GOUDSMIT MAGNETICS

User Manual

Magnetic bar, series SESx & SBAx…

Fe separation system by permanent magnetism

☺ Suited for removal of ferromagnetic parts out of powders and granulates

☹ Not suited for badly flowing (sticky) products

The descriptions and pictures in this manual, used for explanation, may differ from your execution.

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CE

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Version overview of standard manual

Version	Date	Description
1.0	12-2009	First version of the English version of the user manual, derived of the grid magnet manual version 2.0
1.1	07-2019	New logo and update layout.

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.

Table of contents

General

This user 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 instruction 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:

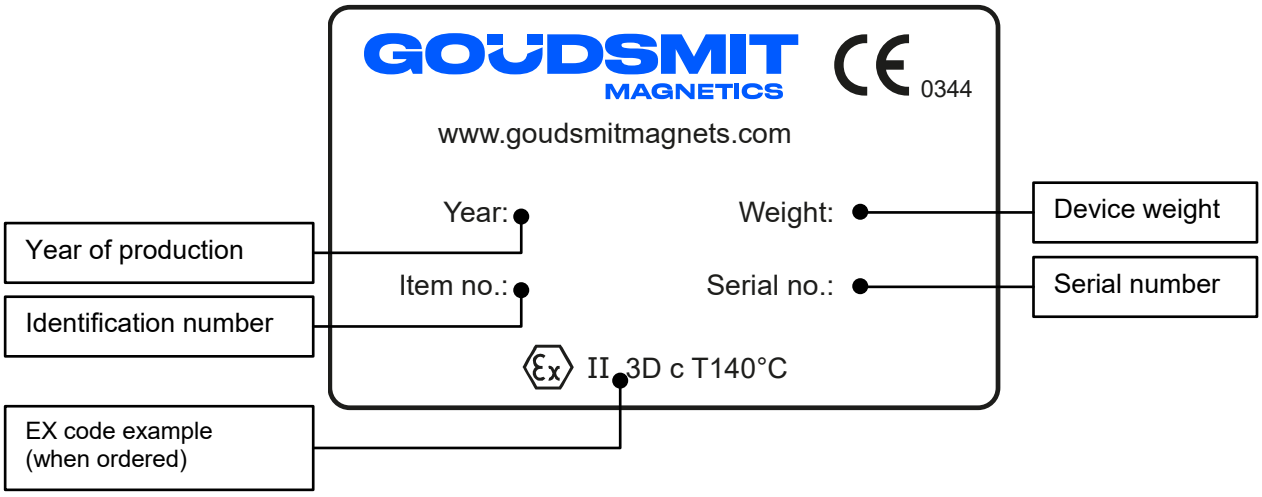
- Possible damage and/or shortcomings as a result of transport. If so, ask the transporter to draw up a transport damage report.
- Completeness of the delivery/deliveries, the absence of anything (additionally) ordered.

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 number and the Identification number in case of breakdowns or delivery of spare parts.



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 separating ferromagnetic* (Fe) particles out of free flowing powder and granular products, grain size up to 10 mm, such as plastics, flour, sugar, coffee beans, etc.

Not suited for fatty powders or raw materials with particle size over 10 mm or smaller when heavy enough to damage the magnetic bar tube.

Fe particles

Suited for use in product flows with Fe particles of **30 µm** and larger for Neoflux® magnet systems, and **1 mm** and larger for Ferroxdure magnet systems.

Product has to be free from ferromagnetic or other parts that can cause damage to the magnetic bar tubes (like dents/bumps).

Temperatures

Suited for:

- Surrounding temperatures of -20°C up to +40 °C.
- Product temperatures up to +80 °C for Neoflux® magnet systems.
- Product temperatures up to +100 °C for Ferroxdure magnet systems.

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 approximately 0.5 meter of free space around the device to perform and ease the inspection and maintenance operation, like mounting or dismounting the magnetic bars.

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.

Cleaning

Minimum 2x per day cleaning (Fe disposal) of the device is advised for an optimal magnetic separation result and to prevent Fe parts accumulation on the magnetic bar tubes and the problems that can be caused by that. Clean magnets have the best separating result. So, make sure you clean a little more than you think is necessary, to achieve a satisfactory result of the magnetic device.

! Clean more often when necessary and less often when proven possible**!**

For dirt cleaning: see chapter *Maintenance*

Deliverable specials

High product temperatures

When high temperatures occur, there is the possibility to use another magnet material than the (standard) applied Neoflux® or Ferroxdure magnet material.

Abrasive products

If you have an abrasive product, we can supply the grid magnet with a protective coating, like tungsten carbide or PU coating.

Use in FOOD product flows

For use in food we recommend to use magnetic bars with SS surrounding tubes to make sure that no unnecessary gaps are present. The SS tube magnetic bars of Goudsmit are mostly AISI316 or else AISI304. The device can also be delivered in combination with other – for instance prescribed or delivered by customer – food improved materials. Surface treatments like electrolytic polishing, staining, etc. are naturally possible.

ATEX

The magnetic bar is suited for ATEX II 3D (suited for use in Ex dust zone 22).

It is however your own responsibility to take the right precautions when using the magnetic bar in 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.

Working principle

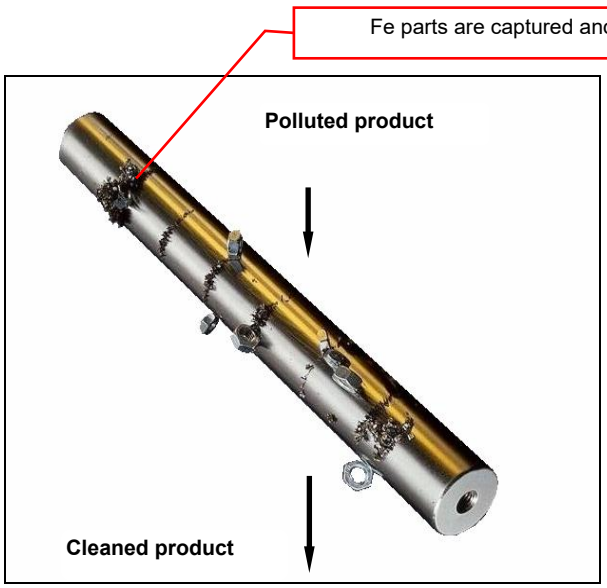


Photo: magnetic bar with surrounding SS tube

Photo: extractor type magnetic bar, type SESX

- The **magnetic bar** has the function of separating Fe (ferromagnetic*) particles out of a passing product flow.
- The Fe containing material will be attracted by the magnets and will "cling" onto the bar, whilst the cleaned product flows further without further being influenced.
- The Fe particles will stay on the tube, right above the magnet's steel poles, until they will be removed manually. This can be done by taking out the magnetic bar and executing a cleaning/Fe disposal action.

*ferromagnetic: see chapter *General /Ferromagnetism*

☹ *Unfortunately some product that got stuck in-between and under caught Fe parts will fall off with it while cleaning the magnetic bars and cause some "product loss".*

Cleaning the magnetic bar

Minimum 2x per day cleaning (Fe disposal) of the device is advised for an optimal magnetic separation result and to prevent Fe parts accumulation on the magnetic bar tubes and the problems that can be caused by that. Clean magnets have the best separating result. So, make sure you clean a little more than you think is necessary, to achieve a satisfactory result of the magnet device.

! Clean more often when necessary and less often when proven possible **!**

For dirt cleaning: see chapter *Maintenance*

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

Cleaning of magnetic bar with surrounding extractor unit (SESX)

1. Stop the product flow.
2. Take the magnetic bar out of the product flow.
3. Shove the magnetic bar out of the extractor tube.
   - Catch the Fe parts that now will fall off the tubes.
   - Place the magnetic bar far enough away from the extractor tube on a clean surface.
4. Sweep with a brush of soft cloth and or blow clean the extractor tube (not in the direction of or over the magnetic bar!).
5. Clean the magnetic bar and or inside extractor tube if necessary (with a soft cloth or a suited cleaning fluid).
6. Shove back the magnetic bar into the extractor tube. Make sure that no (new) dirt gets trapped in-between the bar and extractor tube!
7. Place the assembly of magnetic bar and tube back into place.
8. (Re-)Start the product flow.

Cleaning of grid magnet without extractor unit (SBAx)

1. Stop the product flow.
2. Take the magnetic bar out.
3. Sweep with a brush of soft cloth and or blow clean the magnetic bar.
4. Place the magnetic bar back into place.
5. (Re-)Start the product flow.

Installation and putting into operation

Transport and placing procedures

- Use lifting belts around the magnetic bar to support and guide the device when the device is too heavy to lift by hand. Make sure to provide for stable lifting and further transport. Pay attention to possible unequal weight distribution.
- Use proper lifting devices that suit with device's weight.

The weight of the device is stated on the identification plate when > 15 kg.

- Clear the area under the device during lifting and transport.
- Ensure that the product channels are strong enough to support the weight of the device and raw product that passes through. Reinforce them when necessary.
- Install the magnetic bar in a well reachable height for the operators. A good height eases the working and cleaning process.
- Work safely and make sure there is enough working space, use proper scaffolding, ladders and other help materials, so the device can be installed without safety risks.

Magnetic bar protection

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

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

- See also chapter *Maintenance*

Damage to the magnetic bar 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

Checks before and during start-up

During start-up, it is essential to follow the safety notes in this user manual!

Before start-up, make sure that:

- The device or the installation has no damages or malfunctions.
- All connections (electrical, mechanical, pneumatically) have been made properly.
- The device or the installation is placed and located correctly.
- All protective covers (if applied) have been fitted correctly.
- All foreign (iron) objects larger than 10mm are blocked from entering the production 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.
- That the entire installation, including the magnet tubes, is grounded.
- There are no other sources of danger.

During operation, make sure that:

- The device or the installation has no damages or malfunctions.
- The motor is running correctly (no overload, no speed fluctuation, no loud noises, etc.).
- The motor rotates in the correct/wanted direction.

Maintenance

Magnetic systems attract dust and Fe particles. Regular cleaning of any device fitted with a magnetic system is therefore essential. A clean magnet functions considerably more efficient than a heavily contaminated magnet.

All parts are best cleaned by pressurised air and/or soft cloth. Also it is possible to deep clean with special cleaning fluids that do not harm the materials

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

Always inform operating personnel well in advance regarding planned inspections, maintenance, repairs and when attending to failures or breakdowns.
Make someone responsible who also exercises supervision.

Magnetic bars

- As a following of the passing product (abrasive or not) and the Fe contamination the magnetic 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 or PU.
Please contact **GOUDSMIT magnetic systems** for advice.

- During maintenance and or cleaning one has to be careful with the magnetic 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 magnetic 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 magnetic bar and or extractor tube is damaged it can be sent to **Goudsmit Magnetic Systems** for repair/revision.

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 property!

- Any repair to GOUDSMIT magnet devices may be performed by qualified personnel only.
- Be aware that permanent magnetic material attracts ferromagnetic material with great force when it gets in reach of the magnetic field
- Consult GOUDSMIT MAGNETIC SYSTEMS customer 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 customer service.

Malfunction	Possible cause	Possible remedy
Magnet does not separate ferromagnetic (Fe) particles out of the product stream, or separates them badly	Magnetic bar is overloaded with Fe parts	Clean the magnet more frequently
	Not-attracted objects are not ferromagnetic	Check if particles to be separated are ferromagnetic, using a permanent magnet
	Fe parts close to the magnet reduces the magnetic field	Check if there is ferromagnetic material close to the magnetic bars. If so try to replace the Fe construction
Magnets do not move in the extractor tubes any more or move badly (extractor types)	Tube is dented	Replace dented tube
	Too much Fe on tube(s)	Clean magnetic bars of caught Fe parts more often

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:
the extractor tube unit and magnetic bar.
We advise to have one or more magnetic bars and an extractor unit (extractor type) as a spare part when 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.