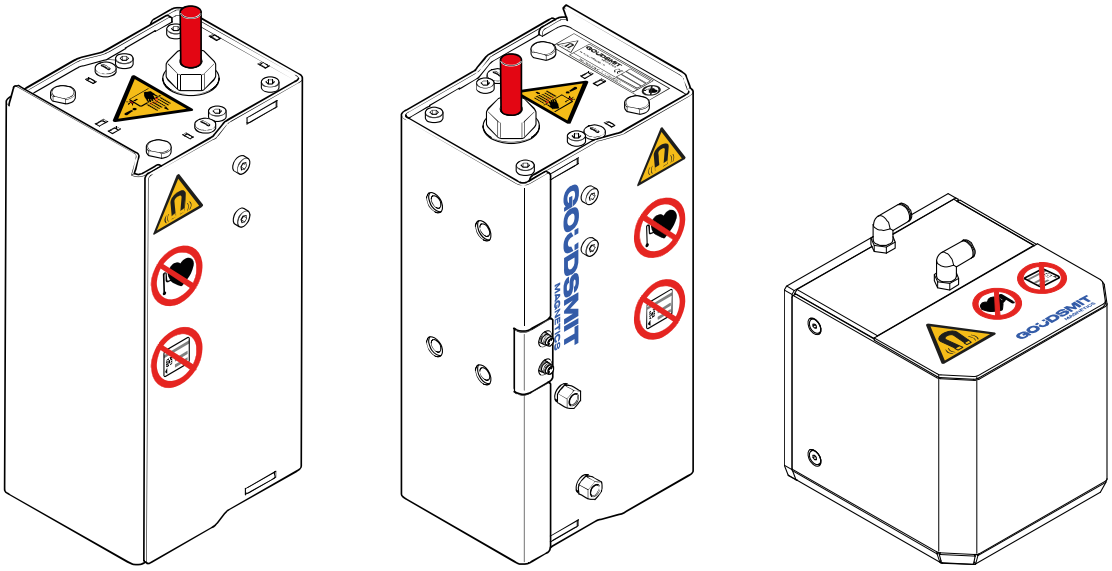
GOUDSMIT MAGNETICS

Installation and maintenance manual

Switchable sheet separators, TPSP series…

Ferro magnetic divider with permanent magnet



The descriptions and illustrations in this manual, used for explanation, may differ from the descriptions and illustrations of your version. The as-built drawing(s) of the delivered device are enclosed.

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CE

Disclaimer

Version overview

Version	Date	Description
1.0	02/2020	First version.
1.1	02/2022	• Additional fixing method added. • Pneumatic connection diagram added. • Product specifications expanded.
1.3	03/2024	Minimum operating pressure TPSP126001 adjusted.

Foreword

This manual contains information for the correct installation and maintenance of the device. The manual contains instructions to prevent possible injury and serious damage and ensures safe and trouble-free operation of the machine. Please read this manual thoroughly and make sure you have understood everything before installing and using the machine in your installation.

The information published in this manual is based on the information available at the time of delivery.
We reserve the right to modify or adapt the construction and/or model of our products at any time, without any obligation to adapt previously delivered products accordingly.

If you require more information or if there are any further questions, please contact GOUDSMIT Magnetic Systems B.V.. The contact details are listed on the title page of this document.

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

In the manual, the magnetic sheet separator is partially further referred to as "device".

- This manual and the manufacturer's declaration(s) must be regarded as part of the device.
- The pieces must remain with the device if it is sold.
- The manual must be available to all operating personnel, service technicians, and others working on the device for the lifetime of the device.

Table of contents

Safety

This chapter describes the safety risks of the device. Where necessary, warning icons are attached to the device. This chapter clarifies the meaning of these icons.

Know your icons

- Carefully read the warnings and instructions on the stickers and labels of the device.
- Regularly check that the icons on the device are present and clearly legible.
- Keep icons clean.
- Replace removed or illegible icons with new ones and apply them in the same place.

General safety instructions

Danger of entrapment due to strong magnetic fields

The magnets of sheet separators can cause serious and permanent injuries. Ferromagnetic objects are attracted when they come within a radius of 0.5 metres of the magnet.

- Do not carry out any cleaning or maintenance work on the device while it is still in operation.
- The instructions in this manual must be adhered to. Failure to do so may result in damage to property, personal injury or even death.
- The device may only be used for separating steel sheets. Any other use does not comply with the regulations. Any resulting damage is not covered by the manufacturer's warranty.
- Make sure that personnel working on the device or in its immediate vicinity wear adequate protective equipment.
- Keep a minimum clearance of 0.5 m around the device. Have clear markings to minimize danger to passers-by. The marking must have a clear warning regarding strong magnetic fields.
- Always leave all safety and protection equipment in place if it is not necessary to remove it.
- Apply additional safety measures if the device remains easily accessible to persons. If this is not possible, make sure that clear instructions are given about the entire installation in which this device is included.
- The device should only be operated remotely when all covers are in place and the moving parts are not accessible.
- Work on the device may only be done by qualified personnel. Maintenance of the magnetic parts should preferably done Goudsmit Magnetics personnel.
- Always observe the locally applicable safety and environmental regulations.

Emergencies

Switch off in case of emergency

The device does NOT have a safety switch. It is very important that your installation offers the possibility to switch off (de-pressurize) the compressed air supply to the device in case of an emergency.

Damage by magnetic fields

The magnets generate a powerful magnetic field that attracts ferromagnetic particles. This also applies to ferrous materials people carry with them, such as house wrenches, money and tools. Within the magnetic range, only use non-ferromagnetic tools and workbenches with a wooden worktop and non-ferromagnetic base.

Norms and guidelines

Declaration of conformity

This device complies with European and national requirements in terms of construction and operation.

The CE marking confirms the conformity of the device with all applicable EU regulations, which are connected with the affixing of this marking..

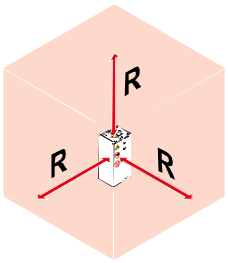
Guidelines

The standard version of this device complies with the requirements of the following European Directives:

- Machinery Directive 2006/42/EC;
- EMC Directive 2014/30/EU.

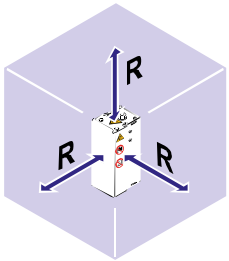
Occupational and public exposure limit values for (electro-) magnetic fields

The limit values of magnetic fields are defined as follows according to the *EMF Directive 2013/35/EU: Directive 2013/35/EU of the European Parliament* and of the Council of 26 June 2013 on minimum health and safety requirements regarding the exposure of workers to the risks arising from electromagnetic fields.
With regard to exposure to magnetic fields according to EN12198-1 (machine category = 0, no restrictions) of the device, observe the following measures:



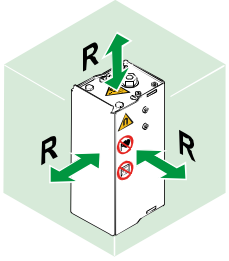
Lethal danger to persons with implanted medical devices

Persons with active implanted medical devices (e.g., pacemaker, defibrillator, insulin pump) should not move within an radius "R" of **1 meter** from the device.



Damage to magnetically sensitive products

Objects which contain ferro-magnetic parts, such as bank, credit or chip cards, keys and watches can be irreparably damaged when they come within a radius “R” of **0.5 meter** from the device.



Pregnant personnel must not come within a radius "R" of at least **40 mm**.

Occupational exposure limit values (general and for limbs) have not been exceeded.

General information

This manual

This manual contains information for the correct installation and maintenance of the device. It also includes instructions for preventing injury and serious property damage and for the safe and undisturbed operation of the device. Please read this manual carefully before using the device and ensure that you are familiar with the operation of the device. Follow all instructions carefully.

- The information in this manual is based on the information available at the time of delivery. It may be changed at a later moment.
- We reserve the right to modify or change the construction and/or model of our products at any time without notice and without obligation to modify previously delivered products.

Sales and warranty conditions

The terms and conditions of sale are the **'General terms and conditions for the delivery and assembly of mechanical, electrical and electronic products' (SE01)**, published by Orgalime in Brussels.
You can request these conditions in writing from Goudsmit Magnetics Group B.V., as stated in our written offer.
The above-mentioned document also contains the warranty conditions.

The warranty on the device expires if:

- service and maintenance are not carried out in accordance with the instructions for use or are carried out by personnel who have not been specially trained for this purpose. Goudsmit Magnetics Group B.V. recommends that service and maintenance be carried out by Goudsmit service technicians.
- Modifications to the appliance are carried out without our prior written permission.
- Parts of the device will be replaced by non-OEM or non-identical parts.
- parts of the machine are damaged because the machine has been taken into production with a (permanent) malfunction.

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

Other remarks/warnings

- Do not use the device if it is damaged.
- Use the device only for the application for which it was designed.
- Check that all protective covers (including all safety circuits) are correctly mounted and installed.
- Make sure that the device is maintained correctly and in accordance with the instructions in this manual.

Eliminate any malfunction before operating the device. If the device is put into operation with the malfunction, after you have performed a risk assessment, warn the operating and maintenance personnel of this malfunction and the possible risks it may pose.

Specifications

Function description

The Fail Safe magnetic sheet separators are designed for the automatic separation and singulation of steel sheets. Steel sheets are often difficult to pick up from a stack if they are coated with a corrosion-resistant oil film and therefore stick together. The presence of burrs as a result of cutting processes can also cause steel sheets to stick together.
This creates the risk of two or more sheets being lifted and transported into the production machine.
This can cause enormous damage, for example when feeding into a 3D mould where there is no room for a double plate.
Furthermore, when lifting a steel strip from a stack, an underpressure is created between the lifted strip and the stack. This underpressure, especially with larger sheet sizes, can result in significant lifting forces, especially when the transport speed increases.

With powerful neodymium magnets, the sheet separators ensure that the steel sheets are strongly magnetised, so that each steel sheet becomes a magnet, as it were.
Since equal magnetic poles repel each other, the repulsive forces push the top sheets apart, creating space between the steel sheets so that a vacuum or magnetic gripper can easily lift just the top steel sheet.

Extra safe due to "fail safe" design

The switchable sheet separator is the only one of its kind to be equipped with a spring-loaded off position. This provides additional safety. In the event of an emergency stop or interruption in the compressed air supply, the sheet separator automatically switches to a spring-loaded off position, thus eliminating the dangerous magnetic field. Even at full load of a maximum stack height, the sheet separator switches off. So the sheet separator will never be switched on unintentionally, minimising the risk of trapped fingers between steel sheets and sheet separator. In addition, the sheet separator is equipped with a clear red indicator that shows that the sheet separator is "ON". If the indicator is not visible, the sheet separator is "OFF".

Field of application

The “Fail Safe” magnetic sheet separators are suitable for separating ferromagnetic steel sheets up to a thickness of about 4 mm.

Sheets thicker than 4 mm do not need a sheet separator in practice, because a possible second sheet will come loose through its own weight and remain on the stack. In some cases, when a lot of sticky oil is present, it can still happen that a second sheet does not come loose. In this case, a sheet separator can still be helpful. The magnetic force will not separate the top sheet on the stack, but the magnetic force, when lifting the sheet, will peel off the second sheet, leaving it on the stack.

The sheet separators are suitable for separating steel sheets of all shapes and sizes, including round or asymmetric shapes. For large sheet sizes, it may be necessary to install multiple sheet separators for effective separation. In the case of clean and non-oiled steel sheets, the sheet separators effectively separate an area of up to approximately 34 dm². For sticky sheets, due to oil or burrs, the effective area can be reduced to approximately 22 dm².

Temperatures

Suitable for use in ambient temperatures from 5 °C to +45 °C.

Take measures to avoid freezing, as moisture in the compressed air system may freeze below 5℃, causing damage to seals and leading to malfunction and seizure.

Avoid operation above 45℃, such high temperatures affect magnetic force and spring force, and may cause air leakage and wear because the applied lubricants no longer work optimally. All this can lead to malfunctions.

The sheet separator is constructed with permanent magnets that are sensitive to temperature, high temperatures cause a permanent loss of magnetic force. Make sure that the magnets are not exposed to temperatures above 70 °C during transport and storage.

Compressed air

Connect the sheet separator to compressed air of sufficient pressure to ensure proper operation:

Type	Minimum operating pressure [bar]	Maximum operating pressure [bar]
TPSP123301	5	10
TPSP124501	5	10
TPSP125301	6	10
TPSP126001	7.5 - 8	10

Table 1: Operating pressures

Surface and corrosion protection

The sheet separator consists of stainless steel parts, anodised aluminium parts and nickel-plated steel parts. The corrosion protection is more than adequate for use in technical production environments.

Lubrication of the sheet separator

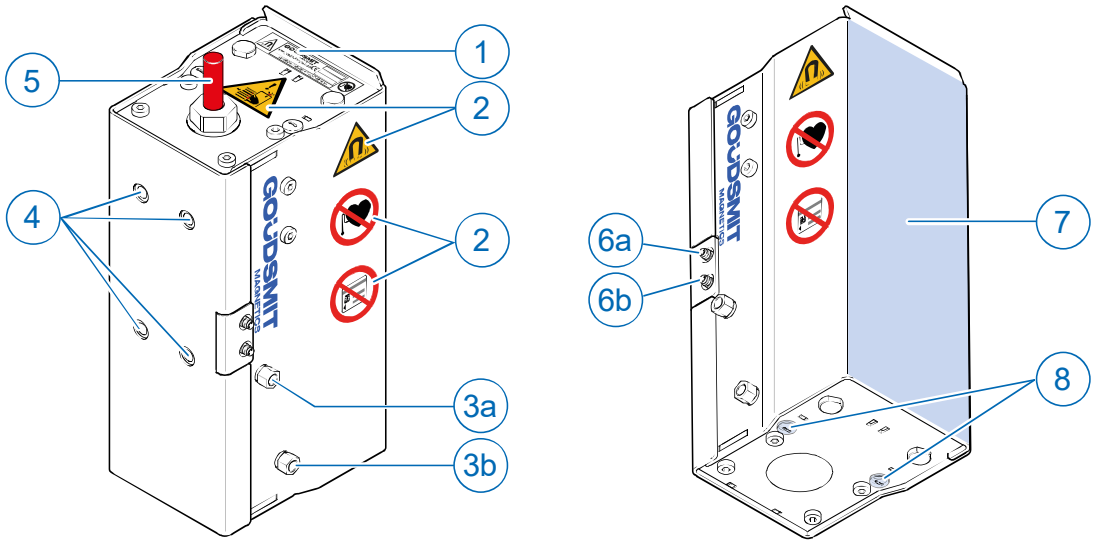
The sheet separator is equipped with maintenance-free bearings and the pneumatic cylinder is factory lubricated for life. The sheet separator can be used without further lubrication.

Vibrations and shocks

Although the sheet separator is heavy-duty and robustly constructed to withstand the high loads resulting from its use in the steel industry, it is important that extreme vibration, shock and mechanical stress are avoided or prevented.

Product information

Overview drawing



1. Type plate
2. Warning decals
3a. Compressed air connection G1/8" port (magnet OFF)
3b. Compressed air connection G1/8" port (magnet IN)
4. Threaded holes M8 (4x) at the back
5. Red indicator (magnet active)
6a. Sensor connection ON
6b. Sensor connection OFF
7. Working surface magnetic system
8 Threaded holes M12 (2x) at the bottom

Type plate

The type plate with identification data is located on top of the sheet separator.

- Never remove the type plate.
- Always keep the type plate clean and legible.

When ordering spare parts, service or in case of malfunction, always quote the item number [**1**] and order number [**2**] and possibly the product key [**3**].

Compressed air connections [3a/3b]

The sheet separator switches ON when port 3a is pressurised and port 3b is vented.
The sheet separator switches OFF when port 3b is pressurised and port 3a is vented.

Red indicator [5]

The red indicator shows whether the sheet separator is on or off.
If the red indicator is visible (extended), the magnetic field is switched on.
If the red indicator is not visible (retracted), the magnetic field is switched off.

Sensor connections [6a/6b]

The sheet separator is equipped with 2 sensors for on/off signalling [6a + 6b]. The sensors operate on 24V nominal voltage and have a 3-wire switching output with N/O contact.
The sensors can be connected with Festo NEBU-M8 cables with 3-pin M8x1.3 connectors.

Scope of delivery

Check the shipment immediately upon delivery:

- possible damage and/or shortcomings as a result of transport. If damaged, ask the carrier for a transport damage report.
- Completeness of the delivery. Check whether the ordered accessories have been delivered.

In case of damage or wrong delivery, immediately contact Goudsmit Magnetic Ssystems B.V..

Transport and installation

Transport

Caution

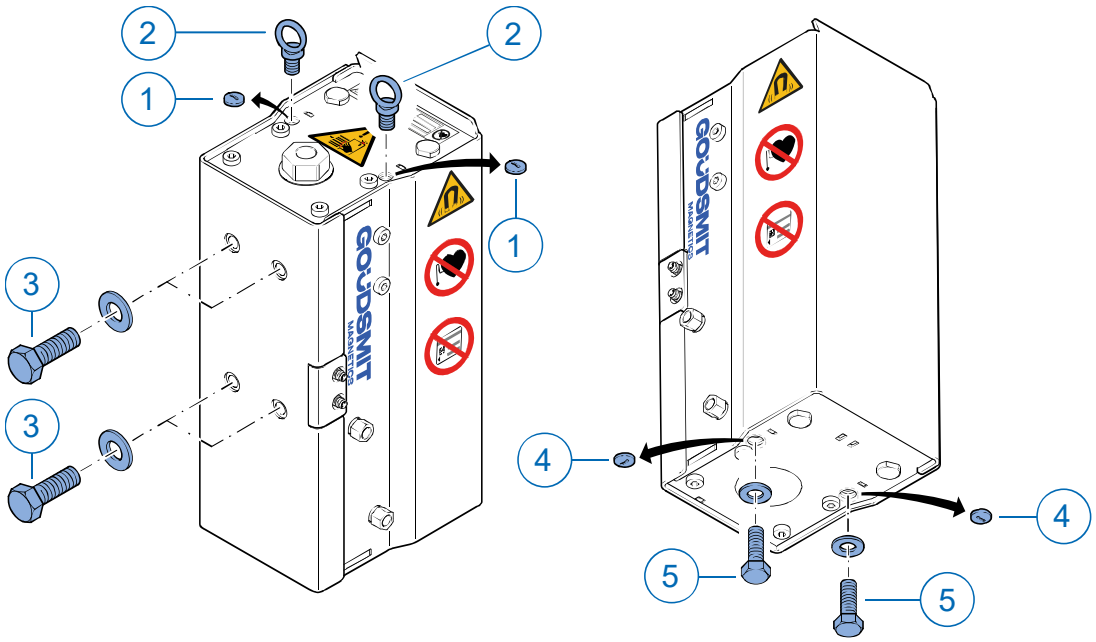
Lift the device with suitable lifting gear.

- ▶ Danger of entrapment: Do not put your hands in the box during lifting.
- ▶ Make sure that the area around the device is clear during transport.
- ▶ Avoid any impact during transport to avoid damage.

Installation of the device

Take the following precautions:

- Only allow qualified personnel to work on the installation.
- The surface must be strong enough to support the weight of the device.
- Make sure that there is at least 0.5 meters of free space around the installation location to place the unit.
- Provide (safety) markings around the device after installation.



- ▶ The sheet separator comes in a box. Open the box and remove the 2 cover caps [**1**].
- ▶ Install an eyebolt M12 [**2**] in both holes.
- ▶ Lift the sheet separator out of the box evenly and transport it to the setup location.
  Use a lifting device that supports the weight of the sheet separator.
- ▶ Attach the sheet separator to your construction or robot arm with 2 x M12 bolts [**5**] (first remove cover caps [**4**]) on the bottom or with 4 x M8 bolts [**3**] on the backside.
- ▶ Screw the bolts at least 20 - 25 mm deep into the sheet separator.

Commissioning

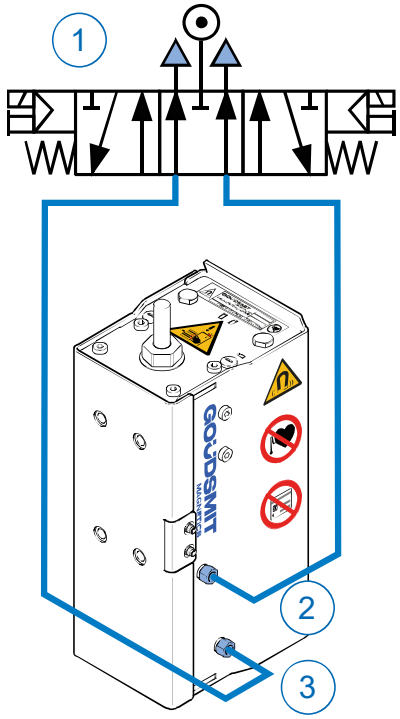
After the sheet separator has been installed, the compressed air must be connected to it in order to put it into operation. Without air pressure, the magnet cannot be switched on and there is practically no magnetic field on the working surface. As soon as air pressure is applied to the sheet separator, the magnets turn towards the work surface and a strong magnetic field is created.

Before start-up, check whether:

- the sheet separator is not damaged or malfunctioning.
- all connections (pneumatic, mechanical) have been made correctly.
- the sheet separator or the installation is correctly positioned and placed.
- all protective devices and markings are correctly applied.
- there are no other sources of danger.

During start-up, check whether:

- the sheet separator or the installation does not show any faults.
- all other parts of the sheet separator or the installation work as described.

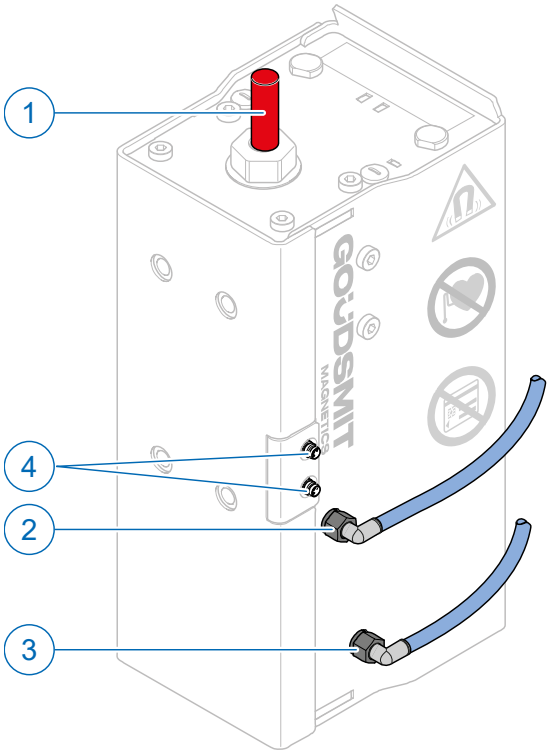


Connection diagram

[**1**] 5/3 valve
[**2**] Magnet OFF
[**3**] Magnet IN (active)

Pneumatic connection

- ▶ Connect an air supply hose with a minimum diameter of Ø 6 mm with a G1/8" connector to the compressed air output connection (magnet OUT) [**2**] and input connection (magnet IN) [**3**] of the sheet separator.
- ▶ Pressurise the system (for the correct operating pressure, see table 1 on page 8). The red indicator [**1**] rises from the sheet separator, indicating that the magnet is active.
- ▶ Check that the sheet separator is working properly.
- ▶ Check both compressed air connections [**2+3**] for air leakage.



Connecting sensors (option)

The sheet separator can control the switching on and off of the magnet by means of the sensors.

- ▶ Connect the 2 sensors to the 24V connections (3-pin) [**4**]. For more information, see section "Sensor connections [6a/6b]" on page 8.

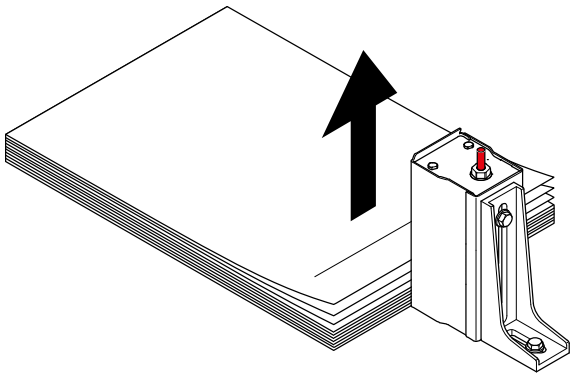
Application and assembly examples

The device can be placed next to a stack of steel sheets in different ways, with 1, 2 or more magnets at the same time. Practice should show which method works best. See examples below.

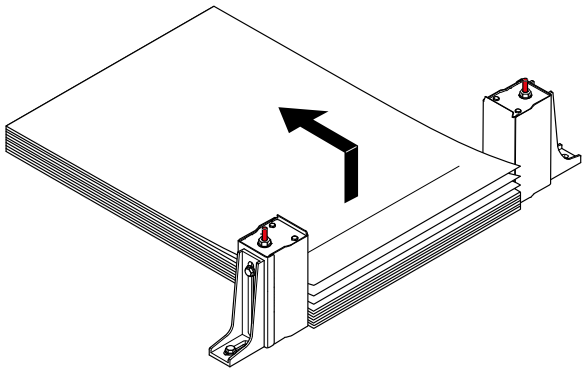
Assembly examples

Assembly is easily done using the screw holes in the back of the device (see section "Installing the device"). The arrows on the drawings indicate the recommended direction of transport for the sheets after separation by the device.

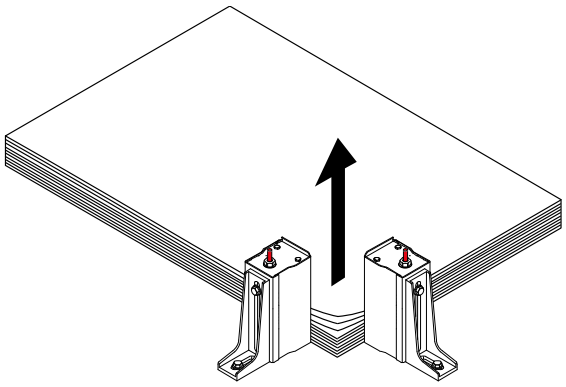
For **smaller sheets**, place the sheet separator in the middle of the shortest side.



When the sheet separators are placed **opposite each other**, the sheets remain floating.



In case of a stack of **large steel sheets**, place the sheet separators on the corners.



Preferably switch off the sheet separator when the steel sheet leaves the stack.

Maintenance and inspection

Danger of crushing / crushing

Due to the very high magnetic forces on the magnets, replacement of the magnetic components is extremely dangerous. This replacement may ONLY be done by qualified personnel or (preferably) by mechanics of Goudsmit Magnetic Systems B.V.. If the replacement is still done by non-qualified personnel, the warranty becomes void.

Goudsmit Magnetic Systems B.V. is not liable for any consequential damage to persons and/or materials in the event of failure to comply with this prohibition.

During maintenance, place the magnetic components on a non-ferromagnetic surface.

Caution

Do all work on the device while the compressed air is switched off.

Periodic inspection and maintenance

- Always inform the operating personnel of planned inspections, maintenance, repairs or in the event of malfunctions.
- Check that there are no faults on the outside of the device (e.g. loose air hose).
- Check the proper function and performance of the sheet separator. Pay attention to noticeable deviations such as strange noises, irregular switching speeds or leaks.
- Check that all fixing bolts and components are still tight.
- Regularly check that all warning decals and the type plate are in the correct place on the device. If the warning decals or the rating plate are lost or damaged, immediately apply new icons to the original location.
- Make sure that the exterior of the device is clean. Remove dust, dirt and parts on the device that do not belong there.

Goudsmit Magnetic Systems B.V. offers an annual inspection and an inspection report with a certificate for the magnets.

Malfunctions

Use the table below to troubleshoot, determine the possible cause and find the remedy. In the event of a malfunction that is not listed in the table, please contact the Goudsmit Magnetic Systems B.V. customer service.

Malfunction	Possible cause	Remedy
Magnet cannot separate the sheets, or cannot separate them properly.	Working surface is dirty.	Clean the working surface more often.
	The sheets to be separated are too thick.	Order a magnet with a higher capacity. Maximum sheet thickness is 4 mm.
	The sheets to be separated are not or only slightly ferromagnetic.	Check the non or poorly separated sheets with a permanent magnet to determine if the load is not or only weakly attracted. Contact Goudsmit for advice.
	The sheets cannot be placed correctly near/against the device.	Place the sheets correctly (flat and even) against the device.
	Air pressure is too low.	Repair or replace the air connection if necessary.
	Leakage in the supply air hose.	Replace the air hose.
Device does not work.	No or too low air pressure.	Check air pressure.
	Magnets in device do not move even when there is sufficient air pressure on device.	Contact Goudsmit Magnetics.

Service, spare parts, storage and disassembly

Customer service

Please have the following information at hand when contacting customer service:

- All the details on the type plate.
- Type and extent of the problem.
- Time at which the problem occurred and any additional circumstances.
- Assumed cause.

Spare parts

Due to the quality of the products of Goudsmit Magnetic Systems B.V. the device has a high operational reliability.

Spare parts are usually parts subject to wear and tear, such as the cover plate that is in contact with the steel sheets. Please contact Goudsmit Magnetics for replacement of the cover plate.
The contact details are listed on the title page of this document.

Storage and disassembly

Avoid direct sunlight or storage at high temperatures above 70 °C.

Avoid extreme mechanical shocks, as this could interfere with the adjustment of the switching mechanism.

At the end of its technical service life, the device must be disposed of properly and in accordance with local regulations.