RAUCH

# Operator's manual

**Please read carefully before using the machine!**

## Keep for future use

This operator's and assembly manual is an integral part of the machine. Suppliers of new and second-hand machines are required to document in writing that the operator's and assembly manual was delivered with the machine and handed over to the customer.

SA 250/360

5900666-e-en-0823

Original instructions

**Foreword**

Dear customer,

By purchasing the single disc spreader for winter road maintenance of the SA series, you have shown confidence in our product. Thank you very much! We want to justify this confidence. You have purchased a powerful and reliable machine.

However, in case unexpected problems arise, our customer service department is always there for you.

**Please read this operator's manual carefully before commissioning the single disc spreader for winter road maintenance and observe the instructions.**

This operator's manual gives detailed instructions on the operation of the machine, as well as valuable information on assembly, maintenance, and care.

This manual may also describe equipment that is not included in your machine.

Please note that damage caused by incorrect operation or improper use cannot be covered by warranty claims.

Please enter the type and serial number here together with the year of manufacture of your single disc spreader for winter road maintenance.
This information is provided on the machine nameplate or on the frame.
Please state this information when ordering spare parts or optional equipment, and in case of complaints.

Type:

Serial number:

Year of manufacture:

**Technical improvements**

We continuously strive to improve our products. For this reason, we reserve the right to make any improvements and changes to our machine that we consider necessary without notice. We do not accept any obligation to make such improvements or changes on machines that have already been sold.

We will be pleased to answer any other questions that you might have.

Yours sincerely

RAUCH Landmaschinenfabrik GmbH

# Table of contents

# 1 Intended use

The single disc spreaders for winter road maintenance of the SA series may only be used in accordance with the stipulations of the present operator’s manual.

The single disc spreaders for winter road maintenance of the SA series are constructed in accordance with their intended use.

**They may only be used for spreading material that can be delivered by chute, such as grit (3/5), sand, and salt, as well as in agriculture to apply granulated fertilizers.**

The machine is intended as a three-point linkage on the rear of a tractor and for operation by a person.

In the following chapters, the single disc spreader is referred to as the "machine".

Any use beyond these specifications is considered as contrary to the intended use. The manufacturer shall not assume any liability for any damages resulting from this. The risk is solely carried by the operator.

The intended use also comprises the compliance with the operating, maintenance, and repair conditions prescribed by the manufacturer. Only genuine spare parts from RAUCH may be used as replacements.

The machine may only be used, maintained and repaired by people who are familiar with the characteristics of the machine and who are aware of the risks.

The instructions regarding the operation, service, and safe handling of the machine as described in this operator's manual and declared by the manufacturer in the form of warning signs and symbols on the machine must be strictly followed during operation. The relevant accident prevention regulations and other generally recognized safety-related, occupational health and road traffic regulations must be observed when using the machine.

Unauthorized modifications to the machine are not permitted. Such modifications exclude any liability of the manufacturer for any resulting damages.

■ ***Foreseeable misuse***

The manufacturer provides warning notes and signs on the mineral fertilizer spreader relating to foreseeable misuse. These warnings and warning symbols must always be observed. This way, application of the machine against the intentions of the operator’s manual is prevented.

# 2 User instructions

## 2.1 About this operator’s manual

This operator’s manual is an **integral part** of the machine.

The operator’s manual contains important instructions for **safe, proper,** and economic **use** and **maintenance** of the machine. Compliance with its stipulations helps to **avoid risks**, reduce repair costs and downtime, and to increase the reliability and service life of the machine controlled with it.

The complete documentation, comprising this operator’s manual and any other documents provided, must be kept in an easily accessible location close to where the machine is used (e.g., in the tractor).

If the machine is sold, the operator’s manual must also be passed to the new owner.

The operator’s manual is intended for the operator of the machine and anyone involved in operating and maintaining it. It must be read, understood, and applied by every person who is entrusted with the following work on the machine:

- Operation,
- Maintenance and cleaning,
- Troubleshooting.

In particular, the following is to be observed:

- The chapter on safety,
- The warnings in the text of the individual chapters.

The operator's manual does not replace your **own responsibility** as operator and operational staff of the machine control unit.

## 2.2 Structure of the operator’s manual

The operator’s manual is divided into six key areas in terms of content

- User instructions
- Safety instructions
- Machine data
- Instructions on operating the machine
- Instructions for finding and correcting faults
- Maintenance and service instructions

## 2.3 Notes on text descriptions

### 2.3.1 Instructions and procedures

Steps that the operator must carry out are shown as follows.

▶ Instruction for action step 1

▶ Instruction for action step 2

### 2.3.2 Lists

Lists without a specific sequence are shown as lists with bullet points:

- Property A
- Property B

### 2.3.3 References

References to other sections in the document are shown with paragraph number, header text and/or page number:

- **Example:** Please also note *3 Safety*

References to other documents are shown as information or instructions without the exact chapter or page number:

- **Example:** Follow the instructions in the operator's manual of the universal drive shaft manufacturer.

# 3 Safety

## 3.1 General information

The chapter **Safety** contains basic warning notes as well as working and traffic safety instructions for the usage of the installed machine.

The adherence to the instructions in this chapter is a prerequisite for the safe handling and trouble-free operation of the machine.

There are additional warnings in the other chapters of this operator's manual, which must also be observed. The warning instructions are given before the text for the relevant actions.

Warning notes on the supplier components can be found in the respective supplier documentation. These warning instructions must also be observed.

## 3.2 Meaning of warnings

The warnings in the operator's manual are classified according to the severity of the risk and the probability of its occurrence.

The warning symbols draw attention to the residual risks to which users of the machine are exposed. The warnings used are structured as follows:

| |
|---|
| Symbol + **signal word** |
| Explanation |

**Level of danger of warnings**
The level of danger is indicated in the signal word. The levels of danger are classified as follows:

**⚠ DANGER!**

**Type and source of danger**

This warning warns of a danger posing an immediate threat to the health and life of people.

Ignoring these warnings will result in severe injury or death.

▶ Always observe the measures described to prevent this danger.

**⚠ WARNING!**

**Type and source of danger**

This warning warns of a potentially dangerous situation for personal health.

Ignoring these warnings leads to severe injury.

▶ Always observe the measures described to prevent this danger.

**⚠CAUTION!**

**Type and source of danger**

This warning warns of a potentially dangerous situation for personal health.

Ignoring these warnings leads to injury.

▶ Always observe the measures described to prevent this danger.

***NOTICE!***

**Type and source of danger**

This warning warns of material and environmental damage.

Ignoring these warnings will result in damage to the machine and to the environment.

▶ Always observe the measures described to prevent this danger.

This is an instruction:
General instructions contain tips for the operation and information that is particularly useful, but no warnings about hazards.

## 3.3 General information on the safety of the machine

The machine is constructed in accordance with the state of the art and the recognized technical regulations. However, its usage and maintenance may cause danger to the health and life of the operator or third parties and/or the impairment of the machine and other material assets.

For this reason, the machine may only be operated
- when it is in a proper and roadworthy condition,
- in awareness of safety and dangers.

Therefore, it is imperative that you have read and understood the contents of the operator's manual. You must be familiar with the applicable accident protection regulations and the generally accepted regulations for safety, occupational health, and road traffic, and apply these rules as required.

## 3.4 Instructions for the operator

The owner is responsible for the intended use of the machine.

### 3.4.1 Qualifications of personnel

Before starting any work on or with the machine, all persons who are involved in operation, maintenance or service must have read and understood this operator's manual.

- The machine may only be operated by instructed personnel authorized by the owner.
- Persons who are apprentices, in training or under instruction may only work on the machine under the supervision of an experienced person.
- Maintenance and service may only be carried out by qualified maintenance personnel.

### 3.4.2 Instruction

Distribution partners, works representatives or employees of the manufacturer will instruct the operator regarding the operation and maintenance of the machine.

The owner must ensure that newly recruited operating and maintenance personnel are instructed to the same extent and with the same care with regard to the operation and repair of the machine in compliance with this operator’s manual.

### 3.4.3 Accident prevention

Safety and accident prevention regulations are legally specified in every country. The owner of the machine is responsible for observing the regulations applicable in the country of operation.

The following instructions must also be observed:

- Never let the machine run without supervision.
- Do not ride on the machine while it is working or being transported (**no passengers**).
- **Do not use** machine parts as steps.
- Always wear tight fitting clothes. Do not wear work clothes with belts, loose threads or other items that could get caught.
- Follow the manufacturer's warnings when handling chemicals. You may have to wear personal protective equipment (PPE).

## 3.5 Information on operational safety

Only use the machine in safe operating condition. Avoid hazardous situations.

### 3.5.1 Lifting and moving the machine

The machine is delivered ex works standing on a pallet.

- Exclusively lift the machine on the pallet using a suitable lift truck or forklift truck. Please observe the total weight.
- Never lift or move the machine at the hopper or at other, non-marked anchor points.

### 3.5.2 Parking the machine

- Only park the machine with an empty hopper on level, firm ground.
- If the machine is parked alone (without tractor), open the metering slide completely. The return spring is released; any water that may be entering the hopper is drained.

### 3.5.3 Filling the machine

- Only fill the machine when the engine of the tractor is shut off. Remove the ignition key in order to prevent the engine from being started.
- Use suitable auxiliary equipment for filling the machine (e.g., front-end loader, feed screw conveyor).
- When manually filling it (e.g., loading it with big bags), use suitable steps.
- Only fill the machine when it is mounted.
- Fill the machine no higher than the top-edge. Check the filling level.
- Only fill the machine when the protective grid is closed. This way, faults during spreading caused by lumps in the spreading material or other foreign bodies are prevented.

### 3.5.4 Checks before commissioning the machine

Check the operating safety of the machine before the first and every subsequent commissioning.

- Is all safety equipment at the machine installed and functioning?
- Are all fasteners and load-bearing connections tightly installed and in good condition?
- Are the spreading discs, the spreading vanes, and their attachments in good condition?
- Is the protective grid locked in the hopper?
- Are all locking mechanisms securely engaged?
- Are there **no** persons in the danger zone of the machine?
- Is the universal drive shaft cover in good condition?
- Check the mounting height. The distance between the bottom edge of the frame and the ground must not be more than 120 cm.

### 3.5.5 Hazard zone

Ejected spreading material may cause serious injury (e.g., to the eyes).

When persons are present between the tractor and the machine, there is a great hazard caused by the tractor rolling away or machine movements which may have fatal consequences.

The following figure displays the hazard zones of the machine.

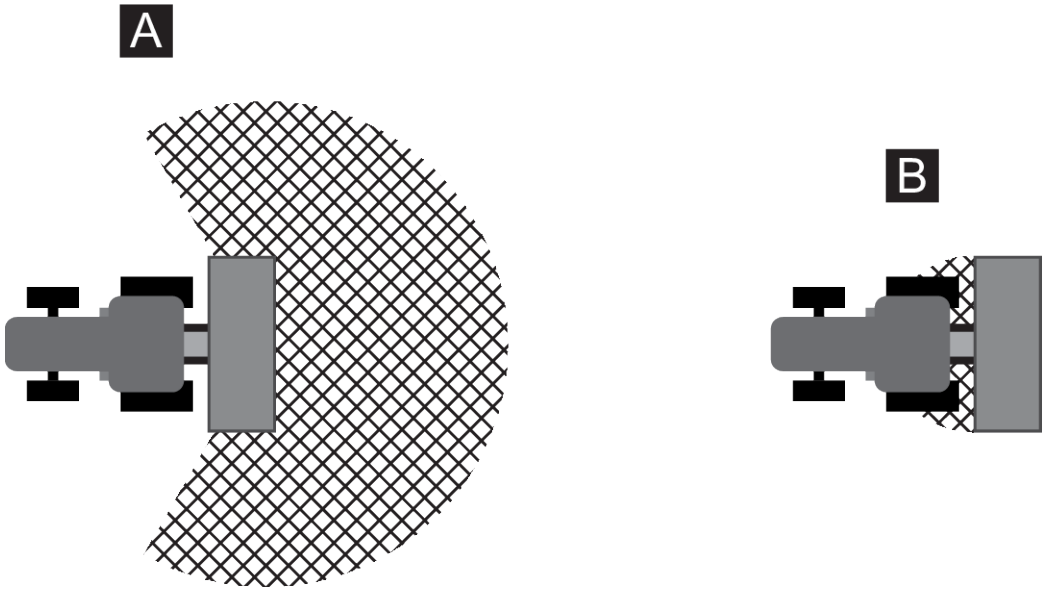


*Fig. 1: Hazard zone when devices are attached*

A Hazard zone in spreading operation

B Hazard zone when coupling/decoupling the machine

- Ensure that no persons are present in the spreading range [A] of the machine.
- Immediately stop the machine and the tractor if persons are present in the hazard zone of the machine.
- When coupling/decoupling the machine at the tractor or attaching/detaching the spreading unit, make sure that no one is present in the hazard zones [B].

### 3.5.6 Running operation

- In the event of malfunctions, the machine is to be shut down and secured immediately. Have the fault repaired immediately by qualified technicians.
- Do not climb on the machine while the spreader unit is running.
- Only operate the machine with the protective grids in the hopper closed. During operation, the protective grid must **neither be opened nor removed**.
- Rotating machine components can cause serious injury. Make sure that body parts or clothing never come close to rotating components.
- Do not deposit any parts (such as screws, nuts) in the hopper.
- Ejected spreading material may cause serious injury (e.g., to the eyes). For this reason, ensure that nobody is present in the spreading range of the machine.
- If the wind speed becomes too high, spreading has to be stopped as the specified spreading range cannot be guaranteed under such conditions.
- Do not climb on the machine or the tractor when it is situated beneath high-voltage electrical power lines.

## 3.6 Using spreading material

Improper selection or use of spreading material may cause serious injury or environmental damage.

- When selecting the spreading material, inform yourself of its effects on humans, the environment, and the machine.
- Always follow the instructions of the spreading material manufacturer.

## 3.7 Hydraulics system

The hydraulic system is under high pressure.

Fluid escaping under high pressure may cause serious injury and environmental damage. The following instructions must be observed to prevent danger:

- Always operate the machine below the permissible maximum operating pressure.
- **Release the pressure** from the hydraulic system **before** carrying out any maintenance. Switch off the engine of the tractor. Secure it against reactivation.
- When searching for leaks, always wear safety **glasses** and safety **gloves**.
- In case of injury in connection with hydraulic oil, consult **a physician immediately** as severe infections may occur.
- When connecting the hydraulic hoses to the tractor, ensure that the hydraulic system is **depressurized**, both on the tractor and the machine side.
- Attach the hydraulic hoses of the tractor and the spreader hydraulic systems only with the prescribed connections.
- Prevent any contamination of the hydraulic circuit. Always suspend the couplings in the brackets provided. Use the dust caps. Clean the connections before coupling them.
- Regularly check the hydraulic components and hydraulic hose lines for mechanical defects, e.g., cuts and abrasions, contusions, bends, tears, porosity, etc.
- Even when stored correctly and used within approved load limits, hoses and hose couplings are subject to a natural aging process. This limits their storage and service life.

The hydraulic hoses are designed for a maximum service life of 6 years, including storage for a maximum of 2 years.

The month and year of manufacture of the hydraulic hoses is stamped on the hose fitting.

- Have the hydraulic hoses replaced if they are damaged and after the specified service life has been reached.
- Replacement hydraulic hoses must meet the technical requirements of the equipment manufacturer. Make sure the replacement hydraulic hoses meet the maximum pressure specifications.

## 3.8 Maintenance and service

Maintenance and service involve additional hazards that do not occur during operation of the machine.

For this reason, take particular care when carrying out maintenance and service work. Work particularly thoroughly and cautiously.

### 3.8.1 Qualifications of maintenance personnel

- Welding and work on the electrical and hydraulic systems is to be carried out by qualified technicians only.

### 3.8.2 Wear parts

- The maintenance and service intervals described in the present operator's manual are to be strictly adhered to at all times.
- Also observe the maintenance and service intervals for the supplied components. See the supplier documentation for the relevant intervals.
- We recommend having your dealer check the condition of the machine, particularly fastening components, safety-relevant plastic components, the hydraulic system, metering components and spreading vanes, after every working season.
- Spare parts must at least comply with the technical standards specified by the manufacturer. Compliance with technical requirements is ensured using original spare parts.
- Self-locking nuts are designed to be used only once. Always use new self-locking nuts to fasten components (e.g., when replacing spreading vanes).

### 3.8.3 Maintenance and service tasks

- **Always switch off the tractor engine** before any cleaning, maintenance, service, and troubleshooting. **Wait until all rotating parts of the machine have come to a standstill.**
- Make sure that unauthorized persons **cannot** start the machine. Remove the ignition key of the tractor.
- Disconnect the power supply between the tractor and the machine before performing any maintenance and service tasks or before working on the electrical system.
- Check that the tractor with the machine is correctly parked. Park the spreader with an empty hopper on level, solid ground and secure it to prevent it from moving.
- Secure the lifted machine additionally against falling (e.g., by means of a safety stand) when carrying out maintenance and repair work or inspections under the lifted machine.
- Release the pressure from the hydraulic system before any maintenance and repair work.
- Only open the protective grid in the hopper if the machine has been decommissioned.
- If work is to be carried out while the PTO shaft is rotating, make sure that nobody is near the PTO or the universal drive shaft.
- Never clear blockages in the spreader hopper by hand or with the foot: always use a suitable tool.
- When cleaning with high-pressure, never aim the water jet directly at warning signs, electrical equipment, hydraulic components, and sliding bearings.
- Regularly check nuts and screws for tightness. Retighten loose connections.

## 3.9 Safety in traffic

When driving on public streets and roads, the tractor with the attached machine must comply with the road traffic regulations of the respective country. The owner and driver are responsible for compliance with these regulations.

### 3.9.1 Checks before driving

Die Abfahrtskontrolle ist ein wichtiger Beitrag zur Verkehrssicherheit. Prüfen Sie unmittelbar vor jeder Fahrt die Einhaltung der Betriebsbedingungen, der Verkehrssicherheit und der Bestimmungen des Einsatzlandes

- Wird das zulässige Gesamtgewicht eingehalten? Beachten Sie die zulässige Achslast, die zulässige Bremslast und die zulässige Reifentragfähigkeit;
  - Siehe*5 Axle load calculation*
- Ist die Maschine vorschriftsmäßig angebaut?
- Kann während der Fahrt Düngemittel verloren gehen?
  - Achten Sie auf den Füllstand des Düngermittels im Behälter.
  - Die Dosierschieber müssen geschlossen sein.
  - Bei einfachwirkenden Hydraulikzylindern zusätzlich die Kugelhähne sperren.
  - Schalten Sie die elektronische Bedieneinheit aus.
- Prüfen Sie den Reifendruck und die Funktion des Bremssystems des Traktors.
- Entspricht die Beleuchtung und Kennzeichnung der Maschine den Bestimmungen Ihres Landes zur Benutzung öffentlicher Verkehrswege? Achten Sie auf die vorschriftsmäßige Anbringung.

### 3.9.2 Road travel with the machine

Handling, steering, and braking performance of the tractor are affected by the attached machine. For example, an excessive weight of the machine will reduce the weight on the front axle of the tractor and affect the steering.

- Adapt your driving to the modified driving characteristics.
- When driving, always ensure that there is sufficient visibility. If vision is restricted (e.g. when reversing), another person is required to direct the driver.
- Observe the admissible maximum speed.
- Avoid sudden turns when driving uphill or downhill or across a slope. The change in the center of gravity may increase the danger of tipping. Special care is to be particularly applied when driving on uneven, soft ground (e.g. when entering fields, curbs).
- Arrest sideways movement of the lower link of the three-point linkage to prevent the machine from swinging.
- Passengers are prohibited on the machine during transport and operation.

## 3.10 Safety equipment, warnings and instructions

### 3.10.1 Position of safety equipment as well as warning and instruction stickers


*Fig. 2: Position of safety equipment and warning and instruction stickers*

[1] Reflector
[2] Warning: Danger due to ejection of material
[3] Front spreading disc cover
[4] Instructions: PTO speed (in machines with PTO drive)
[5] Warning: Danger from hydraulic system (in machines with hydraulic drive)
[6] Instructions: Max. load capacity
[7] Nameplate
[8] Warning: Read the operator's manual and warnings.
[9] Warning: Hazard between the tractor and the machine

*Fig. 3: Universal drive shaft guard*

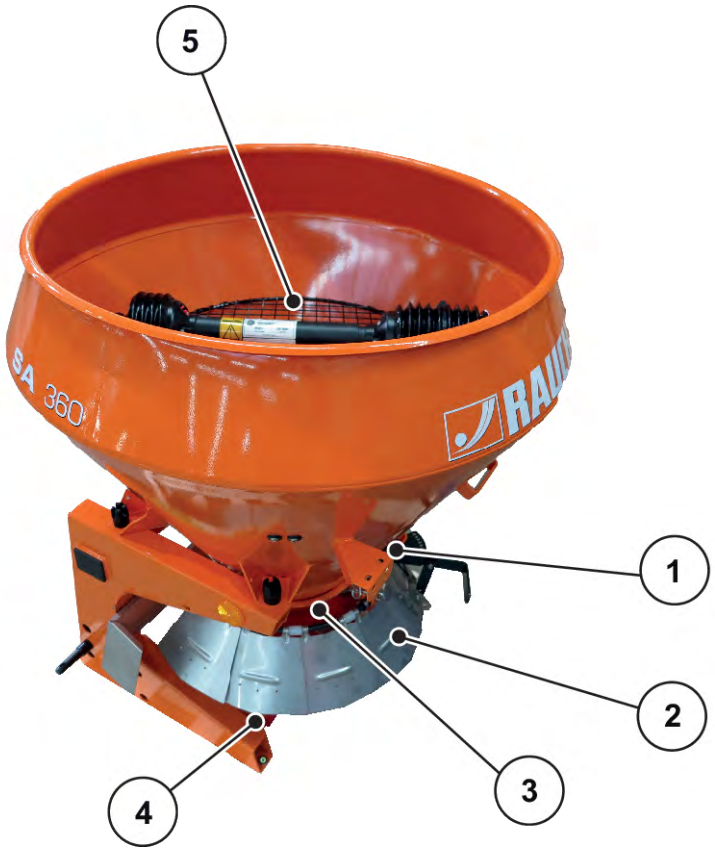


*Fig. 4: Position of safety equipment and warning and instruction stickers*

[1] Warning: Remove ignition key
[2] Adjustable spreading disc cover (spreading width limiter)
[3] Warning: Danger due to moving parts
[4] Reflector
[5] Protective grid in hopper

## 3.10.2 Function of safety equipment

The safety equipment is designed to protect your health and life.

- Before working with the machine, ensure that the safety equipment is functioning and not damaged.
- Only operate the machine when the safety equipment is functional.

| Designation | Function |
|---|---|
| Protective grid in hopper | Prevents body parts from being caught by the rotating agitator.<br>Prevents body parts from being cut off by the metering slide.<br>Prevents faults during spreading caused by lumps in the spreading material, large stones, or other large objects (screening effect). |
| Universal drive shaft guard | Prevents body parts and clothing from being pulled into the rotating universal drive shaft. |
| Adjustable spreading disc cover (spreading width limiter) | This prevents being caught by the rotating spreading disc from the side and from the rear.<br>It ensures the ejection of the spreading material in the desired spreading width. |
| Front spreading disc cover | Protection against getting caught by the rotating disc from the front.<br>Prevents the ejection of spreading material to the front (direction of tractor/workplace). |

## 3.11 Warning and instruction stickers

Various warning and instruction stickers are attached to the machine (for the position at the machine, please refer to *3.10.1 Position of safety equipment as well as warning and instruction stickers*).

The warning and instruction stickers are components of the machine. They must not be removed or modified.

▶ Replace missing or illegible warning and instruction stickers immediately.

If new components are installed during repairs, the same warning and instruction stickers that were on the original parts must be placed on the new parts.

The correct warning and instruction stickers can be obtained from the spare parts service.

### 3.11.1 Warning stickers

| Illustration | Description |
|---|---|
|  | Read the operator's manual and warnings.<br>Read and observe the operator’s manual and warnings before commissioning the machine. The operator’s manual explains in detail how to operate the spreader and contains valuable information on operation, care and maintenance. |
|  | Remove the ignition key.<br>Switch off the engine and remove the key before carrying out maintenance and repair work. Disconnect the power supply |
|  | Danger from hydraulic system<br>Hot fluid escaping under high pressure may cause serious injury.<br>It may also penetrate the skin and cause infection.<br>De-pressurize the hydraulic system before maintenance work.<br>When checking for leakage, wear protective goggles and protective gloves at all times.<br>In the event of injury caused by hydraulic oil, seek medical attention immediately!<br>Observe the manufacturer documentation. |
|  | Danger due to ejection of material<br>Danger of injury to the whole body caused by ejected spreading material<br>Before commissioning, instruct all people to leave the hazard zone (spreading range) of the machine. |
|  | Danger due to moving parts<br>Danger of cutting off body parts<br>It is prohibited to reach into the hazard zone of rotating parts.<br>Switch off the engine and remove the key before carrying out maintenance, repair and adjustment work. |
|  | Danger between the tractor and the machine<br>There is a crushing hazard that may result in fatal injury for persons standing between the tractor and the machine when the tractor approaches or the hydraulic system is actuated.<br>The tractor may brake too late or not at all because of carelessness or incorrect operation.<br>Ensure that nobody is present in the hazard zone between the tractor and the machine. |

### 3.11.2 Instruction stickers

| Illustration | Description |
|---|---|
|  | Maximum load capacity |
|  | Rated speed of the PTO shaft<br>The rated speed of the PTO shaft is 540 rpm. |

## 3.12 Name plate and machine marking

When delivering your machine, ensure that all necessary signs are present.

Depending on the country of destination, additional signs can be attached to the machine.

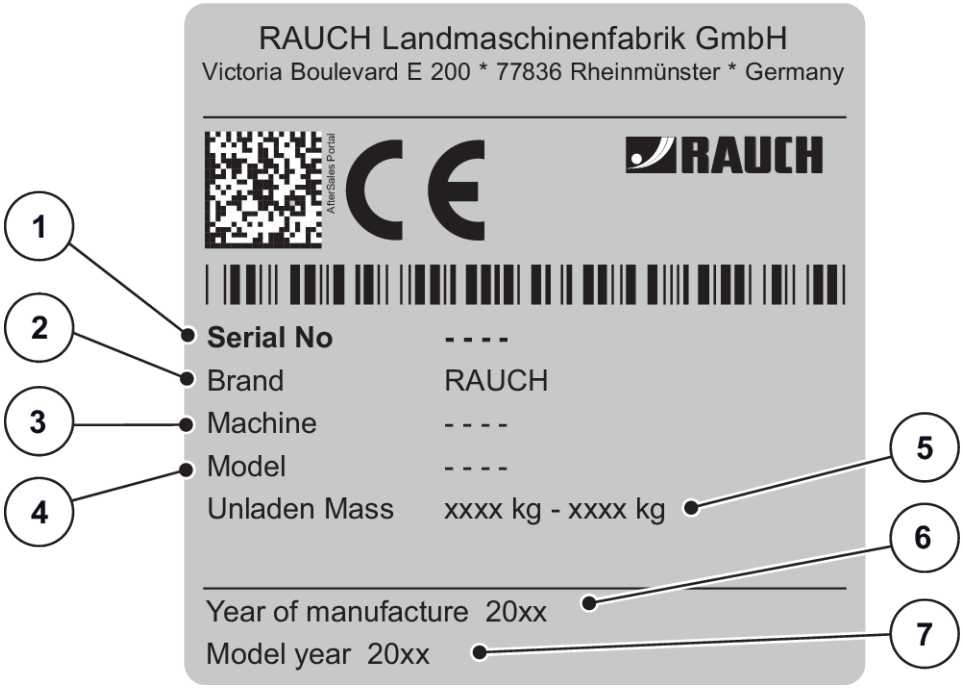


*Fig. 5: Nameplate*

[1] Serial number
[2] Manufacturer
[3] Machine
[4] Type
[5] Empty weight
[6] Year of construction
[7] Model year

## 3.13 Beleuchtungsanlage Vorder-, Seiten- und Rückstrahler

The machine can be fitted with auxiliary lighting.

The lighting mounted ex works depends on the country of use of the attachment.

- Contact your dealer/importer if you need rear lighting.

Attachments are subject to the lighting regulations specified in the traffic regulations.

- Observe the traffic regulations of your country.

▶ Correctly attach the lighting equipment to the machine as specified.

*The lighting equipment must always be in operating condition.*

*Lights must not be covered or obscured by dirt.*

# 4 Machine data

## 4.1 Manufacturer

RAUCH Landmaschinenfabrik GmbH
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77836 Rheinmünster
Germany

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Fax: +49 (0) 7229 8580-200

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RAUCH Landmaschinenfabrik GmbH
PO box 1162
email: service@rauch.de
Fax: +49 (0) 7229 8580-203

## 4.2 Description of the machine

Use the machines in accordance with chapter *1 Intended use*.

The machine consists of the following assemblies.

- Hopper with agitator and outlet
- Frame and coupling points
- Drive elements (universal drive shaft, transmission, or hydraulic motor)
- Metering elements (agitator, metering slide, application rate scale)
- Elements for adjusting the spreading width
- Safety equipment - See *3.10 Safety equipment, warnings and instructions*

Some models are not available in all countries.

## 4.2.1 Assembly overview

### ■ Assembly overview, back

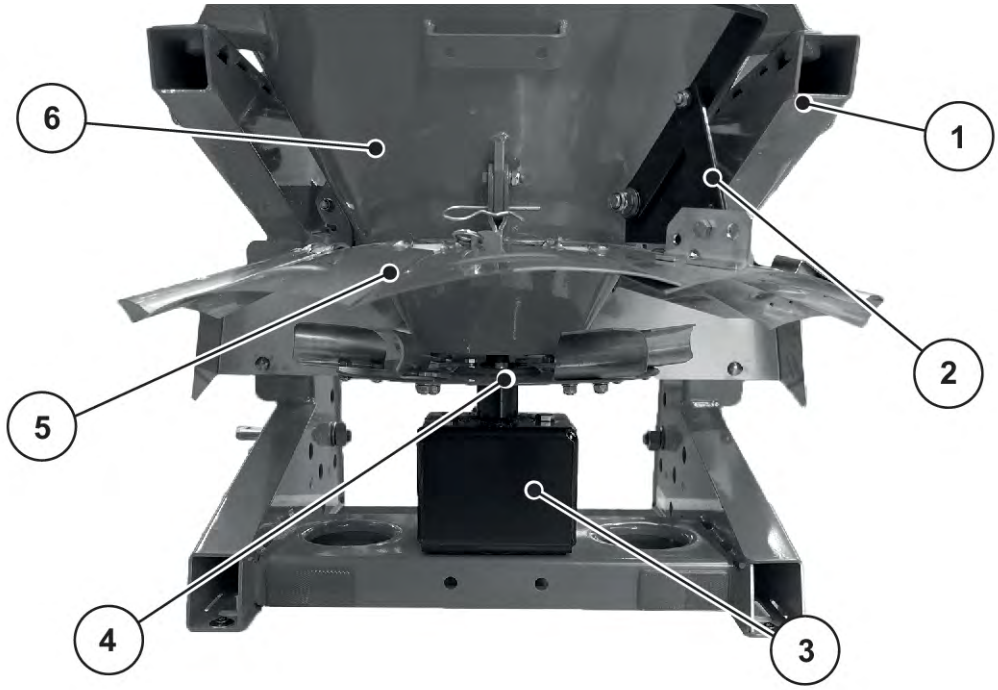



*Fig. 6: Assembly overview – back*

[1] Frame
[2] Adjustment lever with position holes
[3] Hydraulic motor or transmission (depending on model)
[4] Spreading disc
[5] Spreading width limiters
[6] Hopper

## ■ Assembly overview, front (PTO drive)

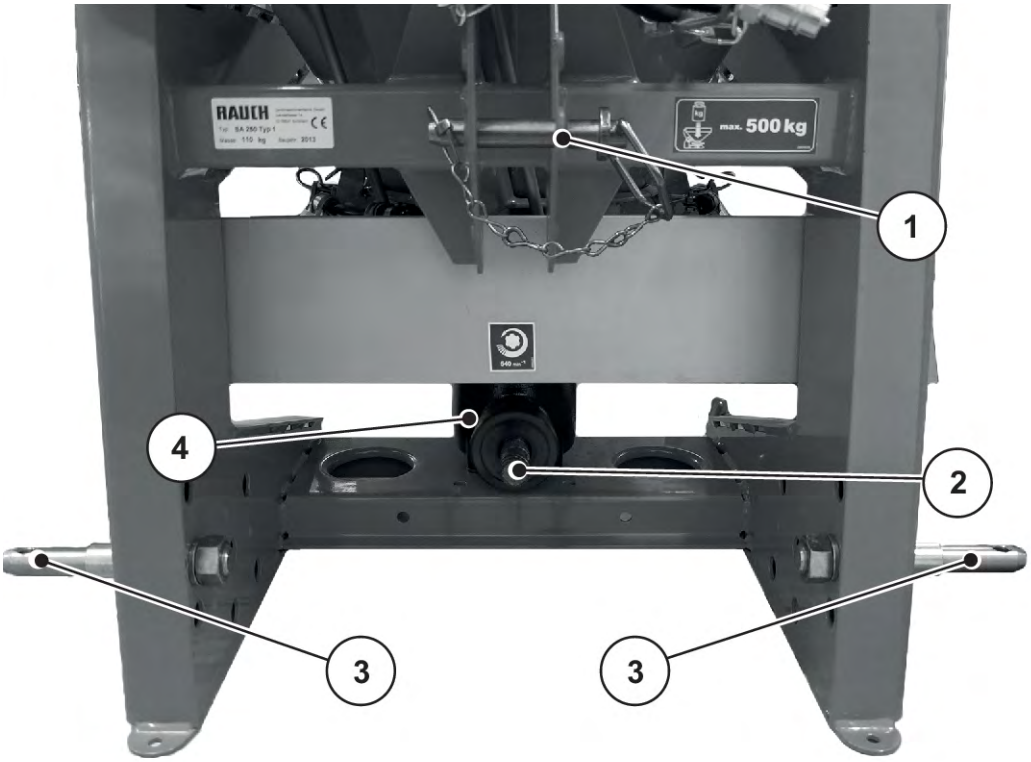



*Fig. 7: Assembly overview – back*

[1] Upper coupling point
[2] Transmission spigot
[3] Lower link pin
[4] Transmission

■ **Assembly overview, front (hydraulic drive)**

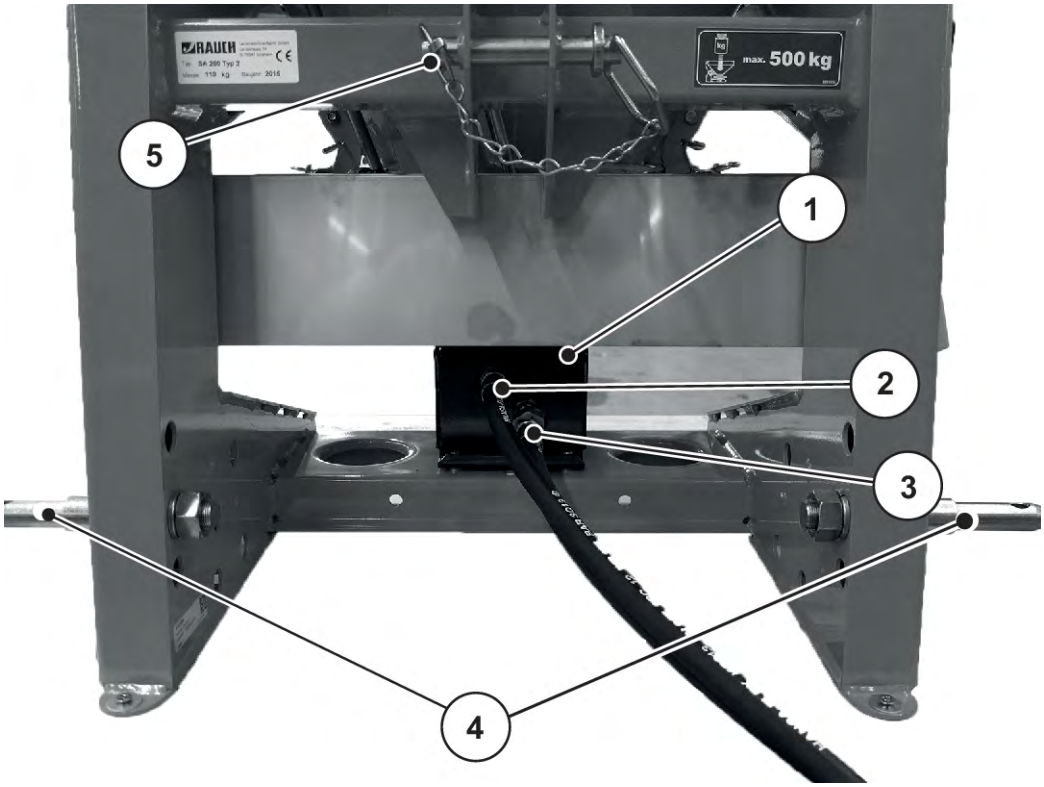



*Fig. 8: Assembly overview – front*

[1] Hydraulic motor
[2] Inflow
[3] Return flow
[4] Lower link pin
[5] Upper coupling point

## 4.3 Technical data for the basic equipment

| Data | SA 250 | SA 360 |
|---|---|---|
| Overall width | 88 cm | 100 cm |
| Overall length | 91 cm | 99 cm |
| Filling level (basic machine) | 107 cm | 118 cm |
| Distance between center of gravity and lower link coupling point | 290 cm | 295 cm |
| Filling width | 77 cm | |
| Working width (depending on spreading material and spreading disc type) | 0.8 m -6.0 m | 0.8 m -6.0 m |
| PTO speed | max. 540 rpm | max. 540 rpm |
| Hopper capacity | 250 l | 360 l |

| Data | SA 250 | SA 360 |
|---|---|---|
| Hydraulic pressure | max. 200 bar | max. 200 bar |
| 3-point attachment | Cat. I | Cat. I |

### 4.3.1 Weights and loads

The empty weight (mass) of the machine varies depending on the feature package and extension combination.

| Data | SA 250 | SA 360 |
|---|---|---|
| Empty weight | 110 kg | 120 kg |
| Spreading material load capacity | 500 kg | 500 kg |

## 4.4 Special equipment

We recommend that you have the extra equipment fitted and mounted on the basic machine by your supplier or an authorized service center.

Some models are not available in all countries.

The available special equipment depends on the country of use of the machine and is not listed fully here.

- Contact your dealer/importer if you need specific special equipment.

### 4.4.1 Hopper cover

A hopper cover can be fitted to protect the spreading material from humidity.

The hopper cover is screwed both to the main hopper as well as to the additionally mounted hopper extensions.

| Hopper cover | Application |
|---|---|
| TA 16 | • Basic hopper SA 250 |
| TA 17 | • Basic hopper SA 360 |

### 4.4.2 Electrical remote control

With the electrical remote control, the metering slide and/or the spreading width limiter can be operated from the tractor cabin.

For the electrical remote, a 12V connection (2-pin socket) is required at the tractor.

| Designation | Area of application | Scope of delivery |
|---|---|---|
| EF 26 | For opening/closing the metering slides | • Remote control box with plug, 2-pin<br>• Assembly plate<br>• Attachment components for the equipment to be remote-controlled<br>• Electric cylinder with 5 m cable |
| EF 12 | For adjusting the spreading width limiter | • Remote control box with plug, 2-pin<br>• Assembly plate<br>• Attachment components for the equipment to be remote-controlled<br>• Electric cylinder with 5 m cable |

For the EF 12 electrical remote control, a 2.5 m extension cable is available as an option.

### 4.4.3 Mechanical remote control

With the mechanical remote control, the metering slide and/or the spreading width limiter can be operated from the tractor cabin.

| Designation | Application | Scope of delivery |
|---|---|---|
| MFB 1 | For opening/closing the metering slides | • Push/pull cable, 2 m long<br>• Adjustment lever with attachment parts for tractor installation |
| MFB 3 | For adjusting the spreading width limiter | • Push/pull cable, 3 m long<br>• Adjustment lever with attachment parts for tractor installation |

### 4.4.4 Hydraulic remote control (metering slide)

With the hydraulic remote control, the metering slide can be operated from the tractor cabin.

| Designation | Area of application | Scope of delivery |
|---|---|---|
| FHZ 8 | For opening/closing the metering slides | • with single-acting hydraulic cylinders<br>• Hydraulic hose 1.75 m long |

### 4.4.5 Spreader apron

| Spreader apron | Dimensions | Application |
|---|---|---|
| Spreader apron | 120 cm wide | Basic hopper SA 250/360 |

### 4.4.6 Agitator

■ ***Agitator for granular fertilizer***

*Fig. 9: Agitator for granular fertilizer*

■ ***Agitator for grit and grit-salt mixture***

*Fig. 10: Agitator RWK 4*

■ ***Agitator for grit***

*Fig. 11: Agitator RWK 5*

■ ***Agitator for salt and sand***

**NOTICE!**

**Material damage due to incorrect agitator/spreading material pairing**

Using the RWK 2 agitator for spreading grit can lead to damage to the transmission and the hydraulic motor.

▶ Only use the spreading material approved for the installed agitator.

*Fig. 12: Agitator RWK 2*

### 4.4.7 Combined lower link pin

| Category | For lower link spacing on tractor up to |
|---|---|
| Cat. I N | Approx. 440 mm |
| Cat. II | Approx. 683 mm |

### 4.4.8 Hydraulic drive

For the hydraulic drive (instead of a PTO drive), a single-acting control valve and an oil return connection on the tractor are required.

With smaller working widths and good spreading material quality, the agitator speed can be reduced.

### 4.4.9 Auxiliary lighting

The machine can be fitted with auxiliary lighting.

| Designation | Application |
|---|---|
| BLW 7 | • with warning sign |

# 5 Axle load calculation

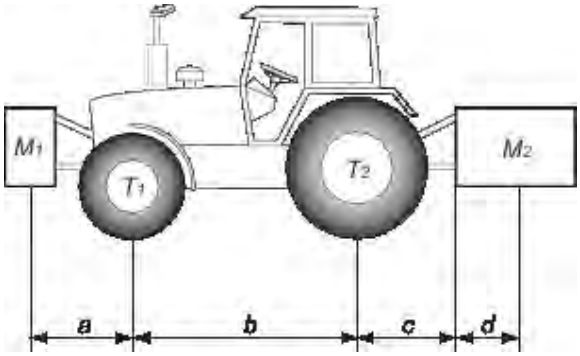
**⚠ WARNING!**

**Overload**

Mounted units on the front or rear three-point linkage must not cause the approved total weight to be exceeded.

- ▶ Before using the machine, ensure that these conditions are met.
- ▶ Implement the following calculations or weigh the tractor machine combination.

Define the total weight, axle loads, tire capacity and minimum additional mass:
The following values are required for the calculation:




| Description | Units | Description | Obtained by |
|---|---|---|---|
| T | kg | Tractor unladen weight | Refer to the tractor operator's manual<br>Measure on scale |
| T1 | kg | Unladen load on tractor front axle | Refer to the tractor operator's manual<br>Measure on scale |
| T2 | kg | Empty load on tractor rear axle | Refer to the tractor operator's manual<br>Measure on scale |
| t | kg | Axle loads (Tractor + machine) | Measure on scale |
| t1 | kg | Load on front axle (Tractor + machine) | Measure on scale |
| t2 | kg | Load on rear axle (Tractor + machine) | Measure on scale |
| M1 | kg | Total weight of front tool or front ballast | Refer to the machine price-list or operator's manual<br>Measure on scale |

| Description | Units | Description | Obtained by |
|---|---|---|---|
| M2 | kg | Total weight of rear tool or rear ballast | Refer to the machine price-list or operator's manual<br>Measure on scale |
| a | m | Distance between the tools' center of gravity or the front ballast and the front axle center | Refer to the machine price-list or operator's manual<br>Dimensions |
| b | m | Distance between the tractor axles | Refer to the tractor operator's manual<br>Dimensions |
| c | m | Distance between the rear axle center and the center of the lower link ball joints | Refer to the tractor operator's manual<br>Dimensions |
| d | m | Distance between the center of the lower link ball joints and the center of gravity of the rear tool or rear ballast | Refer to the machine price-list or operator's manual |

**Rear tool or front-rear combination:**

| **1) Calculation of the minimum front ballast weight: M1 minimum** |
|---|
| M1 minimum = [ M2 x (c+d) - T1 x b + 0.2 x T x b ] / [a+b] |
| Write the minimum additional weight in the chart. |

**Front tool:**

| **2) Calculation of the minimum rear ballast weight M2: minimum** |
|---|
| M2 minimum = [ M1 x a - T2 x b + 0.45 x T x b] / [ b + c + d ] |
| Write the minimum additional weight in the chart. |

| **3) Calculation of the actual load on the front axle: T1 real** |
|---|
| If the front tool (M1) is lighter than the minimum load required at the front (minimum), increase tool weight until the required minimum front load is reached |
| T1 real = [ M1 x (a+b) + T1 x b - M2 x (c+d) ] / [ b ] |
| Indicate front axle calculated load value and the one indicated in the tractor operator's manual. |

| **4) Calculation of the total weight: M real** |
|---|
| If the rear tool (M2) is lighter than the minimum load required at the rear(minimum), increase tool weight until the required minimum rear load is reached |

| **4) Calculation of the total weight: M real** |
|---|
| M real = M1 + T + M2 |
| Indicate calculated total load value and the one authorized as indicated in the tractor operator's manual. |

| **5) Calculation of the actual rear axle load: T2 real** |
|---|
| T2 real = M real - T1 real |
| Indicate rear axle calculated load value and the one indicated in the tractor operator's manual. |

| **6) Tire carrying capacity** |
|---|
| Indicate double (2 tires) the authorized load value (see tire manufacturer indications). |

**Table:**

| | **Actual value obtained by calculation** | **Value authorized according to operator's manual** | **Double value of the authorized capacity per tire (2 tires)** |
|---|---|---|---|
| Minimum front/rear ballasting | kg | | |
| Total weight | kg | kg | |
| Load on front axle | kg | kg | kg |
| Load on rear axle | kg | kg | kg |
| | The minimum ballasting must be made by fitting a tool or an additional mass to the tractor.<br>The values obtained must be below or equal the authorized values. | | |

# 6 Transport without tractor

## 6.1 General safety instructions

Read the following instructions before transporting the machine:

- Without tractor, the machine may only be transported with an empty hopper.
- Only suitable, instructed and expressively authorized persons may execute the work.
- Suitable means of transportation and lifting equipment (e.g., crane, forklift truck, lifting tackle ...) are to be used.
- Establish the transportation route in good time and remove possible obstacles.
- Check that all safety and transportation devices are fully operational.
- Secure all danger areas appropriately, even if they only exist briefly.
- The person responsible for transportation ensures that the machine is transported appropriately.
- Unauthorized persons are to be kept away from the transport route. Cordon off the affected areas!
- Transport the machine cautiously and handle it with care.
- Ensure that allowances are made for the center of gravity. If necessary, adjust the cables to ensure that the machine is correctly aligned on the means of transport.
- Transport the machine to the set-up location as close to the ground as possible.

## 6.2 Loading and unloading, parking

▶ Determine the weight of the machine.

  ▷ Check the details on the name plate.

  ▷ Take the weight of mounted optional equipment into account.

▶ Carefully lift the machine with suitable lifting equipment.

▶ Carefully place the machine on the loading platform of the transportation vehicle or on solid ground.

# 7 Commissioning

## 7.1 Accepting the machine

When accepting the machine, please check the completeness of the delivery.

The standard equipment includes:
- Single disc spreader of the SA series
- 1 operator’s manual SA 250
- Upper link pin Category 0/1
- 1 universal drive shaft including operator’s manual ((not included in the case of a hydraulic motor or direct drive with single-axis machines)
- 1 agitator
- 1 protective grid in hopper

Please also check any additionally ordered optional equipment.

Check for any transport damage or missing parts. Have any shipping damage confirmed by the forwarding agent.

When receiving the machine, check that attached components are correctly and tightly positioned.

In case of doubt, please contact your dealer or the factory directly.

## 7.2 Tractor requirements

To ensure safe and correct use of the machine of the SA series, the tractor must meet the necessary mechanical, hydraulic, and electrical requirements.

- Universal drive shaft connection: 1 3/8 inches, 6 splines, 540 rpm,
- Operating voltage: 12 V
- Three-point linkage category Kat. I
- Oil supply: Max. 200 bar

**Additionally for drive with hydraulic motor type 100 cm³**

- 1 single-acting control unit
- 1 oil return flow connection
- Flow rate of at least 20l/min to max. 40l/min

**Additionally for drive with hydraulic motor type 200 cm³**

- 1 single-acting control unit
- 1 oil return flow connection
- Flow rate of at least 45l/min to max. 65l/min

## 7.3 Mounting the universal drive shaft on the machine

**⚠DANGER!**

**Danger of pulling in on the rotating universal drive shaft**

Installing and removing the universal drive shaft while the motor is running may cause serious injuries (crushing, pulling into the rotating shaft).

- ▶ Turn the tractor engine off and remove the ignition key.
- ▶ Make sure that the universal drive shaft cover is in good condition.

***NOTICE!***

**Material damage due to an unsuitable universal drive shaft**

The machine is equipped with a universal drive shaft that is designed according to the device and performance.

The use of incorrectly dimensioned or inadmissible drive shafts, for instance without guard or suspension chain, may cause personal injury or lead to damage to the tractor and/or the machine.

- ▶ Use only universal drive shafts approved by the manufacturer.
- ▶ Follow the directions in the operator’s manual of the universal drive shaft manufacturer.

### 7.3.1 Check length of the PTO drive shaft

- Check the length of the universal drive shaft when it's first attached to the tractor.
  - Drive shaft tubes that are too long could damage the universal drive shaft and the machine.

Observe the installation and shortening instructions provided in the operator's manual of the universal drive shaft manufacturer when checking and adjusting the universal drive shaft. The operator’s manual is attached to the drive shaft on delivery.

### 7.3.2 Mounting/dismounting the universal drive shaft

- ▶ Check the mounting position.

  *The drive shaft end that is marked with a tractor symbol must point to the tractor.*
- ▶ Release the lock on the universal drive shaft guard.

- ▶ Rotate the plastic ring in the bayonet lock of the universal drive shaft cover by means of a screwdriver.
- ▶ Pull the universal drive shaft guard backwards.
- ▶ Hold the universal drive shaft guard and the clamp in an open position with your hand.

*Fig. 13: Opening the universal drive shaft guard*

- ▶ Grease the transmission spigot. Place the universal drive shaft on the transmission spigot.

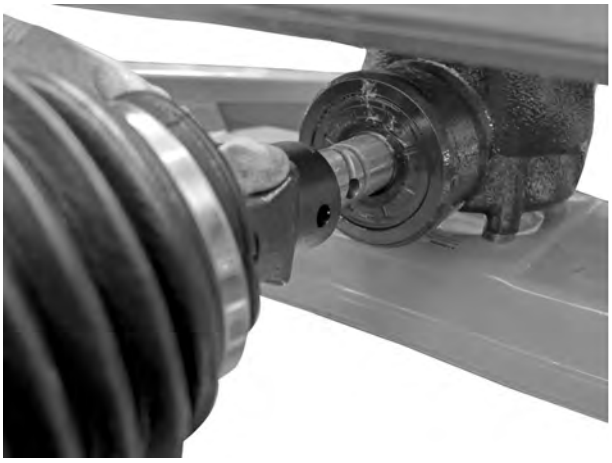


*Fig. 14: Pushing the universal drive shaft onto the transmission spigot*

- Tighten the hex cap screw and nut using a size 17 wrench (max. 35 Nm).

*Fig. 15: Connecting the universal drive shaft*

- Push the universal drive shaft guard with hose clamp over the universal drive shaft and attach it to the transmission neck.
- Tighten the hose clamp.

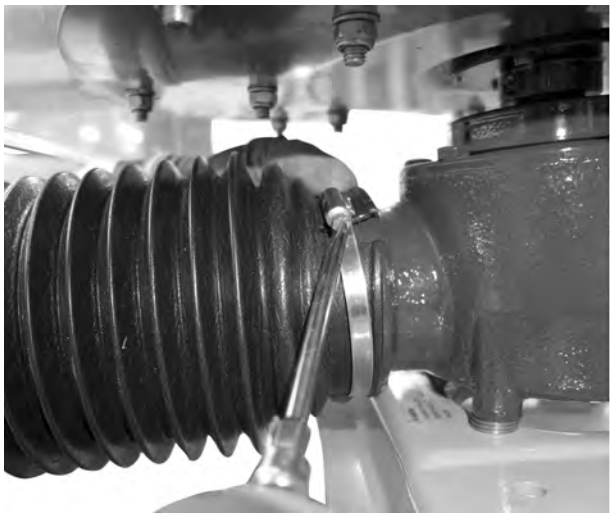


*Fig. 16: Mounting the universal drive shaft guard*

- Rotate the plastic ring until it reaches its locking position.
- Press the lock on the universal drive shaft guard into a closed position.

*Fig. 17: Securing the universal drive shaft cover*

**Notes for removal:**

- Dismount the universal drive shaft in reverse order of mounting.

## 7.4 Installing the machine at the tractor

### 7.4.1 Preconditions

**⚠ DANGER!**

**Danger to life due to unsuitable tractor**

Using an unsuitable tractor for the machine may result in severe accidents during operation or road travel.

- ▶ Only use tractors that comply with the technical requirements of the machine.
- ▶ Refer to the vehicle documents in order to check whether the tractor is suitable for the machine.

**Check the following specific preconditions:**

- Are both the tractor and the machine safe to operate?
- Does the tractor comply with the mechanical, hydraulic, and electrical requirements?
- Do the mounting categories of the tractor and the machine match (if necessary, consult your dealer)?
- Is the machine securely positioned on level and solid ground?
- Do the axle loads conform to the stipulated calculations?

### 7.4.2 Mounting the machine

**⚠ DANGER!**

**Danger to life due to carelessness or incorrect operation**

There is a crushing hazard that may result in fatal injury for persons standing between the tractor and the machine when the tractor approaches or the hydraulic system is actuated.

The tractor may brake too late or not at all because of carelessness or incorrect operation.

- ▶ Ensure that nobody is present in the hazard zone between the tractor and the machine.

**⚠ DANGER!**

**Risk of tipping or falling**

There are no anchor or lifting points provided on the attachments or the frame of the machine.

If the machine is lifted or moved on the attachments or the frame, it may tip over or fall. There is a risk of death.

- ▶ Fasten the machine to a pallet.

- The machine is installed at the three-point linkage (rear power lift) of the tractor.

■ ***Mounting instructions***

- Always install the machine horizontally.
- The bottom and upper link pins must be secured with linch pins or spring clips.
- Attach the machine according to the values in the fertilizer chart. This guarantees correct cross-distribution of the fertilizer.
- Any oscillating movements during spreading are to be avoided. Make sure that the machine does not have too much play to the sides.


*Fig. 18: Secured pin*

■ ***Setting the mounting height***

The information on the mounting height refers to the distance between the lower edge of the spreading disc and the ground with a horizontally mounted machine. The specified mounting height [dimension **A**] is **50 cm**.

▶ Measure the distance between the lower edge of the frame and the ground.

▷ The distance must be **27 cm** [dimension **B**].

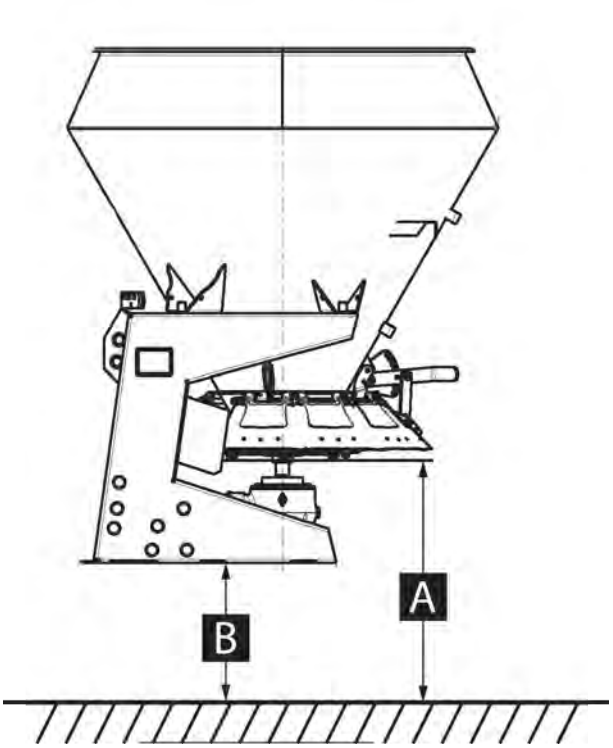



*Fig. 19: Setting the mounting height*

A 70 cm B 45 cm

To protect against inadvertently touching the spreading discs, the distance between the lower edge of the frame and the ground must not exceed 120 cm [dimension B]. This corresponds to a maximum admissible mounting height of the machine of 145 cm [dimension A].

■ ***Mounting the machine with universal drive shaft***

- ▶ Start the tractor.
  - ▷ Check: The PTO shaft is switched off.
- ▶ Move the tractor to the machine.
  - ▷ Do not latch the lower link hooks into place yet.
  - ▷ Make sure there is enough space between the tractor and the machine in order to be able to connect the drives and control elements.
- ▶ Switch off the tractor engine. Pull the hand brake of the tractor. Remove the ignition key.
- ▶ Mount the universal drive shaft on the tractor.
- ▶ From the tractor cab, connect the lower link hooks and the upper link to the designated coupling points; please refer to the operator's manual of the tractor.
- ▶ Check that the machine is securely positioned.
- ▶ Carefully lift the machine to the desired lifting height.

**NOTICE!**

**Material damage caused by a universal drive shaft that is too long**

When the machine is lifted up, the halves of the universal drive shaft can come into contact with each other. This may cause damage to the universal drive shaft, to the gearbox or the machine.

- ▶ Check the clearance between the machine and the tractor.
- ▶ Make sure that there is enough space (at least 20 to 30 mm) between the outer pipe of the universal drive shaft and the protective cone on the spreading side.

- ▶ Shorten the universal drive shaft, if required.

**Only** your dealer or your specialist workshop may shorten the universal drive shaft.

Observe the installation and shortening instructions provided in the operator's manual of the universal drive shaft manufacturer when checking and adjusting the universal drive shaft. The operator's manual is attached to the drive shaft on delivery.

### ■ *Connecting the hydraulic drive*

Depending on the model, the machine may be equipped with a hydraulic motor as a drive for the spreading disc and the agitator.

A single-acting control valve and a free return flow are needed on the tractor. An additional check valve is installed in the return line.

The hydraulic drive is connected to the tractor via 2 hydraulic hoses.

- ▶ Connect the plug with the red protective cap to the pressure line.
- ▶ Connect the plug with the blue protective cap to the return line.
- ▶ Do not allow removed hydraulic hoses to hang down to the ground.
- ▶ Always put a dust cap on the uncoupled hydraulic hoses.

## 7.5 Mounting the agitator

**Requirements:**

- PTO and tractor engine are switched off and locked to prevent unauthorized starting.

- The agitator is fixed with a bayonet lock.
- The agitators offered can be found under *4.4.6 Agitator*
- For dismounting the agitator, please refer to *11.7 Replacing the agitator*

- ▶ Open the hex cap screw at the protective grid.
- ▶ Remove the protective grid.
- ▶ Grease the transmission shaft.
- ▶ Put the agitator onto the transmission shaft.

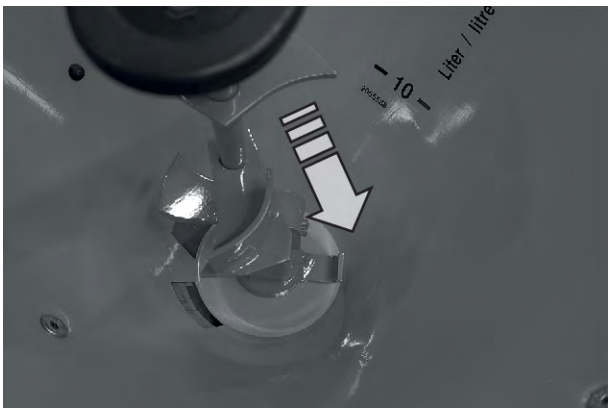



*Fig. 20: Agitator in the hopper*

- ▶ Turn the agitator counterclockwise until it reaches the stop.

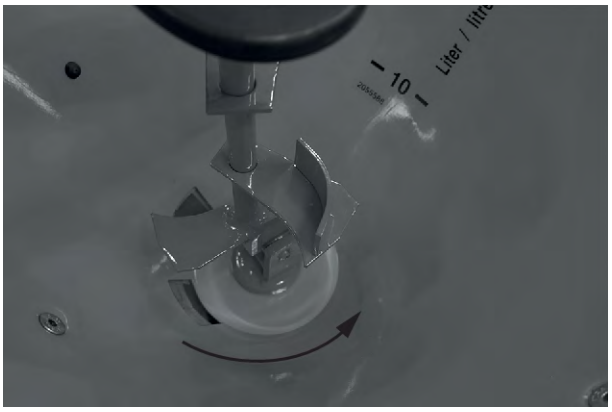



*Fig. 21: Agitator mounted*

## 7.6 Setting the spreading vane

**Requirements:**

- PTO and tractor engine are switched off and locked to prevent unauthorized starting.

Dispose of the self-locking nuts after releasing them and replace them with new ones. See *11.6 Spreading vane replacement*

### 7.6.1 Increasing the spreading density on the right in direction of travel

▶ Dismount the screws of the spreading vanes with the respective nuts and washers.

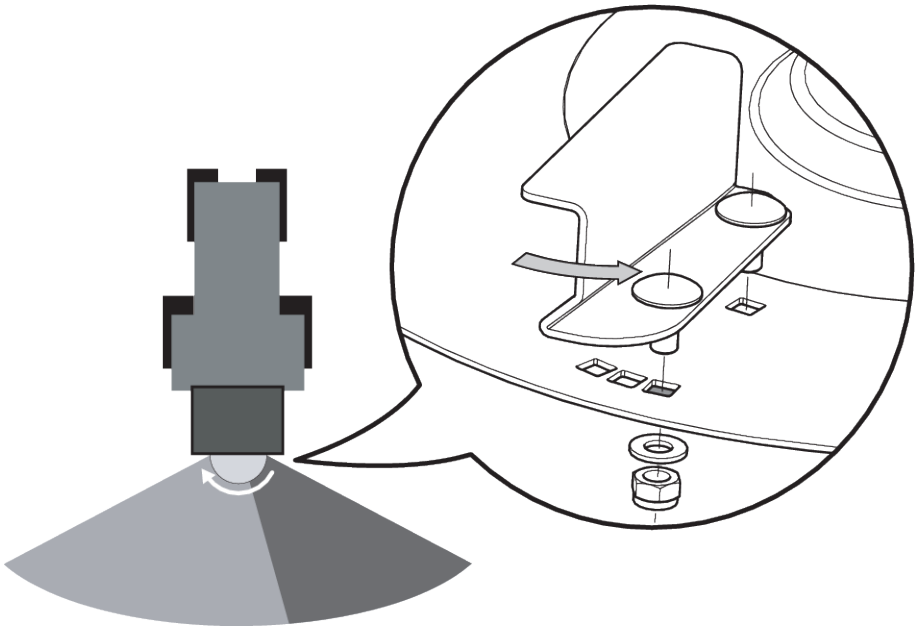


*Fig. 22: Spreading density on the right in direction of travel*

White arrow: Rotational direction of spreading disc

Grey arrow: Adjustment of the spreading vanes against the rotary direction of the spreading disc

▶ Reset the spreading vanes against the rotary direction of the spreading disc.

*With this setting, the spreading material is ejected* **earlier**.

▶ Screw on the spreading vane (tightening torque: approx. 18 Nm). For this purpose, always use new self-locking nuts.

*The spreading density on the right-hand side viewed in the direction of travel is increased.*

### 7.6.2 Spreading density on the left in direction of travel

▶ Dismount the screws of the spreading vanes with the respective nuts and washers.

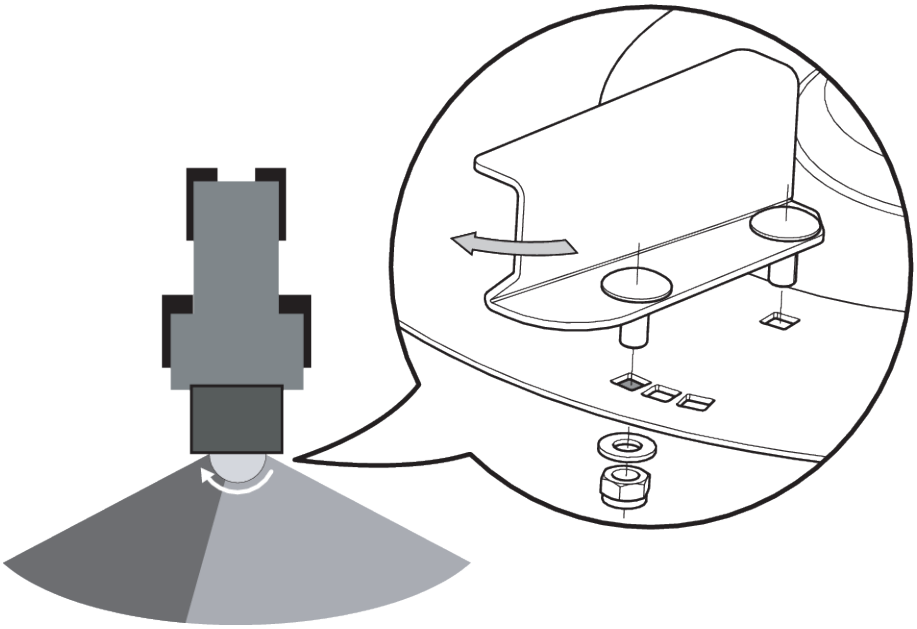


*Fig. 23: Spreading density on the right in direction of travel*

White arrow: Rotational direction of spreading disc

Grey arrow: Adjustment of the spreading vanes in the rotary direction of the spreading disc

▶ Set the spreading vanes forward against the rotary direction of the spreading disc.

*With this setting, the spreading material is ejected* **later**.

▶ Screw on the spreading vane (tightening torque: approx. 18 Nm). For this purpose, always use new self-locking nuts.

*The spreading density on the left-hand side viewed in the direction of travel is increased.*

## 7.7 Filling the machine

**⚠DANGER!**

**Danger of injury due to running engine**

Working on the machine with the engine running may result in serious injury caused by mechanical components and escaping spreading material.

- ▶ Wait until all moving parts have come to a complete stop before making any adjustments or performing maintenance work.
- ▶ Switch off the tractor engine.
- ▶ Remove the ignition key.
- ▶ Ensure that nobody is present **in the hazard zone**.

**⚠DANGER!**

**Danger due to inadmissible overall weight**

Exceeding the overall weight can lead to breakage during operation and negatively affects the operational and road safety of the vehicle (machine and tractor).

Serious personal injury is possible as well as material and environmental damage.

- Always observe the information in chapter *4.3 Technical data for the basic equipment*.
- Prior to filling, determine the maximum quantity to be loaded.
- Observe the admissible overall weight.

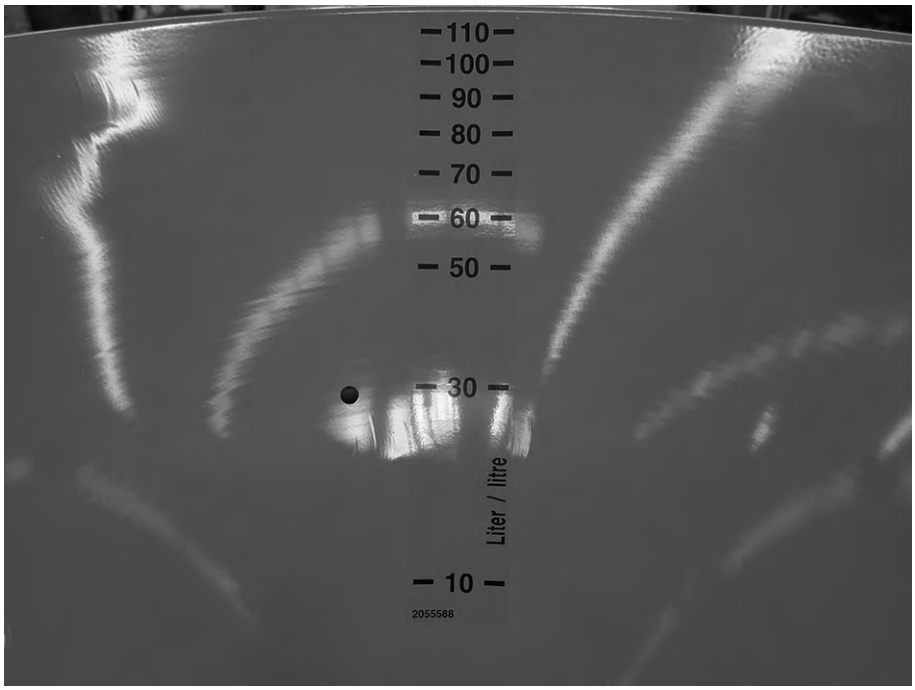



*Fig. 24: Fill level indicator*

- ▶ Close the metering slide.
- ▶ When determining the maximum admissible load, observe the specific weight of the spreading material (kg/l).
  - ▷ The weight of the spreading material depends on the type of the spreading material (e.g., grit, sand, fertilizer) and its condition (dry, damp).
- ▶ **Only** fill the machine when it is attached to the tractor. Make sure that the tractor is standing on level and solid ground.
- ▶ Secure the tractor against moving. Apply the handbrake.
- ▶ Switch off the tractor engine and remove the ignition key.
- ▶ Fill the machine with auxiliary equipment (e.g., front-end loader, screw conveyor, silo).
- ▶ When manually filling it (e.g., loading it with big bags), use suitable steps.
- ▶ Maximally fill the machine up to the edge.

*The machine is filled.*

## 7.8 Overviews

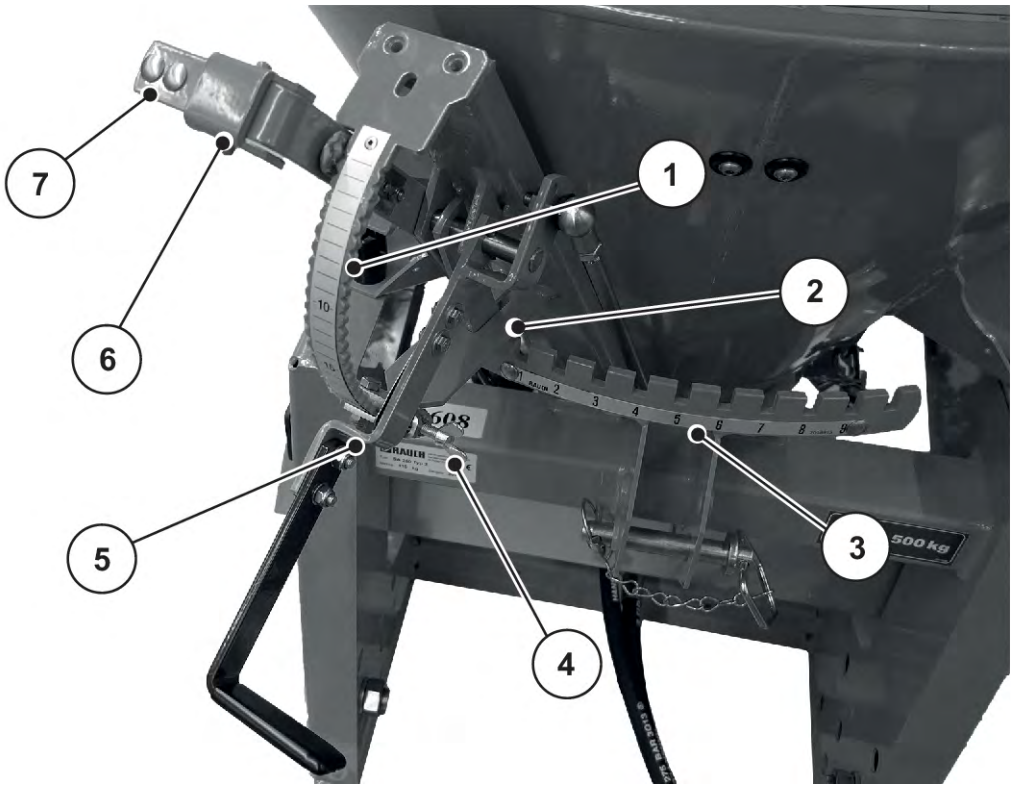



*Fig. 25: Setting elements on the machine, front*

[1] Numeric scale: Application rate setting
[2] Feed point locking mechanism
[3] Feed point numeric scale
[4] Metering slide stop
[5] Adjustment lever: Metering slide, left
[6] Locking mechanism: Synchronous adjustment of the adjustment lever
[7] Adjustment lever: Metering slide, right

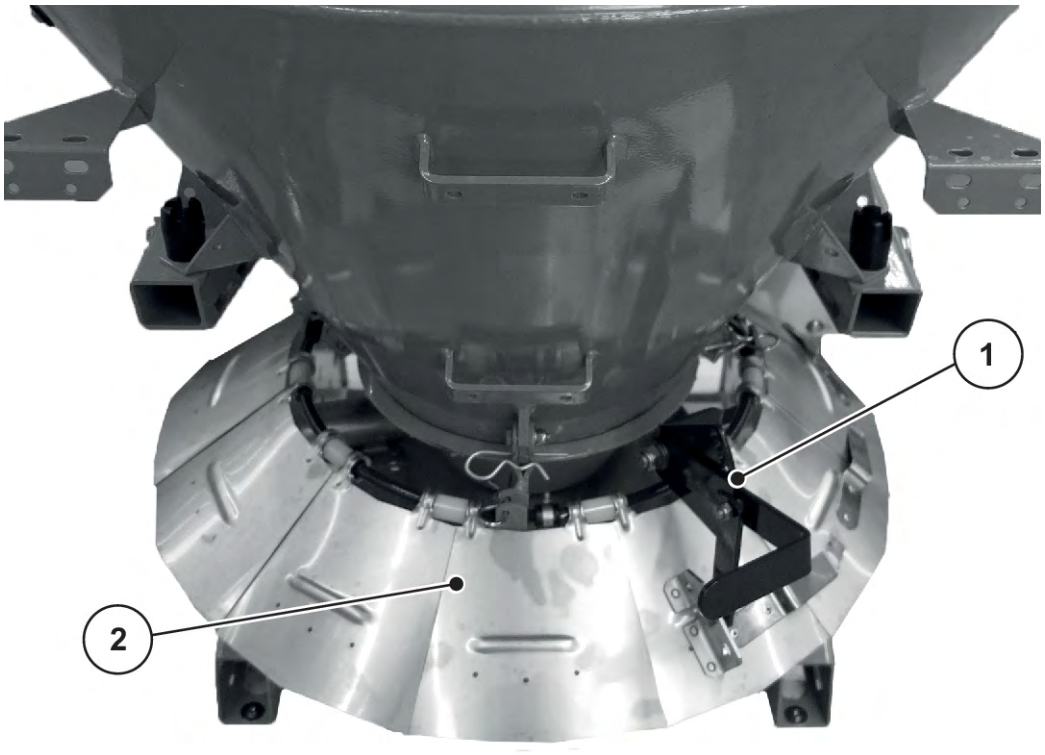



*Fig. 26: Spreading width limiter setting*

[1] Adjustment lever with position holes

[2] Spreading width limiters

# 8 Calibration

For precise control of the discharge amount, we recommend running a new calibration test every time the spreading material type is changed.

Execute the calibration:

- Before spreading for the first time
- If the spreading material quality has changed significantly (moisture, high dust content, granulate damage)
- If a new spreading material is used

The calibration must be conducted while the PTO shaft is running at a standstill or during travel over a test track.

## 8.1 Determining the output volume

- Calculate the nominal output volume before starting the calibration test.

The exact forward speed must be known to calculate the nominal output volume.

**To calculate the nominal output volume per minute, you will require the following:**
- Forward speed,
- Working width,
- Desired application rate

**Example:** You wish to calculate the nominal output rate.
- Your forward speed is **3 km/h**,
- The working width is specified to be **4 m**,
- The application rate should be 50 g/m².

If you cannot find your values in the spreading material chart, the nominal output rate is to be determined by means of a formula.

$$\text{Nominal output rate (kg/min)} = \frac{\text{Forward speed (km/h) x working width (m) x application rate (g/m2)}}{60}$$

Example

$$\frac{\text{3 km/h x 4 m x 50 g/m2}}{60} = \text{10 kg/min}$$

## 8.2 Implementing the calibration test

**⚠WARNING!**

**Risk of injury due to chemicals**

Escaping fertilizer may lead to injury to eyes and nasal mucous membranes.

- ▶ Wear safety goggles during calibration.
- ▶ Follow the manufacturer's warnings when handling chemicals. Wear the recommended personal protective equipment (PPE).
- ▶ Before running the calibration test, ensure that all people leave the hazard zone of the machine.

**Requirements:**

- The metering slide is closed.
- PTO and tractor engine are switched off and locked to prevent unauthorized starting.
- An adequately sized hopper is ready for collecting the discharged spreading material. The hopper’s empty weight is known.
- Using the spreading material chart, the pre-set values for the metering slide stop are determined and known.
- There is sufficient spreading material in the hopper.

Select the calibration time to obtain the maximum possible spreading material discharge quantity. The higher the quantity, the higher the precision of the measurement (e.g., Nominal output rate: 10 kg/min, calibration test time: 3 min, used spreading material quantity: 30 kg).

- ▶ Mount the agitator indicated in the spreading material chart for the respective spreading material. See *4.4.6 Agitator*
- ▶ Fill the machine.
- ▶ Place a foil or a hopper for collecting the spreading material under the machine.
- ▶ Set the adjustment lever of the spreading width limiter to the lower stop (lowest spreading width).
- ▶ Set the metering slide stop to the scale value from the spreading material chart.
- ▶ Switch on the tractor and the PTO shaft.
- ▶ Open the metering slide for the calibration test time specified before (e.g., 60 seconds). Close the metering slide when this time has elapsed.
- ▶ Switch off the PTO shaft and the tractor. Remove the ignition key.
- ▶ Determine the collected weight.
- ▶ Compare the actual quantity with the target quantity.

**Actual volume = nominal volume: The adjustment lever at the metering slide is set correctly. End calibration test.**

**Actual volume < nominal volume: Set the adjustment lever at the metering slide to a higher scale value and repeat the calibration test.**

**Actual volume > nominal volume: Set the adjustment lever at the metering slide to a lower scale value and repeat the calibration test.**

# 9 Spreading operation

**⚠DANGER!**

**Danger of injury due to running engine**

Working on the machine with the engine running may result in serious injury caused by mechanical components and escaping spreading material.

- ▶ Wait until all moving parts have come to a complete stop before making any adjustments or performing maintenance work.
- ▶ Switch off the tractor engine.
- ▶ Remove the ignition key.
- ▶ Ensure that nobody is present **in the hazard zone**.

**⚠WARNING!**

**There is a risk of injury by crushing and shearing in the application rate setting areas!**

Moving the adjustment lever can lead to severe injuries to the fingers.

- ▶ Never put your fingers in the movement direction of the adjustment levers.
- ▶ Never put your fingers between the adjustment lever and the scale plate.

## 9.1 General information

The modern technology and design of our machines and exhaustive, continuous testing in the factory's spreading material test system ensure that you will have a perfect spreading pattern.

In spite of the care taken during machine manufacture, deviations in application or other faults are possible even with designated usage.

Reasons for this may be:

- Changes in the physical properties of the spreading material (such as variable grain size distribution, variable density, grain size and surface, and moisture)
- Clumping and damp spreading material
- Wind drift: stop spreading at high wind speeds.
- Blockages or bridge formation (e.g., due to foreign objects, bag residue, wet spreading material).
- Uneven ground
- Abrasion of wear parts, e.g., agitator, spreading vanes, outlet.
- Damage from external causes
- Poor cleaning and care for preventing corrosion
- Incorrect drive speeds and forward speeds
- Calibration test has not been carried out or calibration test has been carried out with incorrect values (e.g., incorrect PTO speed)
- Incorrect machine settings

Cleaning the machine after each use prevents deposits at the hopper base. You can thus reduce the wear of the agitator and increase the operational reliability of your machine.

- ▶ Pay close attention to the machine settings. Even a slightly incorrect setting may adversely affect the spreading pattern.
- ▶ Check that your machine is working properly and that the application is sufficiently precise before every use of the spreader and during work (carry out a calibration test).

Particularly hard spreading material types (such as grit) increase the wear on the spreading vanes.

- ▶ **Always** use the protective grid supplied to prevent blockages, e.g., caused by foreign objects or fertilizer clumping.
- ▶ For spreading, select the PTO speed and/or the spreading disc speed with which you have carried out the calibration test.

Claims for damage other than to the machine will not be accepted.

**This also means that no liability will be accepted for damage resulting from spreading errors.**

## 9.2 General information on the agitator

Depending on the spreading material, 4 different agitators are available. Please also refer to *4.4.6 Agitator*

| Agitator type | Application/spreading material | See |
|---|---|---|
| RWK 5 | Grit | Page:*31* |
| RWK 2 | Sand and salt | Page:*31* |
| RWK 4 | Grit-salt mixture | Page:*30* |
| RWK 17 | Granular fertilizer | Page:*30* |

***NOTICE!***

**Possible material and environmental damage**

The rotating agitator may lead to an increased wear or hardening of the spreading material if the metering slide is closed.

This hardening can impact or completely hinder the discharge of spreading material.

- ▶ Always deactivate the agitator when the metering slide is closed.

## 9.3 Instructions regarding the spreading operation

The intended use of the machine includes compliance with the operating, maintenance, and service conditions in accordance with the manufacturer specifications. **Spreading** therefore always includes **preparation** and **cleaning/maintenance**.

**⚠ DANGER!**

**Danger of injury when spreading**

Contact with rotating machine components (universal drive shaft, spreading disc, agitator) may cause injury. Body parts or objects may be caught or pulled in.

▶ **Only** spread material with the protective grid installed.

- Carry out spreading operations in accordance with the sequence described below.

**Preparation**

▶ Install the machine at the tractor: *42*

▶ Close the metering slide.

▶ Set the mounting height: *44*

▶ Fill the machine: *48*

▶ Run the calibration test: *53*

▶ Set the spreading width limiter: *62*

**Spreading**

▶ Travel to the spreading location

▶ Switch on the drive.

▶ Open the metering slide and start spreading operations.

▶ Finish spreading operations and close the metering slide.

▶ Turn off the drive.

▶ Discharge residual material: *74*

**Cleaning/maintenance**

▶ Open the metering slide.

▶ Remove the machine from the tractor.

▶ Clean and maintain the machine: *84*

## 9.4 Setting the application rate

**NOTICE!**

**Material damage caused by an insufficient metering slide opening**

Insufficiently opened metering slides may lead to blocking and cause damage to the spreading material. Increasing wear occurs at the agitator.

▶ Select an adequately large opening for the metering slide at which the spreading material can flow out unhindered.

You can set the application rate via the metering slide opening at the numeric scale on the scale plate.

For this purpose, adjust the stop for the metering slide to the position determined according to the fertilizer chart or by means of a calibration test. This is the stop position that the slide must be opened to before the spreading run. Actuation can be mechanical, hydraulic or electric (depending on the model).

- Adjusting it downwards, in the direction of higher values, opens the metering slide.
- Adjusting it upwards, in the direction of lower values, closes the metering slide.

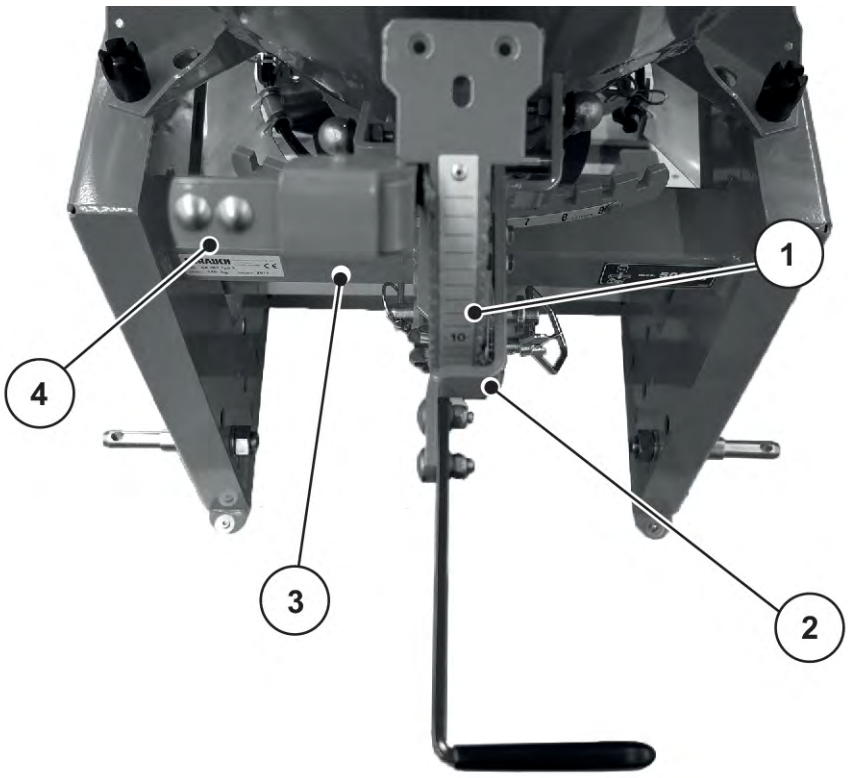



*Fig. 27: Application rate setting*

[1] Numeric scale
[2] Left-hand adjustment lever for metering slide
[3] Locking mechanism: Synchronously adjusts both metering slides
[4] Right-hand adjustment lever for metering slide

### 9.4.1 Actuating both metering slides together

- ▶ Close both metering slides completely.
- ▶ Push the locking mechanism [3] to the right, in the direction of the adjustment lever for the left-hand metering slide.
- ▶ Move both adjustment levers for metering slides to the determined position.

### 9.4.2 Actuating the metering slides separately

- ▶ Close both metering slides completely.
- ▶ Push the locking mechanism [3] to the left, in the direction of the adjustment lever for the right-hand metering slide.
- ▶ Position the stop at the lower end of the numeric scale or on the greater value for both metering slides.
- ▶ Move the adjustment levers for the metering slides to the determined position.

## 9.5 Adjusting the drop point

■ ***Symmetrical spreading pattern***

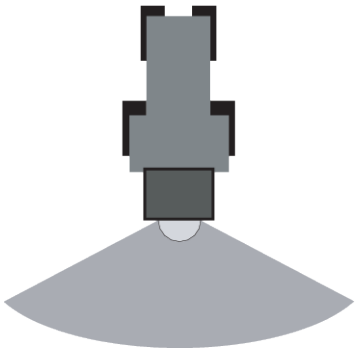


*Fig. 28: Symmetrical spreading pattern*

■ ***Asymmetrical spreading pattern***

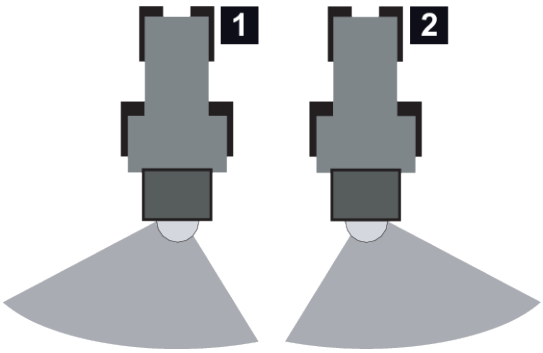


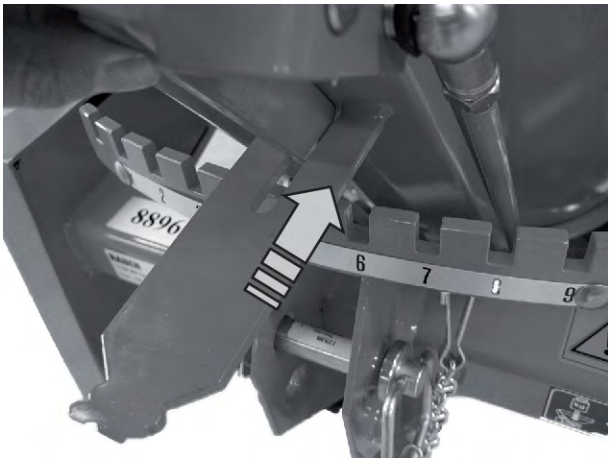

*Fig. 29: Asymmetrical spreading pattern*

[1] Spreading to the left (in the direction of travel)

[2] Spreading to the right (in the direction of travel)

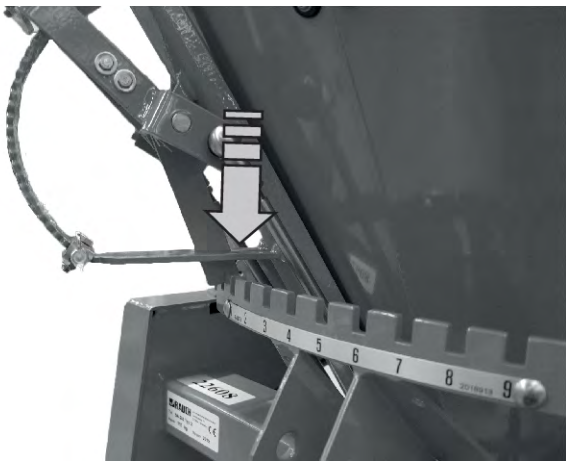
### 9.5.1 Adjusting the drop point

▶ Release the locking mechanism.




▶ Turn the adjusting element in the desired direction.

▶ Insert the locking mechanism in the desired position.



## 9.5.2 Asymmetrical spreading pattern

Proceed as described below to discharge a different amount of spreading material on each side.

The directions refer to the direction of travel.

**Spread only to the right**

▶ Open the left adjustment lever.

▶ Insert the outflow funnel (adjustment segment) into position 9.

▶ Close the right adjustment lever.

*Fertilizer will only be spread to the right.*

**Spread only to the left**

▶ Open the right volume adjustment lever.

▶ Insert the outflow funnel (adjustment segment) into position 1.

▶ Close the left volume adjustment lever.

*Fertilizer will only be spread to the left.*

If adjusting the feed point is not sufficient to set the desired spreading pattern, the spreading vanes on the spreading discs can be adjusted.

- See*Chapter 7.6 - Setting the spreading vane - Page 47*

## 9.6 Set the spreading width limiter

Using different positions, the spreading width limiter makes spreading widths of approx. **0.8 m - 6 m** possible at a mounting height of **approx. 70 cm** (see mounting height specification *44*).

Check to make sure that the spreading width limiter is in good condition. Damaged or bent elements of the spreading width limiter impact the spreading pattern.

**Adjustment:**

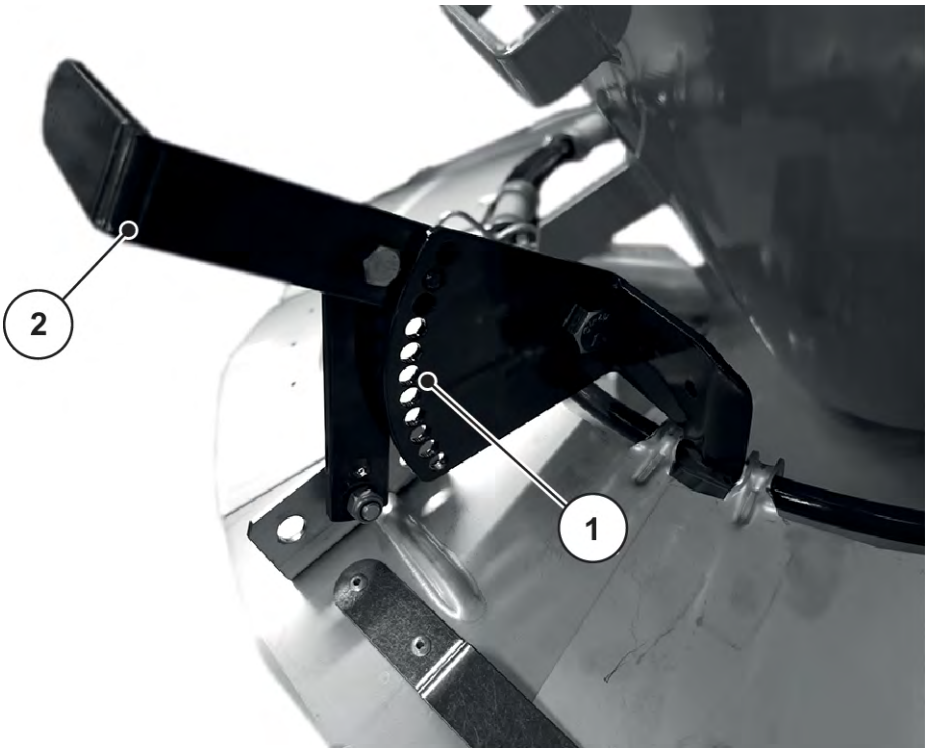



*Fig. 30: Spreading width limiter*

[1] Perforated arch

[2] Adjustment lever

▶ Release the adjustment lever [2] from the perforated arch [1].

▶ Move the adjustment lever [2] to the desired position.

▷ Adjustment lever upward: Spreading width is increased.
▷ Adjustment lever downward: Spreading width is decreased.

▶ Push the adjustment lever [2] into the direction of the perforated arch [1].

*The new spreading width is set.*

## 9.7 Using the fertilizer chart

### 9.7.1 Information on the fertilizer chart

The values in the spreading material chart have been determined using the manufacturer's test system.

The spreading material used here has been obtained from manufacturers or dealers. Experience shows that your spreading material - even with identical specifications - may have different spreading properties due to storage, transport, and many other reasons.

Together with the machine settings indicated in the spreading material charts, this may lead to a different application rate and a less optimal spreading material distribution.

**The following instructions should therefore be observed:**

- Always check the actual application rate by means of calibration. See *8 Calibration*
- Observe the setting values exactly. Even a slightly incorrect setting may adversely affect the spreading pattern.
- Adjustments for spreading materials not listed in the spreading material chart can be determined by means of calibration.

With small working widths, the spreading disc speed can be reduced. Implement another calibration test with the new speed (RPM).

The operator is responsible the correct adjustments for the spreading material in use.

We point out specifically that we do not accept any liability for damage resulting from incorrect spreader settings.

### 9.7.2 Fertilizer charts

Further spreading material charts can be found on the spreading material chart CD provided.

| Spreading material chart for winter road maintenance | Link |
|---|---|
| Spreading material chart for grit (3/5 mm) | *65* |
| Spreading material chart for sand (0.3) | *66* |
| Spreading material chart for salt | *67* |

| Spreading material chart for fertilizer | Link |
|---|---|
| NPK EG PRODUCTS | *68* |
| NITROCHALK EG PRODUCTS | *69* |
| KORN-KALI WITH MgO by Karli & Salz GmbH | *70* |

■ ***Grit (3/5 mm)***

- The unit of the spreading material chart for winter road maintenance is g/m².
- Use the RWK 5 agitator.

| Streubreite | 2 m | | | 4 m | | | 6 m | | |
|---|---|---|---|---|---|---|---|---|---|
| km/h | 3 | 6 | 10 | 3 | 6 | 10 | 3 | 6 | 10 |
| Skala-Nr. | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 10 | 65 | 32 | 20 | 32 | 16 | 10 | 21 | 10 | - |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 15 | 250 | 125 | 75 | 125 | 62 | 37 | 83 | 41 | 25 |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 20 | 490 | 245 | 147 | 245 | 122 | 73 | 163 | 81 | 49 |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 24 | 820 | 410 | 246 | 410 | 205 | 123 | 273 | 136 | 82 |
| | | | | | | | | | |

■ ***Sand (0.3)***

- The unit of the spreading material chart for winter road maintenance is g/m².
- Use the RWK 2 agitator.

| Streubreite | | 2m | | | 4m | | | 5m | |
|---|---|---|---|---|---|---|---|---|---|
| km/h | 3 | 6 | 10 | 3 | 6 | 10 | 3 | 6 | 10 |
| Skala-Nr. | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 10 | 95 | 47 | 29 | 47 | 24 | 14 | 38 | 19 | 11 |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 15 | 465 | 232 | 140 | 232 | 116 | 70 | 186 | 93 | 56 |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 20 | 580 | 290 | 174 | 290 | 145 | 87 | 232 | 116 | 70 |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 24 | 750 | 375 | 225 | 375 | 187 | 113 | 300 | 150 | 90 |
| | | | | | | | | | |

■ ***Salt***

- The unit of the spreading material chart for winter road maintenance is g/m².
- Use the RWK 2 agitator.

| Streubreite | | 2m | | | 4m | | | 5m | |
|---|---|---|---|---|---|---|---|---|---|
| km/h | 3 | 6 | 10 | 3 | 6 | 10 | 3 | 6 | 10 |
| Skala-Nr. | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 10 | 32 | 16 | 10 | 16 | 8 | 5 | 13 | 6 | - |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 15 | 43 | 21 | 13 | 21 | 11 | 6 | 17 | 8 | - |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 20 | 58 | 29 | 18 | 29 | 14 | 9 | 23 | 12 | 7 |
| - | | | | | | | | | |
| - | | | | | | | | | |
| - | | | | | | | | | |
| 24 | 105 | 52 | 31 | 52 | 26 | 16 | 42 | 21 | 12 |
| | | | | | | | | | |

## ■ *NPK EG PRODUCTS*

- Composition 13-13-21
- Density 1.2 kg/l
- Working width 5 m

- The unit of the spreading material chart for fertilizer is kg/ha
- Use the RWK 17 agitator.

In order to obtain the values indicated in the chart, the machine must be screwed on at a height of 70 cm and the PTO shaft must rotate with 540 rpm.

| | | km/h | | | | |
|---|---|---|---|---|---|---|
| | | 6 | 8 | 10 | 12 | 14 |
| Skala-Nr. | kg/min | | | | | |
| 8 | 4,6 | 92 | 69 | 55 | 46 | 39 |
| 9 | 8,1 | 162 | 121 | 97 | 81 | 69 |
| 10 | 11,6 | 232 | 174 | 139 | 116 | 99 |
| 11 | 16,9 | 339 | 254 | 203 | 169 | 145 |
| 12 | 22,3 | 445 | 334 | 267 | 223 | 191 |
| 13 | 27,6 | 552 | 414 | 331 | 276 | 237 |
| 14 | 32,4 | 648 | 486 | 389 | 324 | 278 |
| 15 | 37,2 | 744 | 558 | 446 | 372 | 319 |
| 16 | 42 | 840 | 630 | 504 | 420 | 360 |
| 17 | 48 | 960 | 720 | 576 | 480 | 411 |
| 18 | 54 | 1080 | 810 | 648 | 540 | 463 |
| 19 | 60 | 1200 | 900 | 720 | 600 | 514 |
| 20 | 65,9 | 1317 | 988 | 790 | 659 | 565 |

## ■ *NITROCHALK EG PRODUCTS*

- Composition 27%N
- Density 1.05 kg/l
- Working width 5 m

- The unit of the spreading material chart for fertilizer is kg/ha
- Use the RWK 17 agitator.

In order to obtain the values indicated in the chart, the machine must be screwed on at a height of 70 cm and the PTO shaft must rotate with 540 rpm.

| | | km/h | | | | |
|---|---|---|---|---|---|---|
| | | 6 | 8 | 10 | 12 | 14 |
| Skala-Nr. | kg/min | | | | | |
| 8 | 5,2 | 104 | 78 | 62 | 52 | 45 |
| 9 | 9,1 | 182 | 136 | 109 | 91 | 78 |
| 10 | 13 | 260 | 195 | 156 | 130 | 111 |
| 11 | 18,4 | 368 | 276 | 221 | 184 | 158 |
| 12 | 23,8 | 476 | 357 | 286 | 238 | 204 |
| 13 | 29,2 | 584 | 438 | 350 | 292 | 250 |
| 14 | 34,1 | 681 | 511 | 409 | 341 | 292 |
| 15 | 38,9 | 779 | 584 | 467 | 389 | 334 |
| 16 | 43,8 | 876 | 657 | 526 | 438 | 375 |
| 17 | 49,9 | 998 | 748 | 599 | 499 | 428 |
| 18 | 56 | 1120 | 840 | 672 | 560 | 480 |
| 19 | 62,1 | 1242 | 931 | 745 | 621 | 532 |
| 20 | 67,8 | 1356 | 1017 | 814 | 678 | 581 |

■ ***KORN-KALI WITH MgO by Karli & Salz GmbH***

- Composition 40/6
- Density 1.15 kg/l
- Working width 4 m

- The unit of the spreading material chart for fertilizer is kg/ha
- Use the RWK 17 agitator.

In order to obtain the values indicated in the chart, the machine must be screwed on at a height of 70 cm and the PTO shaft must rotate with 540 rpm.

| | | km/h | | | | |
|---|---|---|---|---|---|---|
| | | 6 | 8 | 10 | 12 | 14 |
| Skala-Nr. | kg/min | | | | | |
| 8 | 5,8 | 145 | 109 | 87 | 72 | 62 |
| 9 | 9,7 | 242 | 182 | 145 | 121 | 104 |
| 10 | 13,6 | 340 | 255 | 204 | 170 | 146 |
| 11 | 19,3 | 482 | 362 | 289 | 241 | 207 |
| 12 | 25 | 625 | 469 | 375 | 313 | 268 |
| 13 | 30,7 | 767 | 576 | 460 | 384 | 329 |
| 14 | 35,1 | 877 | 657 | 526 | 438 | 376 |
| 15 | 39,4 | 986 | 739 | 591 | 493 | 422 |
| 16 | 43,8 | 1095 | 821 | 657 | 547 | 469 |
| 17 | 49,8 | 1245 | 934 | 747 | 622 | 534 |
| 18 | 55,8 | 1395 | 1046 | 837 | 697 | 598 |
| 19 | 61,8 | 1545 | 1159 | 927 | 772 | 662 |
| 20 | 65,2 | 1630 | 1222 | 978 | 815 | 699 |

## 9.8 Spreading grit or granulated fertilizer

**⚠ WARNING!**

**Risk of injury due to ejected spreading material**

Escaping spreading material may lead to injury to eyes and nasal mucous membranes.

There is also a risk of slipping.

▶ Ensure that nobody is present in the hazard zone during the spreading operation.

**When spreading grit or granular fertilizer, observe the following:**

- ▶ Use the RWK 5 agitator. See *4.4.6 Agitator*
- ▶ For spreading grit or granular fertilizer, a PTO speed of 540 rpm and/or a disc speed of 230 rpm is sufficient.
- ▶ Before each transportation drive, the drive must be disengaged.
- ▶ Slowly couple the PTO shaft at a low motor speed of the tractor in order to prevent damage to the agitator drive.
- ▶ With a closed metering slide, even for short periods, switch off the machine drive.
- ▶ Open the metering slide until the agitator can discharge the grit or granular fertilizer in an unhindered manner.
- ▶ Switch off the agitator when the hopper is empty.
- ▶ Observe chapter *(→ 7.5 Mounting the agitator)* for the assembly of the **RWK 5** agitator.
- ▶ Observe chapter *(→ 11.7 Replacing the agitator)* for the disassembly of the **RWK 5** agitator.

With temperatures below 0 °C, damp spreading material may freeze in the hopper and damage the agitator when the PTO shaft is switched on.

- ▶ Ensure that the spreading material in the hopper cannot freeze.
- ▶ Do not leave the filled machine outside over night.
- ▶ Ensure that the spreading material remains dry.

Work with a reduced speed whenever the working situations permits it.

## 9.9 Spreading sand, salt, or sand/salt mixtures

**⚠WARNING!**

**Risk of injury due to ejected spreading material**

Escaping spreading material may lead to injury to eyes and nasal mucous membranes.

There is also a risk of slipping.

- ▶ Ensure that nobody is present in the hazard zone during the spreading operation.

**Please note, when spreading sand or salt:**

- Use the RWK 2 agitator. See
- The maximum PTO speed of 540 rpm and/or a spreading disc speed of 230 rpm must be observed.
- Before each transportation drive, the drive must be disengaged.
- With a closed metering slide, even for short periods, switch off the machine drive.
- Open the metering slide until the agitator can discharge the sand or salt in an unhindered manner.
- Slowly couple the PTO shaft at a low motor speed of the tractor in order to prevent damage to the agitator drive.
- Switch off the agitator when the hopper is empty.
- Please observe the information in Chapter *Chapter 7.5 - Mounting the agitator - Page 46* for mounting the agitator.
- Please observe the information in Chapter *Chapter 11.7 - Replacing the agitator - Page 89* for dismounting the agitator.
- Due to the hygroscopic effect of salt, only use the machine with a hopper cover.
- Avoid a longer storage of salt in the hopper.

Cleaning the machine after each use prevents deposits at the hopper base. You can thus reduce the wear of the agitator and increase the operational reliability of your machine.

## 9.10 Spreading grit-salt mixtures

**⚠ WARNING!**

**Risk of injury due to ejected spreading material**

Escaping spreading material may lead to injury to eyes and nasal mucous membranes.

There is also a risk of slipping.

- Ensure that nobody is present in the hazard zone during the spreading operation.

**Please note, when spreading a grit-salt mixture:**

- ▶ Use the RWK 4 agitator. See
- ▶ Maximum PTO speed of 540 rpm and/or a spreading disc speed of 230 rpm must be observed.
- ▶ Before each transportation drive, the drive must be disengaged.
- ▶ With a closed metering slide, even for short periods, switch off the machine drive.
- ▶ Open the metering slide until the agitator can discharge the grit-salt mixture in an unhindered manner.
- ▶ Slowly couple the PTO shaft at a low motor speed of the tractor in order to prevent damage to the agitator drive.
- ▶ Switch off the agitator when the hopper is empty.
- ▶ For mounting the agitator, please observe the information in Chapter*Chapter 7.5 - Mounting the agitator - Page 46*
- ▶ For dismounting the agitator, please observe the information in Chapter*Chapter 11.7 - Replacing the agitator - Page 89*

With temperatures below 0 °C, damp spreading material may freeze in the hopper and damage the agitator when the PTO shaft is switched on.

- ▶ Ensure that the spreading material in the hopper cannot freeze.
- ▶ Do not leave the filled machine outside over night.
- ▶ Ensure that the spreading material remains dry.

Cleaning the machine after each use prevents deposits at the hopper base. You can thus reduce the wear of the agitator and increase the operational reliability of your machine.

When spreading a grit-salt mixture, bridging over the agitator can occur.

- In this case, reduce the amount of salt or use dry spreading material.

## 9.11 Spreading granulated fertiliser

**⚠WARNING!**

**Risk of injury due to ejected spreading material**

Escaping spreading material may lead to injury to eyes and nasal mucous membranes.

There is also a risk of slipping.

- ▶ Ensure that nobody is present in the hazard zone during the spreading operation.

**Please note when spreading granulated fertilizer**

- Use the RWK 17 agitator. See
- The maximum PTO speed of 540 rpm and/or a spreading disc speed of 230 rpm must be observed.
- Before each transportation drive, the drive must be disengaged.
- With a closed metering slide, even for short periods, switch off the machine drive.
- Open the metering slide until the agitator can discharge the fertilizer in an unhindered manner.
- Slowly couple the PTO shaft at a low motor speed of the tractor in order to prevent damage to the agitator drive.
- Switch off the agitator when the hopper is empty.
- Please observe the information in Chapter *Chapter 7.5 - Mounting the agitator - Page 46* for mounting the agitator.
- Please observe the information in Chapter *Chapter 11.7 - Replacing the agitator - Page 89* for dismounting the agitator.

Cleaning the machine after each use prevents deposits at the hopper base. You can thus reduce the wear of the agitator and increase the operational reliability of your machine.

## 9.12 Discharging residual material

**⚠ WARNING!**

**Risk of injury due to rotating machine parts**

Rotating machine components (universal drive shaft, spreading disc) may catch and pull-in body parts or objects. Contact with rotating machine components may cause bruises, abrasions and crushing injuries.

Ejected spreading material may cause injury.

- Always stay outside the area of rotating machine components while the machine is running.
- Ensure that nobody is present in the hazard zone of the machine.

To maintain the value of your machine, discharge the hopper immediately after every use.

- ▶ Deactivate the drive and switch off the tractor motor.
- ▶ For collecting the spreading material, place a foil under the machine or position a sufficiently sized hopper beneath the outlet.
- ▶ Lower the spreading width limiter completely.
- ▶ Open the metering slide fully.
- ▶ Deactivate the tractor motor and the drive of the machine and empty the hopper until no spreading material is discharged.
- ▶ Switch off the machine drive and the tractor engine and lock them to prevent unauthorized starting. Remove the ignition key of the tractor.
- ▶ While the metering slide is open, move the drop point back and forth until the last spreading material residues have fallen out.

## 9.13 Settings for unlisted fertilizer types

The settings for fertilizer types not listed in the fertilizer chart can be calculated using the practice test kit (optional equipment).

For calculating the settings for unlisted fertilizer types, please also see the supplementary manual for the practice test kit.

To check the spreading unit settings **quickly**, we recommend using the layout for **one pass**.

To determine the spreading unit settings **more accurately**, we recommend using the layout for **three passes**.

### 9.13.1 Requirements and conditions

The requirements and conditions apply to both one pass and three passages.

Observe these conditions to ensure that the results are as accurate as possible.

**Prepare the test**

✓ We recommend a testing area that is horizontal in both directions. The tracks must not have any significant cavities or heights since this may distort the spreading pattern.

▶ Conduct the test on a **dry** day with **no wind** so the weather does not affect the result.

▶ Carry out the test either on a freshly cut field or on a field with low vegetation (max. 10 cm).

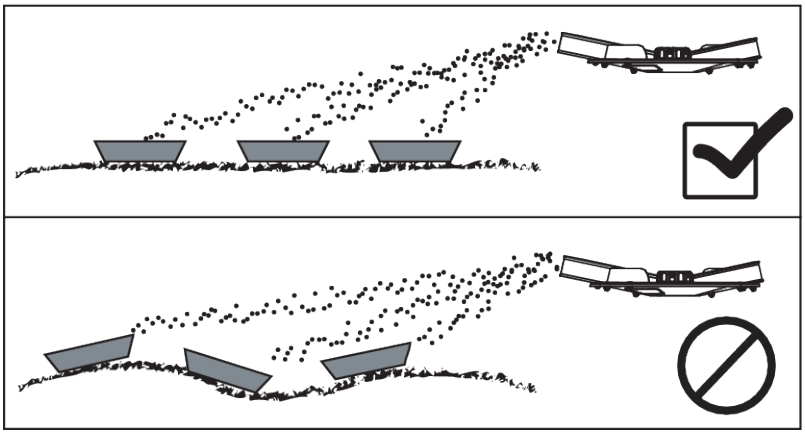


*Fig. 31: Setting up the collection trays*

▶ Make sure that the collecting vessels are placed on level ground. Collecting vessels set at an angle can cause measuring errors (see image above).

▶ Running the calibration test (see *8.2 Implementing the calibration test*).

▶ Adjust and lock the metering slides on the right and left-hand side (see *9.4.2 Actuating the metering slides separately*).

*The test surface is correctly positioned.*

## ■ Executing one pass

### ■ *Layout*

We recommend the layout plan up to a spreading width of **24 m**. A layout plan for greater working widths is included in the PPS 5 practice test kit.

- Length of test area: 60 to 70 m

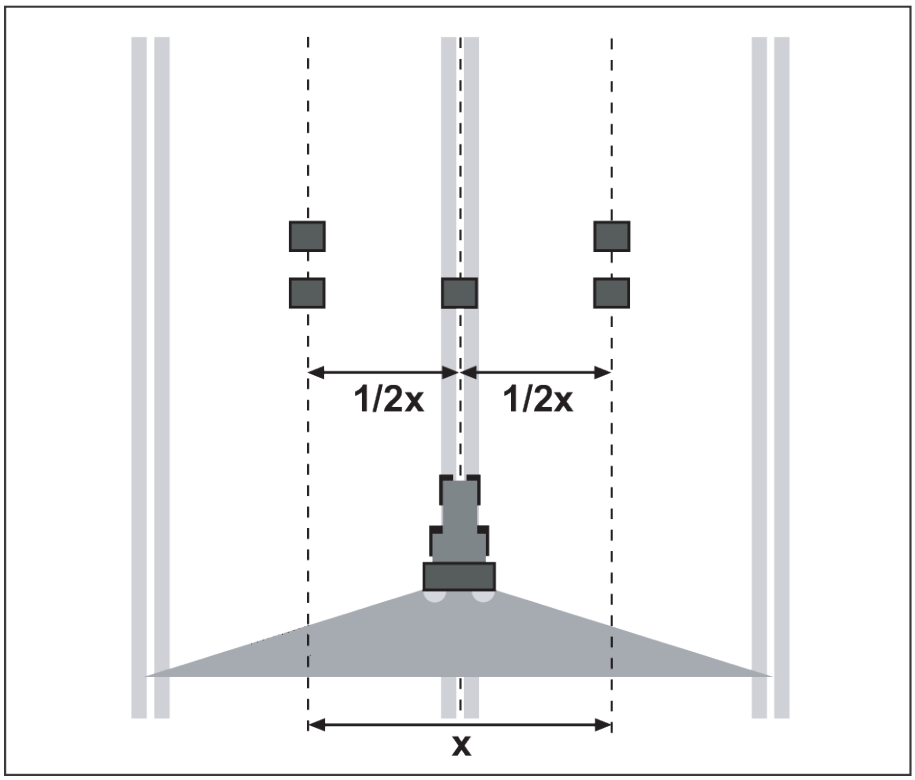



*Fig. 32: Layout for one passage*

**Preparing for one pass**

- ▶ Select a similar fertilizer from the fertilizing charts and set the spreader accordingly.
- ▶ Set the mounting height of the machine as specified in the fertilizer chart. Make sure that the mounting height includes the top edge of the trays.
- ▶ Check the spreading elements (spreading discs, spreading vanes, outlet) for correct functioning and completeness.
- ▶ Place two collecting vessels one in front of another at a distance of **1 m** in the overlap zones (between the tracks) and one collecting vessel in the track (according to *Fig. 32*)

■ ***Run the spreading test with the determined open position for operation:***

✓ **Perform the test at the desired working speed.**

- ▶ Open the metering slide **10 m before** the collection trays.
- ▶ Close the metering slides approx. **30 m behind** the collection trays.

If the quantity collected in the collecting vessels is insufficient, repeat the passage.

Do not change the adjustment of the metering slides.

## ■ Running three passages

■ ***Layout***

We recommend the layout plan up to a spreading width of **24 m**. A layout plan for greater working widths is included in the PPS 5 practice test kit.

- Width of testing area: 3 x track distance
- Length of test area: 60 to 70 m
- The three tracks must be parallel. If you are running the test without drilled tracks, the tracks must be measured using a tape measure and marked (e.g. with rods).

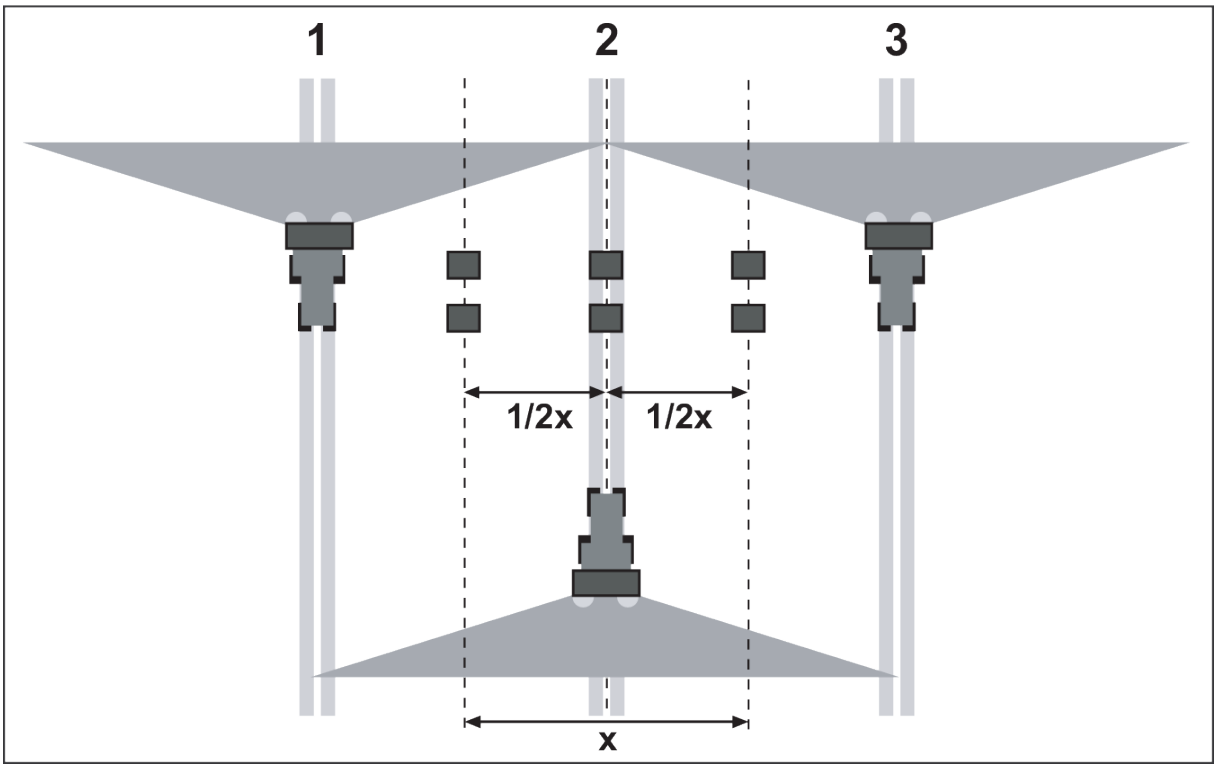



*Fig. 33: Layout for three passages*

**Preparing three passes:**

▶ Select a similar fertilizer from the fertilizing charts and set the spreader accordingly.

▶ Set the mounting height of the machine as specified in the fertilizer chart. Make sure that the mounting height includes the top edge of the trays.

▶ Check the spreading elements (spreading discs, spreading vanes, outlet) for correct functioning and completeness.

▶ Place two collecting vessels one in front of another at a distance of **1 m** in the overlap zones (between the tracks) and in the track (according to *Fig. 33*)

■ ***Run the spreading test with the determined open position for operation:***

✓ **Perform the test at the desired working speed.**
✓ Spread along tracks 1 to 3 one after the other.

▶ Open the metering slide **10 m before** the collection trays.

▶ Close the metering slides approx. **30 m behind** the collection trays.

If the quantity collected in the collecting vessels is insufficient, repeat the passage.

Do not change the adjustment of the metering slides.

### 9.13.2 Evaluating results

▶ Pool the contents of the collecting vessels placed one after another and pour them into the measuring tubes from the left-hand side.

▶ The quality of the horizontal spreading pattern can be read off the three measuring tubes.

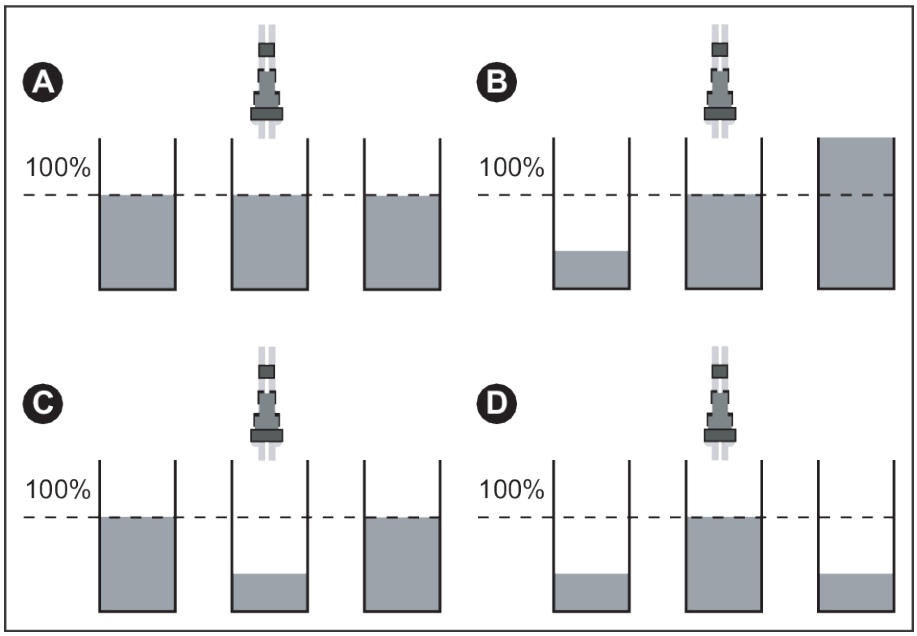



*Fig. 34: Possible results*

A All tubes contain the same amount.
B Fertilizer distribution not symmetrical
C Too much fertilizer in the overlap zone
D Too little fertilizer in the overlap zone

### 9.13.3 Correcting settings

■ ***Examples for the correction of spreader settings***

| Test result | Fertilizer distribution | Measure, test |
|---|---|---|
| Case A | Even distribution (admissible deviation ±1 scale line) | Settings are correct. |

| Test result | Fertilizer distribution | Measure, test |
|---|---|---|
| Case B | Fertilizer quantity decreases from right to left (or vice versa). | Are the same feed points set on the right and left? |
| | | Are the settings of the metering slide the same on the left and right? |
| | | Are the track distances the same? |
| | | Are the tracks parallel? |
| | | Was there a strong side wind during the test? |
| Case C | Too little fertilizer in the center. | Select setting of the feed point sooner (e.g. feed point adjustment from 5 to 4). |
| Case D | Too little fertilizer in the overlap zones. | Select setting of the feed point later (e.g. feed point adjustment from 8 to 9). |

## 9.14 Parking and unhitching the machine

The machine can be safely parked on the frame.

**⚠ DANGER!**

**Crushing hazard between the tractor and the machine**

Persons standing between the tractor and the machine while they are being parked or decoupled are in lethal danger.

▶ Ensure that nobody is present in the hazard zone between the tractor and the machine.

**Requirements for parking the machine:**

- Only park the machine on level, solid ground.
- Only park the machine when the hopper is empty.
- Relieve the load on the coupling points (lower / upper link) before removing the machine.

# 10 Faults and possible causes

**⚠DANGER!**

**Danger of injury due to running engine**

Working on the machine with the engine running may result in serious injury caused by mechanical components and escaping spreading material.

- ▶ Wait until all moving parts have come to a complete stop before making any adjustments or performing maintenance work.
- ▶ Switch off the tractor engine.
- ▶ Remove the ignition key.
- ▶ Ensure that nobody is present **in the hazard zone**.

**⚠WARNING!**

**Risk of injury due to incorrect troubleshooting**

Delayed or incorrect repairs by unqualified personnel may result in severe personal injury as well as in damages to the machine and the environment.

- ▶ Any faults occurring must be repaired **immediately**.
- ▶ Repairs may only be carried out by **qualified** personnel.

**Troubleshooting requirements:**

- Switch off the tractor engine and lock it to prevent unauthorized starting.
- Park the machine.

Please take particular note of the warnings in chapter *3 Safety* and *11 Maintenance and service*.

| Fault | Possible cause | Measure |
|---|---|---|
| Uneven spreading material distribution | Caked-on spreading material on spreading discs, on spreading vanes, on the outlet. | Remove caked-on spreading material. |
| | Worn spreading vane. | Replace spreading vane. |
| | The metering slide does not open all the way. | Check the function of the metering slide. |
| | Locking mechanism of the adjustment lever not engaged. | See *9.5.1 Adjusting the drop point* |

| Fault | Possible cause | Measure |
|---|---|---|
| Irregular spreading material feed to spreading disc | Outlet blocked | ▶ Clear clogging. |
| | Defective agitator | ▶ Check agitator and replace if necessary. See *11.7 Replacing the agitator*<br>▶ Clear clogging. |
| Spreading disc is fluttering. | | ▶ Check for tight fit. |
| Metering slide does not open. | The metering slide is sluggish. | • Check the metering slide, the lever, and the joints for smooth movement and improve if necessary.<br>• Check tension spring. |
| | Power supply to actuator interrupted. | |
| Agitator not working. | Agitator drive is defective. | ▶ Check for wear.<br>▶ Check the dowel pins for damage and wear. |
| Metering openings clogged:<br>• By clumped spreading material<br>• By damp spreading material<br>• By other impurities (leaves, straw, bag residues) | Blockages | ▶ Park tractor, remove ignition key, disconnect the power supply,<br>▶ Open the metering slide.<br>▶ Place collecting vessel underneath.<br>▶ Clean the outlet **from the front** by means of a suitable tool.<br>▶ Remove foreign bodies from the hopper.<br>▶ Close the metering slide again. |

| Fault | Possible cause | Measure |
|---|---|---|
| The spreading disc does not rotate or stops suddenly after being turned on. | When using a universal drive shaft with shear pin protection<br>• The shear pin is defective. | • Check the shear pin protection, and replace if necessary (see the universal drive shaft manufacturer's manual). |
| | With hydraulic drive | • Check the plug connector of the hydraulic hoses. |

# 11 Maintenance and service

## 11.1 Safety

Please note the warnings in the chapter *3 Safety*

Take **particular note of the instructions** in the section. *3.8 Maintenance and service*

Observe the following instructions in particular:

- Welding and work on the electrical and hydraulic systems is to be carried out by qualified technicians only.
- There is a **risk of tipping** when working at the lifted machine. Always secure the machine using suitable supports.
- Always use **both** eyelets in the hopper for lifting the machine by means of hoisting gear.
- There is a risk of **crushing and shearing** at power-operated components. Make sure that there is no one in close proximity to the moving parts during maintenance.
- Spare parts must at least comply with the technical standards specified by the manufacturer. This is assured with original spare parts.
- Before starting any cleaning, maintenance, or repair work, and when troubleshooting, switch off the tractor's engine, remove the ignition key, and wait until all moving parts of the machine have come to a stop.
- By controlling the machine with an operating unit, additional risks and hazards due to externally operated components may arise.
  - Disconnect the power supply between the tractor and the machine.
  - Disconnect the power supply cable from the battery.
- Repairs may **ONLY be carried out by instructed and authorized workshops**.

■ ***Maintenance plan***

| Task | Before operation | After operation | After the first X hours | Every X hours | Every X hours | Every X hours | Quarterly | At the beginning of the season | At the end of the season |
|---|---|---|---|---|---|---|---|---|---|
| **Value (X)** | | | 10 | 30 | 50 | 100 | | | |
| **Cleaning** | | | | | | | | | |
| *Cleaning* | | X | | | | | | | |

| Task | Before operation | After operation | After the first X hours | Every X hours | Every X hours | Every X hours | Quarterly | At the beginning of the season | At the end of the season |
|---|---|---|---|---|---|---|---|---|---|
| **Value (X)** | | | 10 | 30 | 50 | 100 | | | |
| **Lubrication** | | | | | | | | | |
| *Universal drive shaft* | | | | | | | | X | |
| *Joints, bushes* | | | | | X | | | X | |
| *Agitator bayonet lock* | | | | | X | | | X | X |
| *Universal joint of the RWK 10 agitator* | | | | | X | | X | X | X |
| **Check** | | | | | | | | | |
| *Wear parts* | | | | | | X | | X | |
| *Bolted connections* | X | | X | X | | | | X | |
| *Hydraulic hoses* | X | | | | X | | | X | |
| *Spreading vane* | X | | | | X | | | | |

## 11.2 Cleaning the machine

■ ***Cleaning***

▶ Fold up the protective grid in the hopper (refer to chapter *3.10 Safety equipment, warnings and instructions*).

▶ Clean the outlet ducts and the slide guide area from below only.

▶ Only clean oiled machines at washing points fitted with an oil separator.

▶ When cleaning with high-pressure, never aim the water jet directly at warning signs, electrical equipment, hydraulic components, and sliding bearings.

▶ After cleaning, treat the **dry** machine, **especially the coated spreader vanes and stainless steel parts**, with an environmentally friendly anti-corrosion agent.

▷ A suitable polishing kit can be ordered from authorized dealers for treating rust spots.

# 11.3 Lubrication

## 11.3.1 Drive shaft lubrication

■ ***Universal drive shaft***

- Lubricant: Grease
- See operator's manual of the manufacturer.

## 11.3.2 Lubrication of links, bushes

■ ***Joints, bushes***

- Lubricant: Grease, oil

The joints and bushes are designed for dry operation but can be lightly greased.

## 11.3.3 Lubricating the agitator bayonet lock

■ ***Agitator bayonet lock***

- Lubricant: Grease

▶ Ensure smooth movement of the bayonet lock and grease regularly.

▶ Grease at the end of the season.

## 11.3.4 Lubricating the universal joint of the RWK 10 agitator

■ ***Universal joint of the RWK 10 agitator***

- Lubricant: Grease, oil

▶ Ensure smooth movement of the universal joint and grease regularly.

▶ Grease at the end of the season.

# 11.4 Wear parts and screw connections

## 11.4.1 Checking wear parts

■ ***Wear parts***

Wear parts are: **Spreading vanes, agitator, hopper floor, and thrust ring**

- Inspect wear parts on a regular basis.

Replace these parts if they show signs of wear, deformation, holes, or aging. Otherwise, the spreading pattern will not be correct.

The durability of wear parts depends, among other things, on the material being spread.

### 11.4.2 Checking the screw connections

■ ***Bolted connections***

Screw connections have been tightened to the specified torque and locked at the factory. Vibrations and shocks, in particular during the initial operating hours, can loosen screw connections.

▶ Check all screw connections for tightness.

Some components are mounted with self-locking nuts.

▶ When mounting these components, always use new self-locking nuts.

## 11.5 Checking the hydraulic hoses

■ ***Hydraulic hoses***

Hydraulic hoses are subject to high loads. They have to be checked regularly and are to be replaced immediately when damaged.

▶ Check the hydraulic hoses for damage on a regular basis or at least before the start of the spreading season, by means of a visual inspection.

▶ Before the start of the spreading season, check the age of the hydraulic hoses. Replace the hydraulic hoses when the prescribed period for storage and usage has been exceeded.

▶ Replace the hydraulic hoses if they show one or several of the following types of damage:

- ▷ Damages to the external layer up to the insert
- ▷ Embrittlement of the external layer (crack formation)
- ▷ Deformation of the hose
- ▷ Hose moving out of the hose fitting
- ▷ Damages to the hose fitting
- ▷ Resistance and function of the hose fitting reduced due to corrosion

## 11.6 Spreading vane replacement

■ ***Spreading vane***

Have the worn spreading vanes replaced **only** by your dealer or your expert workshop.

Requirement:

- The spreading discs have been removed.

***NOTICE!***

**Conformity of the spreader vane types**

The type and size of the spreader vanes are adapted to the spreading disc. Incorrect spreader vanes can cause damage to the machine and the environment.

- ▶ ONLY use spreader vanes which are approved for the relevant disc.
- ▶ Compare the labeling on the spreader vane. The model and size of the new and old spreader vanes must be identical.

**Spreading vane replacement**

▶ Loosen the self-locking nuts at the spreading vane and remove the spreading vane.

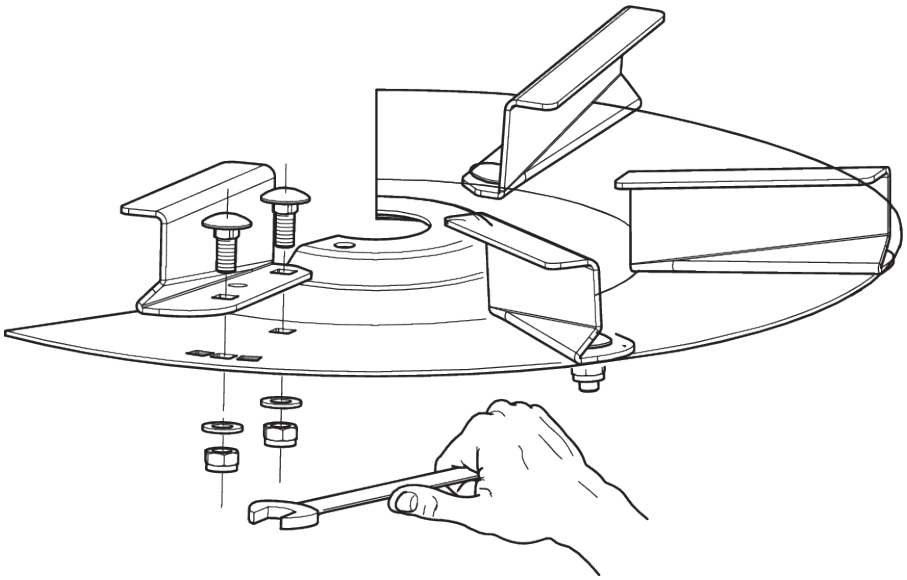


*Fig. 35: Loosening the screws of the spreading vane*

▶ Attach the new spreading vane to the spreading disc. Make sure that you have the correct spreading vane type.

▶ Screw-on the spreader vane (tightening torque: **20 Nm**). For this purpose, **always use new self-locking** nuts.

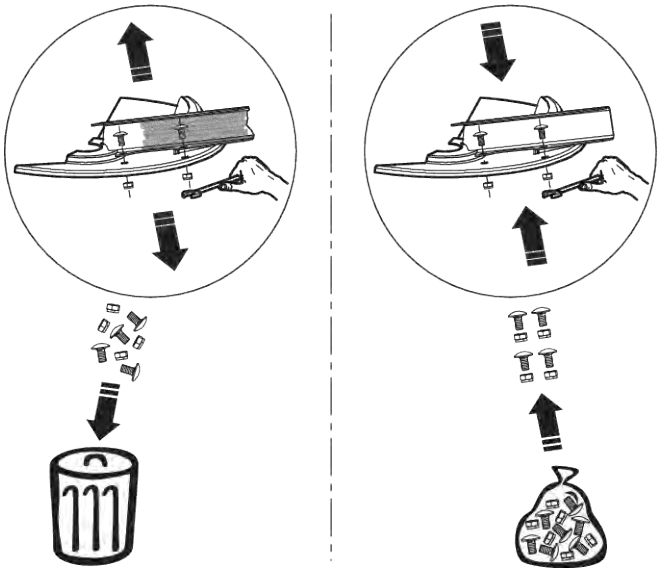


*Fig. 36: Using new self-locking nuts*

## 11.7 Replacing the agitator

■ ***Dismounting the agitator***

The agitator is fixed with a bayonet lock.

- ▶ Open the hex cap screws at the protective grid in the hopper.
- ▶ Remove the protective grid.
- ▶ Turn the agitator clockwise until it reaches the stop.

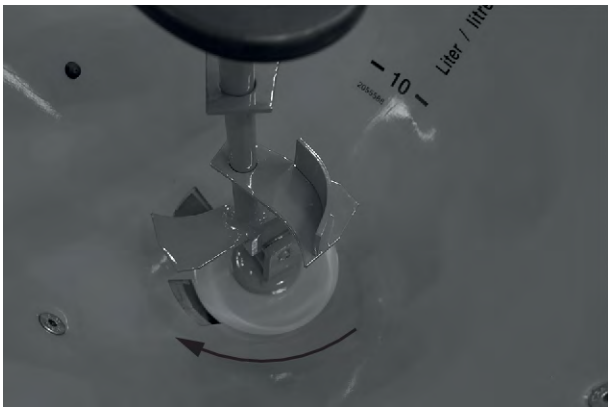



*Fig. 37: Hopper without protective grid*

- ▶ Lift the agitator out in an upwards direction.

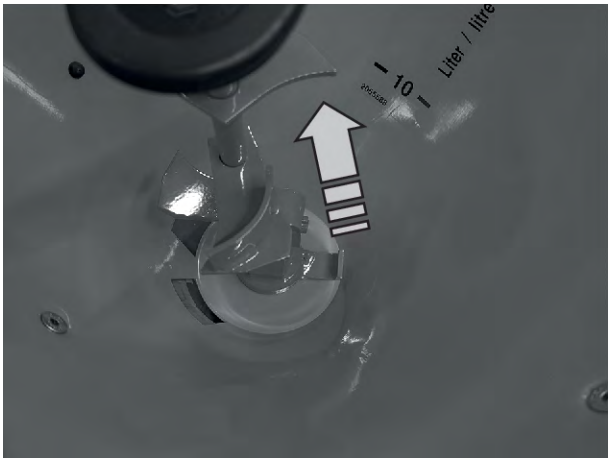



*Fig. 38: Dismounting the agitator*

■ ***Mounting the agitator***

Mount the agitator in the reverse order. See *7.5 Mounting the agitator*

- Grease the bayonet lock and the agitator.
- Ensure that the bayonet lock of the agitator engages securely.

## 11.8 Transmission oil

### 11.8.1 Quantities and types

The machine transmission is filled with approx. **0.35 l** of transmission oil. Any oil with specification SAE 85W-90 API GL-5 is suitable for filling the transmission. Some of these oils are listed in the following table:

| Manufacturer | Types of oil |
|---|---|
| Aral | HYP 85W-90 transmission oil |
| Esso | Gear Oil GX-D 85W-90 |

Do not mix different types of oil.

- **Never** mix different oil types.

## 11.8.2 Checking the oil filling level

The transmission does not need to be lubricated under normal operating conditions. However, we recommend changing the oil after 10 years.

A shorter oil change interval is recommended if spreading materials with high dust content are used and the spreader is frequently cleaned.

Requirements

- In order to check the filling level and for filling, the machine is in a horizontal position. To drain the oil, the machine must be in a slightly tilted position (approx. 200 mm).
- PTO drive and tractor engine are stopped, the ignition key of the tractor is removed.

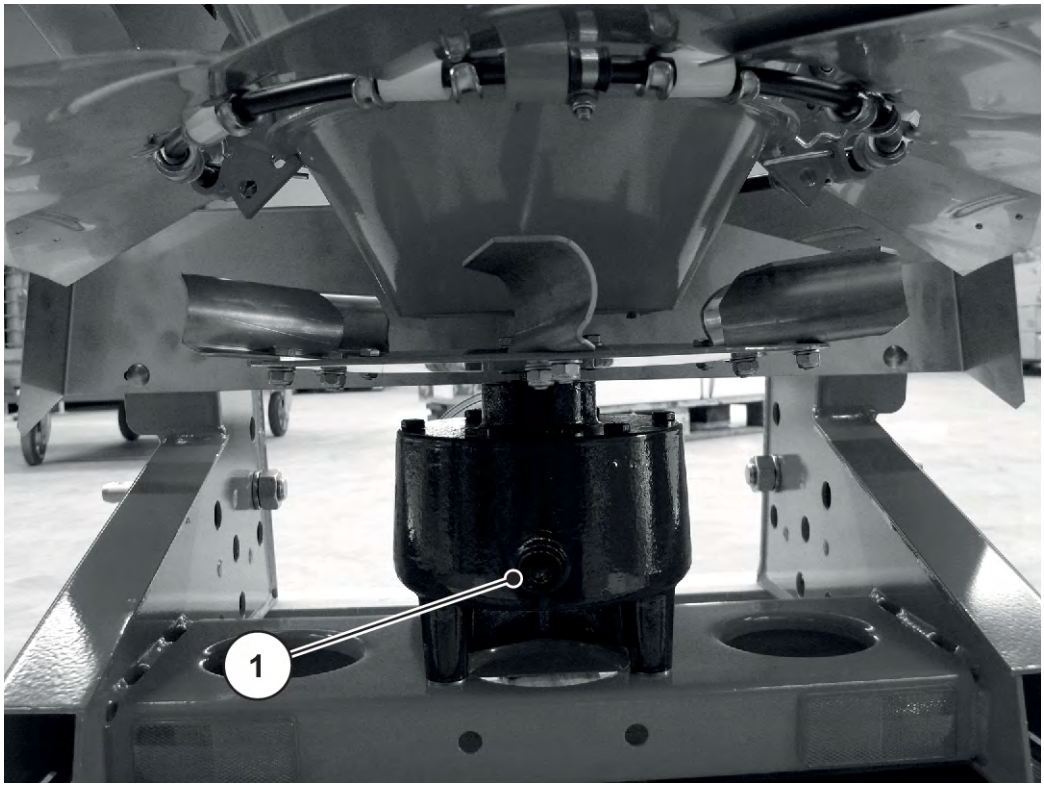



*Fig. 39: Transmission oil level checking screw*

[1] Transmission oil level checking screw

**Checking the oil filling level:**

▶ Open the oil level checking screw.

*The oil level is satisfactory when the oil reaches the lower edge of the hole.*

**Filling in oil:**

▶ Only use SAE 85W-90 transmission oil.

▶ Open the checking screw.

▶ Fill transmission oil into the opening until the oil level at the checking screw reaches the lower edge of the hole.

▶ Close the checking screw.

**Draining oil:**

▶ Tilt the machine backwards (tilt approx. 200 mm).

▶ Position the collection vessel under the oil drain plug.

▶ Open the oil drain plug and let the oil drain out completely.

▶ Close the oil drain plug.

***NOTICE!***

**Environmental pollution due to unsuitable disposal of hydraulic and transmission oil**

The hydraulic and transmission oils are not entirely biodegradable. Therefore, oil must be prevented from entering the environment in an uncontrolled manner.

▶ Collect/dam escaped oil with sand, soil, or other absorptive material.

▶ Collect hydraulic and transmission oil in a suitable container provided for the purpose, and dispose of it in accordance with the local statutory requirements.

▶ Draining and penetration of oil into the sewerage system is to be prevented.

▶ Prevent the penetration of oil into the water drain by setting up sand or earth barriers, or by using other appropriate barrier methods.

**Filling in oil:**

✓ Only use SAE 85W-90 transmission oil.

▶ Open the filling opening and the checking screw.

▶ Fill transmission oil into the filling opening until the oil level at the checking screw reaches the lower edge of the hole.

▶ Close the filler hole and the checking screw again.

# 12 Winterization and preservation

## 12.1 Safety

**NOTICE!**

**Environmental pollution due to unsuitable disposal of hydraulic and transmission oil**

The hydraulic and transmission oils are not entirely biodegradable. Therefore, oil must be prevented from entering the environment in an uncontrolled manner.

- Collect/dam escaped oil with sand, soil, or other absorptive material.
- Collect hydraulic and transmission oil in a suitable container provided for the purpose, and dispose of it in accordance with the local statutory requirements.
- Draining and penetration of oil into the sewerage system is to be prevented.
- Prevent the penetration of oil into the water drain by setting up sand or earth barriers, or by using other appropriate barrier methods.

In combination with moisture, fertilizer can form aggressive acids that attack paints, plastics, and especially metal parts. This is why **regular washing and caring after use** is very important.

Prior to winterizing, thoroughly **wash** the machine (refer to *11.2 Cleaning the machine*) and let it dry well.

Next, **preserve** the machine (refer to *12.3 Preserving the machine*).

- Hang up hoses and cables (refer to *12.3 Preserving the machine*).
- Park the machine (refer to *9.14 Parking and unhitching the machine*).
- Close the hopper cover. Leave a gap open to prevent moisture in the hopper.
- If present, disconnect the control unit or the ISOBUS terminal from power and dust off.

Do not store the control unit or the ISOBUS terminal outdoors. Store in a suitable warm location.

- Place dust caps on hoses and cable.
- Open the fertilizer outlets:
  - Metering slide, pre-metering slide, drain door, etc (depends on the machine)

## 12.2 Washing the machine

A machine that is placed into storage **must** first be cleaned.

Spreading material and dirt can collect in hidden corners!

- Thoroughly clean hidden corners and nooks (under the machine, between frame and hopper, etc.).

▶ Fold up the protective grid in the hopper (if present).

▶ When cleaning with high-pressure, never aim the water jet directly at warning signs, electrical equipment, hydraulic components, and sliding bearings.

▶ Letting the machine dry after cleaning

## 12.3 Preserving the machine

- Only spray on **approved and environmentally friendly** preserving agents.
- Prevent mineral oil-based agents (diesel, etc.). They are rinsed off when the machine is first washed and can get into the sewage system.
- Only use preservation agents that will not attack the paint, plastics, and rubber seals.

▶ Only spray the machine once certain that it is completely **clean** and **dry**.

▶ Treat the machine with environmentally friendly anti-corrosion agents.

▷ We recommend using protective wax or preservation wax.

Please contact your specialist dealer or your specialist workshop if you want to obtain preservation agents.

Preserve the following assemblies or parts:

- All hydraulic components that are susceptible to rust, e.g., hydraulic couplers, pipes, press-fit rings, and valves
- Galvanized bolts
- If present on your machine:
  - Parts of the braking system
  - Pneumatic lines
  - Spray galvanized **bolts on the axles and the drawbar** with a special protective wax after washing.

You can find further useful information on washing and preserving in the video "Getting ready - winterization essentials".

- Please visit the RAUCH YouTube channel.
- Here is the link to the video: *"Winterization video"*.

# 13 Disposal

## 13.1 Safety

**NOTICE!**

**Environmental pollution due to unsuitable disposal of hydraulic and transmission oil**

The hydraulic and transmission oils are not entirely biodegradable. Therefore, oil must be prevented from entering the environment in an uncontrolled manner.

- ▶ Collect/dam escaped oil with sand, soil, or other absorptive material.
- ▶ Collect hydraulic and transmission oil in a suitable container provided for the purpose, and dispose of it in accordance with the local statutory requirements.
- ▶ Draining and penetration of oil into the sewerage system is to be prevented.
- ▶ Prevent the penetration of oil into the water drain by setting up sand or earth barriers, or by using other appropriate barrier methods.

**NOTICE!**

**Environmental pollution caused by inappropriate disposal of packaging materials**

Packaging material contains chemical compounds, which must be dealt with appropriately.

- ▶ Packaging material is to be disposed of at an authorized waste management company.
- ▶ Observe the national regulations.
- ▶ Packaging material may not be burned nor disposed of with the domestic waste processing.

**NOTICE!**

**Environmental pollution caused by inappropriate disposal of components**

The inappropriate disposal of materials is a threat to the environment.

- ▶ Only authorized companies may be commissioned with disposal.

## 13.2 Disposal of the machine

The following points apply without restriction. Stipulate suitable precautionary measures based on the national legislation and implement them.

- ▶ All components, auxiliary and operating materials from the machine must be removed by specialist staff.
  - ▷ In so doing, these parts are to be sorted into specific categories.
- ▶ All waste products are then to be disposed of in accordance with local regulations and directives for recycling or special refuse categories by authorized companies.

# 14 Appendix

## 14.1 Table of tightening torque

| Permissible torques for A2-70 and A4-70 screws for lengths up to 8 x thread diameter, | | |
|---|---|---|
| **Thread** | **Friction coefficient μ** | **Permissible torques Nm** |
| M5 | 0.14 | 4.2 |
| | 0.16 | 4.7 |
| M6 | 0.14 | 7.3 |
| | 0.16 | 8.2 |
| M8 | 0.14 | 17.5 |
| | 0.16 | 19.6 |
| M10 | 0.14 | 35 |
| | 0.16 | 39 |
| M12 | 0.14 | 60 |
| | 0.16 | 67 |
| M14 | 0.14 | 94 |
| | 0.16 | 106 |
| M16 | 0.14 | 144 |
| | 0.16 | 162 |
| M18 | 0.14 | 199 |
| | 0.16 | 225 |
| M20 | 0.14 | 281 |
| | 0.16 | 316 |
| M22 | 0.14 | 376 |
| | 0.16 | 423 |
| M24 | 0.14 | 485 |
| | 0.16 | 546 |
| M27 | 0.14 | 708 |
| | 0.16 | 797 |

| Permissible torques for A2-70 and A4-70 screws for lengths up to 8 x thread diameter, | | |
|---|---|---|
| **Thread** | **Friction coefficient μ** | **Permissible torques Nm** |
| M30 | 0.14 | 969 |
| | 0.16 | 1092 |

# 15 Guarantee and warranty

RAUCH devices are manufactured using modern production methods and with the greatest of professional care, and are subjected to numerous inspections.

This is why RAUCH is offering a 12 month warranty if the following conditions are met:

- The warranty starts on the date of purchase.
- The warranty covers material or manufacturing defects. We are liable for third-party products (hydraulics, electronics) only to the extent of the relevant manufacturer During the warranty period, manufacturing and material defects will be rectified free of charge with the replacement or repair of the affected parts. Other rights extending beyond the above, such as claims for conversion, reduction, or replacement for reasons of damage not suffered by the supplied product are explicitly excluded. Warranty services are provided by authorized workshops, by RAUCH factory representatives or the factory itself.
- Consequences of natural wear, dirt, corrosion, and all defects caused by improper use as well as external influences shall be excluded from the warranty. Any unauthorized repairs or changes to the original condition will void the warranty. The warranty is voided if any spare parts other than genuine RAUCH spare parts were used. Therefore, the directions in the operating manual must be observed. Please contact our company representatives of the parent company if you have any questions or doubts. Warranty claims must be submitted to the company within 30 days at the latest after the damage has occurred. The date of purchase and the machine number must be indicated. If repairs under the warranty are required, they must be carried out by the authorized workshop only after consultation with RAUCH or the company's appointed representatives. The warranty period will not be extended by warranty work. Transport damage is not a factory defect and is therefore not covered by the manufacturer's warranty manufacturer.
- Claims for damage other than to the RAUCH devices will not be accepted. This also means that no liability will be accepted for damage resulting from spreading errors. Unauthorized modifications of the RAUCH devices may result in consequential damage, for which the manufacturer will not accept any liability. The manufacturer's exclusion from liability will not apply in the case of willful intent or gross negligence by the owner or a senior employee, and in cases where – according to the product liability law – there is liability for personal injury or material damage to privately used objects in the event of defects in the supplied product. The exclusion from liability will also not apply if characteristics are missing that are explicitly guaranteed, if the purpose of their guarantee was to protect the purchaser against damage not suffered by the supplied product itself.

**RAUCH Streutabellen**
**RAUCH Fertilizer Chart**
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RAUCH

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