc. to ATEX workplace Directive 99/92/EC). The Ex category is then described on the identification plate.

! *Make sure that the device complies to the correct explosion category*.

Danger – dust explosion!
(no sticker on device)

Also check if **the identification plates of mounted parts** show the correct Ex-category for the Ex zone in which the device will be used.

Danger of magnetic field

The magnets generate a powerful magnetic field that strongly attracts ferromagnetic (Fe) materials. Always take into account that these materials may suddenly be drawn towards the magnet, very powerfully. This applies to steel workbenches and steel tools, but also to Ferromagnetic materials carried on your person, such as coins in your wallet or your keys. Make use of non-magnetic tools and workbenches fitted with a wooden worktop and preferably a non-Fe frame (for instance stainless steel).

! Always be aware that Ferromagnetic parts will be attracted -- even personal items - if you are closer than 0.3 meter to a magnet.

Danger - strong magnetic field!

! People fitted with pacemakers should on no account enter the magnetic field (within a radius of 1 meter).

Prohibited for people with pacemakers!

! Credit cards, chip cards, computer disks/tapes, computer screens, watches, etc. may be damaged or destroyed if they enter the magnetic field (within a radius of 0.5 meter).

Danger for magnetic cards!

Device description

Intended use / user indications

Products

Suited for separation of ferromagnetic* (Fe) particles out of fluids and powders under pressure, grain size up to 0.5 mm, such as flour, sugar, soy, spices, plastics, etc.

Not suited for products that are too sticky and/or badly flowing or raw materials with particle size over 0.5 mm.

Fe particles

Suited for use in product flows with Fe particles of **30 µm** and larger, dependant on magnet type. See product specifications for exact values.

Product has to be free of Fe parts or other parts that can cause damage to the magnet bar tubes with low wall thickness (like dents/bumps). Mechanical sieving is advised when necessary.

When filtering of even smaller or soft-magnetic (like SS) Fe particles is required, then this can be achieved by even more powerful Neoflux® magnets!

Temperatures

Suited for product temperatures up to ….°C or higher, or up to 200°C with special high temp magnet material, dependant on magnet type. *See product data sheet for exact values.*

The magnet is to be protected against higher temperatures than prescribed, because the magnet might **lose magnetic force permanently** when exposed to high temperatures

Free space

Make sure that there is enough free space around the magnetic filter to perform and ease the cleaning, inspection and maintenance operation, and for mounting / dismounting of the magnet bars. See also the added drawings in the appendices.

Pressure

Operating pressure in the product channel has to be less then … bar.

Testing pressure …. bar.

See product data sheet for exact values.

Noise level

Vibrations

The magnet is to be protected against strong external vibrations, because the magnet might **lose magnetic force permanently** and or the brittle ceramic magnet material might break.

*ferromagnetic: see chapter General/Ferromagnetism

Cleaning

Minimum 2x per day cleaning (Fe disposal) of the device is advised or more / less when the magnet bars catch very much / just a little Fe. Clean magnets provide an optimal magnetic filtering. Also it prevents Fe accumulation on the magnet bar tubes and the problems that can be caused by that. So, make sure you clean more than you think is necessary, to achieve a satisfactory result of the magnet device.

For dirt cleaning, see chapter *Maintenance*

Deliverable specials

High product temperatures

For higher temperatures, up to 200 °C, there is the possibility of using other magnet material than the standard Neoflux® magnets inside the magnet bars.

Abrasive products

If you have an abrasive product, we can supply the magnet bars and /or inside housing with a protective coating, like for instance a tungsten carbide coating.

Use in FOOD product flows

The magnetic filter can be adapted so that it can be used satisfactory in your specific food flow. It's standard execution already is delivered in gap-free SS AISI316 or AISI316(L), but can be made in combination with other – for instance prescribed or delivered by customer – food improved materials. Surface treatments like electrolytic polishing, staining, etc. are naturally possible.

Additional measures are often necessary, when the filter is used in Food product flows

ATEX

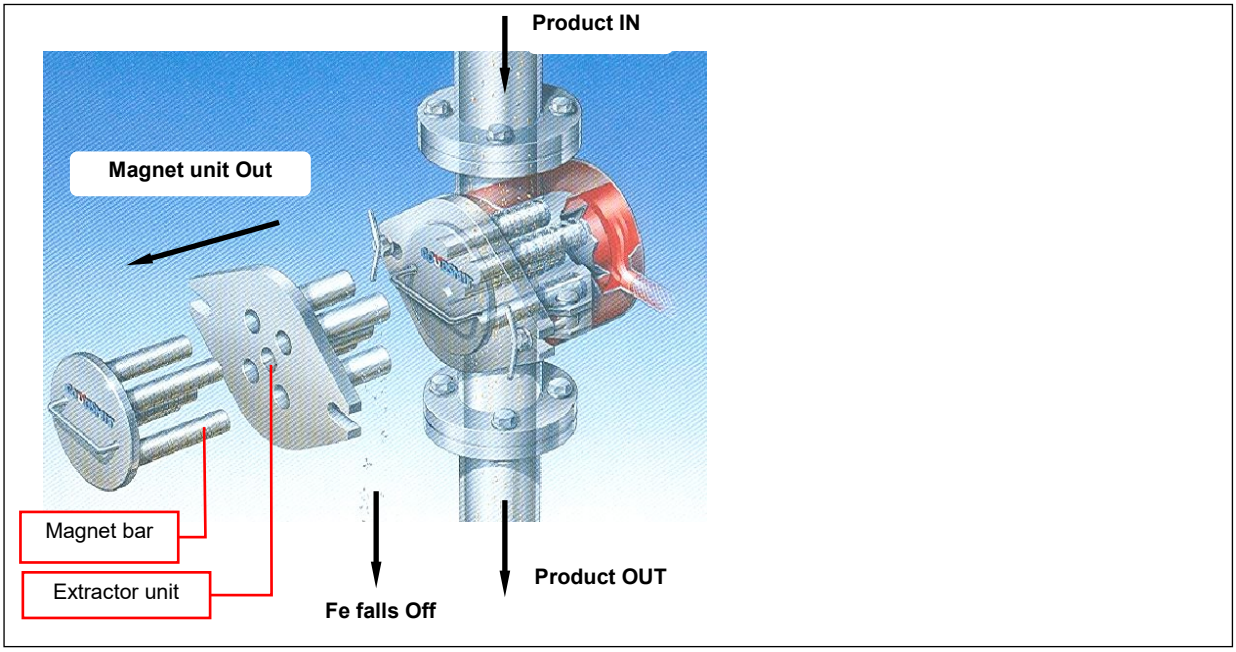
The magnetic filter is ATEX II 3D compatible on the outside, for use in Ex dust zone 22. When components are built-on or built-in which carry their own identification plate, then these components can cause the overall device to be not suited for use in Ex dust zone 22. See Identification plate(s) and spec's for exact Ex codes.

It is however always users own responsibility to take the right precautions when using the magnetic filter in Ex zone 22, like in-time cleaning to prevent for thick accumulating dust layers, and suitable grounding measures.

Read this manual thoroughly for all ATEX measures.

When you want an ATEX certificate to come with the Magnet, then it is necessary to specifically request so when the order is given. Extra price will be charged!

Working principle



Drawing: Quick-cleaning of magnetic filter

- Goudsmit **magnetic filters** are able to remove ferromagnetic (Fe) particles of only 30 microns in size from fluids and powders transported under pressure. The filters have a wide range of applications like the foodstuffs, pharmacy, and ceramic industry, but the principle is always the same. The powerful Neoflux® magnetic bars penetrate deep into the product so that they retain even the smallest Fe particles. The bars can be removed from the product flow for cleaning by lifting the lid.
- Sanitary magnetic filters are specially designed to meet the exacting demands of the foodstuffs industry. They are polished extra smooth on the inside (also the weldings) and have no nooks and crannies.
- Double walled industrial execution filters are specially geared to the removal of Fe particles from products that tend to coagulate, such as chocolate. The industrial filters used for this purpose are fitted with a double wall to allow a continuous flow of hot water so that the product stays liquid.
- In the product channel **several Neoflux® magnet bars** are placed.
- These magnet bars are tubes with a **magnet package** inside.
- The product always passes 1 magnet bar very close.
- The Fe containing material will be attracted by the magnets and will "cling" onto the extractor tubes, while the filtered product flows further.
- The Fe will stay on the tubes until it will be removed manually. This can be done by taking out the complete magnet unit (**Fe out**) and executing a cleaning action by pulling the magnet bar unit out of the extractor unit (quick-cleaning).
- The magnet bar unit can be taken out manually, or by shoving over a side guiding, dependant of the type and or size of the magnetic filter.

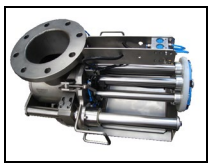
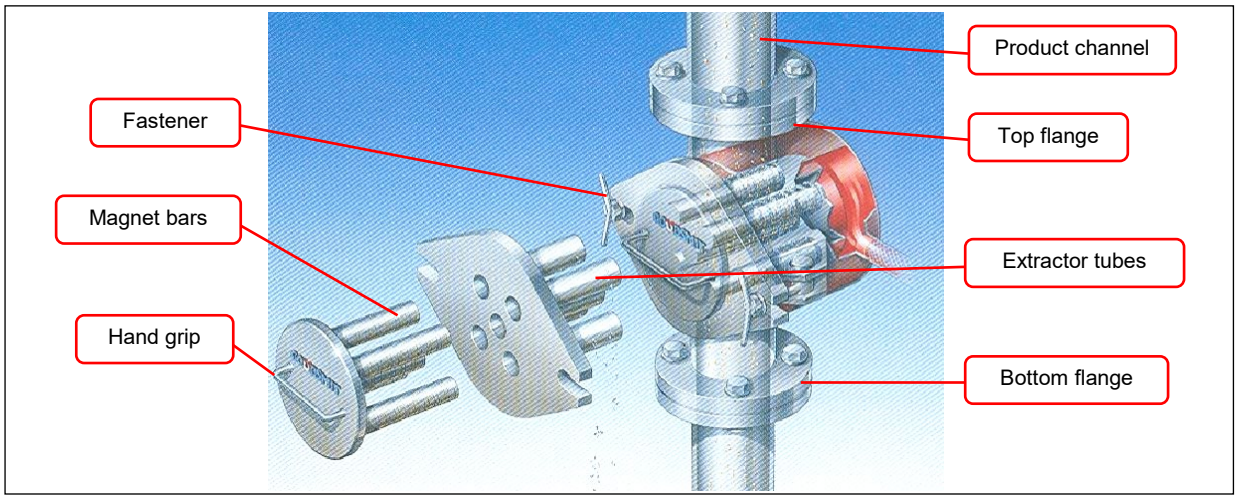


Photo: Automatic filter with bars Ø34 & side-guiding, semi-pneumatic actuation

Construction



Drawing: magnetic filter, quick-cleaning extractor type

- The magnetic filter standard has **flanges with bolt holes** for easy mounting in your product channel. Other couplings / joints can also be ordered.
- The magnetic filter has several **magnet bars,** placed in a way that the product flow, contaminated with Fe parts, will always pass minimum 1 bar very closely, while flowing through the magnet filter.
- For cleaning the Fe from the magnet unit, the assembled unit of magnet bars + extractor tubes has to be taken out the product channel. This can be done by loosening the **fasteners** that clamp the **extractor plate** to the housing.
- The magnet bar unit has magnet bars with enclosing SS tubes, that are welded to an end plate with a **hand grip** at the other side. The **magnet bar unit** can be pulled out of the **extractor unit** by pulling the hand grip. *In some cases the magnet unit has to be unlocked first to be able to shove it out of the extractor unit!*

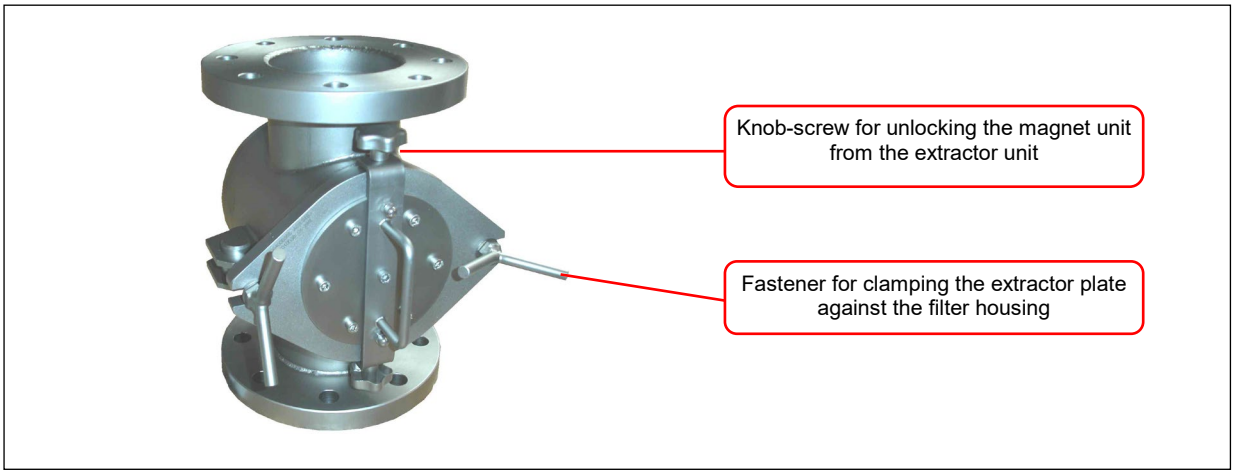


Photo: magnetic filter with magnet lock

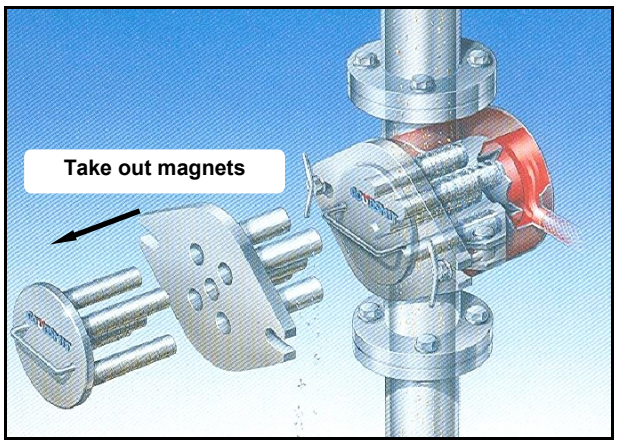
- The extractor tubes (with bottom plate) are also welded to a - holed - end plate. This extractor plate is also the door that closes the **housing opening** dust-tight by tightening the **fasteners** and thereby also clamping the **sealing** in the opening.

Magnet bar cleaning

Minimum 2x per day cleaning (Fe disposal) of the device is advised or more / less when the magnet bars catch very much / just a little Fe. Clean magnets provide an optimal magnetic filtering. Also it prevents Fe accumulation on the magnet bar tubes and the problems that can be caused by that. So, make sure you clean more than you think is necessary, to achieve a satisfactory result of the magnet device.

More cleaning: see chapter *Maintenance*

Pay attention to personal dangers / wear protective clothing, glasses, shoes, hand gloves !



Drawing: Cleaning of magnetic filter

Fe disposal working order:

1. Stop the product flow.
2. Loosen the fasteners.
3. Take out, or shove out over the side guides (depending on the version), the filter top (total magnet bar unit) as far as possible by the hand grip.
4. Place the filter top far enough away from the housing on a clean, non-magnetic surface. With a semi-automatic magnetic filter, the second stage will automatically take place pneumatically.
5. Clean the magnet bars manually with soft cloth and safety gloves. Clean extra with a soft cloth and or a suitable SS cleaning fluid when necessary.

   Extractor type:
   - Shove the magnet bar unit out of the extractor tube unit (loosen the magnet locking device first when present); For semi-automatic filters, the 2nd stage will automatically be pneumatically actuated.
   - catch the Fe parts that will now fall off the extractor tubes;
   - place the magnet bar unit far enough away from the extractor tube unit on a clean surface.
   - Sweep with a brush or soft cloth and or blow clean the extractor tubes (not in the direction of or over the magnet bars or filter housing!) on in- and outside.
   - Shove back the magnet bar unit into the extractor tube unit; make sure that no (new) dirt gets trapped in-between the magnet bars and extractor tubes! (semi-automatic filters will actuate this stage automatically).
   - Lock by locking device if necessary and make sure that they stick together tight.
6. Place the filter top unit back into the device.
7. Tighten the closure.
8. (Re-)Start the product flow.

Installation

Transport and placing procedures

- Clear the area under the magnet during lifting and transport.
- Bolt the joints / flanges of the device tightly to the inlet and outlet joint / flange of your product channel. Improper alignment and loose assembly may cause leakage of raw product.
- Ensure that the product channels are strong enough to support the weight of the magnetic filter and raw product in it. Reinforce them when necessary.

The weight of the device is stated on the identification plate.

- Install the magnetic filter in a well reachable height for the operators when possible. A suitable height eases the working, cleaning and Fe disposal process.
- Work safely; make sure there is enough working space, use proper scaffolding, lifting devices, ladders and other help materials, so the device can be lifted, transported and installed without safety risks.

Magnet bar protection

The magnetic filter has fragile extractor tubes and or fragile magnet bar tubes. The tubes have a small wall thickness, which has the advantage of ensuring a high grade of Fe separation. Disadvantage is that large, heavy Fe and/or other parts in the product flow can easily create bumps in the tubes.

Ensure that large, heavy parts are filtered out of your product flow before it passes the magnetic filter!
Advise: place a sieve (filter) in front of the magnetic filter!

See also chapter *Maintenance*

Damage to the magnet bar and or extractor tubes and/or damage caused by damaged tubes (when used) is not covered by guarantee.

Gasket material / grounding

To prevent the build-up of static electricity, make sure there is metal bridge between the magnetic device / product channel and the installation. The completed installation must also be grounded.

Start-up

Before start-up, make sure that:

- The device or the installation has no damages or malfunctions.
- All connections (electrical, mechanical, pneumatic) have been made properly.
- The device or the installation is placed and situated correctly.
- All protective covers (if applicable) have been fitted correctly.
- That all objects larger than 10mm are blocked from entering the product channel.
- The device is thoroughly cleaned, internally and externally.
- The product does not fall into the magnet device, from a greater height than 10 meters.
- There are no other sources of danger present.

During start-up, make sure that:

- The device or the installation has no damages or malfunctions.
- All other parts of the device or installation function as described.

Maintenance

Magnetic systems attract Ferromagnetic particles. Regular cleaning is essential.
A clean magnet functions considerably better

All parts are best cleaned with pressurized air and/or a soft cloth. It's also possible to deep clean with special cleaning fluids that do not harm the material. Ensure that these fluids do not contaminate the product

Regularly check that all warning pictograms and the identification plate are present at the correct locations on the device. If warning pictograms or the identification plate should get lost or damaged, immediately apply new ones to the original locations.

Always inform operating personnel regarding planned inspections, maintenance, repairs or if attending to breakdowns.

Magnet bars

- As a following of the passing product (abrasive or not) and the Fe contamination the magnet bars / extractor tubes can wear out sooner or later.

Wear as a following of abrasive product can be reduced by coating the outside bars, with for instance tungsten carbide.
Please contact **GOUDSMIT magnetic systems** for advice.

- During maintenance and or cleaning one has to be careful with the magnet bars to prevent them from getting damaged.
- Heavy parts (Fe or product), may hit the bar in a way that bumps occur. The bumps will possibly block the movement of the magnet bars inside the SS tubes (extractor type) and so damage the magnet material, or damage the magnet material underneath the SS protection bushes or tubes (non-extractor type) .

When a magnet bar and or extractor tube is damaged it has to be replaced by another (spare) one immediately to prevent further damage to the magnet bar and or cleanflow. The damaged bar and or extractor tube can be sent to **Goudsmit Magnetic Systems** for repair/revision.

Replace magnet bars / extractor tubes

a. Send the complete magnet bar unit to **Goudsmit Magnetic Systems**
b. Dismount the damaged magnet bar by loosening the bolt in the end plate. Send the magnet bar to **Goudsmit Magnetic Systems**.

Cleaning & ATEX

To prevent explosion risk, avoid dust clouds and the build-up of dust layers.
If dust particles or layers heat up they may ignite and burn. This in turn can ignite airborne dust clouds and cause an explosion.

Malfunctions/Service

CAUTION!

Improper handling of the magnet device may lead to damages.
Potential damage to body and or property!

- Any repair to GOUDSMIT magnet devices may be performed by qualified personnel only.
- Be aware that permanent magnets attract ferromagnetic material with great force when it gets in reach of the magnetic field ➔ danger of getting jammed**!**
- Consult GOUDSMIT MAGNETIC SYSTEMS service.

Malfunctions

In case of malfunctions, consult the following table in order to determine the cause of the malfunction and its possible remedy. In case a specific malfunction can't be found in the table, consult the GOUDSMIT Magnetic Systems service.

Malfunction	Possible cause	Possible remedy
Magnet does not separate ferromagnetic (Fe) particles out of the product flow, or separates them badly	Magnet bar is overloaded with Fe parts	Clean the magnet more often of caught Fe parts
	Not-attracted objects are not ferromagnetic	Check if particles to be separated are ferromagnetic, using a permanent magnet
	Ferromagnetic parts close to the magnet reduce the magnetic field strength	Check if there are ferromagnetic parts close to the bar. If so try to replace the ferrous construction by a non-magnetic one, like aluminium or wood
Magnets do not move in the tubes any more or move badly	Tube is dented	Take bar out and replace it
	To much Fe on tube(s)	Clean magnet bars more often
	Fe or other parts between magnet bar(s) and extractor tube(s)	Clean magnet bars and or extractor tubes inside
Large filters - with guidance:		
Magnet unit moves bad or not at all over the supporting guidance	Dirt on guidance bars and or roller wheels	Clean guidance bars and or roller wheels
	Semi-automatic types: • Air pressure is low or off • Defect cylinder(s) or valve(s) • Mechanical actuated valve does not get (correctly) activated	• Reactivate or raise air pressure • Repair or replace cylinder(s) and or valve(s) • Make sure the valve gets activated, so the 2nd stage get correctly activated

Customer service

Please have the following information available if you require customer service assistance:

- Identification plate (complete)
- Type and extent of the problem
- Time the problem occurred and any accompanying circumstances
- Assumed cause

Spare parts

As a result of the robustness and quality of **GOUDSMIT magnetic systems** products the device possesses high operational reliability.

When however a specific component requires replacement, the correct component can be ordered by quoting the type number stated on the *identification plate* or on one of the drawing(s) added to this user manual in the added data sheet.

The spare parts are mostly wear parts, such as:
extractor tube unit,
magnet bar unit and sealing(s),
guidance rollers (guidance comes with large filters),
pneumatic parts (semi-automatic type filters).

We advise to have one or more spare parts in stock when proven necessary!

Following mutual consultation Goudsmit magnetic systems will arrange rapid and correct delivery.

Storage and Dismantling

Storage

If the device will not be used for a long period of time, we advise to store the device in a dry, safe place and to conserve fragile and/or sensitive parts.

Dismantling / scrapping

On scrapping and/or disposal of the device's parts separately, take into account the different nature and dangers of the components (magnets, iron, aluminium, electrical parts, insulating materials, etc.) and ensure safe disposal. Preferably entrust the task to a specialised company, and always observe the local regulations in regard to disposal of industrial waste.