

User manual

Permanent magnetic drum separator RDxx, SETx, SDxx, SRTx, WBP



The description and pictures in this manual may differ from your version

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The information we supply may only be used for service or operation of the product.
It may not be disclosed to any third parties without our prior written permission.

Our products and the data in our documentation may be subject to later amendment without any obligation to previously supplied equipment.

Please ensure that anyone working with the device has access to all the necessary documentation.

Safety



Dangers of strong magnetic fields

Ferromagnetic objects will be attracted, if you are closer than 1 metre to the magnet.
Any ferromagnetic tools or components may be attracted and cause injury or damage the device.



Danger to people fitted with implanted medical devices

People fitted with pacemakers should not enter the magnetic field of the device.



Danger to electronic and mechanical devices

Magnetic information carriers or electronic and mechanical devices, etc, may be destroyed if they enter the magnetic field.



Danger of being dragged into the machine

Do not place hands (parts of your clothing etc.) to the drum working area!



Danger of falling objects

Magnet attracts ferromagnetic objects. They are moved by cleats on the shell and fall off at the end of the separator. Other material can be caught between the objects and may fall from the magnet at any time. Do not enter to this area!



Danger of electricity

Installation and electric connection may only be performed by qualified person. All valid rules and regulations must be followed. Perform regular inspections.
Switch off the device in case of danger situation, keep it safely off until the situation is solved.
Switch off the device in case of maintenance. Make sure, that there is no way to switch it on without your permit.



Before start up make sure, that all protective covers are not damaged and are mounted properly



Keep all screens and safeguards in place

Make sure, that all warnings are readable. Replace them in case of damage.



General Protection

Wear all the personal safety equipment necessary for safe operation or maintenance. This may include; overalls, safety glasses, ear protection, helmet, safety shoes, etc.



General

Always inform operators about planned inspections, maintenance, repairs and when failures will be repaired. Appoint a person responsible for supervision.

Identification plate

Identification plate contains following data:

- Name and address of the manufacturer
 - Type
 - Serial number
 - Weight – see the drawing
 - Year of the manufacture
 - Max. product temperature: +60 °C
 - Ambient temperature $T_a = -20 \dots +40$ °C
 - Class of cover IP – see the drawing
 - Voltage – see the drawing
 - Motor power – see the drawing
- Values are valid for standard execution

If you need an information of your device, note the type and serial number and contact us.

Start up

Checks before start-up and during start-up

Before start-up, make sure that:

- device, bearings and construction has no damage or malfunctions
- electrical connection have been made properly.
- device / installation are placed and aligned correctly.
- all protective covers are mounted properly.
- there are no other sources of danger present.

During start-up, make sure that:

- the device / the installation has no damages or malfunctions.
- the motor is running correctly (right direction, no overload, no speed fluctuation, no loud noises).
- all other parts of the device / the installation function as described in this manual, completed with the function descriptions in the added data sheet.

Maintenance



Magnetic systems attract dust and Fe particles. Regular cleaning of any device fitted with a magnetic system is therefore essential. If are some Fe particles (especially long) captured on the shell and cannot be separated, try to adjust the magnetic system or check/extend your system to protect the drum magnet to such particles.

All parts are best cleaned by brush, pressurised air and/or soft cloth.



Regularly check that all warning pictograms and the identification plate 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.

Make sure, that the mains supply to the motor is off and cannot be switched on without your permit and the transport belt with material is stopped, before you will start the maintenance. Motor warms up, wait with maintenance begin until is cooled down. Use suitable working tools and procedures. Sharp objects can be caught on the magnet. All the mechanical works must be performed by persons with appropriate experiences.

Greasing (relubrication)

Table: General indication of greasing intervals

Operating temperature of bearing		General indication of greasing interval
°C	°F	
50	122	6 weeks
70	158	3 weeks
100	212	1 week
120	248	3 days
150	302	Daily

You can change the interval according to your conditions.

Use grease SKF LGMT 2 for thye devices.

(Re-)Adjusting the magnet segment

See chapter installation.

Motor reductor

Switch off the motor and protect it against switch on without your permit. Wait until it is cooled down – **Danger of burns!**

Regularly check whether the motor makes more noise than usual or whether it is warmer than normal. If that is the case, find out what the cause is and solve the problem(s) as soon as possible to prevent for (further) damage.

In the table below, general inspection and maintenance intervals are shown as an indication of the inspection and maintenance that is needed.

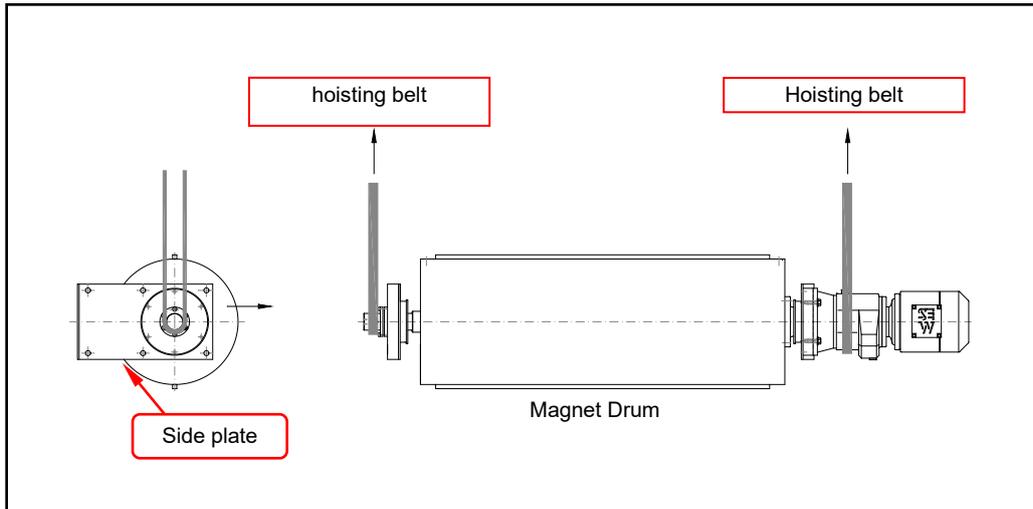
REDUCTOR	
Frequency	What to do?
<ul style="list-style-type: none"> Every 3000 machine hours, at least every 6 months. 	<ul style="list-style-type: none"> Check oil and oil level. Check the seals visually for leakage. For gear units with a torque arm: Check the rubber buffer and change it, if necessary.
<ul style="list-style-type: none"> Depending on the operating conditions (see chart below), every 3 years at the latest. According to oil temperature. 	<ul style="list-style-type: none"> Change mineral oil. Replace anti-friction bearing grease (recommendation). Replace oil seal (do not install it in the same track).
<ul style="list-style-type: none"> Depending on the operating conditions (see chart below), every 5 years at the latest. According to oil temperature. 	<ul style="list-style-type: none"> Change synthetic oil. Replace anti-friction bearing grease (recommendation). Replace oil seal (do not install it in the same track).
<ul style="list-style-type: none"> Some gear units (like SEW R07, R17, R27, F27 and Spiroplan®) have lubrication for life and are therefore maintenance- free. 	
<ul style="list-style-type: none"> Varying (depending on external factors). 	<ul style="list-style-type: none"> Touch up or renew the surface/anticorrosion coating.
MOTOR	
Frequency	What to do?
<ul style="list-style-type: none"> Every 10.000 hours of operation. 	Inspect the motor: <ul style="list-style-type: none"> Check ball bearings and change if necessary. Change the oil seal. Clean the cooling air passages.
<p>Diagram: Lubricant change intervals of oil inside gear unit</p>	<ul style="list-style-type: none"> [1] Operating hours. [2] Sustained 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)

Table: general motor reductor inspection and maintenance intervals

Oil type and quantity are listed on the drive label.

If you need more detailed information about the drive, contact our office, or refer to the drive's manufacturer website.

Drum (dis-)assembling



Drawing: Magnet drum lifting

Follow the instructions below for disassembling the magnet drum:

1. Place hoisting belts around the flange motor reductor and the shaft at the opposite side. Ensure that the drum magnet hangs at the same height.
2. Loosen/tighten the side plates' bolts so the plates are loosened from the housing.
3. Loosen the clamping bush of the fix shaft to loose the magnetic system if necessary.
4. Remove service hatch 2 from the housing.
5. For maintenance personnel: clear area all around your work space.
6. Move the magnet drum out of the housing.
7. To ease the maintenance process and eliminate injury risks, it is highly recommended to place the magnet drum on the floor.
8. *Reassemble in opposite order.*

Danger: The drum is permanent magnetic and will therefore attract Fe or other magnetic parts!

Shell / flange / bearings replacement

Check the shell regularly to avoid an excessive wear. Harsh working conditions can cause penetration of the shell (drum body). The dust and particles can get in the magnetic system and block/destroy it in such a case.

If you need to order new shell measure the circumference at both ends of the shell. We need these values for check, if your flanges will fit with the new shell. Refer these in your order.

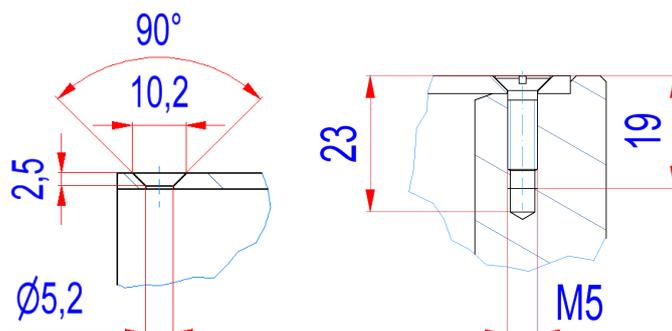


Shell / flange / bearings - Dismounting

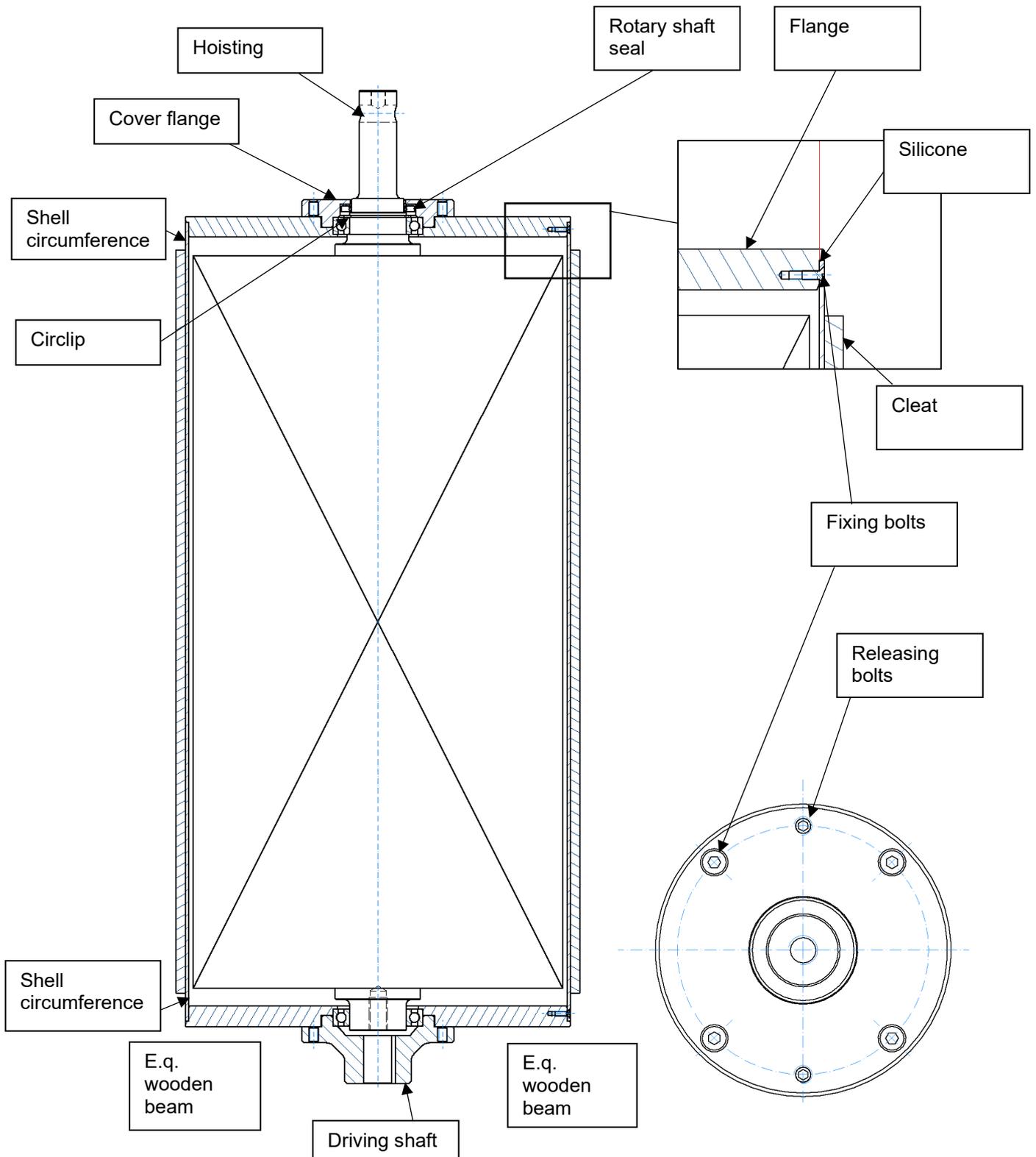
- 1) Dismount the drum from your installation (see previous chapter in case of standard housing).
- 2) Lift the drum to vertical position.
- 3) Support the bottom flange e.g. by wooden beams.
- 4) In case of bearings replacement mark flanges position in the shell.
- 5) Remove the fixing bolts on the shell.
- 6) Remove the fixing bolts on the top flange.
- 7) Tighten the releasing bolts on the top flange to remove the flange.
- 8) Remove the shaft circlip.
- 9) Lift the drum magnet by a crane approx. 50 mm over the beams.
- 10) Tap by rubber mallet on the cleats in vertical direction to release the shell from the flange.
- 11) Carefully remove the magnetic system.
- 12) Place the shell with flange to the horizontal position. Use a suitable object, e.g. wooden beam, to tap out the flange.

Mounting

- 1) Place the shell in the vertical position on a soft flat surface (rubber, wood).
- 2) Apply silicone on the flange recess. If the new shell has bigger diameter, use reasonable silicone quantity. Insert the flange in to the shell, the holes in the shell must be out of the old holes in the flange (for the new shell only – up to step 6. If you have the drum with disc for a rotation sensor, choose the correct flange).
- 3) Drill holes $\text{Ø}4.1$ mm in the flange by help of holes in the shell
- 4) Increase the shell holes diameter to $\text{Ø}5.2$ mm (use a stop to prevent flange drilling)
- 5) Make recess for bolt head.



- 6) Make threads M5 in the flange.
- 7) Apply glue for threaded connections on the bolts, insert and tighten them.
- 8) Insert the bearing and bolt the driving shaft.
- 9) Rotate the assembly on the support, e.q. wooden beams.
- 10) Place the magnetic system by a crane.
- 11) Repeat the steps 2-7 for the second flange.
- 12) Insert the bearing, fix it by the circlip.
- 13) Insert new rotary shaft seal in to the cover flange, bolt the flange.
- 14) Mount the drum in to your installation, set the system to the marked position.



Malfunctions / service

In case of failures one can consult the following table in order to determine the cause of the failure and its possible solution. In case a specific failure can't be found in the table you can always contact us.

Failure	Possible cause	Possible solution
Magnet does not separate ferromagnetic (Fe) particles out of the product flow, or separates them badly	Unattracted particles are not ferromagnetic	Check that the particles to be separated are ferromagnetic by using a small permanent magnet
	Fe parts of your (supporting and or conveying) installation within the reach of the magnet reduce the separation capacity.	Check the reach of the magnet with a little iron or steel sample to determine whether parts of your (conveying) installation are attracted to the magnet. If so, then these parts have to be replaced by non-ferromagnetic parts (for instance aluminium or wood)
Motor makes excessive noise and / or has an excessive high nominal Current [A].	Some object(s) got stuck between construction and drum magnet.	Remove object(s) and replace or revise motor if necessary.
Bearings make excessive noise.	Bearings have excessive wear.	Replace bearings.
Bended or torn cleats.	Too large pieces get clamped on the drum.	Make sure to reduce the piece size.

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

If it is necessary to replace a part, you can order the part according to the type, serial number (see the identification plate) or according to the part number from the spare parts drawing.

Installation

Intended use

Products

To be used for Fe separation out of powders and granular products such as blasting grid, cocoa and coffee beans, sugar, cattle feeds, fish food, animal meal and ceramic granulates. Also for short-wire products, such as shredded car tires.

Not to be used in (moist) product that is sticky and/or badly flowing.

Fe parts

Heavy Fe parts that have a compact shape, like cube-shaped or ball-shaped parts are often more difficult to be separated than light weight parts or heavy parts with long or flat shape.

Temperatures

- Suited for outside temperatures of -5 °C to +40 °C.
- Suited for product temperatures up to +60 °C

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

The free space around the device has to be about 1 meter for inspection and maintenance operation.

Noise level

The noise level of the device is less than 70 dB at delivery. Should it become higher, then the device has to be checked on breakdowns/failures immediately.

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.

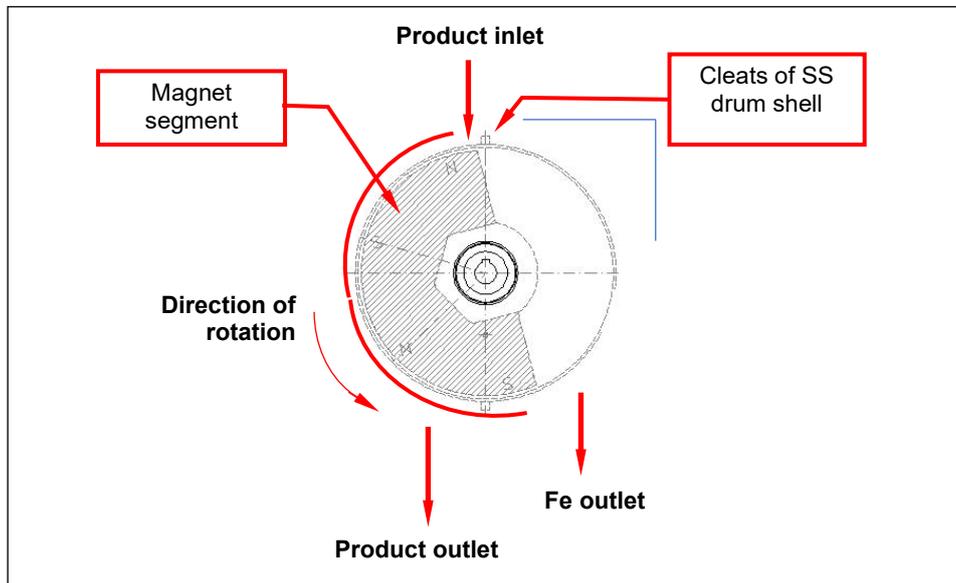
Cleaning

Minimum once per day cleaning of the device is advised for an optimal magnetic separation and to prevent dirt accumulation on the magnet drum and the problems that can be caused by that. Clean magnets have the best Fe separation result. So, make sure you clean a little more than you think is necessary, to achieve a satisfactory result of the magnet device.

For more dirt cleaning: see chapter [Maintenance](#)

Working principle

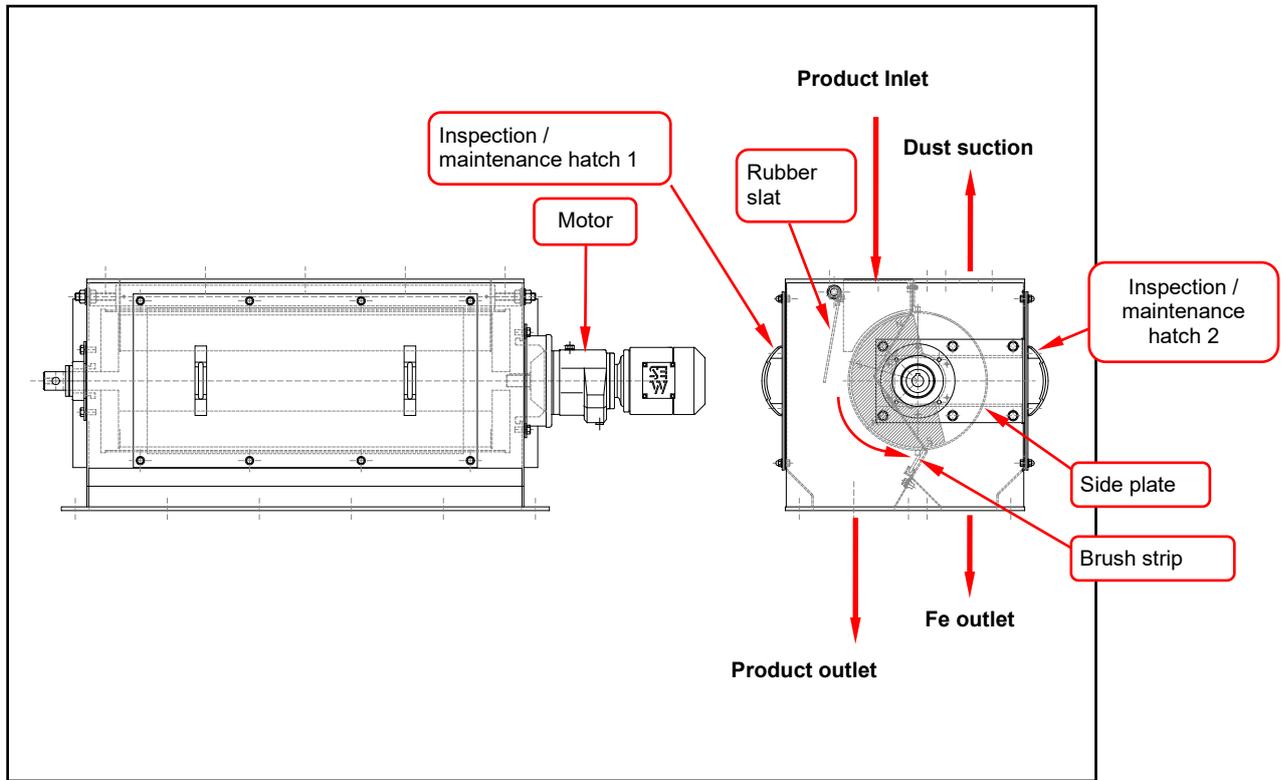
The principle of operation is the same for all drum magnet types:



- The drum consists of a stationary **magnet segment** and a **stainless steel non-magnetic shell**. The drum shell is driven by a motor and revolves in the product. The Fe objects are attracted through the stainless steel shell and “stick” to the casing. The product, which is non-magnetic, is not attracted and falls straight through to the bottom. The Fe objects are transported to the non-magnetic part of the drum. Here the - no longer attracted - Fe objects will fall off the drum, into the **Fe outlet**. To ensure that the Fe objects are pushed out of the powerful magnetic field several **cleats (ribs)** are welded to the casing.
- Raw product – contaminated with Fe – reaches the drum shell through the **product inlet**.
- An adjustable **rubber slat** distributes the incoming raw product as close as possible towards the drum shell. The rubber slat position can be adjusted from the device’s outside, by loosening the 2 nuts at the outside housing and then rotating it towards or from the magnet.
- The filtered product leaves the device through the **product outlet**.
- A **dust suction opening** can be used to suck away dust clouds inside the housing.

Construction drum magnet

Standard drum magnet



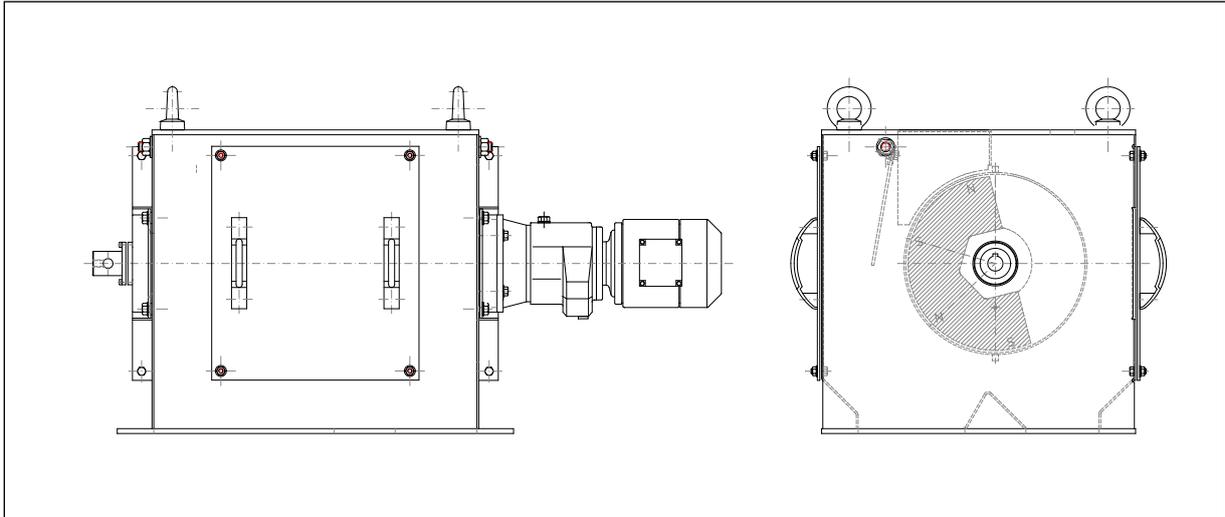
Drawing: Construction of standard drum magnet

- The drum magnet is to be connected to your equipment by the **product inlet flange** and the **product outlet flange** (*make your construction stronger if it is too weak!*).
- The top flange has a **dust collection** opening – with flange holes – on top of which you can mount a vacuum suction device.
- The bottom flange has an **Fe outlet** opening – with flange holes.
- By opening **inspection hatch 1** you can inspect the drum's product side.
- A **brush strip** between the product outlet and the Fe outlet 'sweeps' off most unwanted non-magnetic parts from the shell and also works as a 'dust curtain'.
- By opening **inspection hatch 2** and the 2 **side plates**, the drum can be dismantled and taken out in case of any failures / breakdowns.

Placing, transporting or moving the magnet

The drum magnet must always be lifted on all 4 lifting lugs!
Mount these lifting lugs only onto the 4 corners of the top flange.

Take the position of the centre of gravity into account. This is *not* in the middle / centre of the device, but closer to the motor side of the magnet.



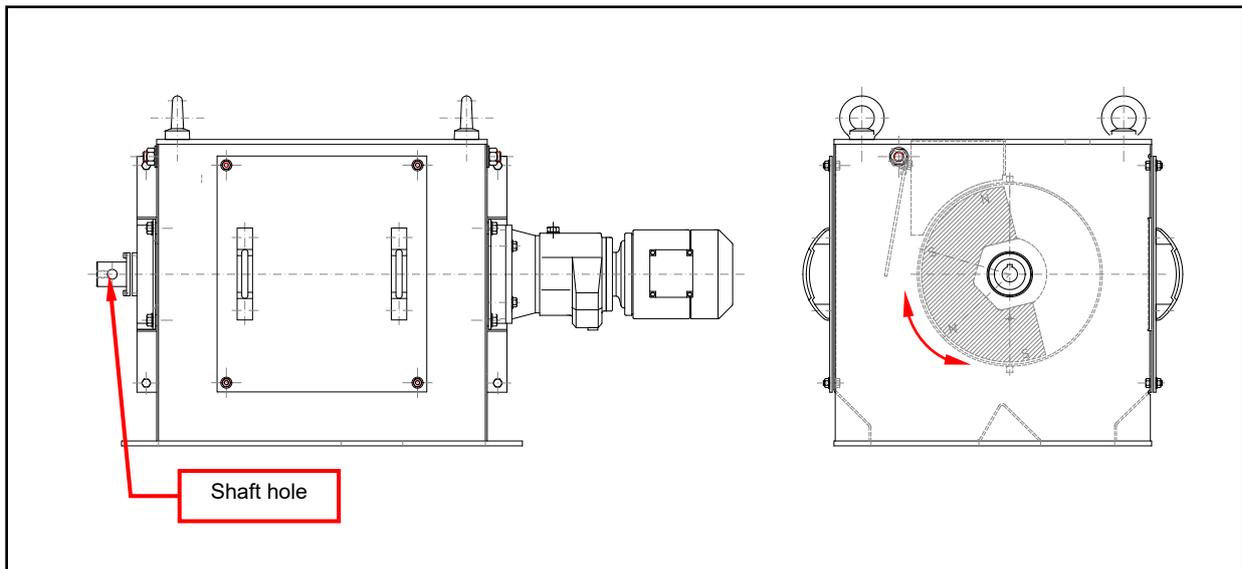
Drawing: Mounting the 4 lifting lugs

- Use only lifting/hoisting and transport equipment that is in good condition and never exceed the safe working load of the equipment being used.
- Avoid shocks during transport.
- Work safely, ensure sufficient working space and use stable and reliable scaffolding, ladders and other auxiliary equipment to ensure that the device can be installed without risk.
- Be sure your channel construction is strong enough to safely carry the weight of the drum magnet.

The weight is stated on the *identification plate/sticker/etching*, which is placed on the device housing.

- When installing the magnet, ensure that the free-fall height of your product is a maximum of 0.4 metres. A higher free-fall height will increase the speed of the product, resulting in poorer separation.

(Re-)Adjusting the magnet segment



Drawing: (re-)adjusting the magnet segment

We have already mounted the magnet segment in the correct position. It will therefore probably not be necessary to readjust it. If however you have a bad separation because all Fe parts fall down before they are above the Fe outlet, then you will have to rotate the magnet segment to the correct position. This can be done as follows :

1. Loosen the clamp bush bolts. The magnet is mounted on the shaft that is now loosened. Rotate the magnet segment to the desired position by rotating the shaft.
2. For this purpose you can use the aid of the adjustment hole on the shaft on the non-motor side. In this hole you can place a lever, for instance a long round bar, to apply torque.

The magnet segment should be approximately in the position as drawn in the above drawing (right view).

3. Retighten the clamp bush bolts.

False positioning of the magnet segment can cause bad déferrisation. Therefore special attention for the positioning is very important!

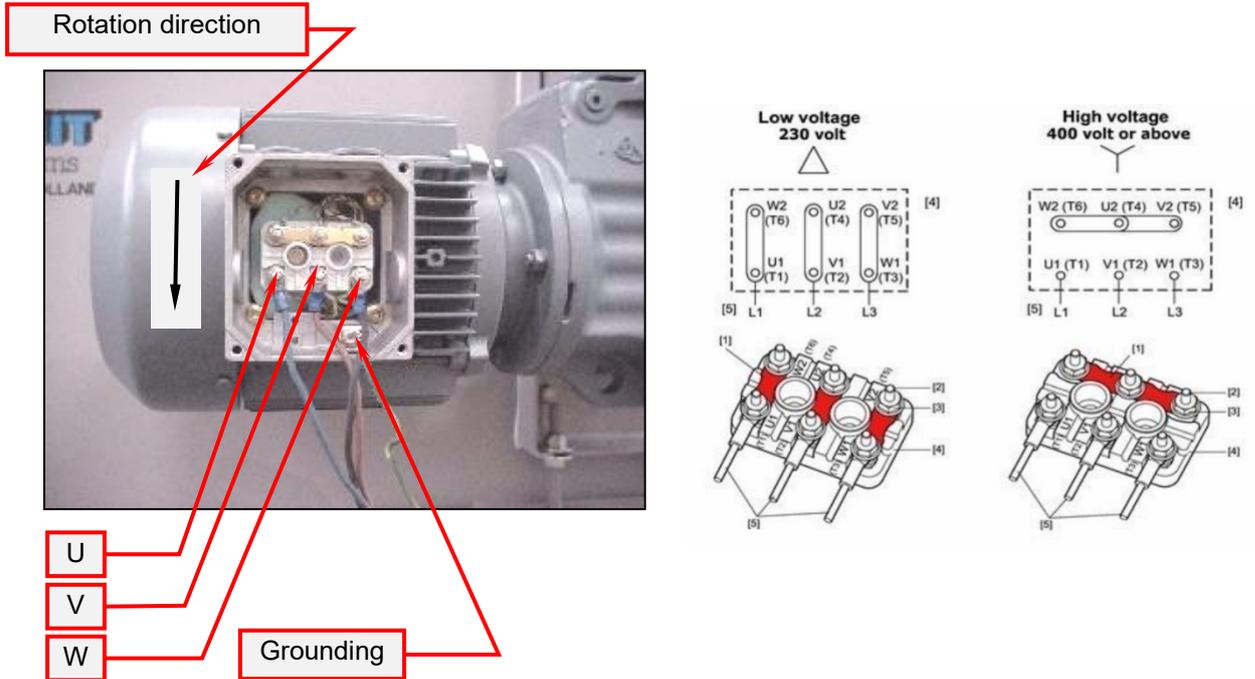
Connecting the motor

Connect the motor by power cable (not included) to **U, V, W** and grounding.
Use circuit breaker according to the values on the motor identification plate.

Check that the rotation direction of the driving motor is correct:

This can be checked by briefly switching the motor on.

If the direction of rotation is incorrect, reverse 2 of 3 phases (U - V) (best directly on the motor junction box)



Isolating material / grounding

Make sure that all closure and or packing material between the magnet device and your product channel has a surface resistance of less than 1 GΩ at (23±2) °C and (50±5)% relative humidity. Possible static charge will be discharged.

We recommend to connect the device and your conveyor/structure.

After device installation

Apply steps to reduce residual hazards:

- General dangers associated with magnetism incl. those for people with medical implants.
- Entrapment of body parts between housing (your structure/device) and rotating drum.
- Mounting the device to other parts of the installation in which it is to be incorporated with must be adequate. E.g.: access to the rotating belt must be prevented, mounting method must be sufficient to hold it's weight and adequate grounding measures should be taken to prevent the built up of electrostatic charge.
- Power cabling requires regular visual inspection to prevent accidental electrocution.
- Making electric connections should only be done by qualified electricians.
- Dust build up on device requires regular cleaning to reduce risk of dust explosion.
- Handle with motor gear unit oil in adequate way.
- Ferromagnetic parts can fall down from the separator at any time, protect the persons in adequate way.
- Prevent the operator from slipping near the separator.
- Describe rules and methods for cleaning and maintenance, train staff.

Storage and dismantling

When recycling the device at the end of its technical life, dispose of correctly and according to local regulations. Always be aware of the magnetism.