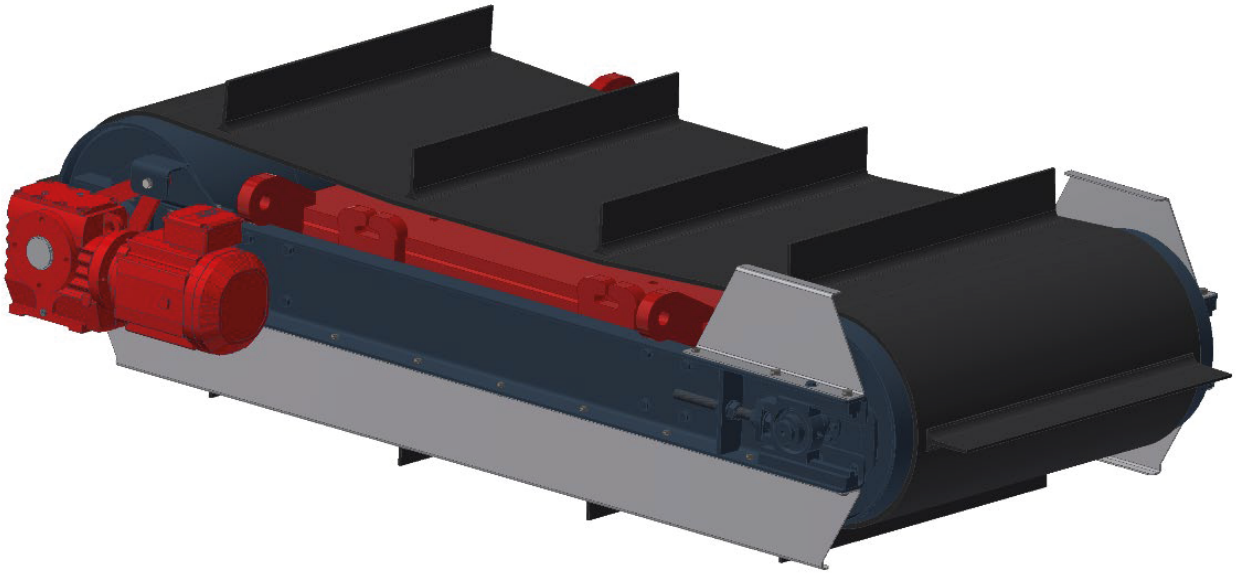
GOUDSMIT MAGNETICS

Installation and user manual

Permanent overband magnets, type ROPx, SxPB, WZPI



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1 Introduction

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

If you need more information or still have questions, please contact the manufacturer.
The contact details are provided on the title page of this document.

Additional copies of the manual can be ordered by providing the machine description and/or the article number and the order number. The descriptions and illustrations in this manual, provided for clarification, may differ from the descriptions and illustrations of your model.

NOTICE

- ► This manual and the manufacturer's declaration(s) are to be considered part of the machine.
- ► The manual and declarations must remain with this machine when it is sold.
- ► The manual must be available to all operating personnel, service technicians and others who work with the machine throughout the entire service life of the machine.

2 Safety

The instructions in this manual must be complied with. Failure to follow these instructions may result in material damage, personal injury or even death.

2.1 Owner's responsibilities

The machine is used in an industrial environment. The owner is therefore subject to legal obligations on occupational safety.

In addition to the safety instructions in this manual, you must comply with safety, accident prevention and environmental protection regulations. Specifically:

- The owner must familiarize themselves with the applicable industrial safety regulations and identify the additional hazards arising from the particular working conditions on the factory premises in a risk assessment. They must apply these findings to formulate work instructions for the operation of the machine.
- The owner must regularly check that the instructions they have drawn comply with the applicable regulations and standards and adjust them as necessary throughout the entire service life of the machine.
- The owner must clearly define and assign the responsibilities for installation, operation, maintenance and cleaning.
- The owner must ensure that all personnel who work with the machine have read and understood the user manual. They must also train and instruct personnel regularly with regard to the hazards.

The owner must provide the required personal protection. The owner is also responsible for ensuring that the machine is in technically perfect condition at all times:

- The owner must ensure that the maintenance intervals specified in this manual are observed.
- The owner must have all safety devices checked regularly for proper operation and completeness.

2.2 Requirements for the personnel – Qualifications

WARNING

Injury risk due to insufficient qualification.

Improper handling can result in serious injury and damage to the equipment.

► Have all work on the machine carried out by qualified personnel only.

This manual establishes the following qualifications for the various work responsibilities:

Only people who can be expected to work reliably may be employed. The work may not be assigned to people with impaired responsiveness, e.g. due to narcotics, alcohol or drugs.

- When selecting personnel, observe locally applicable regulations regarding age and position.
- **Instructed person** has been instructed by the owner on the tasks assigned to them and dangers that may result from injudicious behaviour.
- **Specialized personnel** are able to perform their assigned tasks while recognizing and avoiding potential hazards based on their training, knowledge, experience and familiarity with generally applicable regulations.
- Based on their training, knowledge, experience and familiarity with generally applicable standards and regulations, the **qualified electrician** is able to carry out work on electrical installations, recognizing and avoiding potential hazards. The qualified electrician has undergone training for the place of work and is familiar with the applicable standards and regulations.

2.2.1 Unauthorized personnel

WARNING

Danger to unauthorized personnel

Unauthorized personnel who do not meet the requirements listed here are not familiar with the hazards associated with the work area.

- ▶ Keep unauthorized personnel away from the work area.
- ▶ If in doubt, approach individuals and escort them out of the work area.
- ▶ Stop the work activities as long as unauthorized personnel are in the work area.

2.2.2 Instruction

The owner must provide instruction to personnel at regular intervals. In the interest of traceability, records of the instruction sessions must be kept.

2.3 Intended use

The machine is designed and built exclusively for the intended use described here.

The machine is intended for sorting bulk goods only. For the properties of the bulk goods, see the order confirmation.

WARNING

Beware of unintended use.

Hazardous situations may arise if the machine is not used as intended or is used for other purposes.

- ▶ Use the machine only as intended.
- ▶ Strictly follow all information in this manual.
- ▶ Do not exceed the maximum specified speed of the pole system.
- ▶ In particular, do NOT use the machine for the following non-intended purposes:
  - transporting people
  - walking on the conveyor belt
  - storing material
  - installation at an incline outside the permitted angle range
  - feeding highly flammable substances

Claims for damages of any kind resulting from unintended use are excluded.

The owner bears sole liability for any and all damage resulting from unintended use.

2.4 Personal protection

To minimize health hazards, the use of personal protection is mandatory.

- Ensure that you always wear the protective equipment required for the task at hand.
- Observe personal protection instructions posted in the work area.

2.4.1 Protective measures

- Always wear protective clothing, safety shoes, hearing protection, respiratory protection, safety glasses and protective gloves.

Clothing for specific tasks

Certain activities require special protective equipment. The individual chapters of this manual specify the use of such equipment. Such special protective equipment is explained below:

Safety helmet – protects against falling and projected objects and material.

Safety harness – protects against falls where there is an increased risk of falling.

Such a risk is found where certain height differences are exceeded or when the workplace is not protected with a railing. Wear the safety harness with the safety rope connected between the safety harness and a fixed attachment point; use a fall arrestor if necessary. Safety harnesses may only be worn by specially trained people.

2.5 Special hazards

The following section describes residual risks identified on the basis of a risk assessment.

Observe the safety instructions given here and the warnings in the following chapters of this manual to reduce health risks and prevent dangerous situations.

DANGER

Life-threatening danger from magnetic radiation

For people with implanted pacemakers and metal implants, there is a risk of serious physical injury or even death in a radiation zone.

- ► Ensure that no one with an implanted pacemaker or metallic implant enters the direct and indirect danger zone. In terms of exposure to magnetic fields, the safe distances from machine parts are further specified in this manual.

DANGER

Life-threatening danger from electric current

Contact with live wires poses an immediate life-threatening danger. Damage to the insulation or individual components can be life-threatening.

- ► If insulation damage is found, disconnect the power supply and have the insulation repaired immediately.
- ► Only allow work on the electrical system to be carried out by trained electricians.
- ► Disconnect the electrical system and check that no voltage is present before carrying out any work.
- ► Switch off the power supply and secure it against being switched on again before carrying out maintenance, cleaning or repair work.
- ► Do not bypass or disable fuses. Pay attention to the correct rating when replacing fuses.
- ► Keep moisture away from live parts as it may cause short circuits.

WARNING

Fire hazard due to highly flammable substances

Highly flammable substances, liquids or gases can catch fire and cause serious injury or even death.

- ► Do not smoke in the danger zone or the surrounding area. Do not use open flame or ignition sources.
- ► Keep fire extinguishers close at hand.
- ► Report any suspicious substances, liquids or gases to the supervisor immediately.
- ► Immediately interrupt work in case of fire. Leave the danger zone until everything is safe.

WARNING

Dust explosion hazard

Dust deposits that are disturbed can form an explosive mixture with the surrounding air.

- ▶ Smoking and handling open flame and/or ignition sources of any kind are strictly prohibited in the vicinity of the machine and in the building.
- ▶ Keep the hazard zone dust-free.
- ▶ Interrupt work immediately if excessive dust formation occurs. Wait for the dust to settle and then remove the dust layer.

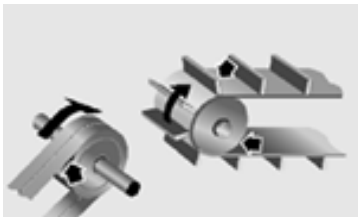
WARNING

Health risk due to dust

In the long term, inhaled dust can lead to lung damage and other health problems.

- ▶ Always wear respiratory protection while working.

WARNING



Danger of being pulled into the machine

Risk of injury from moving parts.

- ▶ Do not place hands (or parts of your clothing, etc.) in the space between covers and the conveyor belt!
- ▶ Do not handle or reach into moving parts during operation.
- ▶ Do not open any covers during operation.
- ▶ Sharp edges and pointed corners may cause abrasions and cuts to the skin.
- ▶ Wear close-fitting protective clothing in the danger zone.

WARNING

Hearing loss due to noise

The noise level in the working environment may cause severe hearing loss.

- ▶ Always wear hearing protection while working.
- ▶ Keep time spent in the hazard zone to a minimum.

WARNING

Risk of injury from falling material

Material falling down or ejected during operation can cause serious injury.

- ▶ Do not enter danger zones while the machine is in operation.
- ▶ Only enter the danger zone (e.g. during adjustment) while wearing a safety helmet, safety shoes and protective clothing.

WARNING

Danger of tripping due to litter and scattered objects

Litter and scattered objects are a slipping and tripping hazard and can cause serious injury.

- ► Always keep the work area tidy.
- ► Remove items that are no longer needed.
- ► Mark obstacles with yellow/black marking tape or red/white barrier tape.

NOTICE

Risk of injury from edges and corners

Litter and scattered objects are a slipping and tripping hazard and can cause serious injury.

- ► Take particular care when carrying out work near sharp edges and pointed corners.
- ► Wear protective gloves if in doubt.

NOTICE

Risk of burns from hot surfaces

Contact with hot parts may cause burns.

- ► Always wear protective work clothing and safety gloves when carrying out work near hot components.
- ► Ensure that all components have cooled down to ambient temperature before carrying out any work.

NOTICE

Risk of injury to limbs from built-in rollers

Injury to body parts when removing stuck objects.

- ► Switch off the machine/installation.
- ► Ensure the guards around the roller are removed before removing stuck objects.

2.6 Safety devices and warning pictograms on and around the machine

Where necessary, warning pictograms have been affixed to the machine.

NOTICE

Know your pictograms

- ► Read the warnings and instructions on the machine's pictograms carefully.
- ► Regularly check that the pictograms on the machine are still present, intact and clearly legible.
- ► Keep the pictograms clean.
- ► Replace any missing or illegible pictograms with new ones and ensure they are placed in the same location.

2.7 Damage caused by magnetic field

The magnets generate a powerful magnetic field that attracts ferromagnetic parts. This also applies to ferrous materials you may carry with you, such as house keys, money and tools. Use only non-ferromagnetic tools and workbenches with a wooden worktop and a non-ferromagnetic base within the magnetic range.

WARNING

Strong magnetic field

There is a risk of personal injury when working on or checking the magnetic components. Ensure that fingers do not get caught between the components.

2.8 Lock Out – Tag Out (LOTO)

Lock Out – Tag Out (LOTO) is a safety procedure used to ensure that hazardous equipment is properly shut down and cannot be restarted until maintenance or repair work has been completed. The use of LOTO is intended to protect people from the unexpected release of energy and the dangers of operating machinery. The isolated power sources are then locked, and a tag is attached to the lock identifying the employee and stating the reason why the LOTO has been applied. This prevents equipment from being accidentally started while it is in a hazardous condition or while an employee is in direct contact with it.

The employee then has the key to the padlock, so only they can remove the lock and start the equipment. This prevents equipment from being accidentally started while it is in a hazardous condition or while an employee is in direct contact with it.

2.9 Other remarks/warnings

Rectify faults before using the machine. If the machine is used while the fault is present, after having completed a risk assessment, inform operating and maintenance personnel of the fault and the potential risks associated with it.

3 Product standards and directives

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

In accordance with the 2013/35/EU, the limit values for magnetic fields are defined 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 electromagnetic fields.*

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

Life-threatening danger to people with implanted medical devices

People with an active implanted medical aid (e.g. pacemaker, defibrillator, insulin pump) must not be present within a radius of **4 metre(s)** of the magnetic separator.

Damage to magnetically sensitive objects

Objects containing ferromagnetic components, such as bank cards, credit cards or chip cards, keys and watches, may be irreparably damaged if they come within a radius of **1.8 metre(s)** of the magnetic separator.

Be aware that ferromagnetic components are attracted – even if you are carrying them – when you are within **0.6** metre(s) of the magnetic separator.

Pregnant personnel and the general public must not come within a radius of **0.6 metre(s)** of the magnetic separator.

4 General

This manual contains information about correct operation and maintenance of the machine. In addition, instructions are included regarding the prevention of possible injury and serious damage to property, and the safe and uninterrupted operation of the product.

Please read this manual carefully before using the machine and ensure that you are familiar with how it works and how to operate it. Follow all instructions carefully.

The information in this instruction manual is based on the information available at the time of delivery. This publication is subject to future revision.

We reserve the right to change the construction and/or design of our products at any time without notice and without incurring any obligation to make the same changes to previously supplied products.

4.1 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 to complete a damage report.
  - Completeness of the scope of delivery.

NOTICE

In the event of damage or incorrect delivery, contact the manufacturer immediately. The contact details are given on the title page of this manual.

4.2 Identification plate

There is an identification plate on the machine, as shown below. The identification data are very important for maintenance and service of the machine.

- Always keep the identification plate clean and legible.

NOTICE

Always state the serial number when ordering spare parts, requesting service or reporting a malfunction.

Type:		Rev.:		Weight:	kg
Ser. Nr.:		IP55		Voltage:	V
Year:	2025	T_a = -20...+40 °C		Power:	kW

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5 Operating principle

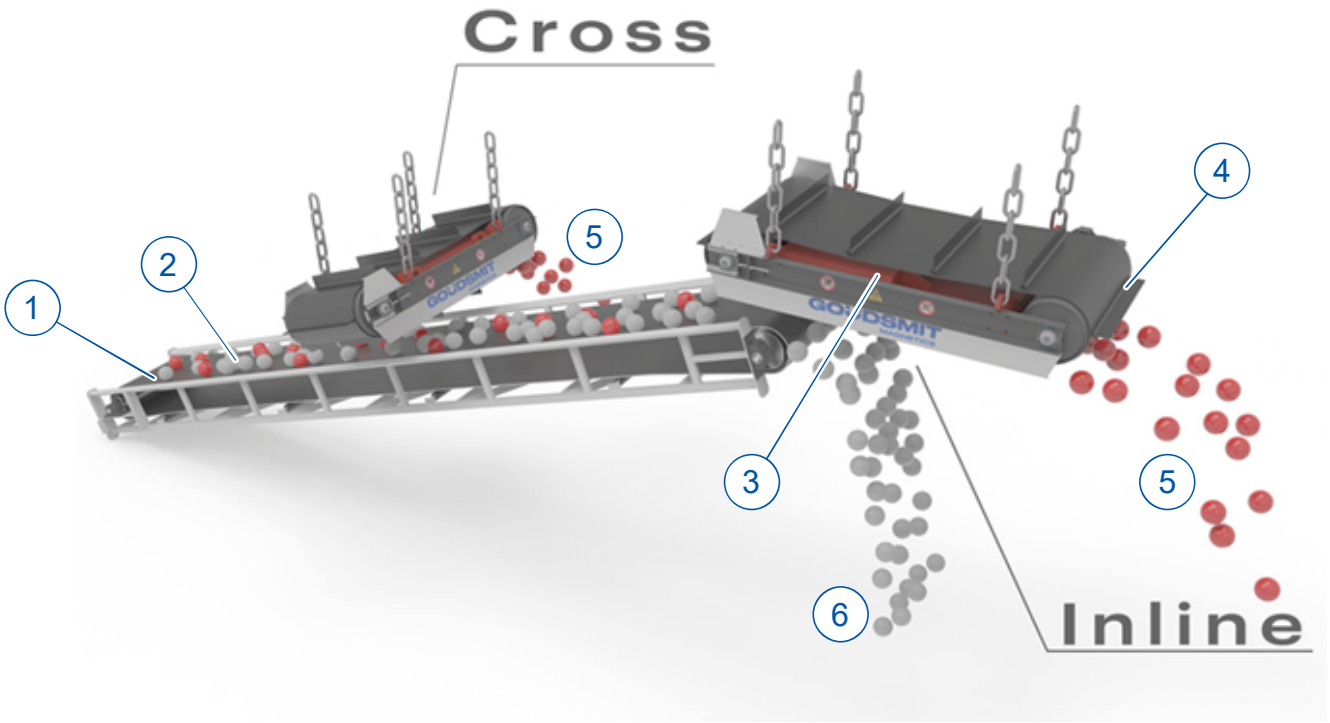


Figure: Operating principle of the overband magnet

[1]	Conveyor belt	[3]	Magnet	[5]	Fe parts
[2]	Product with Fe parts	[4]	Rubber belt with cleats	[6]	Product

- The product (with Fe parts*) on the conveyor passes beneath the **magnet** suspended above it. The Fe parts are **attracted** by the magnet.
- The Fe parts **stick to** the **rubber belt** and are then carried out of the magnetic field by the **cleats .**
- Finally, the separated Fe parts fall down under their own weight and can then be collected or discharged.

** Fe parts*

Magnetic parts are formed by the application of an external magnetic field. Temporary magnets lose their magnetism once the external magnetic field has been removed. Most alloys of iron, cobalt and nickel are magnetic. However, some stainless steel alloys, such as AISI304 or AISI316, are only slightly magnetic.

Since in most cases it is iron parts that are affected by ferromagnetism, this manual uses the term ‘Fe’ when referring to ferromagnetic material.

6 Construction

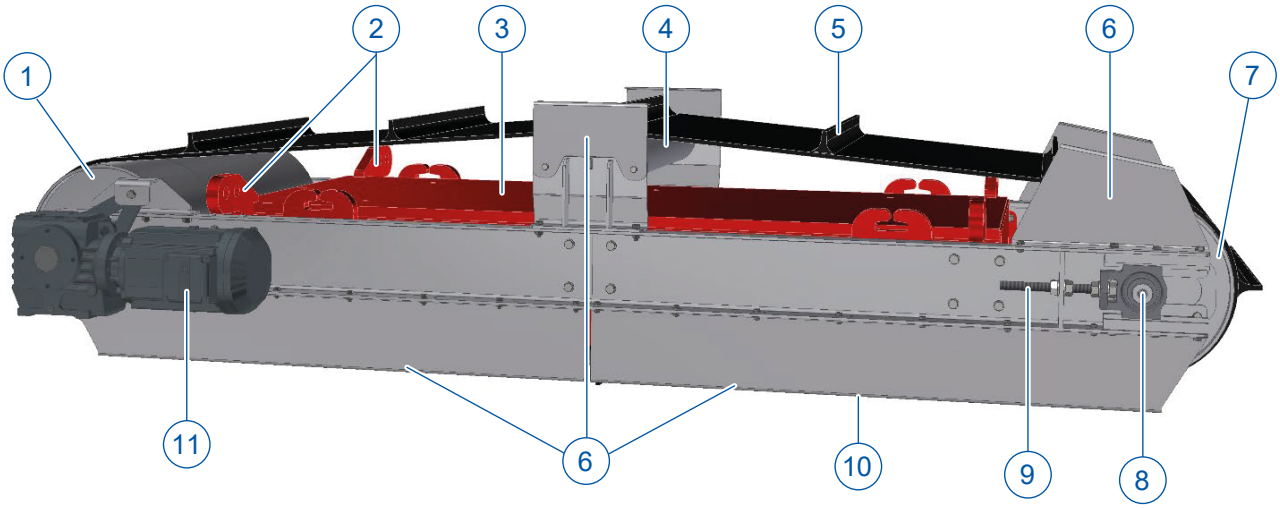


Figure: Construction of a standard permanent overband magnet

[1]	Tension roller	[5]	Rubber belt with cleats	[9]	Tensioner
[2]	Lifting eye/attachment point	[6]	Cover	[10]	Stainless steel wear plate
[3]	Magnet	[7]	Drive roller	[11]	Motor
[4]	Top roller	[8]	Tension bearing		

Beneath the magnet is a replaceable **stainless steel wear plate**. The plate protects the magnet from damage. The overband magnet has a roller construction around which a **rubber belt with cleats** runs. The **drive roller** and the **tension roller** are curved to provide a guiding effect on the conveyor belt. The belt can be tensioned by adjusting the two tension bearings.

One or two **top rollers** guide the rubber belt over the large magnets. They can help align the belt horizontally if necessary.

Around the rollers is a **rubber belt with cleats**. The cleats serve to push the separated Fe parts out of the magnetic field so they can be more easily removed.

The frame has four to six **attachment points (lifting eyes)** for hoisting and suspending the permanent overband magnet.

7 Product information

7.1 Intended use

The permanent overband magnet is suitable for removing or separating large quantities of Fe parts from, for example, construction and demolition waste, waste paper, electric cables, car tyres, glass, wood, plastics, paint cans and for cleaning slag from incinerators.

7.2 Fe parts

The overband magnet is designed to capture most accessible iron (ferromagnetic) parts. Fe parts with a compact shape (e.g. cube or ball) are more difficult to separate than parts with an elongated or flat shape (e.g. rod, nail or sheet).

7.2.1 Temperatures

Suitable for ambient temperatures from -20 °C to +40 °C.

Suitable for product temperatures up to +80 °C for NdFeB magnets and +100 °C for ferrite magnets.

These values apply to the standard version.

The magnet must be protected against temperatures outside this range. Exceeding these temperatures may reduce performance or **cause irreparable damage to the magnet or bearings**.

7.2.2 Clearance

The clearance around the overband magnet must be about 0.6 metres for maintenance. On one side, a clearance of at least 1.5 times the belt width must be provided for belt replacement (the overband magnet must be moved to a suitable floor for replacing the belt).

7.2.3 Noise level

The sound pressure level Lp(A), measured at a distance of 1 metre from the overband magnet without capturing Fe parts, is less than 70 dB(A). If the Lp(A) level increases during operation, the overband magnet must be checked immediately for defects.

The noise level may increase during operation due to the captured parts. The customer must ensure suitable protection for the operator.

7.2.4 Vibrations

The vibrations caused by the magnet must be damped by the equipment from which the overband magnet is suspended. Make the structure strong enough. Also ensure that the magnet is not exposed to external vibrations, as these may adversely affect the magnetic force (captured parts may fall off).

8 Transport and installation

8.1 Transport

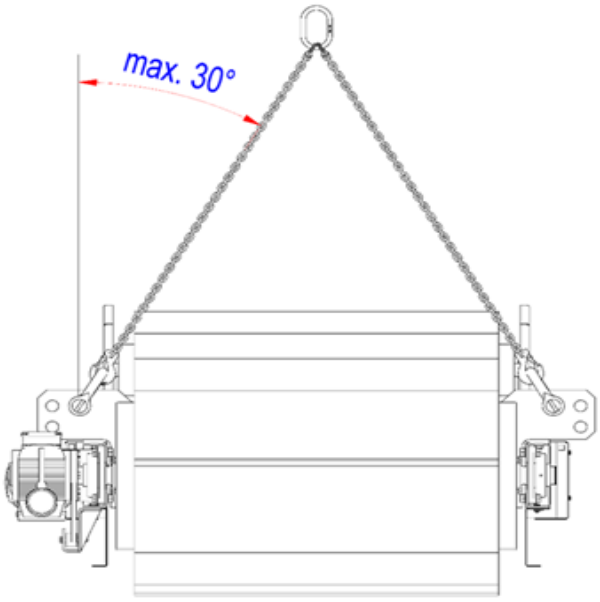
WARNING

- ▶ The machine permanently emits a magnetic force. See the 'Safety [▶ 6]' chapter for the precautions to be taken during transport.
- ▶ Keep in mind the centre of gravity. The centre of gravity lies slightly off-centre towards the drive and the main pole of the magnet.
- ▶ Do not use ferromagnetic materials for the rollers or structural parts of your construction/installation within the machine's magnetic field. These parts may become magnetized and the separation result will be adversely affected.

- Use a suitable lifting/hoisting system that supports the weight of the machine. The weight of the machine is shown on the identification plate.
- Ensure there is enough free space around the machine and construction for transport and installation.
- Avoid shocks during transport to prevent damage.

CAUTION

Risk of damage



Always lift and move as vertically as possible using the lifting eyes. The chains must not damage the overband magnet (e.g. the covers). Always use four chains. It is recommended to use the inner holes of the lifting eyes, as shown in the figure above. The outer holes are intended for final suspension in the installation.

8.2 Installation and assembly

WARNING

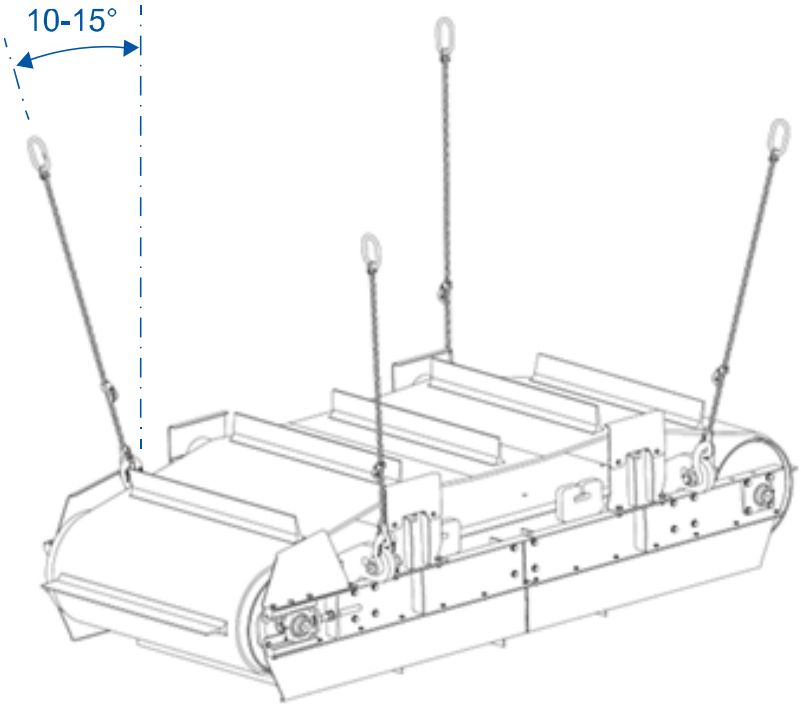
Requirements for installation and assembly

Installation of the machine requires specialists with sufficient experience. Incorrect installation may lead to life-threatening situations or considerable material damage.

Take the following precautions:

- ► Allow only qualified personnel to install the machine and connect it, both electrically and otherwise.
- ► The suspension/base must be strong enough to support the weight of the machine and the product to be processed.
- ► A permanent magnetic force is present in the magnetic components of the machine. See the 'Safety [▷ 6]' chapter for the precautions to be taken when working on the machine.

All auxiliary equipment used for transport purposes must be disconnected and removed before the machine is put into operation.



The machine is preferably suspended with chains, as chains damp vibrations better than a rigid structure.

The chain angle relative to the vertical should be 10–15° outward (see drawing above).

- Check the load capacity of the chains used and the supporting structure. The load consists of the weight of the machine and other forces caused by operation and attracted material.
- Check that the load is distributed over all four chains.

8.3 Installation requirements

8.3.1 General requirements

Do not use iron materials for rollers and/or structural parts within the magnetic field of the magnet. These parts will become magnetized, negatively affecting the Fe separation result. This also applies to structures intended for discharging the separated parts. **Use stainless steel, for example.**

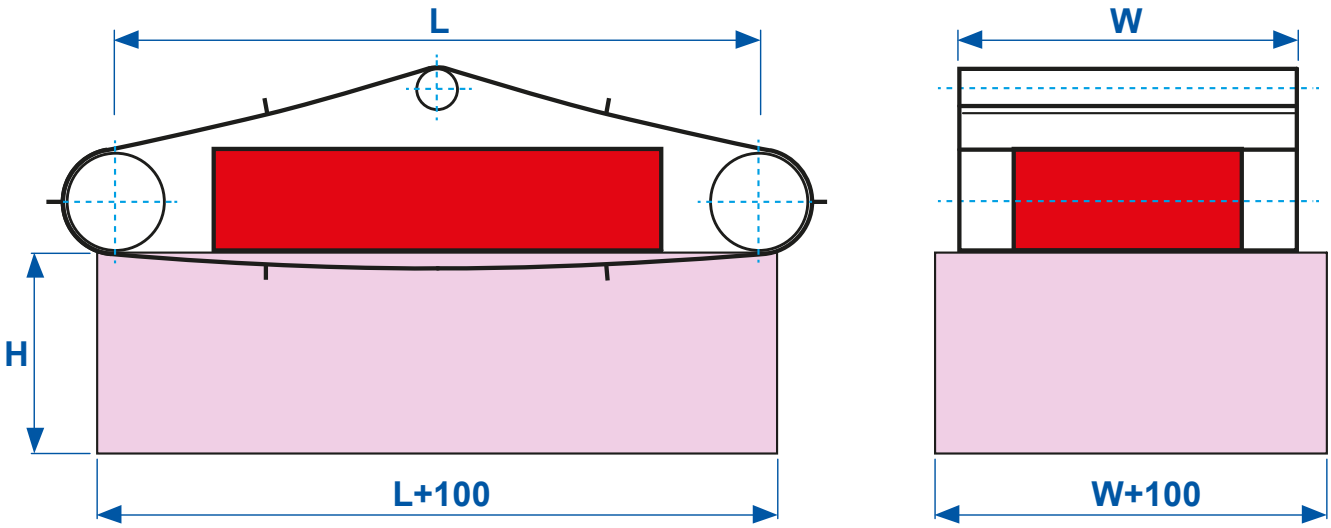


Figure: Area with strong magnetic field effect

L – roller pitch

W – width of rubber belt

Size	Product key	H [mm]
2	ROP-x2-...; ROPZ-x2-...	370
3	ROP-x3-...; ROPZ-x3-...	480
4	ROP-x4-...; ROPZ-x4-...	600
5	ROP-x5-...; ROPZ-x5-...	740
6	ROP-x6-...; ROPZ-x6-...	860
8	ROP-x8-...; ROPZ-x8-...	1080

It is strongly recommended to use non-magnetic material in the area with a strong magnetic field. Ferrous materials can affect the separation process. Iron material also attracts iron dust and iron particles.

It is not advisable to install electrical and especially electronic equipment near the magnetic field. Such equipment may be affected or severely damaged.

8.3.2 Transverse installation over a conveyor

In practice, transverse installation is the most common, as it is easier to fit into an existing production line. An additional advantage is that the separated parts are discharged to the side, which is easier to handle from a logistical point of view.

For the best separation result, install the overband magnet as close as possible to the conveyor.

8.3.3 Transverse installation over an inclined conveyor

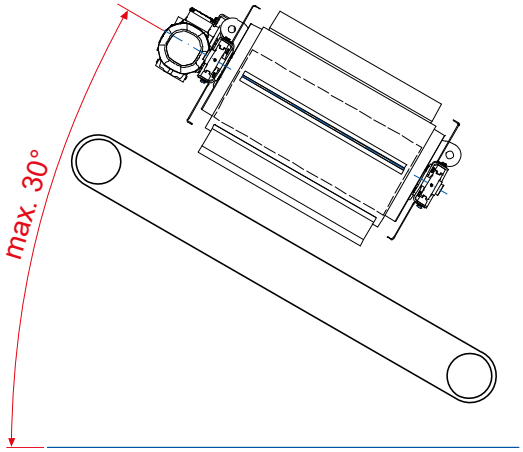
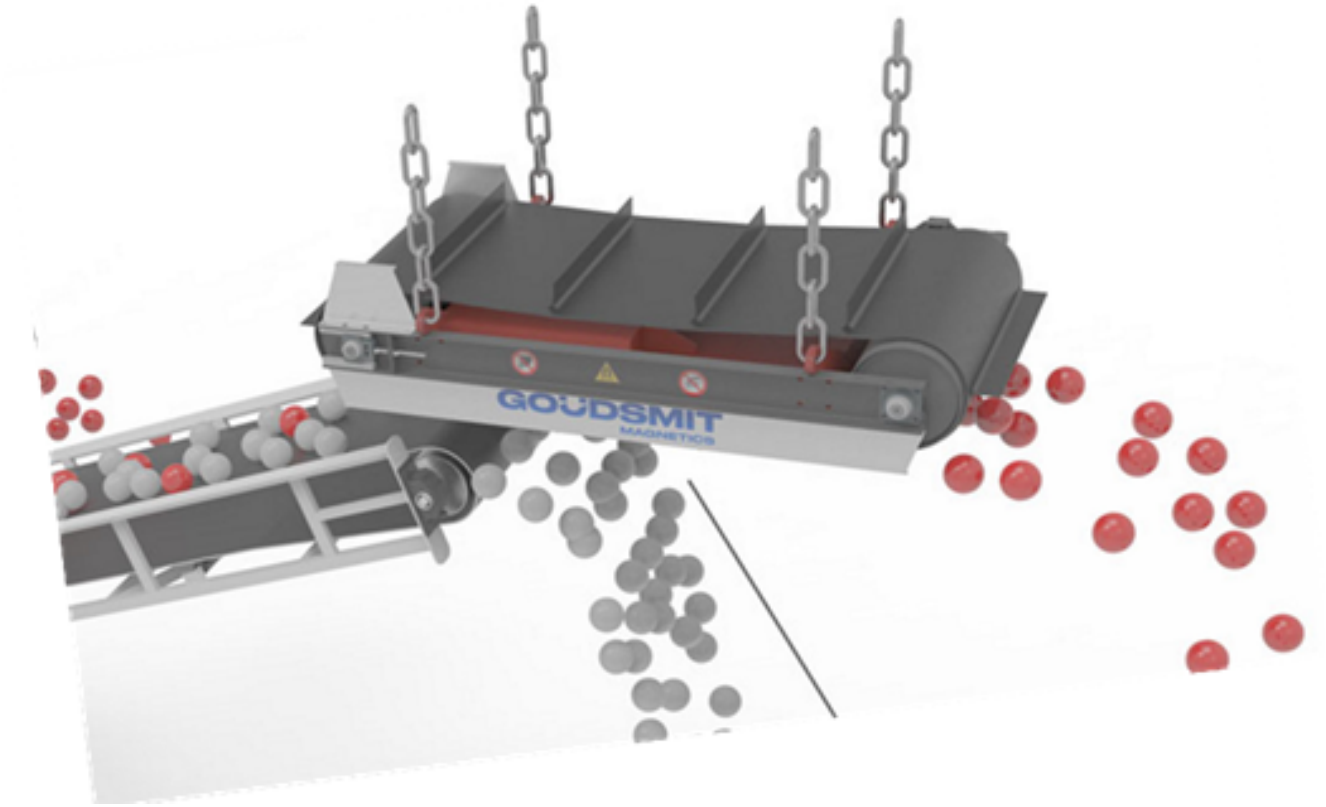


Figure: Overband magnet with motor at the top

The inclination angle of the standard overband magnet is limited to 30°. The motor must be at the top. If the overband magnet needs to be installed at a greater inclination angle, specify this when ordering. Otherwise, contact us.

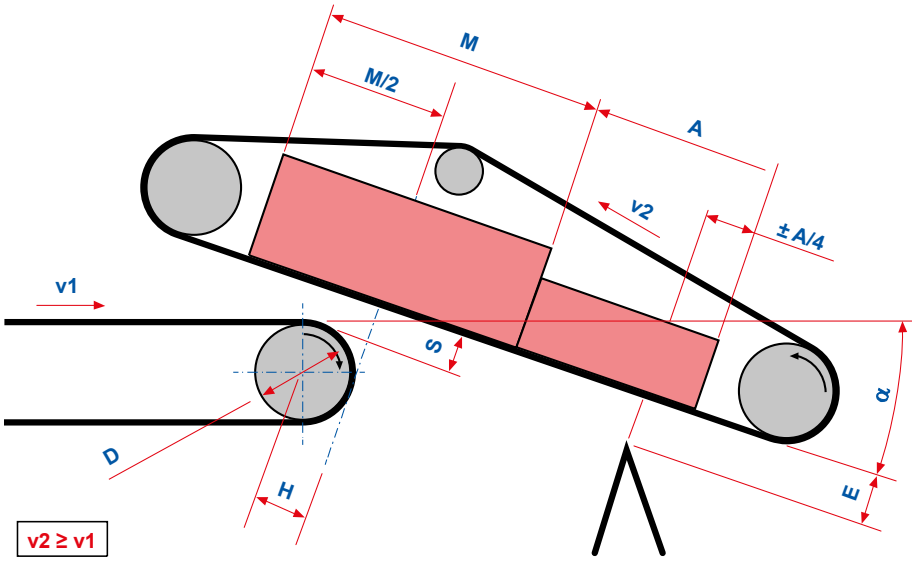
8.3.4 Positioning, in line above the reversing roller of your conveyor



If you have the option to position the overband magnet in line with the conveyor, this is always preferred. The advantage is that the conveyed material ‘opens up’ at the end of the belt (head pulley) and hangs in the air for a few milliseconds. This allows the magnet to pull the ferrous parts out of the product flow more easily.

The inclination angle of the standard overband magnet is limited to 20°. If the overband magnet needs to be installed at a greater inclination angle, specify this when ordering. Otherwise, contact us.

Position the axis of the main pole at the point where the material is closest to the magnet or, if your conveyor speed is low, at the point where the material leaves the conveyor. For the best separation result, install the overband magnet as low as possible.



Angle	v [m/s]	H [mm]
α = 5°	1.5	**50**
	2	**50**
	2.5	**50**
	3	**65**
	3.5	**95**
α = 10°	1.5	**50**
	2	**50**
	2.5	**80**
	3	**130**
	3.5	**190**
α = 15°	1.5	**50**
	2	**65**
	2.5	**125**
	3	**200**
	3.5	**290**
α = 20°	1.5	**50**
	2	**90**
	2.5	**170**
	3	**270**
	3.5	**390**
α = 25°	1.5	**50**
	2	**120**
	2.5	**220**
	3	**350**
	3.5	**500**

The inclination angle relative to the horizontal is limited to 25° for the standard overband magnet.
Angle α is between the overband magnet and your inclined conveyor.

8.4 Connections to the control cabinet (applicable only to the standard control cabinet)

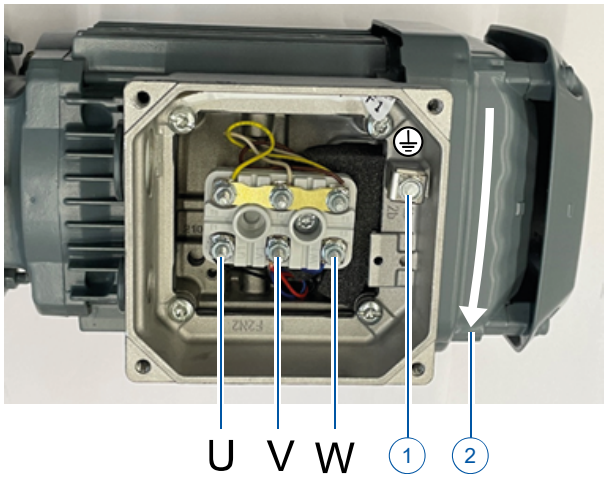
8.4.1 Connecting the motor

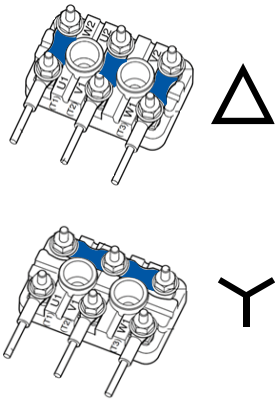
- Connect the wires corresponding to U, V, W and earth to the control cabinet.
- Connect the motor with a power cable (not supplied) to the corresponding U, V, W and earth. Select the correct configuration 'Y' or 'Δ' according to the motor identification plate and your supply voltage.
- Use a circuit breaker corresponding to the values on the motor identification plate.

Check that the drive motor is rotating in the correct direction:

This can be done by briefly switching on the motor.

If the direction of rotation is incorrect, swap two of the three phases (U – V), preferably directly at the motor terminal box.





Legend:

1. Earth
2. Motor rotation direction

8.4.2 Rotation sensor (option)

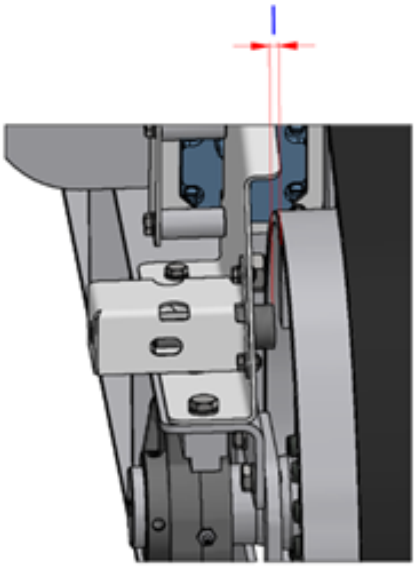
The rotation sensor is installed at distance 'l' as shown in the figure.

Distance 'l' is about 60% of the maximum operating range given in the documentation of the sensor used.

Example (standard sensor):

Operating range: 0–8 mm

Distance 'l' setting = 5 mm



- Setting the switch-off point (in case the sensor is replaced):
  - Stop the material flow under the overband magnet.
  - Check the belt tension and deflection, the bearings and the top roller(s).
  - After switching off the motor, check that the belt continues to run for a few seconds.
  - Check the rotational speed ('speed') in this condition.
  - Set the switch-off point to 80–90% of the revolutions determined in the previous step.

8.5 Closure material / earthing

The machine and the control cabinet must be connected to an equipotential bonding system using a Cu cable in accordance with EN 60204-1.

Ensure that all closure material between the overband magnet and your construction/installation has a surface resistance of less than 25 Ω.

8.5.1 Components used

Depending on the specific design, the machine may include an electric drive, conveyor mistracking switches and a rotation switch. The manufacturer and type of the components used can be found on the identification plates or on the spare parts/customer drawing. If required, the user manual and the declaration of conformity for the components used can be found on the manufacturers' websites. On request, we can also provide these documents.

8.5.2 After installation of the machine

- Apply the following steps to reduce residual hazards:
  - General hazards associated with magnetism, including hazards for people with implanted medical devices.
  - Entrapment of body parts between the rubber belt and rotating roller.
  - The attachment of the machine to other parts of the installation into which it is to be incorporated must be adequate. For example: access to the rotating belt must be prevented, the attachment method must be sufficient to support the weight, and adequate earthing measures must be taken to prevent the build-up of electrostatic charge.
  - Electrical wiring must be visually inspected regularly to prevent unintended electrocution.
  - Electrical connections must only be made by qualified electricians.
  - Dust deposits on the machine must be removed regularly to reduce the risk of fire.
  - Observe the rules for the use of oil.
  - Ferromagnetic parts may fall from the machine at any time.
  - Prevent the operator from slipping near the machine.
  - Define the rules and methods for cleaning and maintenance, and train the personnel.

9 Start-up

9.1 Checks before and during start-up

Before start-up, check that:

- the belt tension is correct (sag is acceptable)
- the machine, including rollers, is clean and free of trapped objects
- the machine, suspension and structure show no damage or defects
- the electrical connection is correct
- the belt deflection and alignment are correct as specified in this manual
- all protective covers are properly fitted
- no other sources of danger are present

9.1.1 Start-up

- Switch on the machine.
- If the machine’s belt runs correctly, then switch on your conveyor with material.

During start-up, check that:

- the machine/installation has no damage or defects
- the motor runs correctly (right direction, no overload, no speed fluctuations, no loud noises)
- the belt is properly aligned
- the ambient temperature does not exceed the maximum ambient temperature specified in the data sheet
- all other parts of the machine/installation function as described in this manual, supplemented by the function descriptions in the attached data sheet

10 Maintenance and inspection

CAUTION

- ► Carry out all work on the machine with the material flow stopped and the installation switched off (LOTO).
- ► The manufacturer cannot be held liable for the safety of personnel involved in maintenance or service work.

- Always inform operating personnel of scheduled inspections, maintenance, repairs and faults.
- Regularly check that all warning pictograms are still present in the correct locations on the machine. If the warning pictograms are missing or damaged, replace them immediately in their original locations.
- Keep the installation as clean as possible to prevent contamination between the belt(s) and rollers.
- Contamination causes increased wear and/or belt mistracking.
- Check daily that the rollers are clean, the belt is aligned, the belt is in good condition and the belt tension is correct.
- Replace the belt if it is damaged. At the same time, inspect the roller(s) and other accessible parts of the machine.

10.1 Cleaning

The machine must be kept clean. Check daily for layers of dust and trapped material in the machine. Any dust layers and trapped material must be removed immediately.

Figure: Overband magnet with heavy dust layers

A clean magnet operates significantly more efficiently than a contaminated magnet.

NOTICE

Follow the safety procedure. Observe the instructions in the ‘Safety [▶ 6]’chapter.

10.2 Corrosion protection

Regularly apply preservative oil to exposed carbon steel parts (e.g. shaft ends, taperlocks).

10.3 Check the pictograms

- Regularly check that all stickers with warning pictograms and the identification plate are in the correct place on the machine. If a sticker or the identification plate is no longer legible or is missing, immediately affix new ones in the original locations.

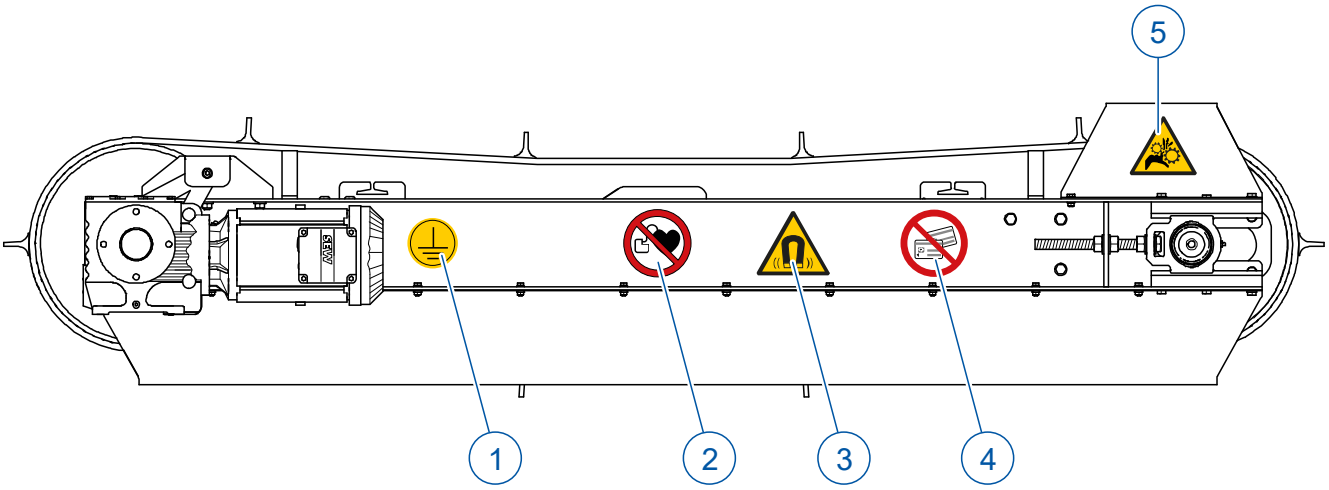


Figure: Overview of warning pictograms

[1] Earthing symbol and identification plate (at motor)

[2] Life-threatening danger to people with implanted medical devices

[3] Strong magnetic field

[4] Damage to magnetically sensitive objects

[5] Risk of being pulled into the machine (sticker on both sides)

10.4 Bearing systems

- Regularly check whether the bearings produce more noise than normal or are more than 10 °C warmer than the ambient temperature. If so, determine the cause and correct the problem(s). Replace the grease and/or bearings if necessary. The belt must take a few seconds to come to a stop after the motor is switched off. If the belt stops immediately, first check the belt tension (sag).

To determine the bearing replacement interval, combine your own experience with bearings in similar applications with the recommended and estimated intervals.

10.4.1 Lubrication (re-greasing)

All bearing systems used contain grease-lubricated bearings that are protected against contamination and moisture. Use only SKF LGMT2 grease to lubricate the bearings. Check the bearings weekly, clean them and re-grease them.

Shaft diameter drive/reversing roller [mm]	Recommended grease volume (per bearing) [cm³]
30	0.5
35	0.6
45	1.0
55	1.7
60	1.8
65	3.6

The top rollers are fitted with maintenance-free bearings.

10.5 Aligning and adjusting the belt tension of the rubber belt

NOTICE

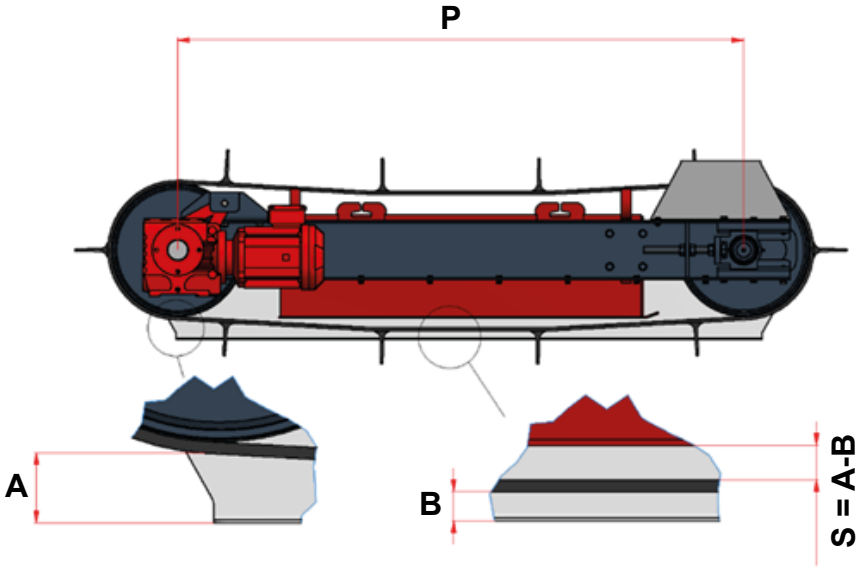
Incorrect alignment and adjustment of the belt may cause damage and accelerated wear of components. Goudsmit Magnetics does not provide any warranty for consequential damage caused by incorrect replacement of the rubber belt or incorrect adjustment of the belt tension.

- ► Check the belt regularly. Replace the belt in case of excessive wear, loss of thickness, splitting, tearing or damage to the cleats. If the belt is not properly aligned, it must be replaced.

If the belt tension is too high, excessive forces are exerted on the shafts and bearings of the rollers, increasing the risk of bearing or shaft failure.

A misaligned belt is a source of ignition.

A misaligned belt may be damaged by running off the roller, may result in poorer Fe separation and/or may damage the wear plate beneath the magnet.



(P) Roller pitch [mm]	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800	3000
(S) Sag = A-B [mm]	35	42	49	56	63	70	77	84	91	98	105

Note:

The recommended sag is for standard rubber belts. For reinforced belts, the sag must be increased by 40 to 80%, depending on the type.

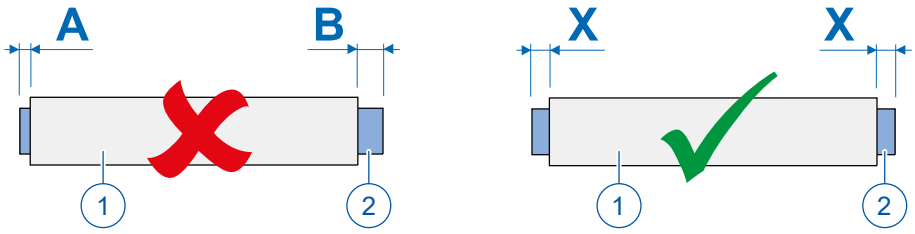


Figure: Adjusting belt alignment

1. Belt
2. Roller

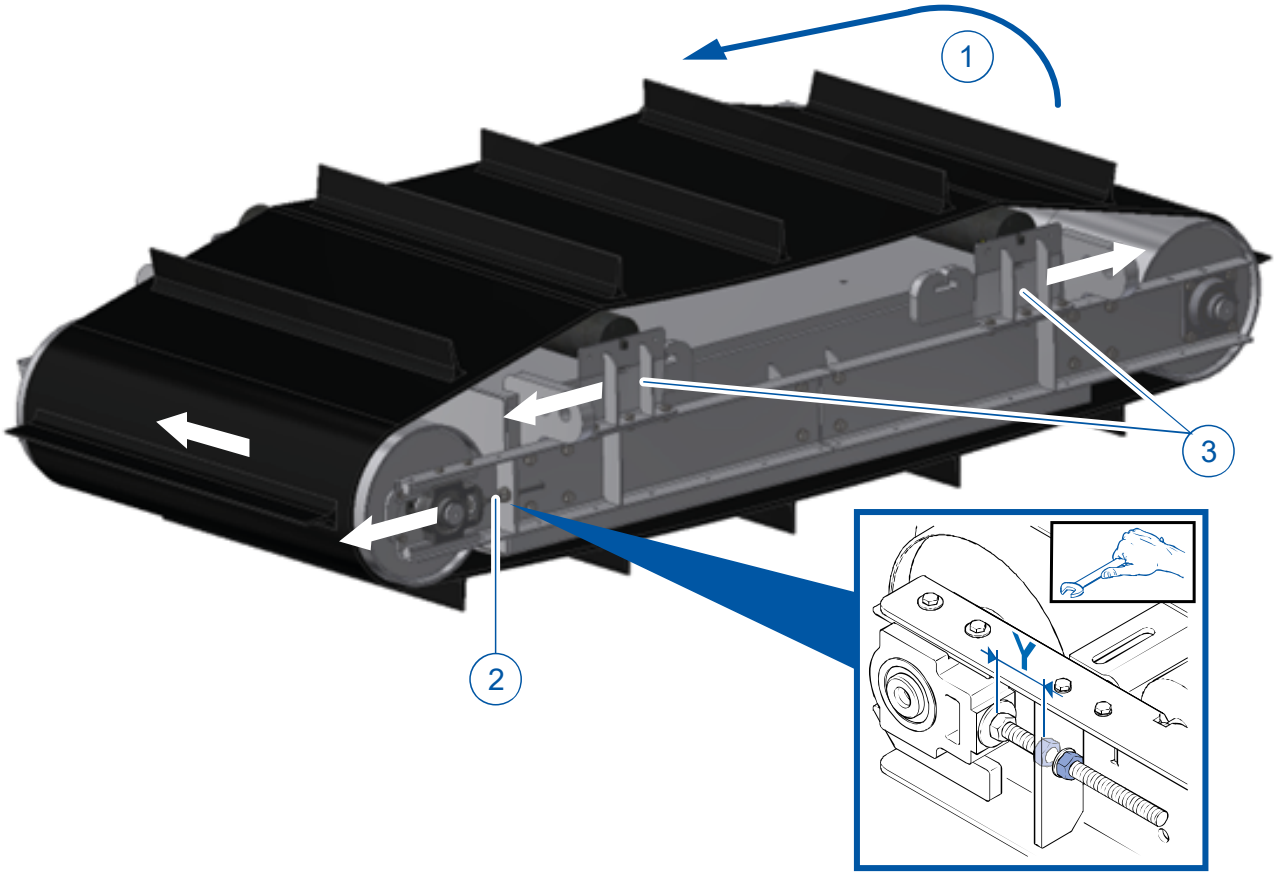


Figure: Adjusting belt tension

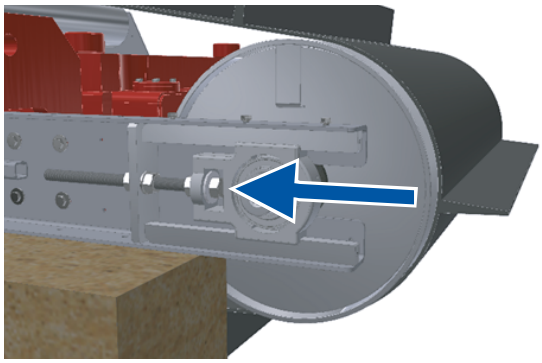
1. Direction of rotation
2. Tensioner
3. Top roller holder

- Use the belt tensioner as the correct method to align the belt for minor adjustments.
- Check that the tensioners are set at the same distance (**Y**) on both sides.
- If the difference (**Y**) needs to be corrected or the belt needs to be moved significantly:
  Loosen the bolts slightly and shift the top roller holder (2–3 mm) at one end. Check the lateral movement of the belt. The arrows in the figure above indicate the belt's direction of movement.
- After alignment, check the belt deflection.
- Note: After switching off the drive, the belt must continue to run for a few seconds before stopping. If the belt stops immediately, check the deflection, the drive and the bearing.

10.6 Belt replacement

Move the machine with a crane to a safe location with a solid surface and sufficient clearance. After assessing the local conditions for safe working, the belt can be replaced for variants A and B.

- Cut and remove the old belt.
- Inspect and clean the wear plate and all accessible components.
- Release the tensioners towards the magnet.



A *(belt with hinged splice)* **Advantage: relatively easy to install** **Disadvantage: shorter service life**	**B** *(vulcanization)*
1 Ensure that all components of the belt are non-magnetic. 2 Fit the new belt. (Note the preferred running direction of the belt.) 3 Join the loose ends of the belt.	1 Fit the new belt. (Note the preferred running direction of the belt.) 2 Vulcanize the loose ends of the belt together.
C (endless belt)	
Observe work safety! The manufacturer is not responsible for the safety of personnel. The following tips are for guidance: Ensure proper protection, especially when lifting and handling suspended loads. Do not stand under the suspended load! When installing the belt, there is a risk of crushing injuries.	

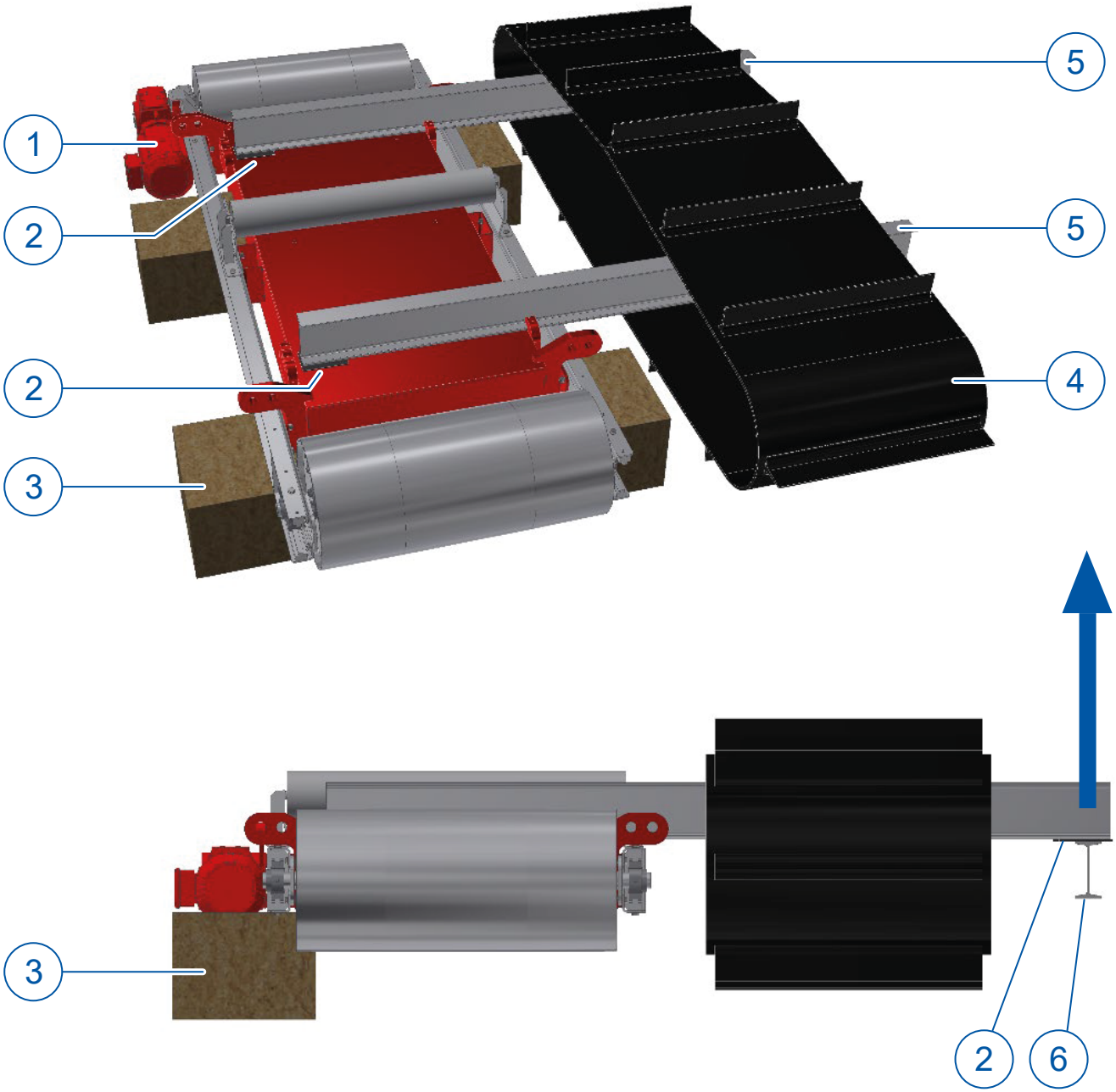
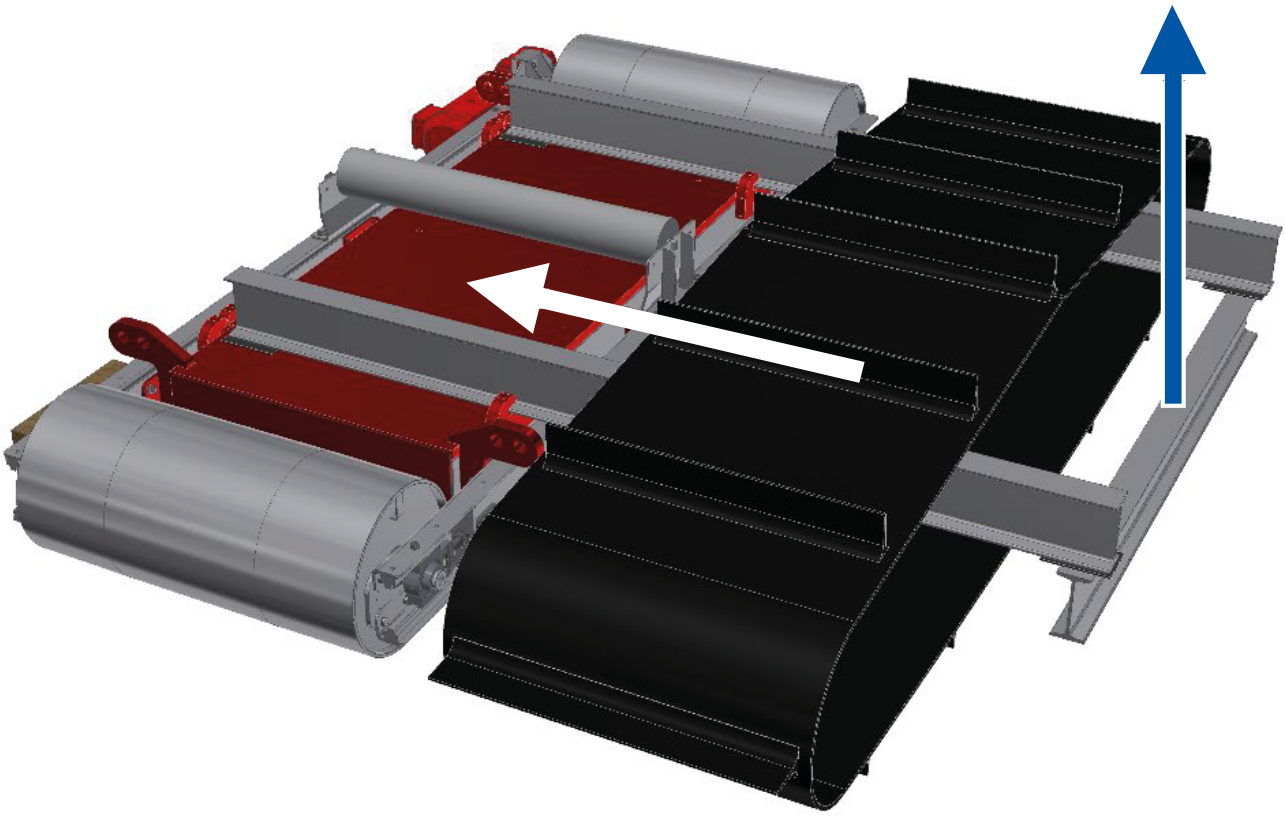


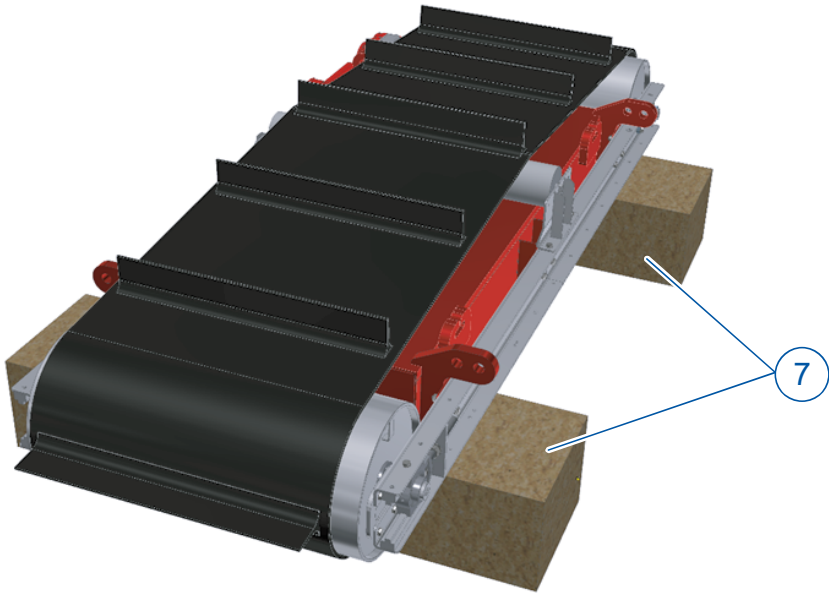
Figure: Belt replacement

[1]	Motor	[4]	Belt
[2]	Rubber strip	[5]	I-beam
[3]	Support (e.g. wooden block)	[6]	Suitable beam

- Work on a floor with sufficient free space.
- Remove the covers. Place the machine on a stable surface, such as wooden blocks [**3**].
- Prepare the new belt (note the preferred running direction of the belt) on I-beams [**5**] (standard I-beam size 100 or 140 mm, depending on the size of the machine). The beams and rubber strips [**2**] must be placed at the prepared points according to this diagram:
- Use another suitable beam [**6**] (I-beam of at least the same size as the I-beams in the machine) to slightly lift the I-beams with the belt at the ends. The supports between the belt and the machine can now be removed.



- Assemble a team of personnel to install the new belt (usually 8–16, subject to experience, equipment and machine size). Observe the safety regulations and wear protective clothing!



Stable support (e.g. a wooden beam)

- Place the machine sideways on the support [**7**].

- Fit the roller covers [**8**].
- Align the belt.
- Set the correct belt sag.
- Lift the machine slightly. Fit the remaining covers.

10.7 Gear motor

NOTICE

Disconnect the power supply to the motor and ensure that it cannot be switched on unexpectedly. Wait until it has cooled down.

Regularly check if the motor produces more noise or heat than normal. If so, determine the cause and correct the problem as quickly as possible to prevent further damage.

The table below shows the general inspection and maintenance intervals as an indication of the necessary inspection and maintenance work.

Gear motor	
Frequency	**What must be done**
Every 3,000 operating hours, at least every 6 months.	• Check the oil and oil level. • Check the seals visually for leaks. • For gear motors with a reaction arm: Check the rubber buffer and replace if necessary.
Depending on operating conditions (see chart below), at least every 3 years. Depending on the oil temperature.	• Replace the oil. • Change the grease in the anti-friction bearings (recommended). • Replace the oil seal (do not fit in same groove).
Depending on operating conditions (see chart below), at least every 5 years. Depending on the oil temperature.	• Replace the synthetic oil. • Change the grease in the anti-friction bearings (recommended). • Replace the oil seal (do not fit in same groove).
Some gear motors (such as SEW R07, R17, R27, F27 and Spiroplan®) are lubricated for life and therefore maintenance-free.	
Varies (depending on external factors).	• Touch up or renew the surface/corrosion protection coating.

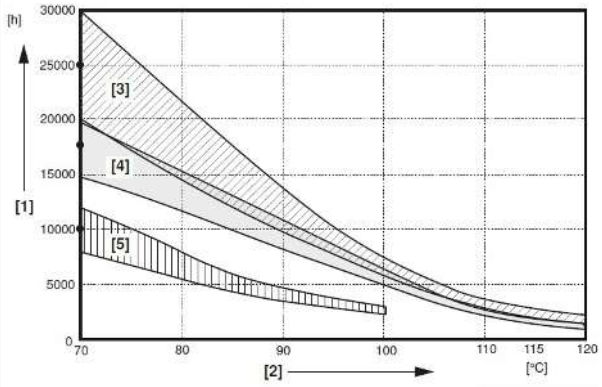
Motor	
Every 10,000 operating hours.	Inspect the motor: - check the ball bearings and replace them if necessary - replace the oil seal - clean the cooling air ducts
 Replacement intervals of the oil in the gear motor	[1] Operating hours [2] Continuous oil bath temperature Average value per oil type at 70 °C [3] CLP PG (polyglycol) [4] CLP HC / HCE (synthetic hydrocarbons / synthetic hydrocarbons + ester oil) [5] CLP / HLP / E (mineral oil / hydraulic oil / ester oil) The replacement interval depends on the temperature.

Table: General inspection and maintenance intervals for the gear motor

The type and quantity of oil are stated on the drive label.

Motor movement (‘rocking’) (up to 1% of the motor length) during operation is normal and does not affect the functioning of the machine. If you require more detailed information about the gear motor, contact our office or consult the website of the gear motor manufacturer.

11 Troubleshooting

Problem	Possible cause	Possible solution
Magnet does not separate or poorly separates ferromagnetic (Fe) parts.	Magnet is switched off or the voltage is too low.	• Check the switch on the control cabinet and the input voltage.
	Magnet is installed too high above the conveyor.	• Mount the magnet lower.
	Parts that are not attracted are not sufficiently ferromagnetic.	• Use a small permanent magnet to check whether the parts to be separated are magnetic.
	Iron parts of your conveyor installation within the range of the magnet reduce the separation capacity.	• Check the range of the magnet with a ferromagnetic sample to determine whether parts of your conveyor installation are being attracted by the magnet. If so, these parts must be replaced with non-ferromagnetic parts.
	The speed of your conveyor is too high.	• Reduce the speed of your conveyor.
Belt not aligned properly.	Objects jammed in the machine forcing the belt to one side.	• Remove objects.
	Roller(s) are misaligned.	• Realign the roller(s).
Motor makes excessive noise.	Belt tension is too high.	• Reduce the belt tension using the tension roller.
	Motor oil level is low.	• Top up the motor oil to the correct level.
	Motor has a defect or fault.	• Repair or replace the motor.
Bearings make too much noise.	Belt tension is too high.	• Reduce the belt tension.
	Bearings are worn out.	• Replace the bearings.
	Bearing grease is too old.	• Replace the bearing grease.

12 Service, storage and disassembly

12.1 Customer service

Have the following information ready when contacting customer service for assistance:

Identification plate (complete)

Nature and extent of the problem

Time when the problem occurred and any accompanying circumstances

Suspected cause

12.2 Spare parts

If a part needs to be replaced, you can order it on the basis of the type, serial number (see identification plate) or the article number from the spare parts list/drawings. If you store a part, keep it in a dry and dark place (out of direct sunlight).

12.3 Long-term storage

If the machine will not be used for an extended period, it is recommended to store it in a safe, dry place to keep vulnerable and/or sensitive parts protected.

Store the machine in a dark place (out of direct sunlight).

Checks/tasks after long-term storage:

- Condition of the belt. If the belt is ‘stuck’ to the magnet, carefully release it by hand and set the normal sag.
- Lubricate the bearings.
- Carefully follow all start-up checks.

12.4 Dismantling/disposal

When dismantling and/or disposing of the machine’s components separately, the different properties of the components (magnets, iron, aluminium, electrical components, insulating material, etc.) must be taken into account. Entrust this task preferably to a specialized company and always comply with local regulations regarding the disposal of industrial waste.

NOTICE

Note the presence of magnetism where a permanent magnet is involved. Inform the waste handler about the dangers of magnetism. See also the ‘Safety [▶ 6]’ chapter.

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