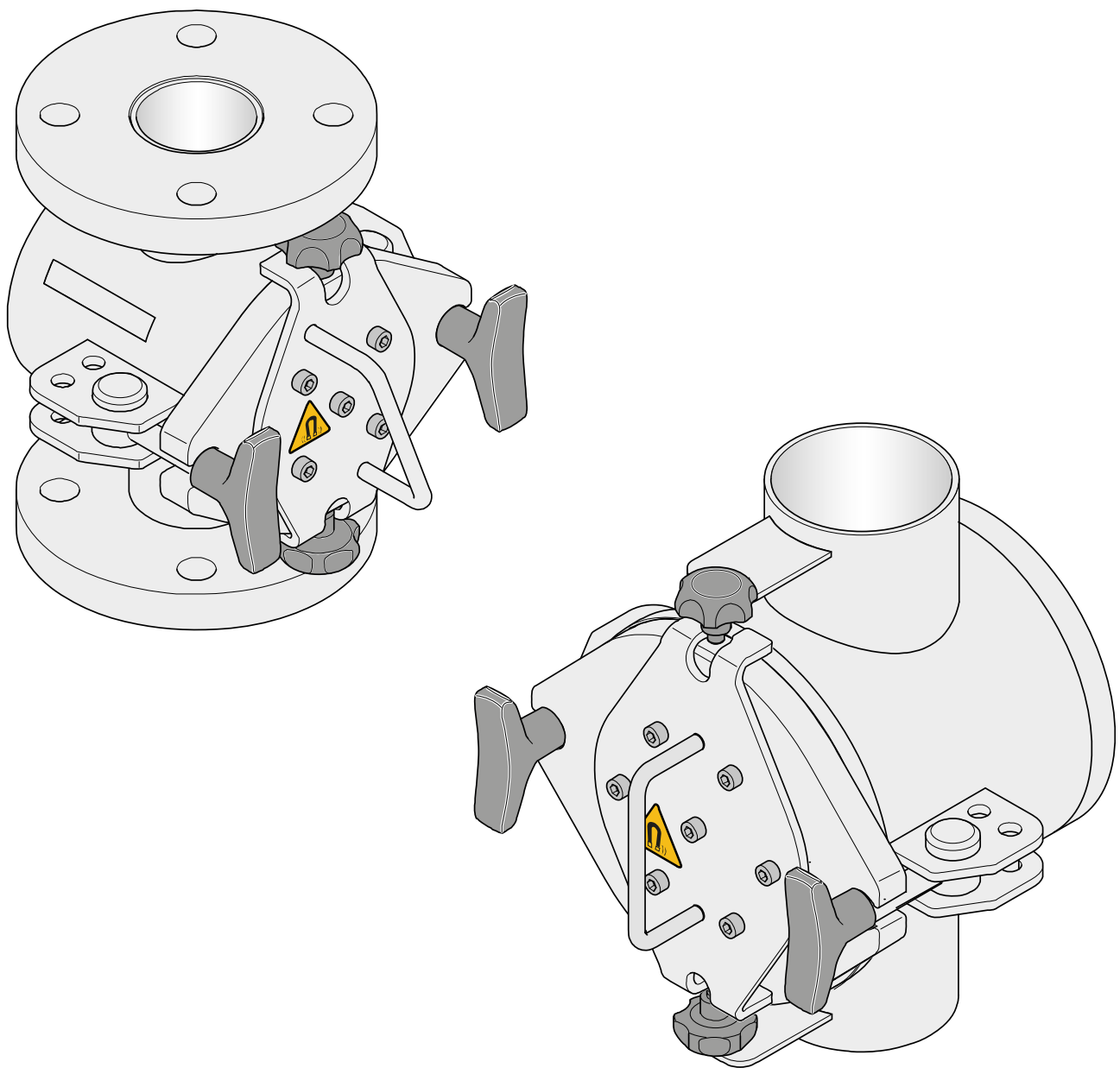


Installation and user manual

Industrial magnetic filter, SFI series

Permanent magnetic filter for fluids and powders in pressure pipes.



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1 Introduction

This manual contains information about correct use and maintenance of the device. The manual contains instructions that should be followed to prevent injury and serious damage and to ensure safe and problem-free operation of the device. Read this manual thoroughly and ensure that you fully understand everything before using the device.

If you need more information or still have questions, please contact Goudsmit Magnetic Systems B.V.. The contact details are provided on the title page of this manual. Additional copies of the manual can be ordered by providing the device description and/or article number as well as the order number.

In this manual, the SFI industrial magnetic filter is further referred to as the 'device'.



NOTICE

Read this manual carefully before installation and commissioning!

The descriptions and figures in this manual, provided for explanatory purposes, may differ from the descriptions and figures of your version.



NOTICE

This manual and manufacturer's declaration(s) are to be considered part of the device. Both documents must remain with this device if it is sold.

The manual must be available to all operating personnel, service technicians and others who work with the device throughout the life of the device.

2 Safety

2.1 Safety risks

This chapter describes the safety risks of the device. Where necessary, warning pictograms have been affixed to the device. These pictograms are explained later in this document.



NOTICE

Observe the following measures:

- ▶ Read the warning pictograms on the device carefully.
- ▶ Check that the pictograms on the device are present and legible at regular intervals.
- ▶ Keep the pictograms clean.
- ▶ Replace pictograms that have become illegible or that have been removed with new pictograms in the same locations.

2.2 General safety instructions

- The instructions in this manual must be complied with. If they are not, there is a risk of material damage, personal injury and even a danger of death.
- The device may only be used to magnetically filter powders and fluids. Any other use is inconsistent with the regulations. Any resulting damage is not covered by the factory warranty.
- Ensure that people who work on the device or in its immediate vicinity wear adequate protective equipment.
- Impose additional safety measures and use additional warning pictograms if the device remains easily accessible to people. If this is not possible, ensure that clear instructions are provided for the entire system in which this device is integrated.
- Work on the device may only be carried out by qualified personnel. Ideally, maintenance work on the magnets should be carried out by Goudsmit Magnetic Systems B.V. personnel.
- Always take locally applicable safety and environmental regulations into account.

2.3 Damage due to magnetic field

The magnets generate a powerful magnetic field that attracts ferromagnetic particles. This also applies to ferrous materials that may be carried on the person, including keys, coins and tools. When working within the magnetic field, use non-ferromagnetic tools and workbenches with a wooden worktop and non-ferromagnetic base.



WARNING

Strong magnetic field

There is a risk of personal injury when carrying out work and measurement checks on the device. Do not place the fingers or other body parts between the magnetic components.

2.4 Other remarks/warnings

Rectify all faults before operating the device. If the device is used whilst exhibiting a fault, after having completed a risk assessment, warn operating and maintenance personnel of the fault and the potential risks associated with that fault.

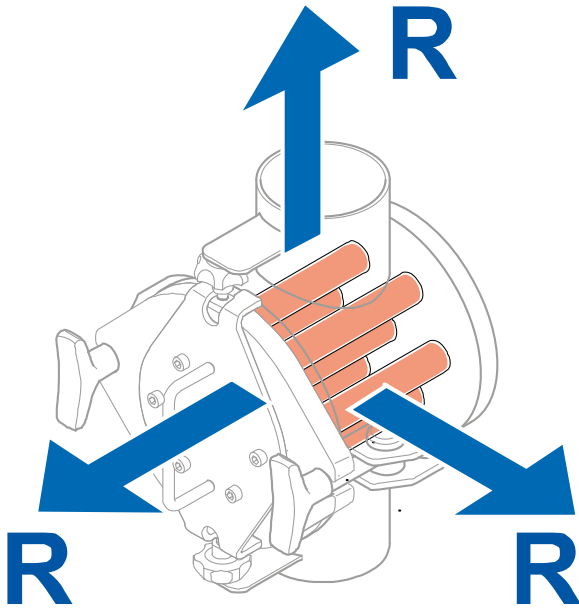
3 Standards and directives

3.1 Limit values for occupational and public exposure to magnetic and electromagnetic fields

The limit values and magnetic fields are defined in accordance with the EMC Directive 2013/35/EU as follows:

Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields).

Observe the following measures in relation to exposure to magnetic fields in accordance with EN12198-1 (machine category = 0, no restrictions) of the device:



Life-threatening danger to people with implanted medical aids

People with an active implanted medical aid (e.g. pacemaker, defibrillator, insulin pump) may never be present within a radius 'R' of 0.5 metre(s) of the device.



Damage to products with sensitivity to magnets

Products that contain ferromagnetic parts, such as debit cards, credit or chip cards, keys and watches, may be rendered permanently damaged if they come within a radius 'R' of 0.2 metre(s) of the device.



Employees who are pregnant and the general public may not come within a radius 'R' of 0.05 metre(s) of the device.



WARNING

Projectile hazard

Ferromagnetic objects will be attracted if they come within a radius of 30 cm of the magnet.

Limit values for occupational exposure (general and for limbs) are not exceeded.

**NOTICE**

Goudsmit Magnetics offers an annual maintenance inspection, including replacement of the seal(s) and an inspection report with certificate for the magnets.

4 Specifications

4.1 Description of function

The device filters fine ferromagnetic contaminants of 30 µm and larger – such as stainless steel wear particles – from fluid and powder flows. The product must not contain any ferromagnetic particles large or heavy enough to cause damage to the magnetic bars. Maximum particle size is 10 mm.

- If necessary, place a strainer before the product inlet of the device in your installation.

4.2 Range of application

The device is suitable for many industrial applications where fluid mixtures and powders are transported in pressure pipes at pressures of up to 10 bar. The design and grit-blasted finish are intended for use in applications without risk of bacterial growth.

4.3 Flow rate

The recommended flow rate of the product material is 1 m/s. Maximum recommended flow rate is 2 m/s. A higher flow rate reduces separation efficiency, and therefore fewer ferromagnetic particles will be filtered from the product material.

4.4 Use in food product flows

The device is supplied as a stainless steel model as standard, with a 3 µm ceramic-blasted finish. This is suitable for normal food contact applications. All contact materials are compliant with EU regulation EC1935/2004. Higher-quality finishes are available for applications with more stringent requirements.

4.5 Temperatures

The devices are suitable for the following ambient and product temperatures:

Applied magnet quality	Ambient temperature	Max. product temperature
N-42SH	-5 to +40 °C	140°C
N-52	-5 to +40 °C	60°C

The magnetic material must be protected against higher temperatures than those specified on the data sheet as the magnet will permanently lose magnetic force if exposed to higher temperatures.

4.6 Free space

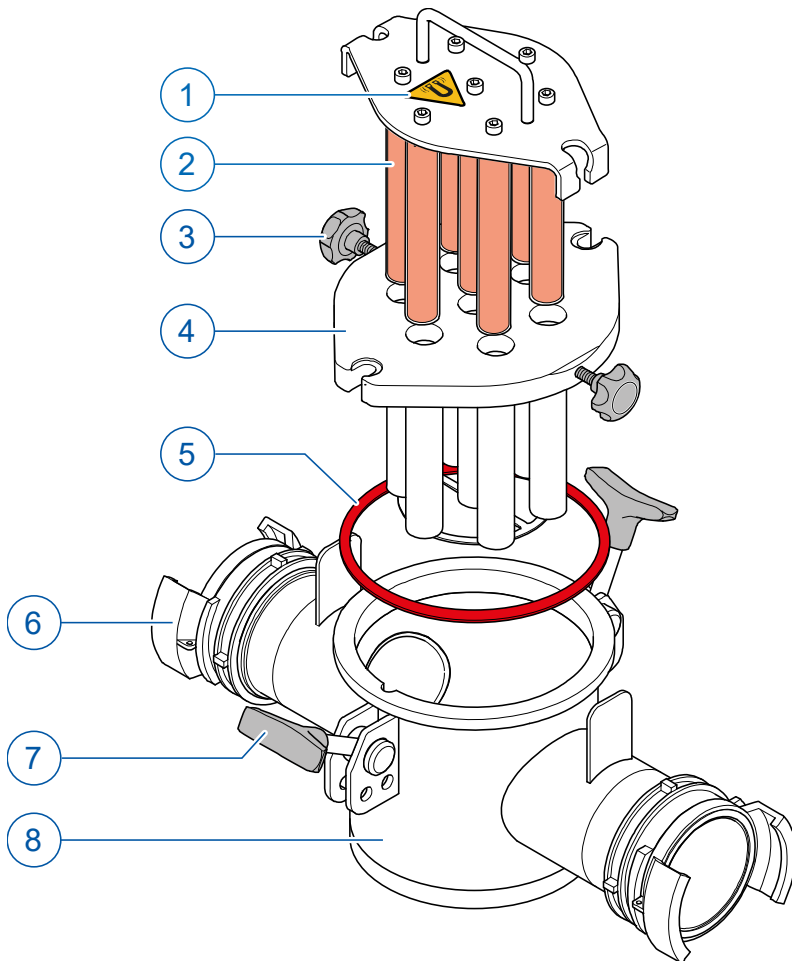
Ensure there is sufficient space around the device for operation and inspection and maintenance work. Maintain a clear space of at least 1 metre at the front and 0.5 metre around the device.

4.7 Connection voltage

The connection voltage for the solenoid valve and detection sensors is 24 V_{DC}.

5 Product information

5.1 Construction



- [1] Warning pictogram
- [2] Magnet unit
- [3] Screw knob

- [4] Extractor
- [5] Seal
- [6] Coupling

- [7] Toggle
- [8] Housing

5.2 Scope of delivery

Check the shipment immediately upon delivery for:

- Possible damage and/or shortcomings as a consequence of transport. In the event of damage, ask the carrier for a transport damage report.
- Completeness.



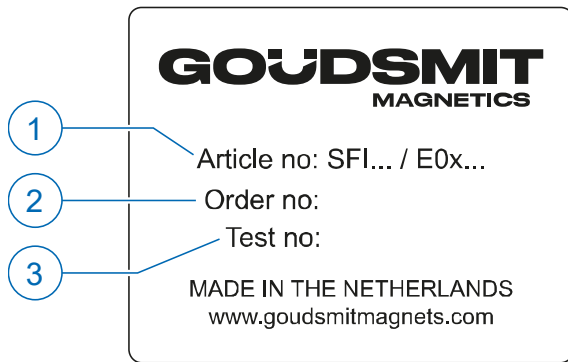
NOTICE

In the event of damage or incorrect shipment, contact Goudsmit Magnetics immediately. The contact details are provided on the title page of this manual.

5.3 Identification plate

The following identification data are shown on the device. The identification data are very important for maintenance of the device.

Always keep the identification data clean and legible. Always provide the article and order numbers when ordering spare parts, requesting service or reporting a malfunction.



- [1] Article number
 [2] Order number
 [3] Pressure-test test number

5.4 Pressure test

All devices with a coupling or flange undergo a pressure test before delivery.

If the device has passed the pressure test, a test number [3] is shown on the identification plate.

See the data sheet for the prescribed pressure test.

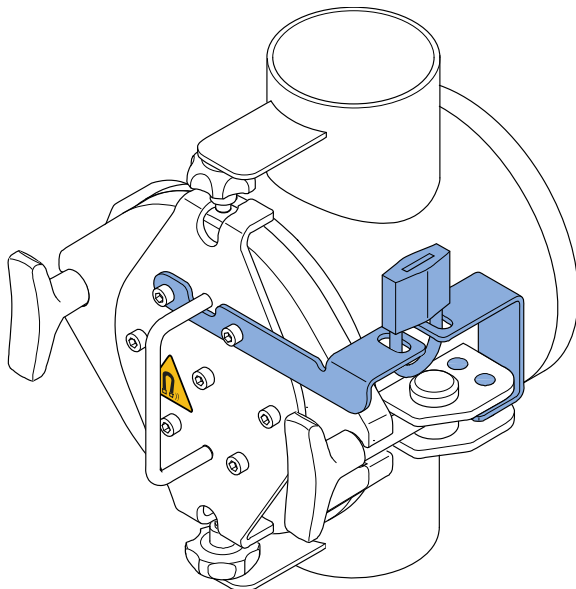


NOTICE

- Devices with only welding ends do not undergo a pressure test.

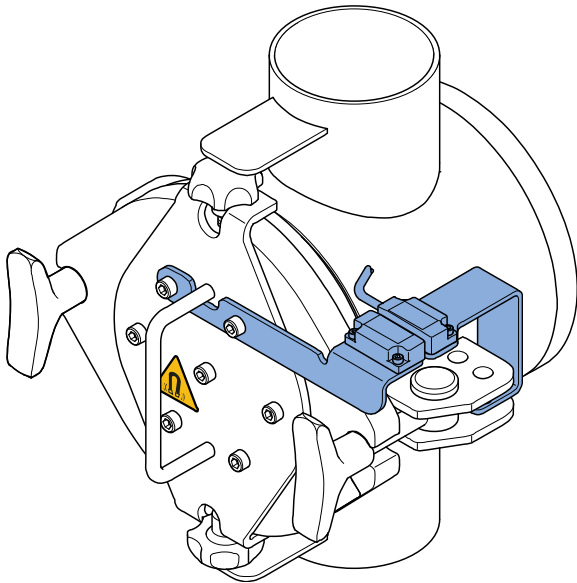
5.5 Accessories

Padlock



The device can be fitted with a padlock. This prevents removal of the magnet unit from the housing.

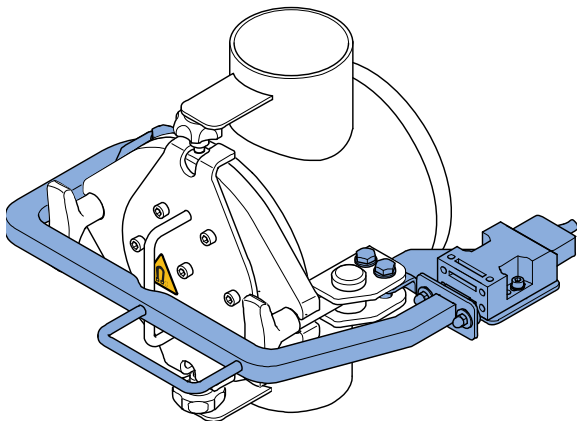
Door sensor



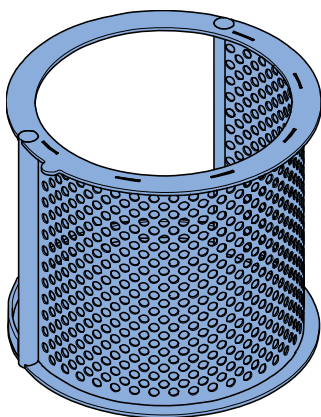
Optionally, a bracket with door sensor can be fitted to detect whether the door is open or closed.

Because this sensor is used for detection, rather than a safety-related function, it is not necessary to connect it to a special safety relay for contactless sensors, which additionally feature current limitation and short-circuit detection.

This ensures that the product flow is stopped when the clasp is released. This prevents unnecessary loss of product material and its contamination.



Sieve



The sieves are not only suitable for catching non-magnetic particles but also all other types of particles.

If larger product particles may enter the liquid product flow, due to cooling in the pipe system for example, it is advisable to install an additional sieve in the device.

The sieves are available with a mesh size of 2 – 5 mm.



NOTICE

On our website you will find a complete overview of all available accessories for these devices.

6 Transport and installation

6.1 Transport



WARNING

Note

The device permanently emits a magnetic force.

Observe the safety instructions for transport in the Safety risks [► 5] section.

- During transport, avoid all impact in order to prevent damage, especially to the magnetic bars. In the event of damage to the tubes, the magnet packs may not move in the tubes, or only move with difficulty.

6.2 Installation

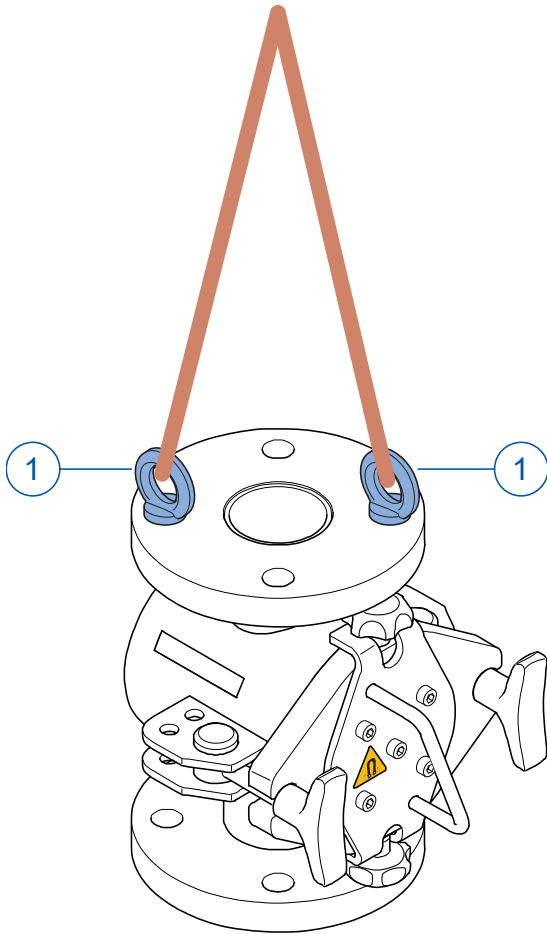


NOTICE

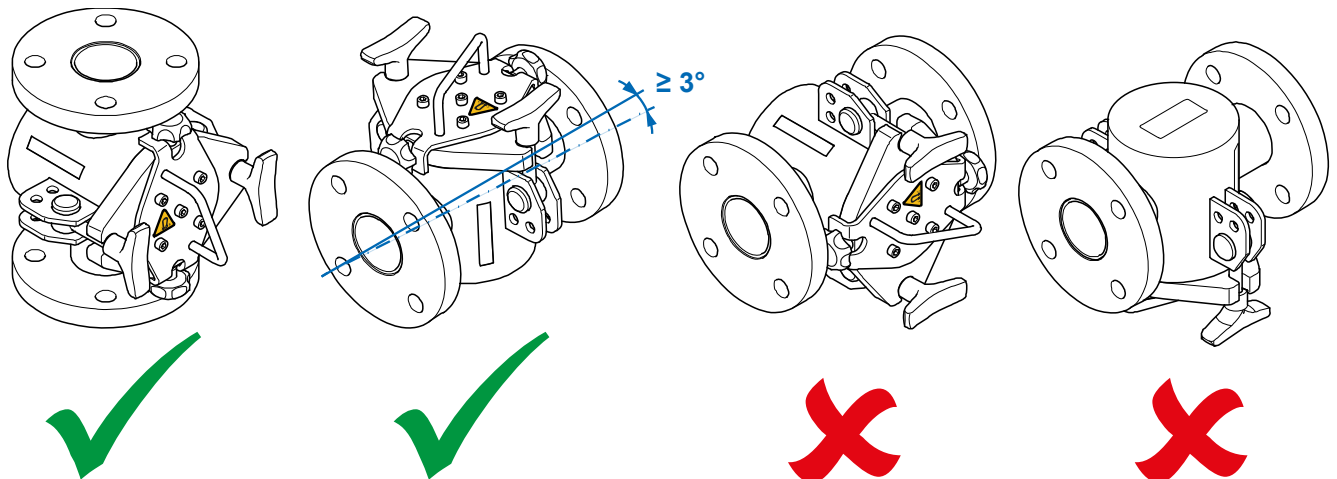
Take the following precautions:

- ▶ Work safely, provide ample work space and use dependable scaffolding, ladders and other tools so the device can be installed without any risks.
 - ▶ The device permanently emits a magnetic force. See the Safety risks [► 5] section for the precautions that must be taken when working on the device.
 - ▶ Only qualified personnel should work on the device.
 - ▶ Ensure that there is sufficient clearance around the installation to install the device in the installation/structure and for operation, inspection and maintenance work to be carried out.
 - ▶ Ensure that no external vibration is transferred to the device, as this can cause permanent loss of magnetic force.
 - ▶ Only non-magnetic structural parts are permitted within the range of the magnetic field in order to prevent a negative impact on the removal of ferrous particles. In simple terms, the magnetic field may not be 'short circuited'.
 - ▶ Only use lifting/hoisting tools that are in good condition, and do not exceed the lifting capacity of the tools.
 - ▶ The supply and discharge channels and structure must be sufficiently strong to bear the weight of the device with the captured ferrous particles.
- Install the device free of mechanical stress and at the correct working height in your product channel for the operating personnel. Mechanical stress on the device can cause deformation and other problems.

- The device is delivered in a crate. Fit at least two lifting eyes [1] (not supplied) to the flange.



- Lift the device out of the crate evenly. Use a suitable lifting/hoisting arrangement that supports the weight of the device.
- Install the device in the recommended position. If this is not possible, bear in mind when opening the device that residue will run out (see figure).



- The devices are available with various EN1092-1 flanges and couplings. Follow the installation instructions in accordance with the relevant standards for the flanges and couplings to install the device in your installation. Misalignment or loose mounting can cause leakage.

**CAUTION****Risk of injury from edges and sharp corners**

- ▶ Take extremely care when carrying out work near sharp edges and pointed corners.
- ▶ Wear protective gloves if you are unsure.

- Install the device free of mechanical stress and at the correct working height in your product channel for the operating personnel. Mechanical stress on the device can cause deformation and other problems.
- Remove the lifting/hoisting arrangement after installation is complete.
- Clean the device thoroughly before commissioning.

6.3 Preventing electrostatic discharges (earthing)

To prevent electrostatic discharge, a provision must be made to prevent potential differences between the installation and the device. This can be done by installing a connection cable to the installation. The electrical resistance must be less than 25 Ω .

7 Operating principle

7.1 General

The magnet unit with very strong neodymium magnetic bars is located in the centre of the product flow. The product contaminated with ferromagnetic particles passes several magnetic bars as it flows through the filter. The magnets attract passing ferromagnetic contaminants. The captured particles stick to the magnets, while the purified product flows on.

7.2 Cleaning process – disposal of ferromagnetic particles



WARNING

Risk of burns from hot residue

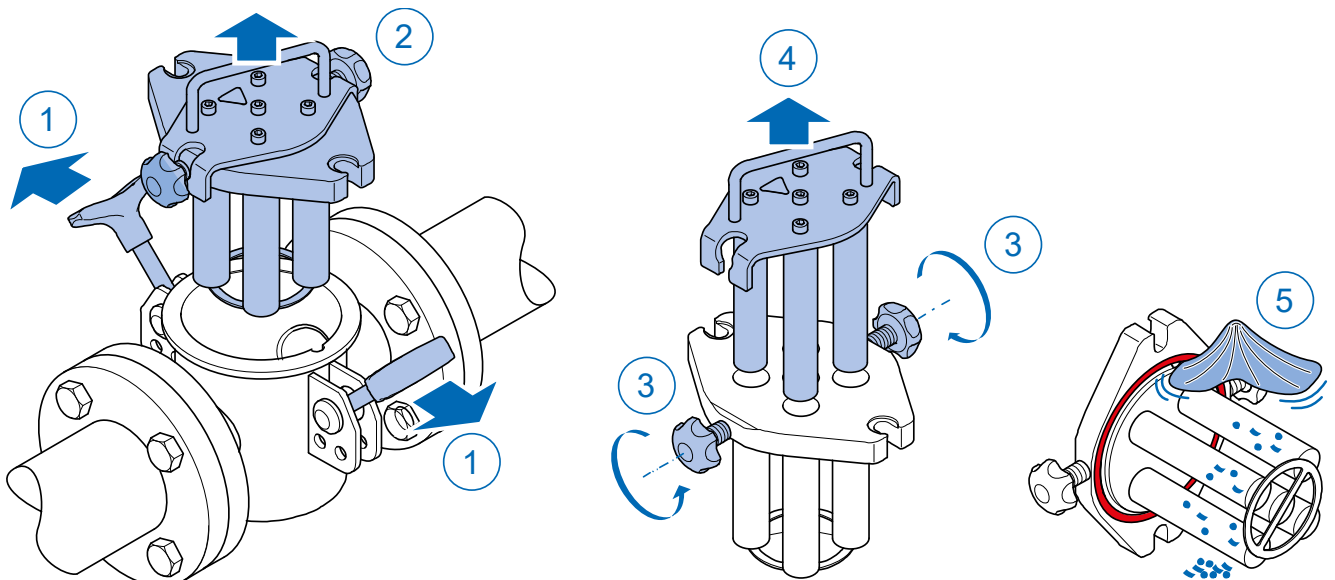
Depending on the installation position, hot residue may remain inside the device housing.

When cleaning the device, wear the requisite protective clothing, such as overalls, gloves, goggles and safety shoes.



Cleaning process – disposal of ferromagnetic particles

Once the product flow is stopped, the entire magnet unit must be removed from the product channel. Then the magnetic bars must be pulled out of the extractor tubes, causing the ferromagnetic particles to fall off of the extractor tubes.



To clean, proceed as follows:

- Stop the product flow.
- Wait until the remaining product material in the product channel has passed through the device and the product channel is no longer pressurized.
- Loosen the toggles [1].
- Remove the magnet unit with extractor [2] from the housing, and place it on a clean wooden or plastic surface.

- Loosen the screw knobs [3] and remove the magnet unit [4] from the extractor.
- Place the magnet unit away from the extractor on a clean wooden or plastic surface.
- Collect the ferromagnetic particles that now fall off the extractor tubes and dispose of them.
- Clean all parts with a soft, clean cloth [5] and – if necessary – with a suitable cleaning agent.
- Reassemble all parts in reverse order.
- Place the magnet unit with extractor [2] back in the housing.
- Secure the toggles [1].
- Production can be safely resumed.

8 Maintenance and inspection

8.1 General guidelines



WARNING

Risk of crushing

In view of the large magnetic forces, replacing the internal magnet components is extremely dangerous as they are difficult to handle. Replacement may **ONLY** be carried out by appropriately qualified personnel or (ideally) by Goudsmit Magnetics technicians.

If the replacement is carried out by unqualified personnel, the warranty will be void.

Goudsmit Magnetics cannot be held liable for any consequential damage to people and/or materials if this prohibition is ignored.



CAUTION

Risk of burns from hot flow product

Contact with hot flow product may cause burns.

- ▶ Always wear protective work clothing and safety gloves when carrying out work near hot liquids.
- ▶ Make sure the flow product has cooled down to ambient temperature before carrying out any work.



WARNING

Caution

The product flow must be stopped when work is being carried out on the device.

Exercise caution with tools. The magnetic force is permanent.

Magnetic systems do not only attract ferromagnetic particles, but a small proportion of your product will also continue to 'adhere' to the magnet. Remove all captured particles from the magnet at regular intervals. A clean magnet is considerably more effective.

- Always inform operating personnel of scheduled inspections, maintenance, repairs and in the event of faults.
- Check regularly that all warning pictograms are still present in the correct locations on the device. If these are lost or damaged, replace them with new pictograms in the original locations immediately.
- Ensure that the device is externally clean. Remove dust, dirt and particles from the device as appropriate.

8.2 Frequency of maintenance

Action	Daily	Monthly	6 months	Annually
Clean magnetic bar tubes (for maximum performance) (► Cleaning process – disposal of ferromagnetic particles [► 15]).	min. 2x ¹⁾			
Check sealing ring for wear and presence.	•			
Check magnetic bar tubes for wear.		•		
Check sieve for wear, and replace if necessary.			•	
Replace sealing ring (► Replacing sealing ring [► 19]).			•	
Measure flux density of magnetic bars (► Flux density measurement of the magnetic bars [► 20])				•

¹⁾ The frequency of the cleaning process depends on the capacity of your product flow and the level of soiling.



NOTICE

Goudsmit Magnetics offers an annual maintenance inspection, including replacement of the seal(s) and an inspection report with certificate for the magnets.

8.3 Cleaning instructions

Wet or dry cleaning

If the use of fluids is prohibited in your installation, use disinfectant cloths that are suitable for contact with the processed product, if necessary.

The frequency of cleaning is dependent on the degree of cleanliness required for the processed product. The frequency of cleaning must be increased in applications where sensitive food products are processed. Perform a hygiene risk assessment to determine the requirements in your situation.

When used in food product flows

Cleaning and disinfectant methods and agents that are used for cleaning must be adapted to the specific type of soiling (carbohydrates, proteins, fats, etc.) and the degree of cleaning required for your application. The type of product that is processed thus determines to a large extent which combination of cleaning agents is suitable. Consult your cleaning agent supplier to select the correct cleaning agents for your specific situation.

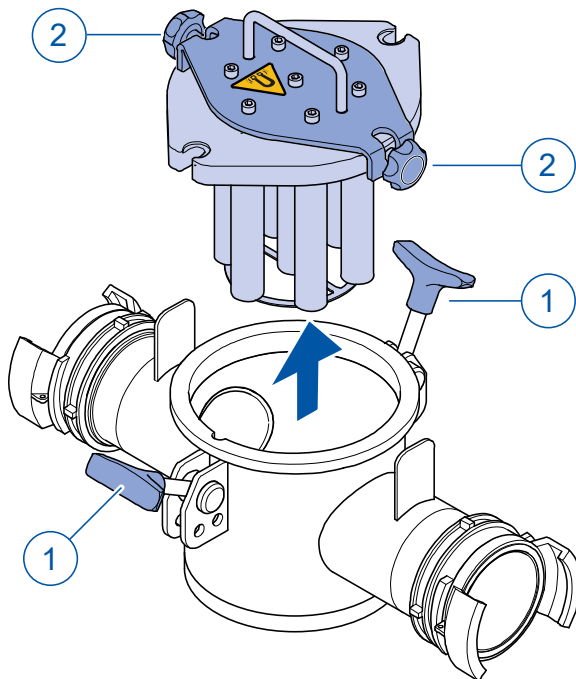
Check with your cleaning agent supplier whether the products are suitable for the material of the chosen seals (silicone, NBR or Viton).

The device is made of stainless steel or 'food-grade stainless steel' 1.4301/SAE 304L and 1.4404/SAE 316L.

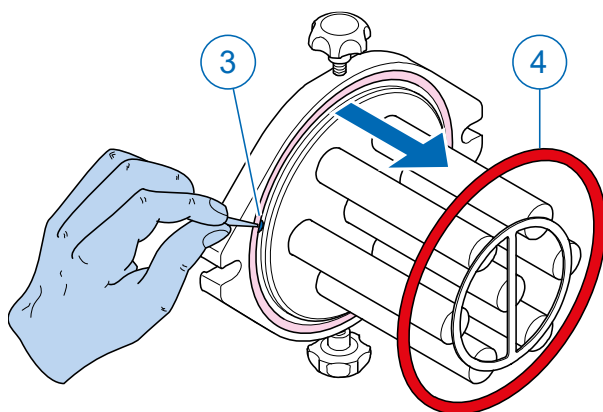
8.4 Replacing sealing ring

We recommend replacing the sealing ring at least every six months or more frequently, depending on the level of wear.

Proceed as follows:



- Stop the product flow.
- Wait until the remaining product material in the product channel has passed through the device and the product channel is no longer pressurized.
- Loosen the toggles [1].
- Remove the magnet unit with extractor from the housing.
- Loosen the screw knobs [2].
- Remove the magnet unit from the extractor, and place it on a clean wooden or plastic surface.



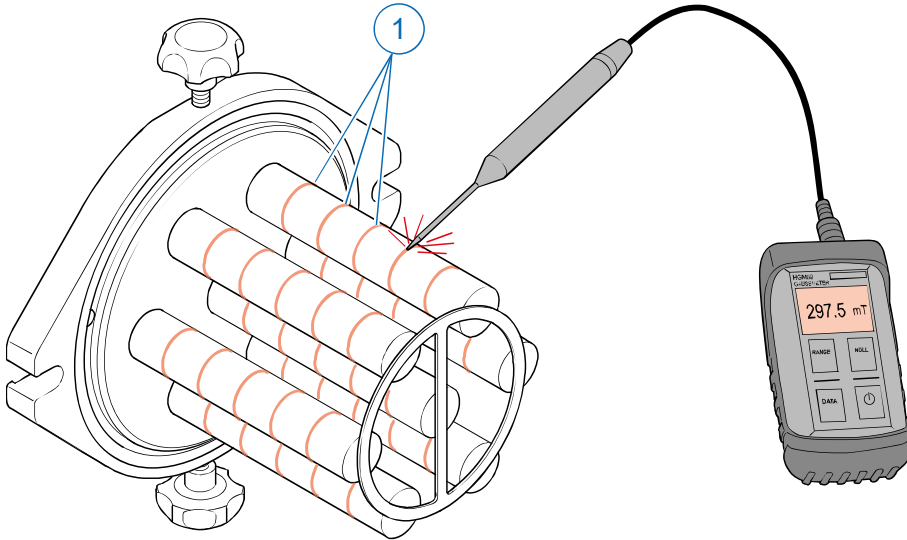
- Remove the old seal from the extractor. In doing so, make use of the notch in the groove [3].
- Thoroughly clean the groove in which the seal was seated, and fit a new seal [4].
- Reassemble the magnet unit with extractor.
- Place the magnet unit with extractor back in the housing.
- Secure the toggles.
- Production can now be safely resumed.

If the seals wear out too quickly, e.g. due to excessive temperature or an excessively abrasive product, enquire about alternative seals.

8.5 Flux density measurement of the magnetic bars

The magnetic bars must be measured at periodic intervals to check their magnetic flux density and to determine whether the magnetic force has reduced. Use a suitable gauss meter/tesla meter to measure the poles of the magnetic bar on the surface (the unit is tesla, gauss, kA/m or oersted).

Goudsmit Magnetics can perform magnet measurements on location, if desired. Proceed as follows:



- Stop the product flow.
- Wait until the remaining product material in the product channel has passed through the device and the product channel is no longer pressurized.
- Carry out the cleaning process (see section Cleaning process – disposal of ferromagnetic particles [► 15]).
- Move the gauss meter/tesla meter probe [1] along the poles on the magnetic bar.

The measured values may fluctuate for various reasons, such as the position (angle) of the probe on the magnetic bar tube, the thickness of the probe and the reproducibility of the measurement. The temperature of the magnetic bar tube may be higher than 20-22°C due to the influence of the product flow.

- Record the highest measured value.
- Using the accompanying data sheet, check whether the measured value falls within the permitted range for the peak value. **Note:** The measured values on the data sheet are values measured at a measurement temperature of 20°C ± 2°C.
- Reassemble all parts in reverse order.
- Place the magnet unit with extractor back in the housing.
- Secure the toggles.
- Production can now be safely resumed.

9 Troubleshooting

9.1 Troubleshooting table

Use the following table to search for faults, determine the possible cause and find the remedy. In the event of a fault that is not in the table, contact Goudsmit Magnetics customer service.

Problem	Possible cause	Solution
The device does not separate ferromagnetic particles, or does so poorly.	The magnetic bar is over-loaded with ferromagnetic particles.	<ul style="list-style-type: none"> Remove the captured particles from the magnetic bar (more frequently). Use a permanent magnet to check whether the separated particles are ferromagnetic.
	Particles that are not attracted are not sufficiently ferromagnetic.	<ul style="list-style-type: none"> Check the magnetic behaviour of the installed parts around the magnets by holding a ferrous object close to the magnets. If there are parts that react to the magnet, replace them with non-magnetic parts, such as those made from stainless steel.
Leakage of product material.	Seal is not seated properly in the groove.	<ul style="list-style-type: none"> Fit the seal in the groove properly.
	Seal is worn out.	<ul style="list-style-type: none"> Replace the seal.
	Magnet unit does not fit against housing properly.	<ul style="list-style-type: none"> Toggles not secured tightly.
Magnet unit binds in extractor.	Dents in the extractor tubes.	<ul style="list-style-type: none"> Remove the dents from the extractor tubes. Contact Goudsmit Magnetics.

10 Service, storage and disassembly

10.1 Customer service

Have the following information to hand when contacting customer service:

- Data from the identification plate.
- Type and scope of the problem.
- Presumed cause.

10.2 Spare parts

The high quality of the products from Goudsmit Magnetics means that the magnet product is highly reliable in operation.

However, if a particular part needs to be replaced, you can order a new one by providing the type number listed on the identification plate or on the attached drawing(s) and/or the data sheet.

Spare parts are usually parts that are subject to wear. These include:

- seal (various types available)

It is recommended to replace the seal every six months.

- magnetic bars
- extractor

How quickly the seals wear will depend on your product and how abrasive it is, as well as the capacity of your product flow. Several types of seals are available for this device. See the data sheet for the precise specifications. Please get in touch with us for information on the availability of the seals.

- When ordering, state the article and order numbers that appear on the identification plate.
- For further information, please contact us by +31 (040) 22 13 283 or consult our website.

10.2.1 Storage and disposal



WARNING

The magnet product may only be dismantled by qualified personnel who are fully aware of the potential dangers of magnetism.

Storage

If you do not intend to use the magnet product for an extended period of time, we recommend placing the device in a dry, safe place, and applying preservative to the vulnerable parts, if necessary.

Disposal/recycling

When dismantling and/or scrapping the magnet product, keep in mind the materials from which the individual parts are made (magnets, iron, aluminium, stainless steel, etc.). This should ideally be done by a specialized company. Always observe the local regulations and standards pertaining to industrial waste disposal.

Inform those disposing of or storing the magnet material of the hazards of magnetism. To this end, see also the Safety risks [► 5] section.

Notes

