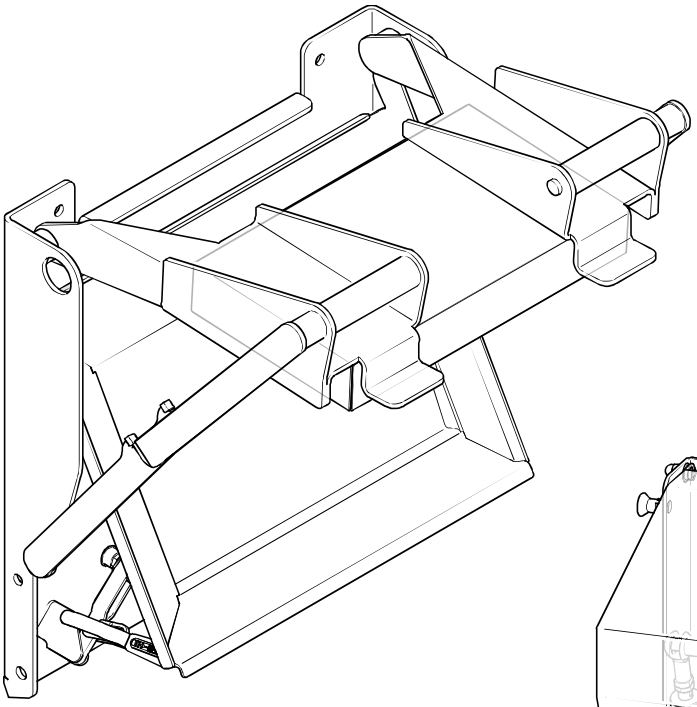
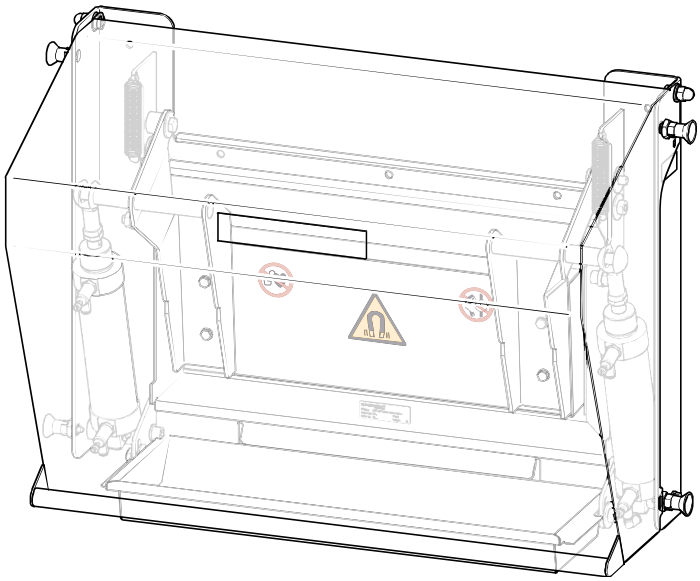
Installation and user manual

Chute magnet, series SCHx...

Suitable for separation of ferromagnetic particles from granulates and powders. Not suitable for poorly flowing and sticky product flows.





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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 SCH chute magnet is further referred to as “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 filter powders and granulates and even coarser streams of raw materials in free-fall chutes or chutes with a sliding angle to 45°. 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.

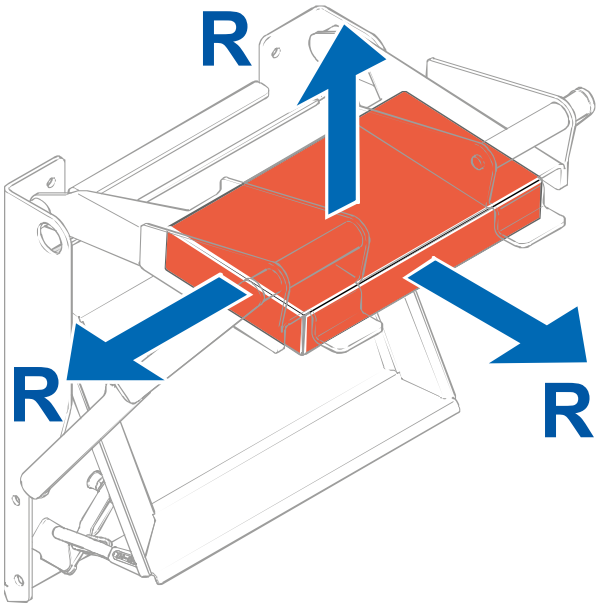
3 Standards and regulations

3.1 Limit values for occupational and public exposure to permanent 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 1.5 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 0.35 metre(s) of the device.

Employees who are pregnant and the general public may not come within a radius ‘R’ of 0.1 metre(s) of the device.

WARNING

Projectile hazard

Ferromagnetic objects will be attracted if they come within a radius of 0.3 metre of the magnet.

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

NOTICE

Goudsmit Magnetics offers measurement inspection to measure the safe clearances of the in-built device on site in order to determine whether they deviate from the values specified above.

4 General information

4.1 Ferromagnetism

The device's principle of operation is based on ferromagnetism. Ferromagnetism is a property possessed by certain materials, such as iron, cobalt and nickel. These materials can become magnetized when exposed to an externally applied magnetic field. Materials that remain magnetized after the external magnetic field is removed are called permanent magnets or magnetically hard.

However, most magnetic materials lose their magnetism after the external magnetic field is removed. These are soft magnetic materials. Most alloys of iron, cobalt and nickel are magnetic.

However, some stainless steel alloys, such as AISI304 or AISI316, are only slightly magnetic.

4.2 Warranty conditions

The warranty on the device is void if:

- Service and maintenance are not performed in accordance with the operating instructions or are carried out by personnel not specially trained for this purpose. Goudsmit Magnetic Systems B.V. recommends having service and maintenance carried out by service technicians from Goudsmit Magnetic Systems B.V..
- Modifications to the device are carried out without our prior written consent.
- Parts of the device are replaced with non-OEM or non-identical parts.
- Parts of the device become damaged, because the device was put into production with a malfunction and/or a persistent malfunction.
- The device is used injudiciously, incorrectly, carelessly or in a manner not in keeping with its nature and/or intended use.

NOTICE

All parts subject to wear and tear are excluded from warranty.

4.3 Other remarks/warnings

- Do not use the device if it is damaged.
- Only use the device for the application for which it was designed.
- Ensure that the device is maintained correctly and in accordance with the instructions in this manual.
- Rectify all faults before operating the device.

5 Specifications

5.1 Range of application

Chute magnets are integrated into the bottom of inclined chutes/channels (maximum angle of 45°) to capture undesirable ferromagnetic particles from product flows. The mounting frame of the chute magnet is welded or screwed around a rectangular recess in the bottom of the existing channel. It is often used in incoming product flows that may contain large pieces of ferromagnetic metals. When capturing ferromagnetic particles, the extractor plate and magnet are placed flush against the mounting frame. In this arrangement, the extractor place is in contact with the product flow. Ferromagnetic particles are magnetically attracted as they pass by and are captured by the powerful magnetic plate. The chute magnet is fitted with quick clamps that lock the magnet and extractor plate in place.

5.2 Description of function

Chute magnets – or magnetic chutes – are very robust plate magnetic separators. Chute magnets, attached to a free-fall channel, capture coarse iron particles from bulk flows. This separation method does not involve placing a magnet directly in the product flow. As a result, the product flow is optimal and no bridging occurs. Extremely suitable for iron separation of coarse particles with a high capacity.

Neodymium (Neoflux®) chute magnets are suitable for separating ferrous contaminants as small as 0.5 mm from product flows.

5.3 Use in food product flows

The device is supplied as an AISI316 stainless steel model as standard, with a 3 µm ceramic grit-blasted finish. This is suitable for normal food contact applications. Because of its resistance to corrosion, this material is generally considered safe for use as a material that comes into contact with food products. All contact materials are compliant with EU regulation EC1935/2004.

5.4 Temperatures

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

Magnet quality used	Ambient temperature	Max. product temperature
GSN-35 (neodymium)	-20 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.

5.5 Models available – specials

Higher product temperatures

If the device is placed in a warm environment (>80°C), standard Neoflux® magnets can no longer be used. As an example, high-temperature Neoflux® magnets can be used with product and ambient temperatures of up to 150°C. A different magnet material may be suitable for even higher temperatures. Samarium cobalt magnets, for example, are also extremely strong and can withstand temperatures of up to 250 °C, and Ferroxdure (although much weaker) can withstand temperatures of up to 225 °C (do, however, contact our sales department for these high temperatures).

Abrasive products

If you have an abrasive product, we can give the surface of the magnet or extractor plate a protective coating, such as a coating of tungsten carbide.

Use in food streams

The device can be used in food streams. In the standard version, the parts that come into contact with the product are already made of stainless steel materials, and the door gasket is FDA-approved.

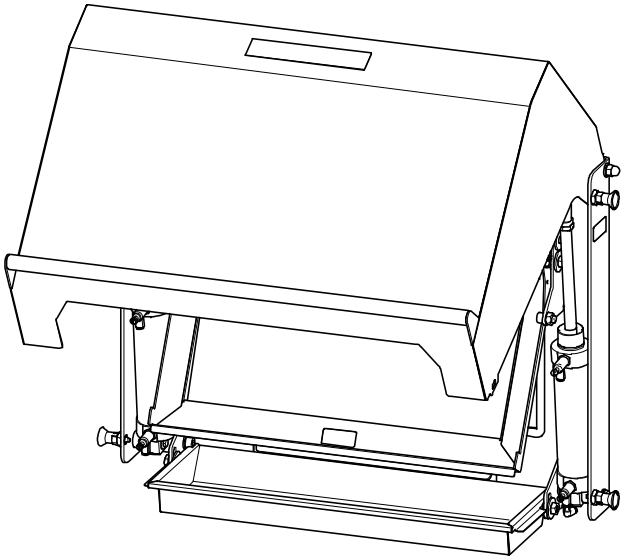
Door safety switch

Optionally, the device can be equipped with an inductive sensor (Ex 3D). This checks that the door is closed. Connection voltage for the sensor is 10-30 VDC – 100 mA.

Pneumatic version

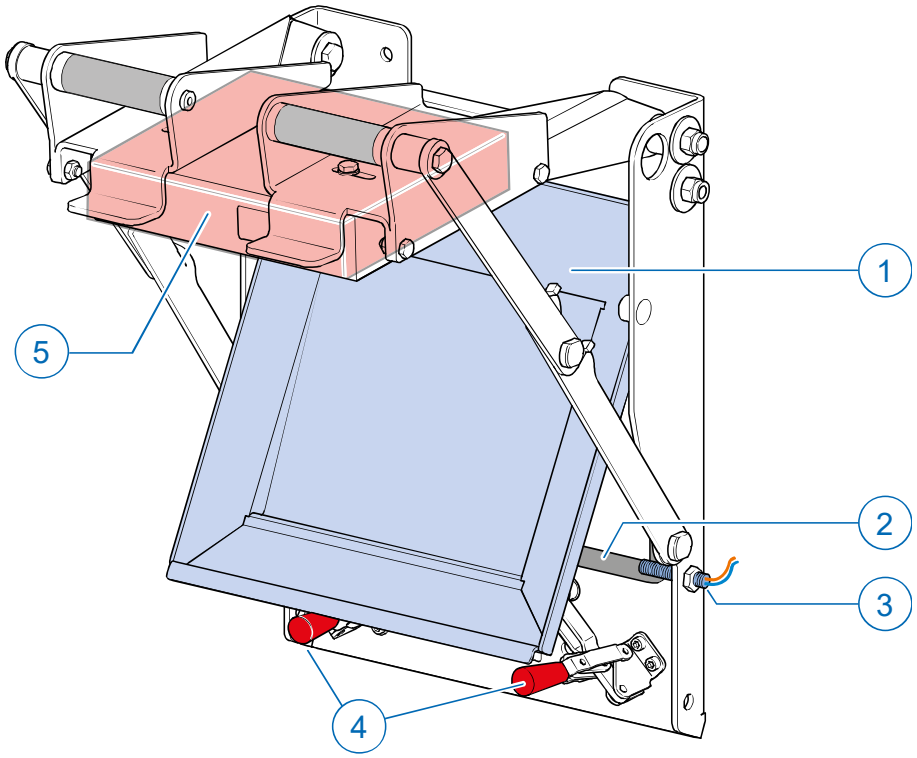
For heavier chute magnets, a pneumatic cylinder is used.

The required supply pressure for the pneumatic version is 6-8 bar.



6 Product information

6.1 Construction



[1]	Extractor plate	[3]	Door safety switch (option)	[5]	Magnet unit
[2]	Door seal	[4]	Quick couplings		

6.2 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.

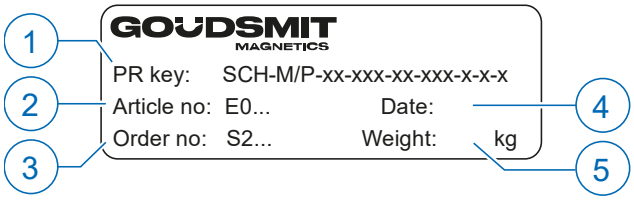
NOTICE

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

6.3 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]	Product key	[3]	Order number	[5]	Weight
[2]	Article number	[4]	Date of manufacture		

6.4 Service life

The service life of this device is indeterminate, as it is highly dependent on the conditions of use.

7 Transport and installation

7.1 Transport

WARNING

Note

The device permanently emits a magnetic force.

Observe the safety instructions for transport in the Safety risks [▶ 6] section.

- During transport, avoid all impact in order to prevent damage.

7.2 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 [▶ 6] 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.
- ▶ When installing the device, ensure that the free-fall height of your product is a **maximum of 0.4 metres**. A higher free-fall height will increase the speed of the product, resulting in poorer separation.

- 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.
- Work safely, provide sufficient working space and use safe, non-magnetic, tools and equipment so that the magnet can be installed without risk.
- Only use lifting/hoisting and transport equipment that is in good condition. Do not apply a workload that exceeds the safe workload. Make certain that the installation on which the chute magnet is mounted can support the weight. If not, reinforce the installation.
- Remove the lifting equipment after the unit is fully installed in the product channel.
- After installation and before commissioning, the device must be cleaned thoroughly.
- Before transporting the chute magnet, make sure the extractor plate is tightly closed against the housing, otherwise the plate magnet may fall away from the extractor plate and cause personal injury.

Securing chute magnet

Measure the hole before cutting the opening for the chute magnet. If necessary, use a piece of paper or cardboard as a template for the mounting holes.

Once the chute magnet is mounted against the product channel, remove the tie-wraps.

NOTICE

Strong magnetic chute magnets come with a safety block

► Install the device including the safety block and only remove the safety block once the device is mounted.

7.3 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 [**1**] to the installation. The electrical resistance must be lower than 25 Ω.

7.4 How to open and close the magnet unit

Opening the quick-release latches

Open the quick-release latches of the plate magnet.

Opening the magnet unit

Then use the two handles to pull open the magnet unit.

Opening carrier arms in locked position

When pulling open the magnet unit, make sure that the arms of the plate magnet fall into the locked position. This works by means of an eccentric hole and a notch in the metal of one of the arms.

When closing the magnet, pull the magnet unit open slightly (this releases the arm from the metal notch). Then turn both the metal rods slightly upwards to fold the arms. Keep in mind that the tubes operate independently, so two-handed operation is required.

8 Operating principle

WARNING

Caution

Please DO NOT reach into the product channel behind the extractor plate with your hand during cleaning operations.

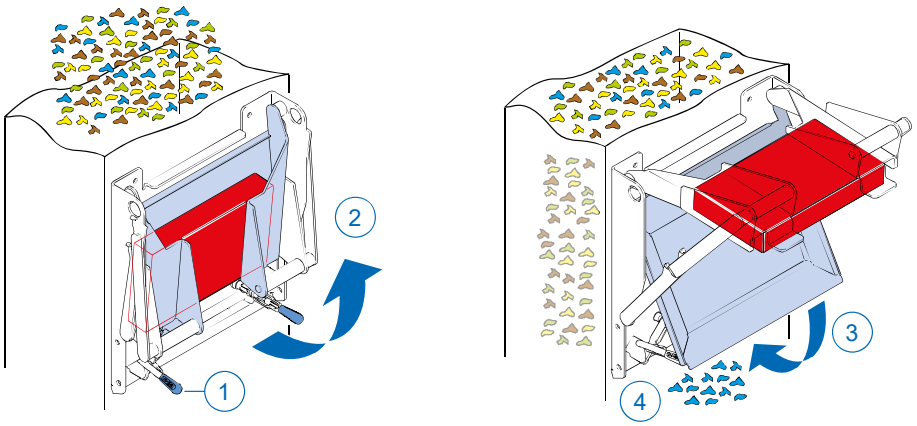
8.1 General

The chute magnet is placed against the product channel. The product flow passes the magnet unit that attracts passing ferromagnetic contaminants. The captured particles stick to the magnet unit, while the purified product flows on.

8.2 Cleaning process – removal of ferromagnetic particles

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

Cleaning process – disposal of ferromagnetic particles



To clean, proceed as follows:

- Stop the product flow.
- Loosen the quick-release latches [**1**].
- Swing the extractor plate up [**2**] away from the product channel and magnet until it engages in the locked position.
- Swing the hinged magnet away from the extractor plate [**3**].
- Collect the ferrous particles that now fall off the extractor plate [**4**] and dispose of them.
- Wipe all parts with a soft clean cloth or brush. If necessary, clean with a suitable cleaning agent.
- Pull the extractor plate [**3**] out of the locked position, and push it back against the magnet.
- Place the magnet unit [**2**] back against the product channel.
- Secure the quick-release latches [**1**].
- Production can now be safely resumed.

9 Maintenance and inspection

9.1 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.

WARNING

Caution

- ► Perform all work on the device while the product flow is stopped and the compressed air is shut off via the on/off valve.
- ► Be careful with tools and ferrous objects. The magnetic force is permanently present.

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.

9.2 Frequency of maintenance

NOTICE

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

Action	Daily	Annually
Clean magnet (for maximum performance).	min. 2x [1)]	
Check seal for wear and presence.	●	
Replace seal.		●
Check magnet for wear.		●

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

9.3 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.

Cleaning of the magnet is done manually by wiping, or using an extractor plate for quick cleaning. This involves sliding or swinging the extractor plate away from the magnet. The ferrous particles fall off of the extractor plate as soon as they are moved far enough away from the magnetic field.

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

10 Troubleshooting

10.1 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
Magnet does not separate ferromagnetic particles completely or at all.	Magnet is heavily soiled or overloaded with ferrous particles.	• Clean the magnet. Clean more often if necessary.
	Particles that are not attracted are not sufficiently ferromagnetic.	Check a non-separated ferrous particle with a strong permanent magnet to determine whether it is actually a ferromagnetic particle. • Not attracted: the particles cannot be separated with any type of magnet. • Slightly attracted: a stronger magnet might be a solution. Consult Goudsmit Magnetics.
	Excessively high volume flow of your product.	• Stay below the maximum capacity shown in the specifications.
	Ferromagnetic components within the range of the magnet reduce the ferrous separation power.	• Check the magnetic behaviour of the installed components around the magnet by holding a ferrous component close to the magnets. If there are components that react to the magnet, replace them with non-magnetic components, such as those made from stainless steel or aluminium.

11 Service, storage and disassembly

11.1 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.

11.2 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.

The spare parts are mainly the wear parts. Only the extractor plate of the magnet (external pole or chute magnets) may need to be replaced/refurbished over time, if it is exposed to a highly abrasive material flow.

- 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.

11.3 Storage and disposal

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. After disassembly, apply 80 mm spacers to the magnet. This prevents body parts from becoming trapped.

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 [▶ 6] section.

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