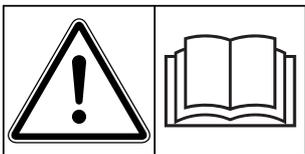


INSTRUCTION MANUAL



Please read carefully before using the machine.

Keep for future reference.

This instruction manual/assembly instruction is to be considered as part of the machine. Suppliers of new and second-hand machines are required to document in writing that the instruction manual/assembly instruction was delivered with the machine and handed over to the customer.



MDS 8.2/14.2/18.2/20.2

Original instructions

5902916-a-en-0819

Preface

Dear Customer,

By purchasing the mineral fertiliser spreader of the MDS 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 team is always there for you.



Please read this operator's manual carefully before commissioning the mineral fertiliser spreader and follow the advice given.

This operator's manual gives detailed instructions on the operation of the machine, as well as valuable information about its 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 is not covered by warranty claims.

NOTE

Please enter the type and serial number as well as the year of construction of your machine here.

You can find this information on the nameplate and/or the frame.

Please always state this information when ordering spare parts or accessories, and in case of complaints.

Type

Serial number

Year of construction

Technical improvements

We are continuously improving our products. Therefore, we reserve the right to make any improvements and changes to our machine that we consider necessary without notice. This constitutes no 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

Preface

Technical improvements

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Terms/conditions of warranty

1 Intended use

The mineral fertiliser spreaders of the MDS series are constructed in accordance with their intended use and may be used exclusively for the points listed below.

- For conventional agricultural use
- For spreading dry, granular and crystalline fertilisers.

Any use outside these definitions is considered misuse. The manufacturer is not liable for any damage which results from misuse. The operator bears the entire risk.

Intended use also includes observing the operating, maintenance and service conditions specified by the manufacturer. Only genuine spare parts made by the manufacturer may be used as replacements.

The mineral fertiliser spreaders of the MDS series 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 notes on the operation, service and secure handling of the machine as described in this operating manual and in the form of warning notes and pictorial warnings at the machine issued by the manufacturer are to be adhered to when using the machine.

Moreover, the relevant accident prevention regulations and any other generally recognised safety, occupational health, and road traffic regulations must be strictly observed when using this machine.

Any unauthorised modifications to the mineral fertiliser spreader MDS are not permitted. They will exempt the manufacturer from liability for any damage resulting therefrom.

In the following chapters, the mineral fertiliser spreader is referred to as “**ma-
chine**”.

Foreseeable misuse

The manufacturer provides warning notes and signs on the MDS mineral fertiliser spreader relating to foreseeable misuse. These warning notes and signs must be observed under all circumstances in order to prevent the machine MDS being used for any other purpose than that specified in the operator’s manual.

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 information for a **safe, appropriate** and economic **use** and **maintenance** of the machine. Adherence to this operator's manual helps to **avoid risks**, to reduce repair costs and downtime, and to increase the machine's reliability and service life.

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 all persons entrusted with the following work on the machine:

- Operation,
- Maintenance and cleaning,
- Repairing faults.

In particular, the following is to be observed:

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

The **operator's manual does not replace** your **own responsibility** as the operator and operating personnel of the 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 the operation of the machine,
 - Transportation
 - Commissioning
 - Spreading operation
- Instructions on detecting and rectifying faults
- Maintenance and repair instructions

2.3 Notes on text descriptions

2.3.1 Instructions and procedures

Steps that the operator must carry out are shown as a numbered list.

1. Instruction for action step 1
2. Instruction for action step 2

Instructions involving only one step are not numbered. The same applies for action steps that do not have a specific sequence.

A bullet is placed in front of these instructions:

- Handling instruction

2.3.2 Listings

Listings without a specific sequence are shown with bullet points (level 1) and dashes (level 2):

- Property A
 - Point A
 - Point B
- Property B

2.3.3 References

References to other text passages in the document are indicated with section number, headline text and page number:

- **Example:** See also Chapter [3: Safety, page 5](#).

References to other documents are indicated as note or instruction without exact chapter or page number:

- **Example:** Please also observe the instructions contained in the manual for the universal drive shaft.

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 Significance of warnings

The warning instructions in this manual have been structured according to the degree of danger and the probability of their occurrence.

Danger signs and symbols inform the user about other construction-related and unavoidable residual risks that may be encountered when operating the machine. The warning notes used are structured as follows:

| Signal word | |
|--------------------|-------------|
| Symbol | Explanation |

Example

| | |
|---|---|
| ▲ DANGER | |
|  | <p>Risk to life if warning is not observed</p> <p>Description of the danger and possible consequences.</p> <p>Ignoring these warnings will result in very serious or even fatal injury.</p> <p>▶ Measures to prevent the danger.</p> |

Warning severity level

The degree of danger is indicated by the signal word. The levels 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 persons.

Ignoring these warnings will result in very serious or even fatal injury.

- ▶ Always observe the measures described to prevent this danger.
-

▲ WARNING



Type and source of danger

This warning warns of a possible dangerous situation for the health of persons.

Ignoring these warnings will result in very serious 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 or of material and environmental damage.

Ignoring this warning can result in injuries and damage to the product or the general area.

- ▶ Always observe the measures described to prevent this danger.
-

NOTICE

General information containing application tips and particularly useful information, but which constitutes neither warnings nor 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

It is the operator's responsibility that the machine is used as intended.

3.4.1 Personnel qualifications

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.
- Only qualified maintenance staff may implement maintenance and service work.

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 governed by law in every country. The operator of the machine shall be responsible for the compliance with these regulations applicable in the country of use.

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 snag.
- Follow the manufacturer's warning notes when handling chemicals. You may have to wear personal protective equipment (PPE).

3.5 Information on operational safety

Only use the machine in an operational safe state. Avoid hazardous situations.

3.5.1 Parking the machine

- Only park the machine with the hopper empty and on horizontal, solid ground.
- If the machine is parked alone (without tractor), open the metering slides completely. The return springs of the single-acting slide actuation are released.

3.5.2 Filling the machine

- Only fill the machine when the motor of the tractor is stopped. Remove the ignition key in order to ensure that the motor cannot be started.
- Use suitable auxiliary equipment for filling the machine (e.g. front-end loader, feed screw conveyor).
- Fill the machine no higher than the top-edge. Check the fill level, e.g. through the viewing window in the hopper (depending on the model).
- Only fill the machine with the protective grid closed. This way, faults during spreading caused by lumps in the spreading material or other foreign bodies are prevented.

3.5.3 Checks before start-up

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

- Are all safety devices at the machine installed and functioning?
- Are all fasteners and load-bearing connections tightly installed and in good condition?
- Are the spreading disks and their fixings in good condition?
- Are the protective grids in the hopper closed and locked?
- Is the test dimension of the protective grid lock within the proper range? See [figure 12.4](#) on [page 113](#).
- Is the hazard zone of the machine **clear** of persons?
- Is the drive shaft cover in good condition?

3.5.4 Hazard zone

Flying 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.

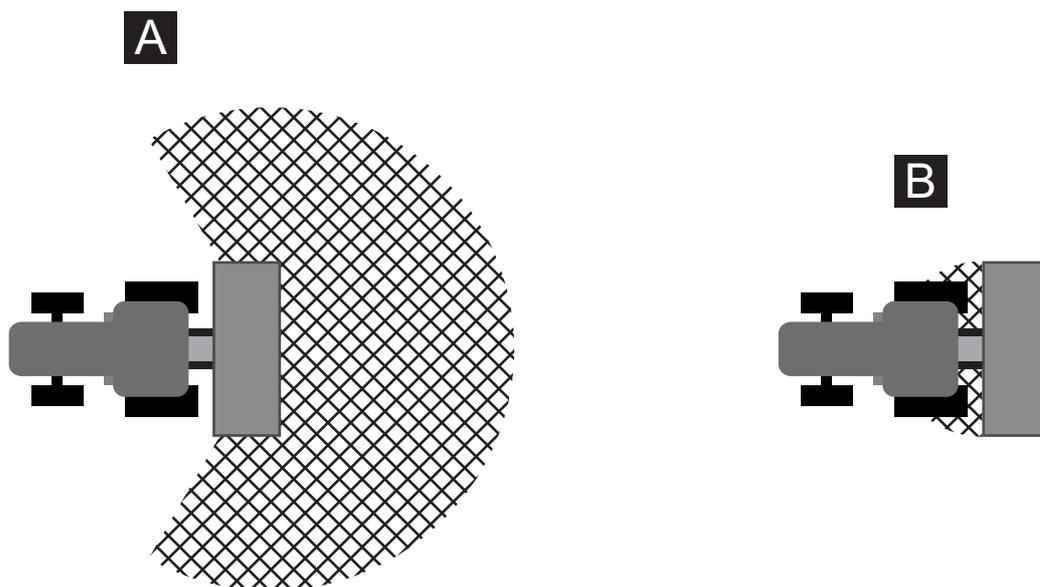


Figure 3.1: Hazard zones around attachment units

- [A] Hazard zone in spreading operation
 [B] Hazard zone when coupling/de-coupling 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 actuating the hydraulic lift, ensure that nobody is present in the hazard zone [B].

3.5.5 Operation

- If the machine malfunctions, stop the machine immediately and secure it. Have the fault repaired immediately by qualified technicians.
- Never climb onto the machine while the spreader unit is running.
- Only operate the machine with the protective grid in the hopper closed. During operation, the protective grid **must neither be opened nor removed**.
- Rotating machine components can cause serious injury. For this reason, ensure that you avoid any contact between body parts or clothes and rotating components.
- Do not deposit any external parts (such as screws, nuts) in the spreader hopper.
- Ejected spreader material may cause serious injury (e.g. to the eyes). For this reason, ensure that nobody is present in the spreading area of the machine.
- If the wind speed is too high, stop the spreading operation because the specified spreading range cannot be guaranteed under such conditions.
- Never climb onto the machine or the tractor when it is situated beneath high-voltage electrical power lines.

3.6 Use of fertiliser

An inappropriate selection or usage of the fertiliser may lead to severe personal injury or environmental damages.

- When selecting the fertiliser, inform yourself about its effects on persons, the environment, and the machine.
- Please follow the instructions of the fertiliser manufacturer exactly.

3.7 Hydraulic system

The hydraulic system is under high pressure.

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

- Always operate the machine below the permissible maximum operating pressure.
- Depressurise the hydraulic system **before** any **maintenance work**. Turn the tractor motor off. Secure it against reactivation.
- When looking for leaks, wear **protective glasses** and **protective gloves at all times**.
- In the case of injury in connection with hydraulic oil, **consult a physician immediately** as severe infections may occur otherwise.
- When connecting the hydraulic hoses to the tractor, ensure that the hydraulic system is **depressurised**, 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 joining 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 ageing process. This limits their storage and service life.

The service life of the hose lines may not exceed 6 years, including a possible storage time of maximally 2 years.

The date of manufacture of the hoses is indicated on the hose coupling in month and year

- Replace hydraulic hoses if damaged or aged.
- Replacement of hydraulic hoses must meet the technical requirements of the equipment manufacturer. In particular, note the different maximum pressure ratings of replacement hoses.

3.8 Maintenance and repair

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

- Any maintenance and service work is to be conducted with increased alertness at all times. Work particularly thoroughly and cautiously.

3.8.1 Qualifications of maintenance staff

- 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.
- Furthermore, the maintenance and repair intervals of the supplier components must also be complied with. See the supplier documentation for the relevant intervals.
- We recommend that you have the condition of the machine checked after each season by your specialist dealer, paying particular attention to its fixing components, safety-relevant plastic components, hydraulic system, metering parts and spreader vanes.
- Spare parts must at least comply with the technical standards specified by the manufacturer. The technical standards can be guaranteed by using genuine 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 work

- **Always switch off the tractor engine** before all cleaning, maintenance and service work and when troubleshooting. **Wait until all rotating parts of the machine have come to a standstill.**
- Make sure that **no unauthorised person** can start the machine. Remove the ignition key of the tractor.
- Before any maintenance and service work, separate the current supply between tractor and machine.
- Disconnect the power supply 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.
- Before carrying out any maintenance and service work, depressurise the hydraulic system.
- If you must work while the PTO shaft is rotating, make sure that nobody is near the PTO or the universal drive shaft.
- Never remove any clogging in the spreader hopper with your hand or foot, but use suitable tools for this purpose. In order to avoid clogging, only fill the hopper when the protective grid is mounted.
- Before cleaning the machine with water, steam or other cleaning agents, cover all components that must not get wet (e.g. bearings, electrical connections).
- Regularly check nuts and screws for their tight seat. 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

The pre-departure check is an important contribution to road safety. Before every trip, check compliance with the operating conditions, traffic safety, and the regulations of the country of operation.

- Is the permissible total weight complied with? Note the permitted axle load, the permitted braking load, and the permitted tyre load capacity; [See also "Axle load calculation" on page 33.](#)
- Is the machine attached appropriately?
- Could fertiliser be lost while travelling?
 - Check the level of the fertiliser in the hopper.
 - The metering slides must be closed.
 - The ball valves must also be closed on single-acting hydraulic cylinders.
 - Switch off the electronic control unit.
- Check the tyre pressures and the function of the tractor brake system.
- Does the lighting and marking of the machine comply with the regulations of your country with respect to driving on public roads? Make sure to make the fittings according to the regulations.

3.9.2 Transportation drive 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 tractor's front axle and affect its steering.

- Be aware of the changed driving behaviour.
- 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 permissible maximum speed.
- Avoid sudden turns when driving uphill or downhill or across a slope. Due to the changed centre of gravity, there is a danger of overturning. Special care is to be particularly applied when driving on uneven, soft ground (e.g. when entering fields, kerbs).
- 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 the drive and operation.

3.10 Safety equipment, warning and instruction notices on the machine

3.10.1 Position of safety equipment, warning and instruction notices

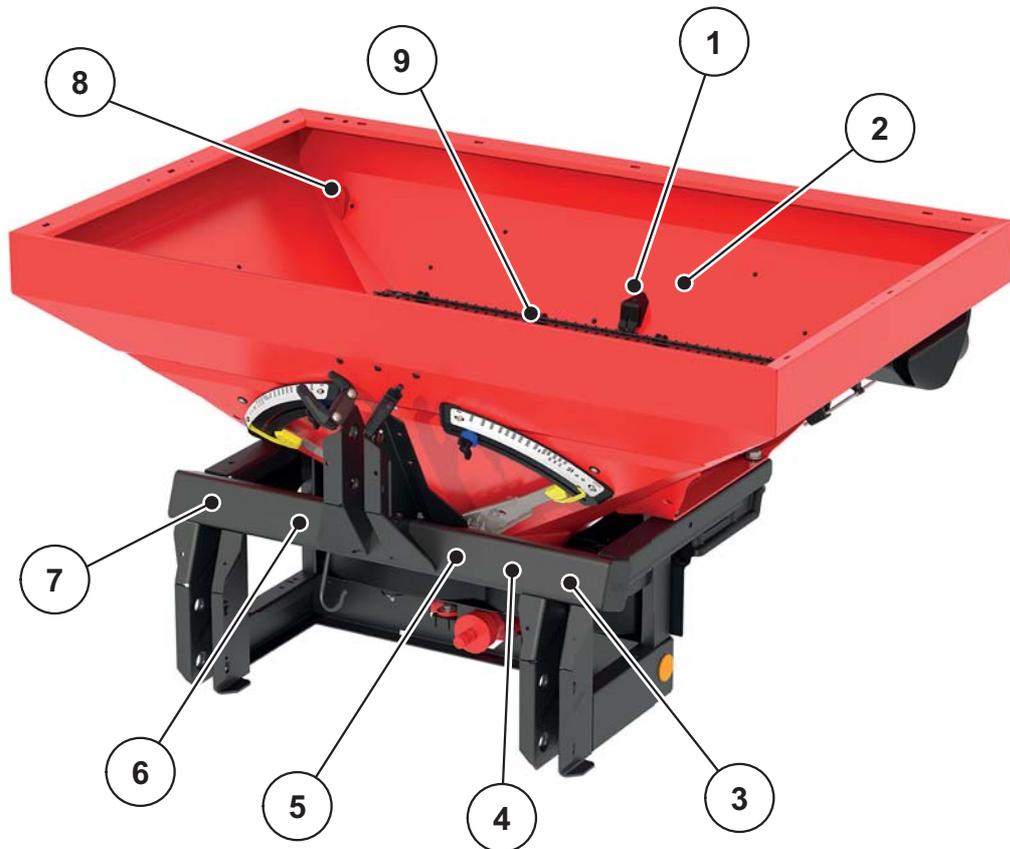


Figure 3.2: Position of safety equipment, warning and instruction notices, reflector (front)

- [1] Protective grid lock
- [2] Instructions: protective grid lock
- [3] Warning: danger of crushing between tractor and machine
- [4] Warning: read operator's manual
- [5] Instructions: maximum payload
- [6] Instructions: PTO speed
- [7] Nameplate
- [8] Ring eyelet
- [9] Protective grid in hopper

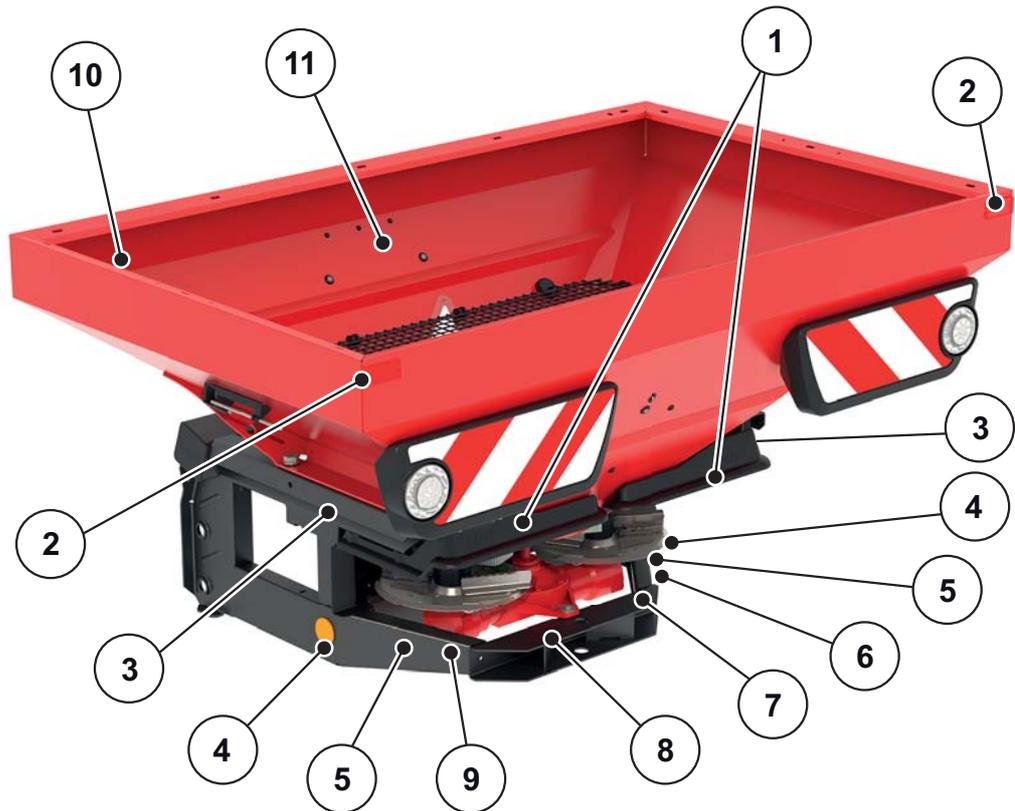


Figure 3.3: Position of safety equipment, warning and instruction notices, reflector (rear)

- [1] Rejection and safety equipment
- [2] Red reflectors
- [3] Instructions: Tightening torque
- [4] Yellow side reflectors
- [5] Warning: moving parts
- [6] Instructions: carrying a trailer (only for Germany)
- [7] Warning: remove ignition key
- [8] Warning: ejection of material
- [9] Instructions: spreading vane adjustment
- [10] Ring eyelet
- [11] Instruction: using a protective grid



[1] Drive shaft guard

Figure 3.4: Drive shaft guard

3.10.2 Function of the safety equipment

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

- Only operate the machine when the safety equipment is functional.
- Do not use the rejection and safety equipment as a climbing aid. It is not designed for this. There is a risk of falling.

| Name | Function |
|--------------------------------|--|
| Protective grid in hopper | Prevents body parts from being caught by the rotating agitator. Prevents body parts from being cut off by the metering sliders. Prevents faults during spreading caused by lumps in the spreading material, large stones or other large objects (screening effect). |
| Protective grid lock | Prevents the inadvertent opening of the protective grid in the hopper. Engages mechanically if protective grid is closed properly and can only be unlocked with a tool. |
| Rejection and safety equipment | The rejection and safety equipment prevents the fertiliser from being ejected towards the front (in the direction of the tractor/workstation). The rejection and safety equipment prevents getting caught by the rotating spreading discs from behind, from the side, and from the front. |
| Drive shaft guard | Prevents body parts from being pulled into the rotating drive shaft. |

3.11 Warning and instruction stickers

There are various warning and instruction stickers affixed to the machine (for the position of said stickers on the machine see [figure 3.2](#)).

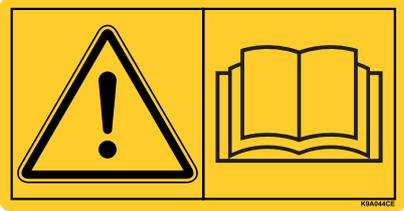
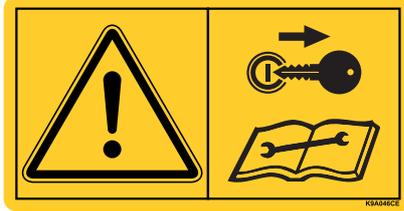
The warning and instruction stickers are components of the machine. They must not be removed or modified. Missing or illegible warning and instruction stickers must be replaced immediately.

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.

NOTICE

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

3.11.1 Warning stickers

| | |
|---|--|
|  | <p>Read the operator's manual and warning messages. Read and observe the operator's manual and warning messages 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.</p> |
|  | <p>Danger due to ejection of material Danger of injury to the whole body caused by ejected spreading material Before commissioning, instruct all people to leave the hazard zone (spreading range) of the machine.</p> |
|  | <p>Danger due to moving parts Risk of body parts being cut off It is prohibited to reach into the danger area of the rotating spreading discs or the agitator. Switch off the engine and remove the key before carrying out any maintenance, repair and adjustment work.</p> |
|  | <p>Remove the ignition key. Before carrying out any repair and maintenance work, shut off the engine and remove the ignition key.</p> |
|  | <p>Crushing hazard between the tractor and the machine 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 inattention or faulty operation. Ensure that nobody is present in the hazard zone between the tractor and the machine.</p> |

3.11.2 Instruction stickers

| | |
|--|---|
| | <p>Protective grid Before commissioning the machine, MDS attach the protective grid and close.</p> |
| | <p>Protective grid lock The grid is automatically locked when the protective grid in the hopper is closed properly. It can only be unlocked by using a tool.</p> |
| | <p>PTO speed The rated speed of the PTO shaft is 540 rpm.</p> |
| | <p>Maximum load capacity 2000 kg for MDS 20.2</p> |
| | <p>Maximum load capacity 1800 kg for MDS 18.2</p> |
| | <p>Maximum load capacity For category I: 800 kg For category II: 1400 kg for MDS 14.2</p> |
| | <p>The maximum load capacity is 800kg for MDS 8.2</p> |

| | |
|--|--|
| | <p>Spreading vane adjustment on the left and right spreading disc.</p> |
| | <p>Tightening torque 90 Nm for fastening the hopper onto the frame.</p> |

3.12 Name plate and machine identification

NOTICE

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.



Figure 3.5: Nameplate

- [1] Manufacturer
- [2] Serial number
- [3] Maschine
- [4] Type
- [5] Empty weight

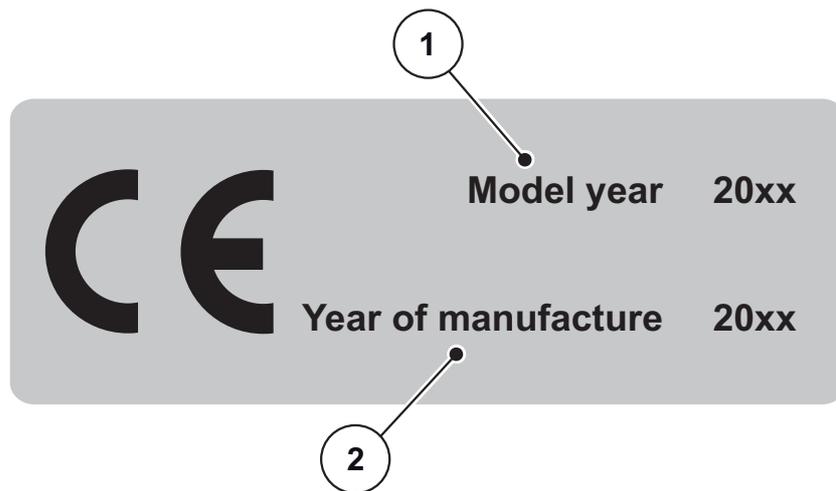


Figure 3.6: CE identification plate

- [1] Model year
- [2] Year of construction

3.13 Reflector

The components of the lighting system must be installed in accordance with the stipulations and be ready to operate at all times. Lights must not be covered or obscured by dirt.

The machine is factory-fitted with passive back and side labelling (for an illustration of the positioning on the machine, see chapter [figure 3.2](#)).

4 Technical data

4.1 Manufacturer

RAUCH Landmaschinenfabrik GmbH

Landstraße 14

D-76547 Sinzheim

Phone: +49 (0) 7221 / 985-0

Fax: +49 (0) 7221 / 985-200

Service Centre, Technical Customer Service

RAUCH Landmaschinenfabrik GmbH

Postfach 1162

D-76545 Sinzheim

Phone: +49 (0) 7221 / 985-250

Fax: +49 (0) 7221 / 985-203

4.2 Description of the machine

Use the machines of the MDS series in accordance with chapter [„Intended use“ on page 1](#).

The machine consists of the following assemblies.

- 1-chamber hopper with agitator and outlets
- Frame and coupling points
- Drive elements (drive shaft and transmission)
- Metering elements (agitator, metering slide, scale for the spreading volume)
- Elements for adjusting the working width
- For safety equipment; see [3.10: Safety equipment, warning and instruction notices on the machine, page 14](#).

NOTICE

Some models are not available in all countries.

4.2.1 Assembly overview

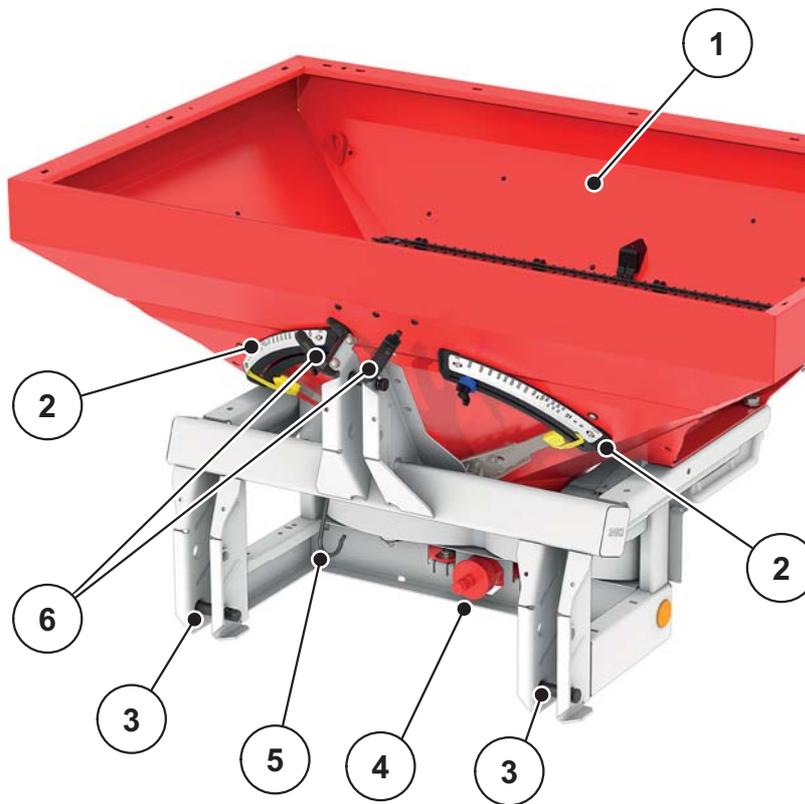


Figure 4.1: Assembly overview: Front

- [1] Hopper (inspection window, filling level scale)
- [2] Scale for the spreading volume (left/right)
- [3] Coupling points
- [4] Transmission spigot
- [5] Drive shaft mounting bracket
- [6] Hose and cable tray

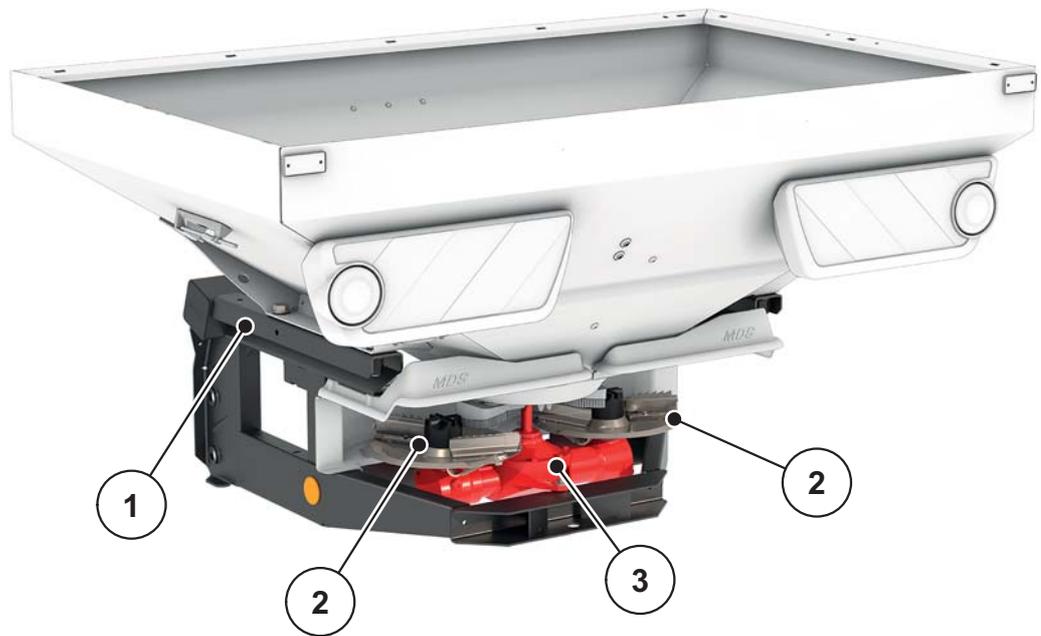


Figure 4.2: Assembly overview: Rear

- [1] Frame
- [2] Spreading disc (left/right)
- [3] Transmission

4.2.2 Agitator

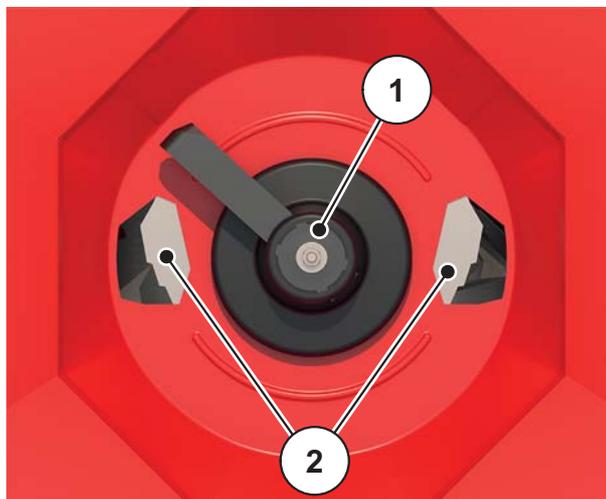


Figure 4.3: Agitator

- [1] Agitator
- [2] Metering slide

4 Technical data

4.3 Machine data

4.3.1 Versions

NOTICE

Some models are not available in all countries.

| Function | K | D | R | C | Q |
|---|---|---|---|---|---|
| Electrically remote-controlled actuators | | | | • | • |
| Single-acting hydraulic cylinder | • | | | | |
| Single-acting hydraulic cylinders with two-way unit | | | • | | |
| Double-acting hydraulic cylinders | | • | | | |
| Spreading depending on forward speed | | | | | • |

4.3.2 Technical data of basic equipment

Dimensions:

| Data | | MDS 8.2 | MDS 14.2 | MDS 18.2 | MDS 20.2 |
|--|---------|------------|------------|------------|------------|
| Overall width | | 108 cm | 140 cm | 190 cm | 190 cm |
| Overall length | | 124 cm | 128 cm | 130 cm | 130 cm |
| Filling height (basic machine) | | 92 cm | 104 cm | 93 cm | 101 cm |
| Distance between centre of gravity and lower link coupling point | | 55 cm | 55 cm | 55 cm | 55 cm |
| Filling width | | 98 cm | 130 cm | 180 cm | 180 cm |
| Working width ^a | | 10 - 24 m |
| PTO speed | minimum | 450 rpm | 450 rpm | 450 rpm | 450 rpm |
| | maximum | 600 rpm | 600 rpm | 600 rpm | 600 rpm |
| Rated speed | | 540 rpm | 540 rpm | 540 rpm | 540 rpm |
| Capacity | | 500 l | 800 l | 700 l | 900 l |
| Mass flow ^b | maximum | 250 kg/min | 250 kg/min | 250 kg/min | 250 kg/min |
| Hydraulic pressure | maximum | 200 bar | 200 bar | 200 bar | 200 bar |
| Sound pressure level ^c (in the closed driver's cab of the tractor) | | 75 dB(A) | 75 dB(A) | 75 dB(A) | 75 dB(A) |

a. Working width depending on fertiliser and spreading disc type (maximum 24 m)

b. Maximum mass flow depending on fertiliser type

c. Since the sound pressure level of the machine can only be determined when the tractor is running, the actual measured value is greatly dependent on the tractor type being used.

Weights and loads:

NOTICE

The empty weight (mass) of the machine varies depending on the feature package and attachment combination. The empty weight indicated on the nameplate refers to the standard version.

| Data | MDS 8.2 | MDS 14.2 | MDS 18.2 | MDS 20.2 |
|----------------------------|---------------------------|--|----------------------|---------------------|
| Empty weight | 190 kg | 210 kg | 210 kg | 230 kg |
| Fertiliser payload maximum | Category I and II: 800 kg | Category I: 800 kg Category II: 1400 kg | Category II: 1800 kg | Category II: 2000kg |

4.3.3 Technical data of the extensions

For machines of the MDS series, various extensions are available. The capacity, dimensions and weights may change depending on the selected feature package.

| Extension | M 31 (only MDS 8.2) | M 21 (only MDS 14.2) | M 41 (only MDS 14.2) |
|--------------------------|------------------------|-------------------------|-------------------------|
| Change in capacity | + 300 l | + 200 l | + 400 l |
| Change in filling height | + 28 cm | + 12 cm | + 24 cm |
| Filling width | 98 cm | 130 cm | |
| Extension size max. | 108 x 108 cm | 140 x 115 cm | |
| Extension weight | 25 kg | 20 kg | 30 kg |
| Comment | 4-sided | 4-sided | |

| Extension for Types MDS 18.2/20.2 | M 430 | M 630 | M 800 | M 1100 |
|-----------------------------------|--------------|---------|--------------|----------|
| Change in capacity | + 400 l | + 600 l | + 800 l | + 1100 l |
| Change in filling height | + 18 cm | + 30 cm | + 18 cm | + 27 cm |
| Filling width | 178 cm | | 228 cm | |
| Extension size max. | 190 x 120 cm | | 240 x 120 cm | |
| Extension weight | 30 kg | 42 kg | 49 kg | 59 kg |
| Comment | 4-sided | 4-sided | 4-sided | 4-sided |

4.4 List of available accessories

4.4.1 Extensions

The capacity of the machine can be increased by fitting a hopper extension.

For the machines MDS 18.2 and MDS 20.2, four-sided extensions are available with different hopper capacities.

The extensions are bolted to the standard hopper.

NOTICE

For an overview of extensions and extension combinations, see chapter [4.3.3: Technical data of the extensions, page 28](#).

4.4.2 Hopper cover

A hopper cover can be fitted to protect the spreading material from rain and moisture.

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

| Hopper cover | Application |
|--------------|---|
| AP 13 | <ul style="list-style-type: none"> Standard unit MDS 14.2 |
| AP 19 | <ul style="list-style-type: none"> Standard unit MDS 18.2/20.2 Extensions: M 430, M 630 |
| AP 240 | <ul style="list-style-type: none"> Extensions: M 800, M 1100 |

4.4.3 RFZ 7 (all versions except MDS 8.2)

This 7-row spreading device can be used to place dry, granular fertiliser in a row next to sprouting plants.

A separate operator's manual is supplied with each row spreading device.

4.4.4 TELIMAT T1

The TELIMAT is used for remote-controlled full and limited border spreading from the tramline (left).

A double-acting valve is required for the operation of the TELIMAT T1.

NOTICE

You can find information about spreading with this special equipment in chapter [10.5: TELIMAT T1 \(optional equipment\), page 95](#).

4 Technical data

4.4.5 Two-way unit

The two-way unit can be used to connect the machine to tractors with only one single-acting control valve.

4.4.6 Tele-Space drive shaft

The Tele-Space drive shaft is extendible and provides additional space (approx. 300mm) for easier coupling of the machine to the tractor.

Separate assembly instructions are supplied when the Tele-Space drive shaft is delivered.

4.4.7 Auxiliary lighting

The machine can be fitted with auxiliary lighting.

| Lighting | Application |
|----------|--|
| BLW 16 | <ul style="list-style-type: none">• For MDS 14.2/18.2/20.2• Rear lighting• With warning sign |

NOTICE

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

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

NOTICE

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

- Observe the traffic regulations of your country.

4.4.8 Row spreading device RV 2M1 for hops and fruit cultivation

The row spreading device is designed in such a way that a row on both the right and left of the machine (row distance: approx. 2-5 m) is spread with fertiliser in a 1-metre wide strip.

NOTICE

You can find information about spreading with this special equipment in chapter [10.7: Row spreading device RV 2M1 \(optional equipment\), page 101](#).

4.4.9 Limited border spreading unit GSE 7

Limits the spreading width (either towards the left or right) to a range between approx. 75 cm and 2 m from the centre of the tractor to the outer edge of the field. The metering slide that points to the field edge is closed.

- Fold the limited border spreading unit downwards for boundary spreading.
- The limited border spreading unit must be folded up again before starting the two-sided spreading.

4.4.10 Hydraulic remote control FHZ 10

This remote control is used from the tractor cabin to hydraulically swing the border spreading unit into position or to swing it from border spreading position into the two-sided spreading position.

4.4.11 Agitator RWK 6

For sticky fertiliser.

4.4.12 Agitator RWK 7

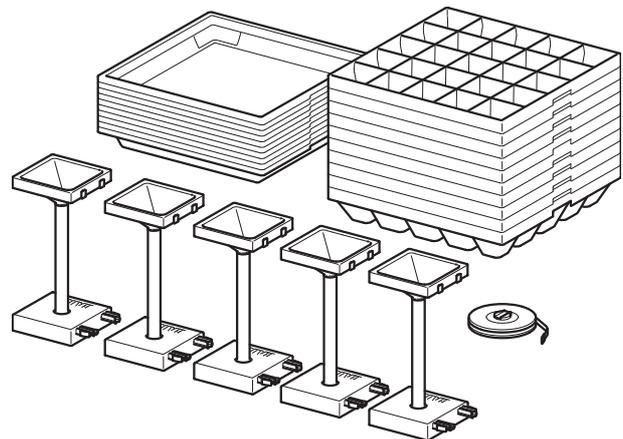
For using grass seeds as spreading material.

4.4.13 Agitator RWK 15

For mealy fertiliser.

4.4.14 Practice test kit PPS5

For checking the cross-distribution in the field.



4.4.15 Fertiliser identification system (DIS)

Fast and uncomplicated determination of spreader settings when working with unfamiliar fertilisers.

5 Axle load calculation

▲ CAUTION



Risk of overload

Mounted units on the front or rear three-point linkage must not cause the approved total weight to be exceeded. The front axle of the tractor must be loaded with a minimum weight of 20 % of the empty weight of the tractor at all times.

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

Calculation of total weight, axle loads and tyre load capacity as well as of the required minimum ballast weights.

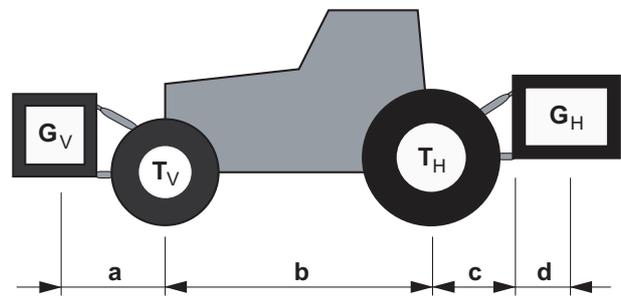


Figure 5.1: Loads and weights

You will need the following data for the calculation:

| Character [unit] | Meaning | Calculation by (table footer) |
|------------------|--|-------------------------------|
| T_L [kg] | Empty weight of the tractor | [1] |
| T_V [kg] | Front axle load of the empty tractor | [1] |
| T_H [kg] | Rear axle load of the empty tractor | [1] |
| G_V [kg] | Total weight of front-mounted unit/front ballast | [2] |
| G_H [kg] | Total weight of rear-mounted unit/rear ballast | [2] |
| a [m] | Distance between centre of gravity of front-mounted unit / front ballast and centre of front axle | [2], [3] |
| b [m] | Wheel base of the tractor | [1], [3] |
| c [m] | Distance between centre of rear axle and centre of lower link ball | [1], [3] |
| d [m] | Distance between centre of lower link ball and centre of gravity of rear-mounted unit / rear ballast | [2] |

[1] See operator's manual of the tractor

[2] See price list and/or operator's manual of the unit

[3] To be measured

Rear-mounted unit and/or front-rear combinations

Calculation of the minimum ballast front $G_{V \min}$

$$G_{V \min} = \frac{(G_H \cdot (c + d) - T_V \cdot b + 0,2 \cdot T_L \cdot b)}{a + b}$$

Enter the calculated minimum ballast requirement in the table.

Front-mounted unit

Calculation of the minimum ballast rear $H_{H \min}$

$$G_{H \min} = \frac{(G_V \cdot a - T_H \cdot b + 0,45 \cdot T_L \cdot b)}{b + c + d}$$

Enter the calculated minimum ballast requirement in the table.

If the front-mounted unit (G_V) is lighter than the minimum ballast at the front ($G_{V \min}$), the weight of the front-mounted unit must be increased to at least the weight of the minimum front ballast.

Calculation of the actual front axle load $T_{V \text{tat}}$

$$T_{V \text{tat}} = \frac{(G_V \cdot (a + b) + T_V \cdot b - G_H \cdot (c + d))}{b}$$

Enter the calculated actual front axle load as well as the admissible front axle load specified in the tractor's operator's manual in the table.

If the rear-mounted unit (G_H) is lighter than the minimum ballast at the rear ($G_{H \min}$), the weight of the rear-mounted unit must be increased to at least the weight of the minimum rear ballast.

Calculation of the actual total weight G_{tat}

$$G_{\text{tat}} = (G_V + T_L + G_H)$$

Enter the calculated actual total weight as well as the admissible total weight specified in the tractor's operator's manual in the table.

Calculation of the actual rear-axle load $T_{H \text{tat}}$

$$T_{H \text{tat}} = (G_{\text{tat}} - G_{V \text{tat}})$$

Enter the calculated actual rear axle load as well as the admissible rear axle load specified in the tractor's operator's manual in the table.

Tyre load capacity

Enter double the value (two tyres) of the admissible tyre load capacity (for example, see the tyre manufacturer's documentation) in the table.

Axle loads table:

| | Actual value according to calculation | Admissible value according to operator's manual | Twice the admissible tyre load capacity (two tyres) |
|------------------------------|--|--|--|
| Minimum ballast front / rear | <input type="text"/> kg | — | — |
| Total weight | <input type="text"/> kg | \leq <input type="text"/> kg | — |
| Front axle load | <input type="text"/> kg | \leq <input type="text"/> kg | \leq <input type="text"/> kg |
| Rear axle load | <input type="text"/> kg | \leq <input type="text"/> kg | \leq <input type="text"/> kg |

The minimum ballast must be mounted on the tractor as an attachment or as ballast weight.

The calculated values must be less than or equal to the admissible values.

6 Transportation without tractor

6.1 General safety instructions

Read the following instructions before transporting the machine:

- If no tractor is used, the machine may only be transported with an empty hopper.
- The work may only be carried out by suitable, trained and expressly authorised personnel.
- Suitable means of transportation and lifting equipment (e.g. crane, forklift truck, lifting tackle ...) are to be used.
- Determine the transportation route early, 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 must ensure that the machine is transported appropriately.
- Unauthorised persons are to be kept away from the transport route. The areas concerned must be cordoned off.
- Cautiously transport the machine and handle it with care.
- Make sure that allowance is made for the centre of gravity. If necessary, adjust the lifting tackle so that the machine is correctly suspended.
- Transport the machine to the final destination as close to the ground as possible.

6.2 Loading and unloading, parking

1. Determine the weight of the machine.
Details are provided on the nameplate.
If applicable, also take the weight of mounted special equipment into account.
2. Carefully lift the machine with suitable lifting equipment.
3. Carefully set the machine down on the loading platform of the transport 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

- 1 MDS series mineral fertiliser spreader
- 1 MDS operator's manual
- 1 fertiliser chart (CD)
- 1 calibration kit comprising chute and calculator
- Lower link and upper link pins
- 1 agitator
- Protective grid in hopper
- 1 spreading disc set (according to order)
- 1 universal drive shaft (including operator's manual)
- Version Q: QUANTRON-A control unit (including operator's manual)
- Version C: E-CLICK control unit (including operator's manual)

Also check any optional equipment that you ordered.

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

NOTICE

When receiving the machine, check that all attached components are correctly and securely tightened.

The right-hand spreading disc and left-hand spreading disc must be mounted facing the direction of travel.

If in doubt, contact your salesperson or the manufacturer directly.

7.2 Tractor requirements

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

- Universal drive shaft connection: 1 3/8 inches, 6-part, 540 rpm (alternatively 8 x 32 x 38, 540 rpm),
- Oil supply: max. 200bar, single- or double-acting valve (depending on equipment) for hydraulic metering slide actuator,
- On-board voltage: 12 V,
- Category I and/or II three-point linkage (depending on the type).

7.3 Mounting the drive shaft onto the machine

▲ CAUTION**Material damages due to unsuitable drive shaft**

The machine is delivered with a 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 universal drive shafts approved by the manufacturer only.
- ▶ Follow the directions in the operator's manual of the universal drive shaft manufacturer.

Depending on the version, the machine may be equipped with different universal drive shafts:

- Standard drive shaft
- Tele-Space drive shaft

1. Check the mounting position.

- ▷ The drive shaft end that is marked with a tractor symbol must point to the tractor.

2. Pull lubrication nipple [1] at drive shaft guard.
3. Rotate the plastic ring with bayonet lock of the drive shaft guard [2] using a screw driver towards the lubrication nipple.

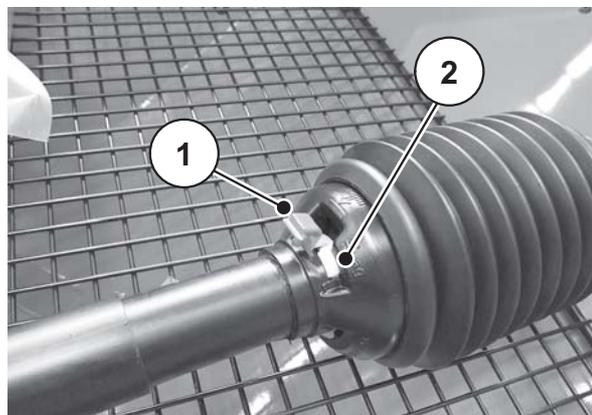


Figure 7.1: Open the universal drive shaft guard

4. Open the universal drive shaft guard backwards.
5. Hold the universal drive shaft guard and the clamp in an open position with your hand.

6. Grease the transmission spigot. Push the universal drive shaft onto the transmission spigot.



Figure 7.2: Push the universal drive shaft onto the transmission spigot

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



Figure 7.3: Connect the universal drive shaft

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



Figure 7.4: Mount the universal drive shaft guard

10. Rotate the plastic ring until it reaches its locking position.
11. Press the lubrication nipple at the universal drive shaft guard into a closed position.



Figure 7.5: Secure the universal drive shaft guard

Instructions for dismounting:

- Dismount the universal drive shaft in reverse order of attachment.
- Do not use the suspension chain for suspending the universal drive shaft.
- Always store the uncoupled universal drive shaft on the bracket provided.



Figure 7.6: Retainer of the universal drive shaft

7.4 Installing the machine on the tractor

7.4.1 Requirements

⚠ 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.
- ▶ Use the vehicle's documentation to check if your tractor is suitable for the machine.

Check the following specific requirements:

- Are both the tractor and the machine in a reliable condition?
- Does the tractor comply with the mechanical, hydraulic, and electrical requirements?
 - See [“Tractor requirements“ on page 39.](#)
- Do the attachment 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?
 - See [5: Axle load calculation, page 33.](#)

7.4.2 Attachment

⚠ DANGER



Danger to life due to inattention or faulty 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 inattention or faulty operation.

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

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

NOTICE

Always use the **upper coupling points** of the machine for normal and late fertilising. See [figure 7.7](#).

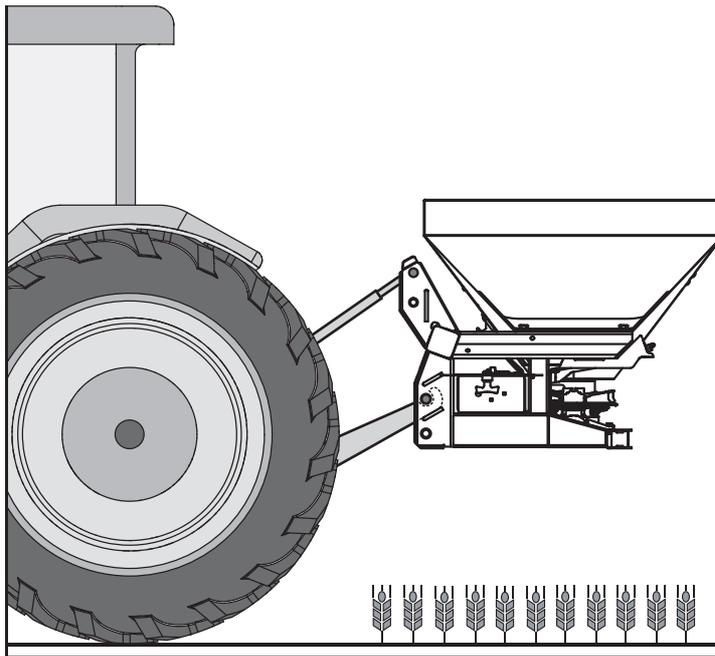


Figure 7.7: Mounting position

Mounting instructions

- The machine can be connected to a tractor with category III linkage only with category II clearance. Use reducing sleeves.
 - The bottom and upper link pins must be secured with linch pins or spring clips.
 - Attach the machine according to the values in the fertiliser chart. This guarantees the correct cross-distribution of the fertiliser.
 - Any oscillating movements during spreading are to be avoided. Make sure that the machine does not have too much sideways play:
 - The lower link arms of the tractor are to be braced by means of stabilising struts or chains.
1. Start the tractor.
 - Check: The PTO shaft is switched off.
 2. 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.
 3. Switch the tractor motor off. Remove the ignition key.
 4. Mount the drive shaft to the tractor.
 - If there is not enough space available, an extendible **Tele-Space universal drive shaft** must be used.
 5. Connect the electric and hydraulic metering slide actuators and the lighting (see [7.6: Connecting the metering slide actuator, page 53](#)).
 6. 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.

NOTICE

We recommend using bottom link hooks together with a hydraulic upper link for safety and comfort. See [figure 7.7](#).

7. Check the tight seat of the machine.
8. Carefully raise the machine to the desired lifting height.

⚠ CAUTION



Material damages due to excessively long drive shaft

When the machine is lifted up, the universal drive shaft halves can come into contact inside each other. This can cause damage to the drive shaft, the transmission or the machine.

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

9. Shorten the universal drive shaft, if required.

NOTICE

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

NOTICE

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

10. Preset the mounting height according to the fertiliser chart. See [8.3.2: Settings as per fertiliser chart, page 64](#).

7.5 Presetting the mounting height

7.5.1 Safety

⚠ DANGER



Risk of being crushed under the falling-down machine

If the upper link halves are accidentally rotated totally apart from each other, it may happen that the upper link cannot compensate for the tractive forces of the machine. This may result in the machine abruptly tilting over backwards or falling down.

This can lead to severe personal injury. Machines can be damaged.

- ▶ When extending the upper link, always observe the maximum admissible length specified by the tractor or upper link manufacturer.
- ▶ Ensure that nobody is present in the hazard zone of the machine.

⚠ WARNING



Risk of injury from rotating spreading discs!

The distribution unit (spreading disc, vanes) may catch and pull-in body parts or objects. Contact with the distribution unit may injure, crush or cut off body parts.

- ▶ Maximum admissible mounting heights at front (V) and rear (H) are to be complied with at all times.
- ▶ Ensure that nobody is present in the hazard zone of the machine.
- ▶ Never remove deflectors mounted on the hopper.

General instructions before setting the mounting height

- We recommend that you choose the highest coupling point on the tractor to connect the upper link, particularly for high lifting heights.

NOTICE

Always use the **upper coupling points** of the machine for normal and late fertilising.

- The lower coupling points on the machine which are meant for the lower links of the tractor should be used **only in exceptional circumstances** in late fertilising.

7.5.2 Maximum admissible mounting height at front (V) and rear (H)

The **maximum** admissible mounting height (**V + H**) is measured **from the ground** to the lower edge of the frame.

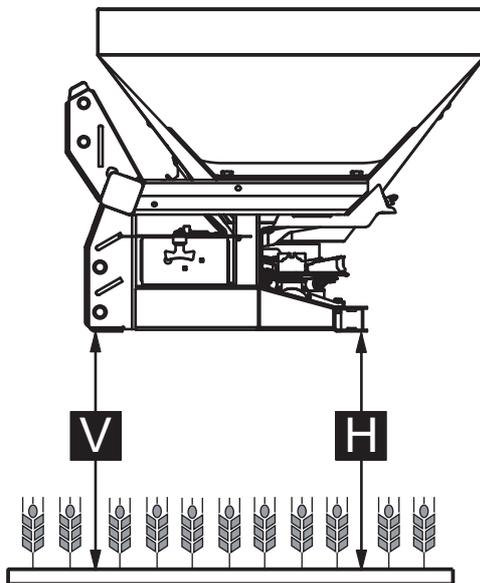


Figure 7.8: Maximum admissible mounting height V and H during normal and late fertilising

The maximum admissible mounting height depends on the following factors:

- Normal or late fertilising.

| | Maximum admissible mounting height | |
|-------------------------|------------------------------------|--------|
| | V [mm] | H [mm] |
| Normal fertilisation | 850 | 850 |
| Late fertilising | 770 | 830 |

7.5.3 Mounting heights A and B according to fertiliser chart

The mounting heights in the fertiliser chart (**A and B**) are always measured in the field from the top of the **crop height** to the bottom edge of the frame.

NOTICE

The values of A and B can be taken from the **fertiliser chart**.

Setting the mounting height during normal fertilisation

Requirements:

- The machine is installed at the highest connecting point of the upper link at the tractor.
- The lower link of the tractor is installed at the **upper coupling point of the lower link** of the machine.

Proceed as follows when determining the mounting height (in normal fertilisation):

1. Determine the mounting heights **A and B** (above crop height) from the fertiliser chart.
2. Compare the mounting heights **A and B** plus the crop height with the maximum admissible mounting heights at the front (V) and rear (H).

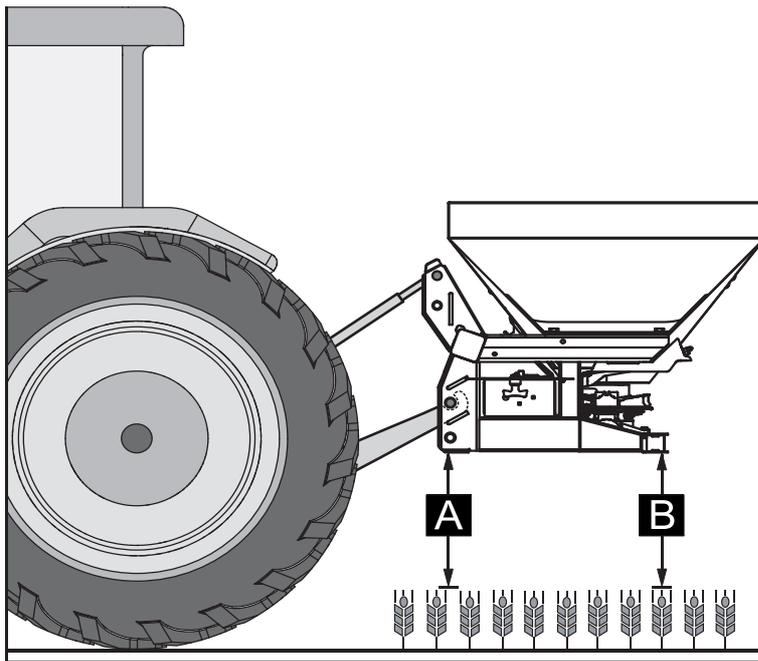


Figure 7.9: Mounting position and height during normal fertilisation

The following applies:

| | |
|---------------------------------|-------------|
| $A + \text{crop height} \leq V$ | Max. 850 mm |
| $B + \text{crop height} \leq H$ | Max. 850 mm |

3. If the maximum admissible mounting height of the machine is exceeded in the normal fertilisation mode, or if the mounting heights A and B cannot be reached: The machine is to be mounted according to the **late fertilising** values.

Setting the mounting height during late fertilising

Requirements:

- The machine is installed at the highest connecting point of the upper link at the tractor.
- The lower link of the tractor is installed at the **upper coupling point of the lower link** of the machine.

Proceed as follows when determining the mounting height (in late fertilising mode):

1. Determine the mounting heights **A** and **B** (above crop height) from the fertiliser chart.
2. Compare the mounting heights **A** and **B** plus the crop height with the maximum admissible mounting heights at the front (V) and rear (H).

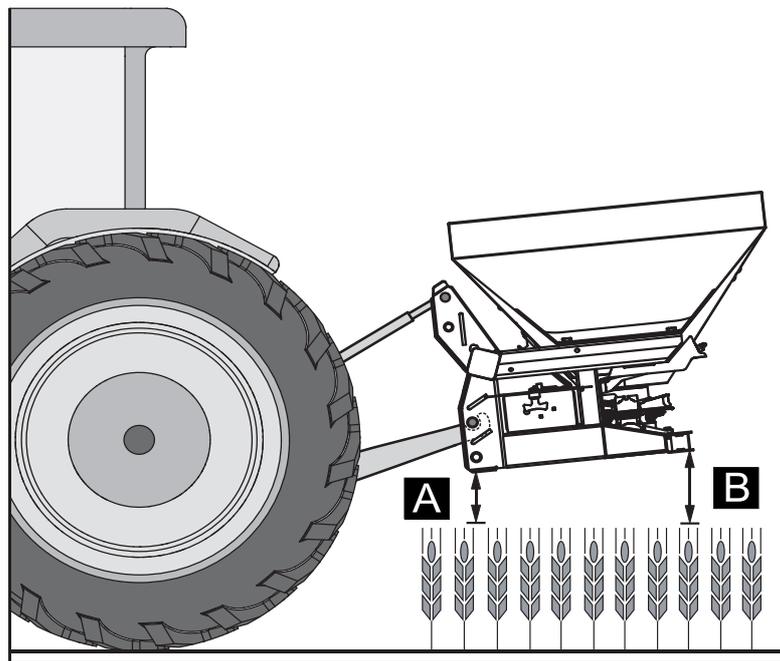


Figure 7.10: Mounting position and height during late fertilising

The following applies:

| | |
|---------------------------------|-------------|
| $A + \text{crop height} \leq V$ | Max. 770 mm |
| $B + \text{crop height} \leq H$ | Max. 830 mm |

3. If the lifting height of the tractor is insufficient for setting the required mounting height: use the lower coupling point on the lower link of the machine.

NOTICE

Make sure that the **maximum admissible length** specified by the upper link or tractor manufacturer is not exceeded.

- Please observe the instructions in the operator's manual provided by the tractor and upper link manufacturer.

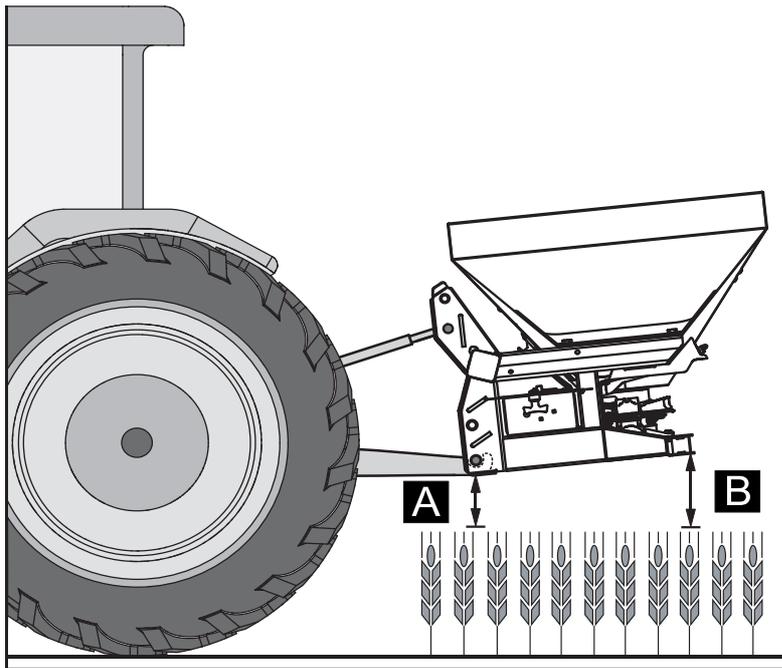


Figure 7.11: Machine mounted to the lower coupling point of the lower link

The following applies:

| | |
|---------------------|-------------|
| A + crop height ≤ V | Max. 770 mm |
| B + crop height ≤ H | Max. 830 mm |

7.6 Connecting the metering slide actuator

7.6.1 Connecting the hydraulic slide actuators: Versions K/R/D

Tractor requirements

- Versions K: Two **single-acting** control valves
- Versions R: One **single-acting** control valve
- Version D: Two **double-acting** control valves

Function

The metering slides are actuated separately by two hydraulic cylinders. The hydraulic cylinders are connected to the slide actuation on the tractor via hydraulic hoses.

| Version | Hydraulic cylinder | Operation |
|---------|--|---|
| K | Single-acting hydraulic cylinders | Oil pressure closes, spring force opens |
| R | Single-acting hydraulic cylinder with two-way unit | Oil pressure closes, spring force opens |
| D | Double-acting hydraulic cylinder | Oil pressure closes, oil pressure opens |

Attachment

1. Depressurise the hydraulic system.
2. Remove the hoses from the brackets attached to the frame of the machine.
3. Insert the hoses into the corresponding couplings on the tractor.

NOTICE

Version K and R

Before extended road travel or **during filling**, close the two ball cocks at the hydraulic pipe plugs. This prevents the automatic opening of the metering slide caused by valve leakages in the tractor hydraulics.

Instructions for connecting a two-way unit

The two-way unit

- is connected to version R as standard.
- is offered as optional equipment for version **K**.

When using the two-way unit, the hydraulic pipes between the hydraulic cylinders and the slide controls are additionally sheathed with a protective hose in order to avoid injury to the operator caused by hydraulic oil.

⚠ CAUTION



Risk of injury from hydraulic oil

Hydraulic oil leaking under pressure may harm the skin and cause poisoning.

- ▶ Use an undamaged hose sheath for the hydraulic lines only.



Figure 7.12: Metering slide actuator of the two-way unit

The metering slides can be actuated individually via the ball cocks of the two-way unit.

Position display

This display serves to identify the position of the metering slide from the driver's seat to avoid the unintentional loss of fertiliser.

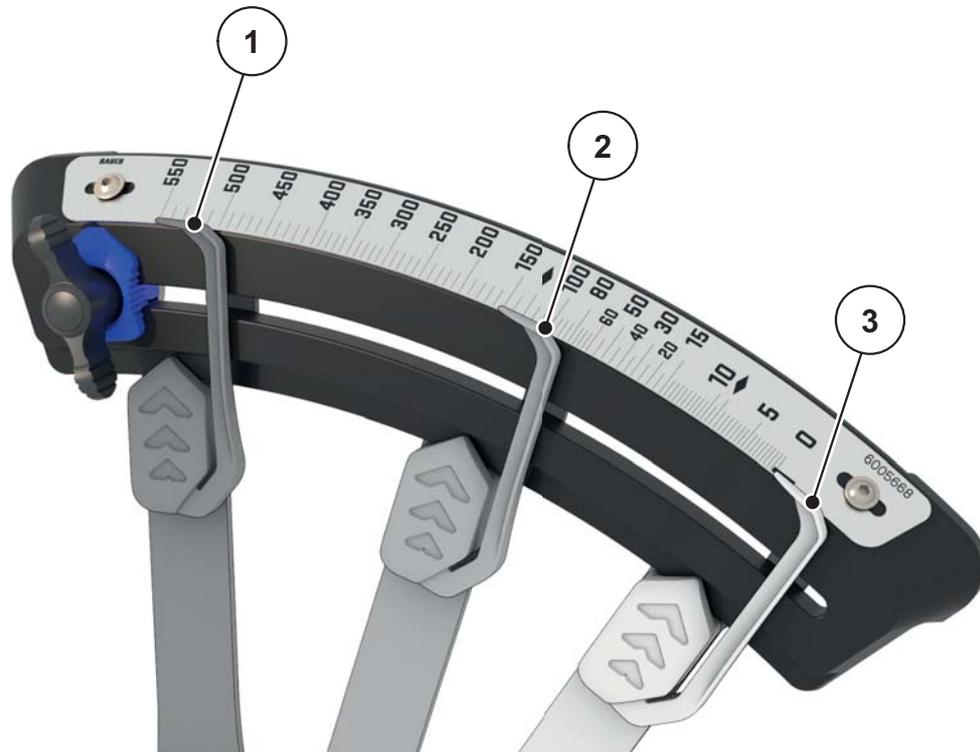


Figure 7.13: Metering slide positions

- [1] Completely opened
- [2] Opened
- [3] Closed

7.6.2 Connecting the electronic slide actuators: Version C

NOTICE

The machines of the version C are equipped with electronic slide actuators.

The electronic slide actuator is described in a separate operator's manual for the **E-Click** operating unit. This operator's manual is an integral part of the operating unit.

7.6.3 Connecting the electronic metering slide actuator: Version Q

NOTICE

The machine version Q is equipped with an electronic metering slide actuator.

The electronic slide actuator is described in a separate operator's manual for the operating unit. This operator's manual is an integral part of the operating unit.

7.7 Filling the machine

DANGER



Danger of injury from running engine

Working on the machine while the engine is running may result in serious injuries caused by mechanical components and escaping fertiliser.

- ▶ Switch the tractor motor off.
 - ▶ Remove the ignition key.
 - ▶ Ensure that nobody is present in the hazard zone.
-

CAUTION



Inadmissible overall weight

If the permissible total weight is exceeded, this will affect the operating and road safety of the vehicle (machine and tractor) and may cause serious damage to the machine and the environment.

- ▶ Before you start filling, calculate the amount you can load.
 - ▶ Comply with the permissible overall weight.
-

Instructions on filling the machine:

- Close the metering slide and, if applicable, the ball valves (version K/R).
- **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 rolling away. Apply the handbrake.
- Turn the tractor motor off.
- Remove the ignition key.
- For filling heights of more than 1.25 m, fill the machine by means of suitable auxiliary equipment (e.g. front loader or screw conveyor).
- Fill the machine up to the edge maximally.
- Check the filling level e.g. with the steps being folded out or by means of the inspection window in the hopper (depending on type).

Filling level scale

A filling level scale is installed in the hopper to monitor the filling level.

This scale can be used to estimate how long spreading can continue until you must refill the hopper.

7.8 Parking and unhitching the machine

The machine can be parked safely 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 unhitched 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.
- After unhitching, place the universal drive shaft, hydraulic hoses, and electric cables in the retainers provided for the purpose.



Figure 7.14: Storage of drive shaft and of hydraulic hoses

⚠ WARNING



Risk of crushing and shearing when the machine is uncoupled

Versions K/R only (single-acting slide actuator):

If the return spring is tensioned when the set screw is loosened, the stop lever may unexpectedly jerk and hit the end of the guide slot.

This may cause crushing injuries to fingers and/or result in injury to the operating personnel.

- ▶ If the machine is parked on its own (without tractor), fully open the metering slide (return spring is released).
- ▶ Never put your fingers in the guide slots of the spreading quantity adjustment unit.

- When decoupling the machine, the return springs of the single-acting hydraulic cylinders must be de-tensioned. Proceed as follows:
 1. Close the metering slide hydraulically.
 2. Set the stopper to the highest scale value.
 3. Close the metering slide.
 4. Uncouple the hydraulic hoses.
- ▷ **The return springs are de-tensioned.**

8 Machine settings

8.1 Safety

⚠ DANGER



Danger of injury from running engine

Working on the machine while the engine is running may result in serious injuries caused by mechanical components and escaping fertiliser.

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

The following points should be noted before carrying out adjustments on the machine:

- Always set the quantity while the metering slide is closed.
- In the event of metering slide actuators with return springs (version K/R), close the ball cocks in order to prevent inadvertent escaping of fertiliser from the hopper.

⚠ CAUTION



Risk of crushing or shearing by tensioned return springs

Versions K/R only (single-acting slide actuator):

If the return spring is tensioned when the set screw is loosened, the stop lever may jerk and hit the end of the guide slot.

This may cause crushing injuries to fingers and/or result in injury to the operating personnel.

- ▶ **Closely** observe the procedure for adjusting the spreading volume.
- ▶ **Never** put your fingers in the guide slots of the spreading quantity adjustment unit.
- ▶ Before carrying out any adjustment work (e.g. setting of the application rate), **always close the metering slide hydraulically.**

8.2 Setting the application rate

▲ WARNING



Risk of injury from rotating spreading discs!

The distribution unit (spreading disc, vanes) may catch and pull-in body parts or objects. Contact with the distribution unit may injure, crush or cut off body parts.

- ▶ Maximum admissible mounting heights at front (V) and rear (H) are to be complied with at all times.
- ▶ Ensure that nobody is present in the hazard zone of the machine.
- ▶ Never remove deflectors mounted on the hopper.

8.2.1 Versions K/R/D/C

In versions K/R/D/C, the application rate is set via the stopper on the adjusting segment. With the metering slides closed, the operator moves the stopper to the position specified beforehand in the fertiliser chart or from a calibration test.

Procedure for adjusting the application rate

The following steps must be carried out on both sides of the machine.

1. Close the metering slide.
2. Close setscrew [2] at the stopper [4].
3. Determine the position for the scale setting in the fertiliser chart or based on the calibration test.
4. Put the stopper into the corresponding position.
5. Tighten the setscrew again at the stopper.

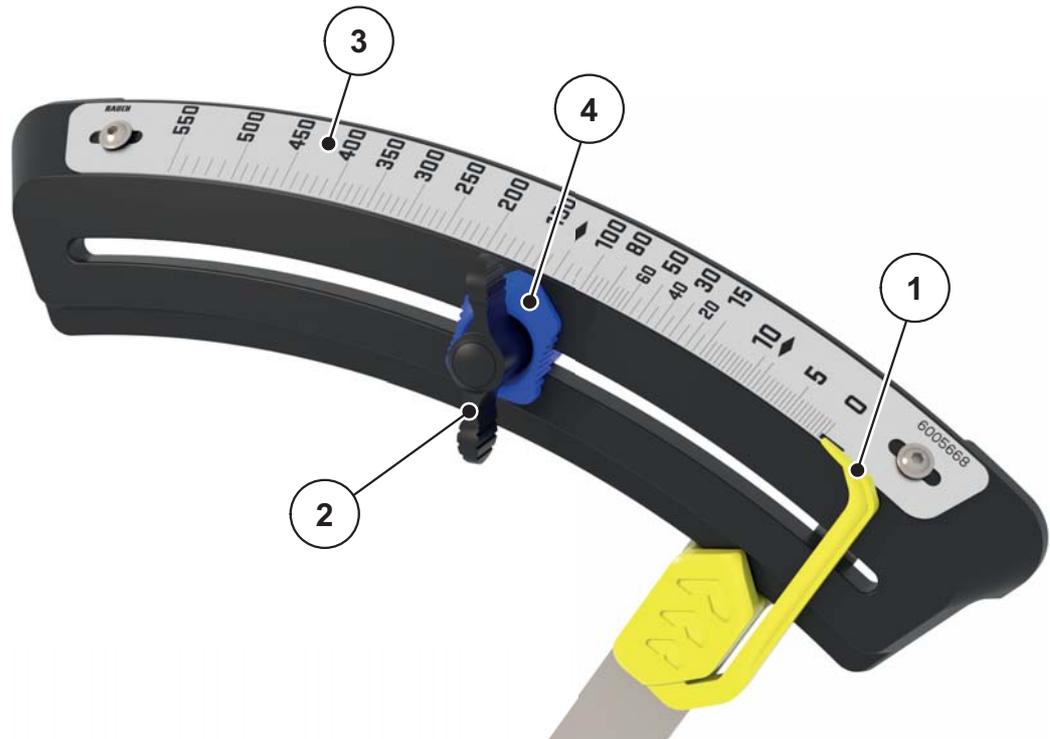


Figure 8.1: Scale for adjusting the application rate (right in the direction of travel, Versions K/R/D/C)

- [1] Position display
- [2] Setscrew
- [3] Scale
- [4] Stopper

▲ WARNING



Danger of injury due to the incorrect process in setting the application rate

The stop lever is tensioned by a return spring. In the event of misuse or non-observance of the procedure for setting the application rate, the stop lever can snap back forcefully and unexpectedly to the end of the guide slot.

This can lead to injuries to the fingers or face.

- ▶ **Never** push against the spring pressure by hand to hold the stop lever in position when setting the quantity.
- ▶ **Be sure to observe the procedure for adjusting the application rate.**

8.2.2 Version Q

NOTICE

The machines of the **Q versions** include electronic metering slide actuators for setting the application rate.

The electronic metering slide actuator is described in a separate operator's manual for the control unit. This operator's manual is an integral part of the operating unit.

CAUTION



Damage to property caused by incorrect positioning of the metering slide

If the stop levers are positioned incorrectly, the operation of the actuators via the QUANTRON operating unit may cause damage to the metering slides.

- ▶ Always clamp the stop levers at the maximum scale position.

With the Q version, the stopper is fixed in a position outside of the scale with a fillister head screw.

- To move the stopper, loosen the fillister head screw [1] at the back.

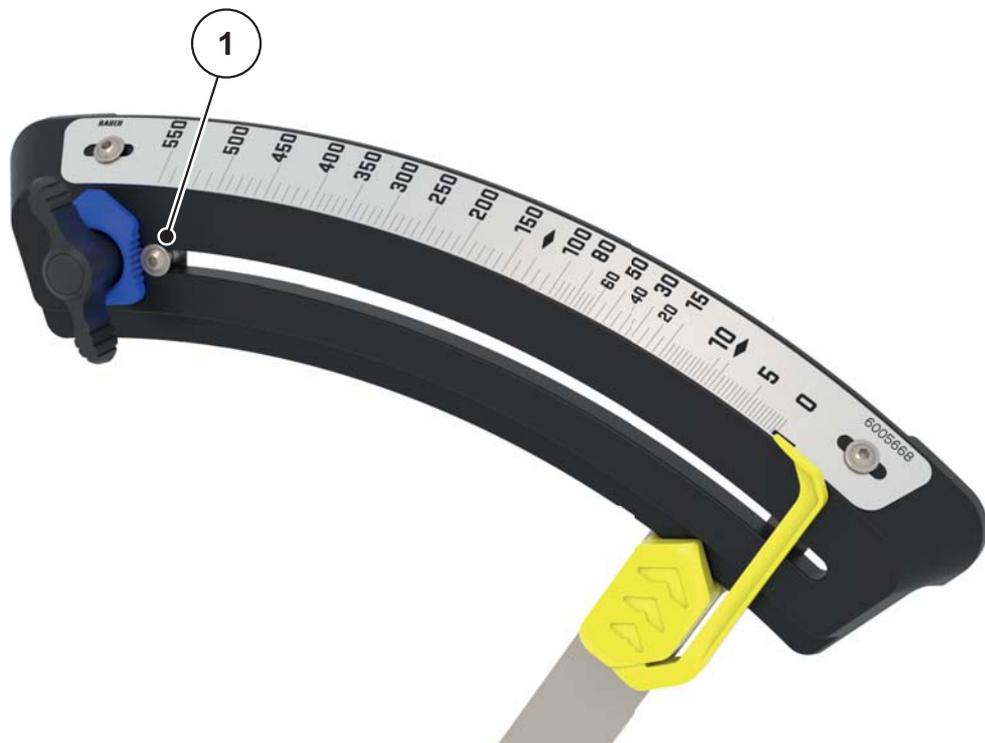


Figure 8.2: Scale for adjusting the application rate (right in the direction of travel, Version Q)

[1] Fillister head screw

8.3 Using the fertiliser chart

8.3.1 Information on the fertiliser chart

The values in the fertiliser chart have been determined using the test system of the manufacturer.

The used fertiliser materials have been purchased from the fertiliser manufacturers or from dealers. Experience shows that, due to storage, transportation and other reasons, the fertiliser materials at your disposal - even with identical specification - might exhibit a different spreading behaviour.

This means that the machine settings specified in the fertiliser charts may result in a different application rate and a poorer fertiliser distribution.

Therefore, observe the following instructions:

- Be sure to check the actual application rate discharged by performing a calibration test.
- Check the working width of the fertiliser distribution with a practice test kit (optional equipment).
- Only use fertilisers listed in the fertiliser chart.
- Contact us if you do not find a particular fertiliser type in the fertiliser chart.
- Observe the setting values exactly. Even a slightly incorrect setting may adversely affect the spreading pattern.

When using urea, particular attention is to be paid to the following:

- Due to a great number of fertiliser imports, urea is available in a wide variety of different qualities and grain sizes. It may therefore be required to adjust the settings of the spreader.
- Urea is more sensitive to wind and absorbs more moisture than other fertilisers.

NOTICE

The operator is responsible for making the correct spreader adjustments according to the fertiliser material in use.

The manufacturer of the machine points out specifically that they do not accept any liability for subsequent damage resulting from incorrect spreader adjustments.

8.3.2 Settings as per fertiliser chart

You can determine the mounting height, metering slide adjustment, spreading disc type and PTO speed for an optimum spreading from the **fertiliser chart** depending on the fertiliser type, working width, application rate, forward speed and fertilisation method.

Example of field spreading during normal fertilising:

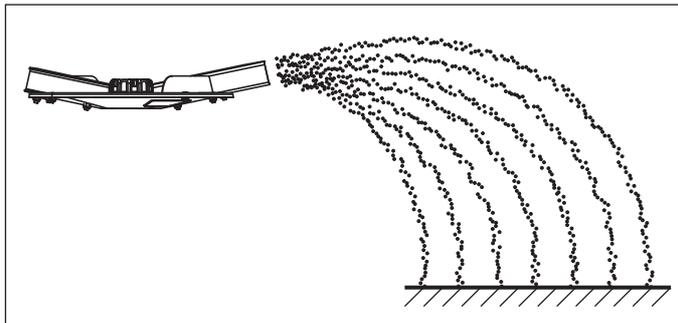


Figure 8.3: Field spreading during normal fertilising

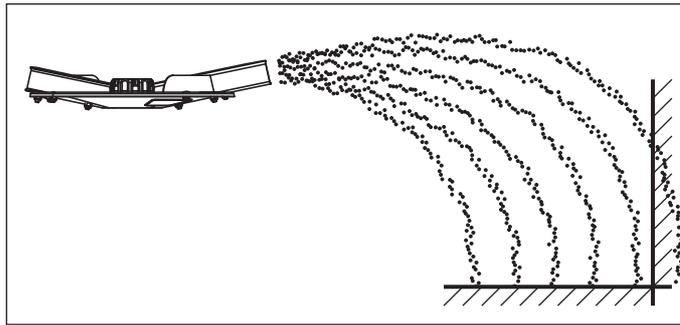
During field spreading in normal fertilisation mode, a symmetrical spreading pattern is produced. If the spreader is correctly set (see information in the fertiliser chart), the fertiliser is evenly spread over the field.

Specified parameters:

| | |
|----------------------|---------------------|
| Type of fertiliser: | ENTEC 26 COMPO BASF |
| Working width: | 12 m |
| Spreading disc type: | M1 |
| Forward speed: | 10 km/h |
| Application rate: | 300 kg/ha |

The following settings are to be applied to the machine according to the fertiliser chart:

| | |
|----------------------------|------------------------------|
| Mounting height: | 50/50 (A = 50 cm, B = 50 cm) |
| Metering slide adjustment: | 160 |
| PTO speed: | 540 rpm |
| Spreading vane adjustment: | C3-B2 |

Example of full border spreading during normal fertilising:**Figure 8.4:** Full border spreading during normal fertilising

Full border spreading in normal fertilisation mode refers to a spreading process in which a bit more fertiliser lands beyond the border of the field. Therefore, there is a slight underfertilisation at the field boundary.

Specified parameters:

| | |
|----------------------|---------------------|
| Type of fertiliser: | ENTEC 26 COMPO BASF |
| Working width: | 12 m |
| Spreading disc type: | M1 |
| Forward speed: | 10 km/h |
| Application rate: | 300 kg/ha |

NOTICE

On the full border spreading side, both spreading vanes must be set to the value stated in the fertiliser chart.

On the other spreading disc, the spreading vanes remain in their normal fertilisation position.

The following settings are to be applied to the machine according to the fertiliser chart:

| | |
|--|------------------------------|
| Mounting height: | 50/50 (A = 50 cm, B = 50 cm) |
| Metering slide adjustment: | 160 |
| PTO speed: | 540 rpm |
| spreading vane adjustment | |
| Full border spreading side: | A3-A3 |
| Other spreading disc (normal fertilisation position): | C3-B2 |

Example of field spreading during late fertilising:

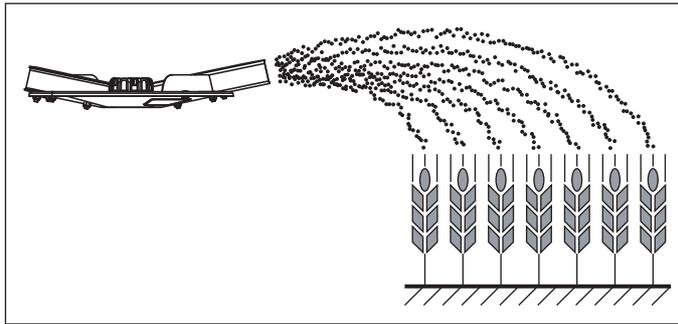


Figure 8.5: Field spreading during late fertilising

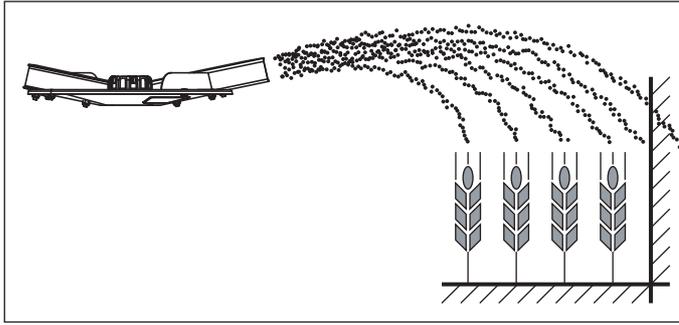
During field spreading in late fertilisation mode, a symmetrical spreading pattern is produced. If the spreader is correctly set (see information in the fertiliser chart), the fertiliser is evenly spread over the field.

Specified parameters:

| | |
|----------------------|---------------------|
| Type of fertiliser: | ENTEC 26 COMPO BASF |
| Working width: | 12 m |
| Spreading disc type: | M1 |
| Forward speed: | 10 km/h |
| Application rate: | 300 kg/ha |

The following settings are to be applied to the machine according to the fertiliser chart:

| | |
|----------------------------|--------------------------|
| Mounting height: | 0/6 (A = 0 cm, B = 6 cm) |
| Metering slide adjustment: | 160 |
| PTO speed: | 540 rpm |
| Spreading vane adjustment: | C3-B2 |

Example for full border spreading during late fertilising:**Figure 8.6:** Full border spreading during late fertilising

Full border spreading during late fertilising mode refers to a spreading process in which a bit more fertiliser lands beyond the border of the field. Therefore, there is a slight underfertilisation at the field boundary.

Specified parameters:

| | |
|----------------------|---------------------|
| Type of fertiliser: | ENTEC 26 COMPO BASF |
| Working width: | 12 m |
| Spreading disc type: | M1 |
| Forward speed: | 10 km/h |
| Application rate: | 300 kg/ha |

NOTICE

On the full border spreading side, both spreading vanes must be set to the value stated in the fertiliser chart.

On the other spreading disc, the spreading vanes remain in their late fertilising position.

The following settings are to be applied to the machine according to the fertiliser chart:

| | |
|---|--------------------------|
| Mounting height: | 0/6 (A = 0 cm, B = 6 cm) |
| Metering slide adjustment: | 160 |
| PTO speed: | 540 rpm |
| spreading vane adjustment | |
| Full border spreading side: | A3-A3 |
| Other spreading disc (late fertilising position): | C3-B2 |

8.4 Setting the working width

8.4.1 Spreading vane adjustment

Various spreading discs are available for implementation of the working width depending on the fertiliser type.

| Spreading disc type | Working width |
|---------------------|---------------|
| M1 | 10 - 18 m |
| M1X | 20 - 24 m |

WARNING



Risk of injury from rotating spreading discs!

The distribution unit (spreading disc, vanes) may catch and pull-in body parts or objects. Contact with the distribution unit may injure, crush or cut off body parts.

- ▶ Maximum admissible mounting heights at front (V) and rear (H) are to be complied with at all times.
- ▶ Ensure that nobody is present in the hazard zone of the machine.
- ▶ Never remove deflectors mounted on the hopper.

Structure of spreading disc M1

- There are two of the same spreading vanes on each spreading disc.
- A spreading vane consists of a main vane and an extension vane.
- The main vane on the **right** spreading disc is named **BR** and the corresponding extension vane is named **AR**.
- The main vane on the **left** spreading disc is named **BL** and the corresponding extension vane is named **AL**.
- Each spreading vane can be pushed forward or backward on the angle as well as shortened or extended in length.

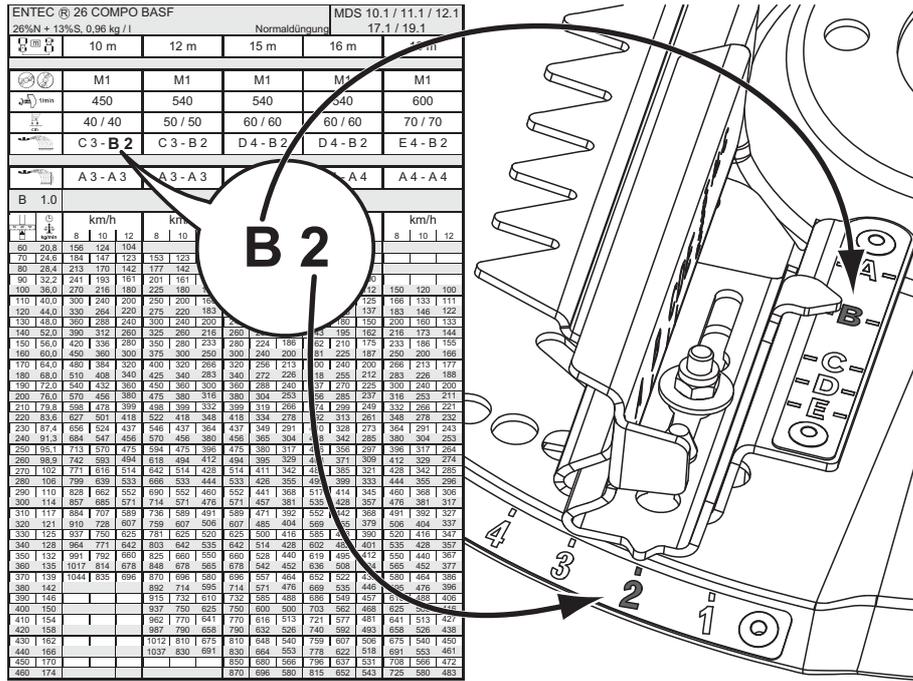


Figure 8.7: Spreading vane adjustment; example spreading vane M1, position B2

A to E: Length adjustment
1 to 6: Angle adjustment

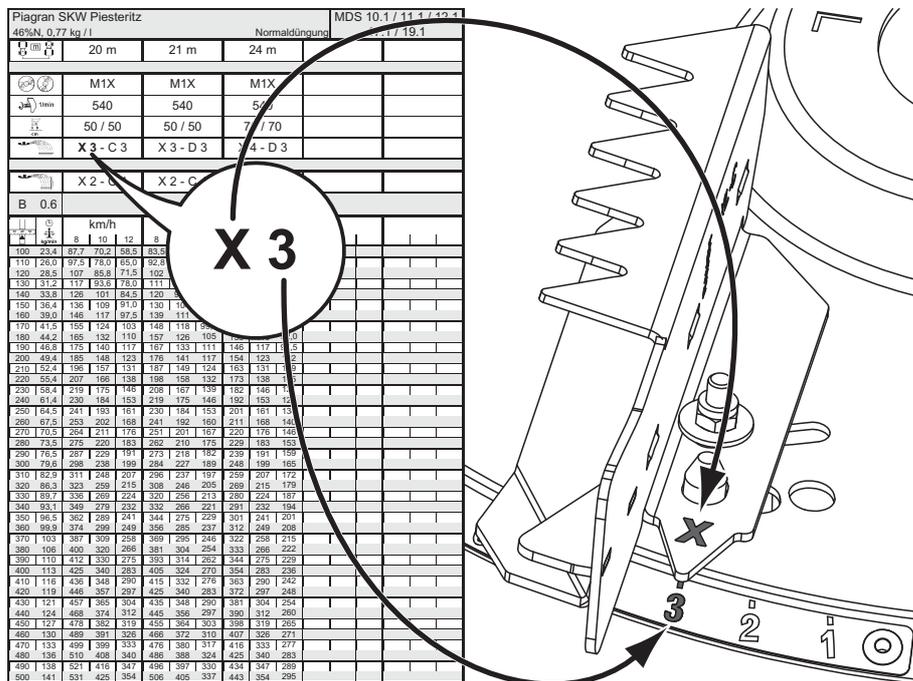


Figure 8.8: Spreading vane adjustment; example spreading vane M1X, position X3

X: Fixed length adjustment
1 to 6: Angle adjustment

Structure of spreading disc M1X: see [12.11: Replacing the MDS-spreading vane with an X-spreading vane, page 132.](#)

Functional principle:

The spreading vanes of the spreading disc can be adjusted for various fertilising types, working widths and kinds of fertiliser.

- Normal fertilisation
- Full border spreading during normal fertilising (optional right or left)
- Late fertilising
- Full border spreading during late fertilising (optional right or left)

Spreading vane angle adjustment:

- Adjusting in the direction of smaller numbers: The spreading vane is pushed backwards on the angle.
- Adjusting in the direction of larger numbers: The spreading vane is pushed forwards on the angle.

Spreading vane length adjustment:

- Shortening the spreading vane: The moveable extension vane is pushed towards the centre of the spreading disc and then clicked into place.
- Extending the spreading vane: The moveable extension vane is pulled outwards then clicked into place.

Spreading vane adjustment:

Set the spreading vane to the position determined previously according to the fertiliser chart.

NOTICE

Adjusting the spreading vane on the right spreading disc **is always the same as** adjusting the spreading vane on the left spreading disc (with the exception of full border spreading).

Example: **C3-B2**

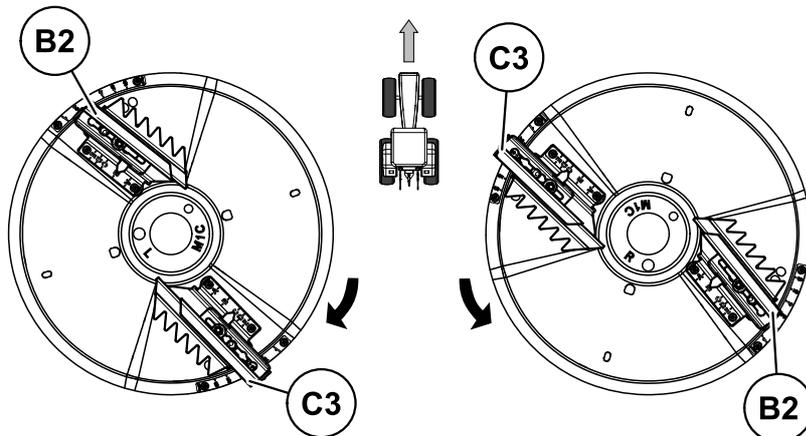


Figure 8.9: Spreading vane adjustment, example C3-B2

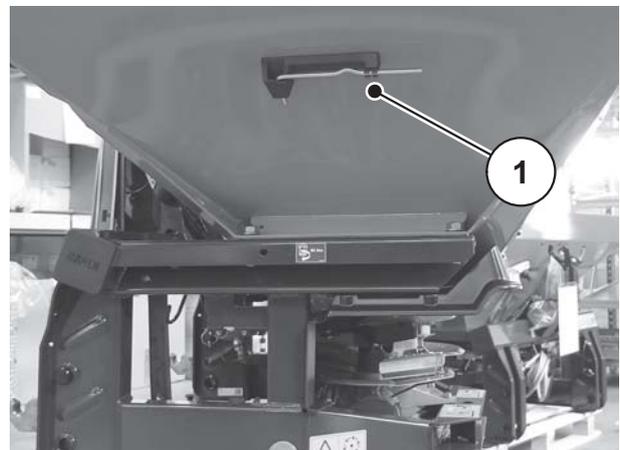
▲ WARNING**Danger of injury due to sharp edges**

The spreading vanes have sharp edges.

Your hands are at risk when you change or adjust the spreading vanes.

► Wear protective gloves.

1. Determine the position of the spreading vane in the fertiliser chart or by carrying out a test using the practice test kit (optional equipment).
2. Use the adjustment lever to adjust the spreading vanes and to change the spreading discs.
3. Remove the adjustment lever [1] from the bracket.



[1] Adjustment lever position
(hopper, left side according to
direction of travel)

Figure 8.10: Adjustment lever

4. Insert the adjustment lever into the locking bolt opening [3] under the spreading disc.
5. Press downwards.
 - ▷ The locking bolt [2] is unlatched.

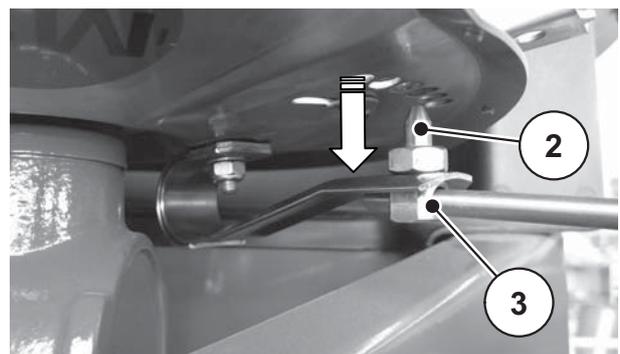


Figure 8.11: spreading vane adjustment

6. Adjust the angle and length of the spreading vane.
7. Push the locking bolt upwards with the adjustment lever until it clicks into place.

⚠ WARNING



Danger of injury, damage to the machine due to improperly assembled parts

There is a risk if the adjustment lever is not fastened again correctly after use or if the locking bolt does not click into place properly into the spreading disc.

Loose components can cause injury or material damage during operation.

- ▶ After the adjustment, click the locking bolt back into place completely.
 - ▶ Fasten the adjustment lever securely to the hopper again before switching on the PTO shaft.
-

⚠ CAUTION



Risk of material damage: Do not bend flat springs

The flat spring tension must lock the main and extension vane reliably onto the spreading disc via the locking bolt. If the flat springs are bent, they lose the tension required to secure the spreading vanes.

If the flat spring tension is too low, the locking bolt becomes unlatched and can cause a high level of material damage.

- ▶ When setting the spreading vane position, press the locking bolt **carefully** into any position drill hole.
 - ▶ Check the spring tension at regular intervals. For this, see [12.2.3: Checking the flat springs of the spreading discs, page 110](#).
 - ▶ Replace flat springs immediately if they have too little spring tension.
-

8.5 Settings for unlisted fertiliser types

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

NOTICE

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

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

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

8.5.1 Requirements and conditions

NOTICE

The requirements and conditions apply to both one passage and three passages. Observe these conditions to ensure that the results are as accurate as possible.

- Conduct the test on a **dry day, with no wind**, so the weather will not influence the result.
- We recommend that you use 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.
- Carry out the test either on freshly mown grass or on a field with low vegetation (max. 10 cm).

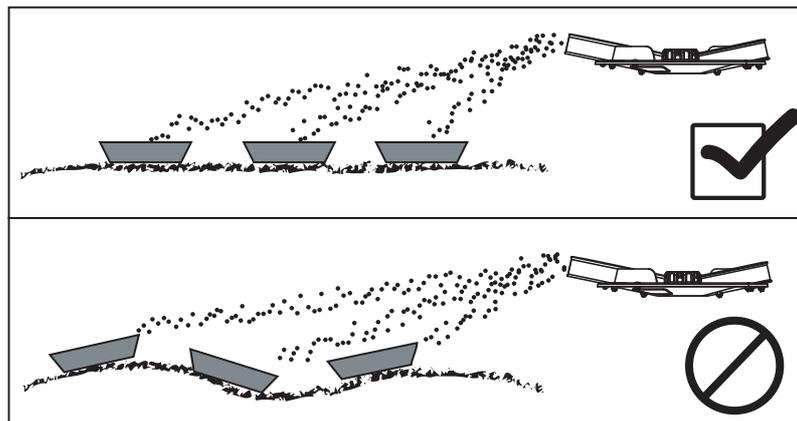


Figure 8.12: Layout of the collecting vessels

- 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 [9: Calibration and discharging residual material, page 81](#)).
- Adjust and lock the metering slides on the right and left-hand side (see [8.2: Setting the application rate, page 60](#)).

8.5.2 Running one passage

Layout:

NOTICE

We recommend the layout plan up to a spreading width of **24 m**. A layout plan for greater working widths is attached to the PPS5 practise test kit.

- Length of testing area: 60 to 70 m

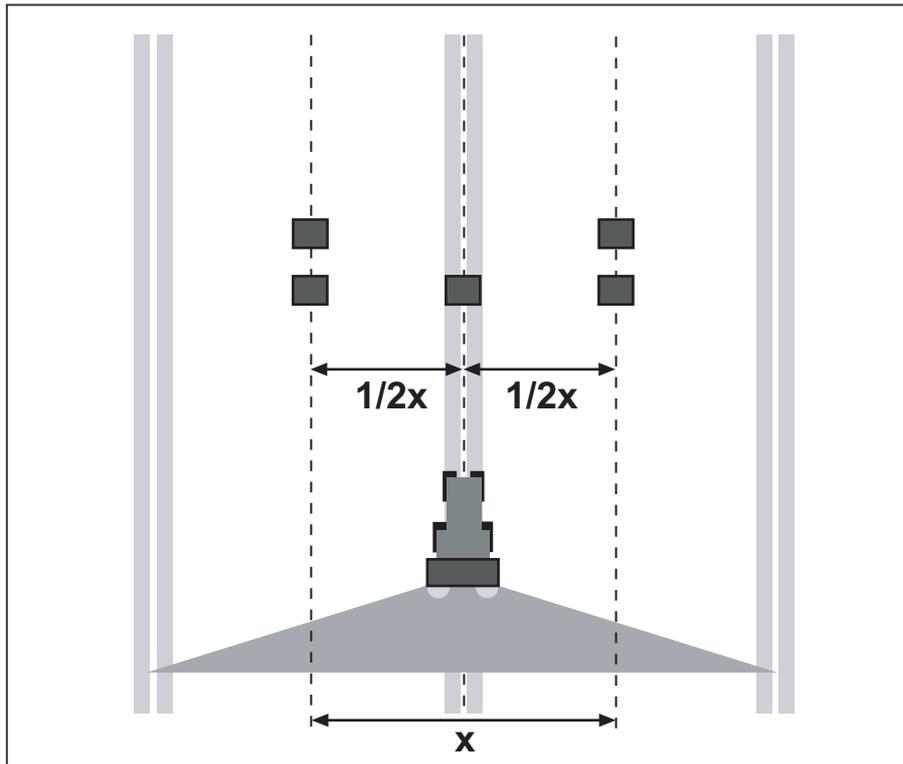


Figure 8.13: Layout for one passage

Preparing one passage:

- Choose a similar fertiliser from the fertiliser chart and adjust the spreader accordingly.
- Set the mounting height of the machine as specified in the fertiliser chart. Make sure that the mounting height includes the top edge of the trays.
- Check the spreading elements (spreading discs, spreader vanes, outlet) for correct functioning and completeness.
- Place two collecting vessels one after another at a distance of **1 m** in the overlap zones (between the tramlines) and one collecting vessel in the track (according to [figure 8.13](#)).

Run the spreading test with the open position that has been decided on for operation:

- Forward speed: **3 to 4 km/h**.
- Open the metering slide **10 m in front of** the collecting vessels.
- Close the metering slides approx. **30 m behind** the collecting vessels.

NOTICE

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

Do not change the adjustment of the metering slides.

8.5.3 Running three passages

Layout:

NOTICE

We recommend the layout plan up to a spreading width of **24 m**. A layout plan for greater working widths is attached to the PPS5 practise test kit.

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

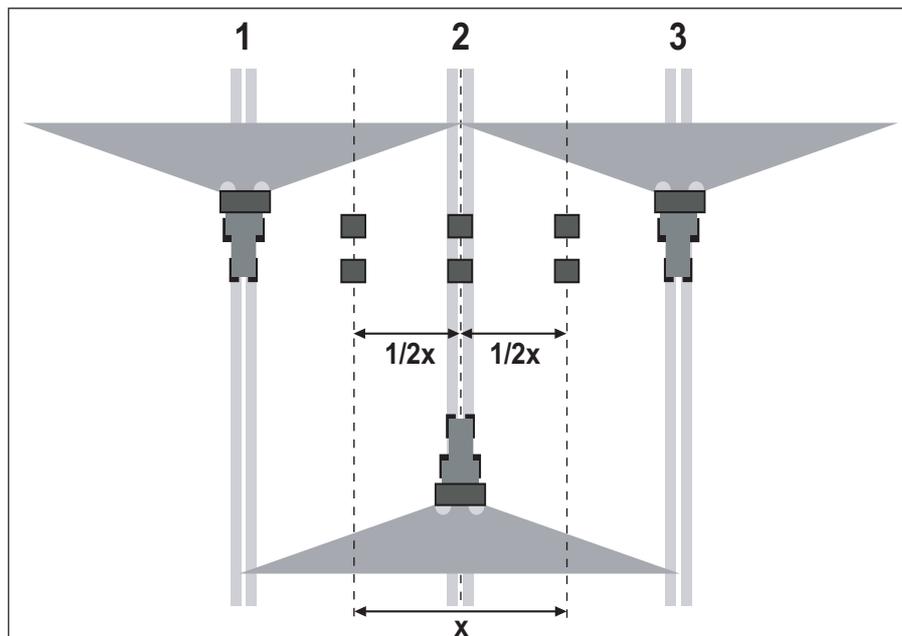


Figure 8.14: Layout for three passages

Preparing three passages:

- Choose a similar fertiliser from the fertiliser chart and adjust the spreader accordingly.
- Set the mounting height of the machine as specified in the fertiliser chart. Make sure that the mounting height includes the top edge of the trays.
- Check the spreading elements (spreading discs, spreader vanes, outlet) for correct functioning and completeness.
- Place two collecting vessels each, one after another, at a distance of **1 m** in the overlap zones and in the centre track (according to [figure 8.14](#)).

Run the spreading test with the open position that has been decided on for operation:

- Forward speed: **3 - 4 km/h**.
- Spread along the tramlines 1-3 one after the other.
- Open the metering slide **10 m in front of** the collecting vessels.
- Close the metering slides approx. **30 m behind** the collecting vessels.

NOTICE

If the quantity collected in the collecting vessels is insufficient, repeat the passage. Do not change the adjustment of the metering slides.

8.5.4 Evaluate the results and correct if necessary

- 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.

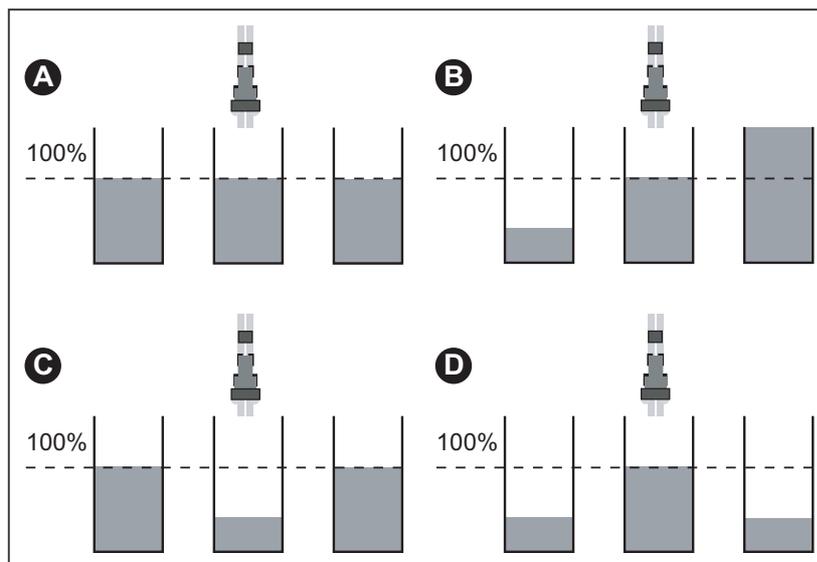


Figure 8.15: Possible results of pass

- [A] All tubes contain the same amount.
- [B] Asymmetrical fertiliser distribution
- [C] Too much fertiliser in the overlap zone
- [D] Too little fertiliser in the overlap zone

Examples of spreader setting corrections:

| Test result | Fertiliser distribution | Action, test |
|---|---|---|
| Case A | Even distribution (admissible deviation ± 1 scale line) | Adjustments are correct. |
| Case B | Fertiliser quantity decreases from right to left (or vice versa). | Are the same drop points set on the right and left side? |
| | | Is the metering slide setting on the left and right side the same? |
| | | Tramline distances the same? |
| | | Tramlines parallel? |
| Was there a strong side wind during the test? | | |
| Case C | Too little fertiliser in the tractor track. | <p>Reduce the fertiliser quantity in the overlap zone:</p> <p>Push back the spreading vane mentioned second in the fertiliser chart (for smaller numbers). e.g. C3-B2 to setting C3-B1.</p> <p>If the angle correction of the spreading vane mentioned second is not sufficient, shorten the length of the spreading vane. e.g. C3-B1 to setting C3-A1.</p> |
| Case D | Too little fertiliser in the overlap zones. | <p>Reduce the fertiliser quantity in the tractor track:</p> <p>Push forward the spreading vane mentioned second in the fertiliser chart (for larger numbers). e.g. E4-C1 to setting E4-C2.</p> <p>If the angle correction of the spreading vane mentioned second is not sufficient, increase the length of the spreading vane. e.g. E4-C2 to setting E4-D2.</p> |

If, in spite of adjusting the spreading vane mentioned second, the result is not achieved, the spreading vane mentioned first can also be adjusted.

Spreading width too wide

1. Adjust the position of the spreading vane mentioned first to the next smallest working width according to the fertiliser chart, e.g. E4-C1 (18 m) to setting D4-C1 (15 m).

Spreading width too narrow

2. Adjust the position of the spreading vane mentioned first to the next largest working width according to the fertiliser chart, e.g. D4-C1 (15 m) to setting E4-C1 (18 m).

8.6 Spreading to one side

| Version | Settings for spreading to one side | Result |
|---|---|--|
| K | <ul style="list-style-type: none"> ● To spread on the left or right, release the corresponding control valve. | The springs pull the respective metering slide against the stopper. |
| R or K with optional equipment two-way unit | <ul style="list-style-type: none"> ● To spread on the left or right, close or open the corresponding ball valve of the two-way unit. ● Release the control valve. | The springs pull the respective metering slide against the stopper. |
| D | <ul style="list-style-type: none"> ● To spread on the left or right, activate the corresponding control valve. | The hydraulic cylinder pulls the respective metering slide against the stopper. |
| C | <ul style="list-style-type: none"> ● To spread on the left or right, activate the corresponding toggle switch of the E-CLICK. | The actuator pulls the respective metering slide against the stopper. |
| Q | <ul style="list-style-type: none"> ● To spread on the left or right, activate the corresponding start/stop button on the control unit. | The actuator opens the respective metering slide corresponding to the electronic controls. |

8.7 Full border or limited border spreading

Full border spreading is a boundary fertiliser distribution where fertiliser still lands beyond the boundary, but there is just a slight underfertilisation at the field boundary.

In limited border spreading, almost no fertiliser goes beyond the field boundary. Underfertilisation at the field boundary must be accepted in this case.

The basic equipment of the machines makes only full border spreading possible. For limited border spreading, you require the optional equipment GSE 7 or TELIMAT T1.

8.7.1 Full border spreading from the first tramline

- Adjust the spreading vanes on the border side corresponding to the details specified in the fertiliser chart.

The metering slide setting corresponds to the metering slide setting on the field side.

8.7.2 Limited or full border spreading with the limited border spreading unit GSE 7 (optional equipment)

The limited border spreading unit limits the spreading width (either towards the left or right) to a range between approx. 75 cm and 2 m from the centre of the tractor to the outer edge of the field. Please also refer to [4.4.9: Limited border spreading unit GSE 7, page 31](#)

- Close the metering slider that points to the edge of the field.
- Fold the limited border spreading unit downwards.
- Fold the limited border spreading unit up again before starting the two-sided spreading.

8.7.3 Limited or full border spreading with the limited border spreading unit TELIMAT T1 (optional equipment)

The limited border spreading unit **TELIMAT T1** limits the spreading width from the first tramline (1/2 working width from the edge of the field). See also [4.4.4: TELIMAT T1, page 29](#).

8.8 Spreading small strips of field

- Adjust the spreading vanes on both spreading discs to the full border spreading position in the fertiliser chart.

9 Calibration and discharging residual material

For precise control of the application rate, we recommend running a new calibration test every time you change fertiliser material types.

Carry out calibration:

- Before spreading for the first time.
- If the fertiliser quality has changed significantly (moisture, high dust content, cracked grain).
- If a new fertiliser type is used.

The calibration must be conducted with engaged PTO at a standstill or during travel over a test track.

NOTICE

With the **version Q** machines, the calibration is carried out at the **QUANTRON** control unit.

The calibration is described in the separate operator's manual for the QUANTRON control unit. This operator's manual is a component of the QUANTRON control unit.

9.1 Determining the nominal output quantity

Calculate the nominal output quantity before starting the calibration test.

Calculating the exact forward speed

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

1. With a **semi-filled** machine, drive a distance of **100 m on the field**.
2. Stop the time required for this.
3. The exact forward speed is indicated at the scale of the calibration test calculator.

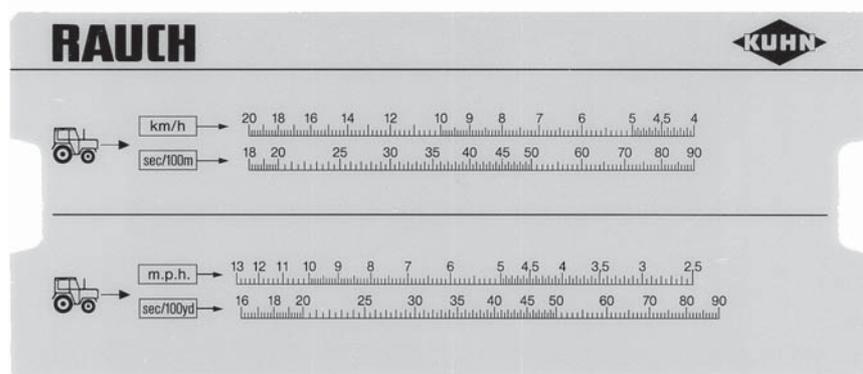


Figure 9.1: Scale for calculating the exact forward speed

The exact forward speed can also be calculated using the following formula:

$$\text{Forward speed (km/h)} = \frac{360}{\text{Stopped time on 100m}}$$

Example: You need 45 seconds for 100 m:

$$\frac{360}{45 \text{ sec}} = 8 \text{ km/h}$$

Determining the nominal output quantity per minute

To calculate the nominal output quantity per minute, you will require the following:

- The exact forward speed,
- the working width,
- the desired application rate.

Example: You wish to calculate the nominal output quantity at a particular outlet. Your forward speed is **8 km/h**, the working width is specified to be **18 m** and the application rate shall amount to **300 kg/ha**.

NOTICE

For some application rates and forward speeds, the output quantity is already shown in the fertiliser chart.

If you cannot find your values in the fertiliser chart, they can be determined with the calibration test calculator or with a formula.

Calculation with the calibration test calculator:

1. Move the tab until it is at 300 kg/ha under 18 m.
2. The value of the nominal output quantity for both outlets can now be read off above the value of the forward speed of 8 km/h.

▷ **The nominal output quantity per minute amounts to 72 kg/min.**

If you implement the calibration at one output only, halve the total value of the nominal output quantity.

3. Divide the read off value by 2 (= number of outlets).

▷ **The nominal output quantity per output amounts to 36 kg/min.**

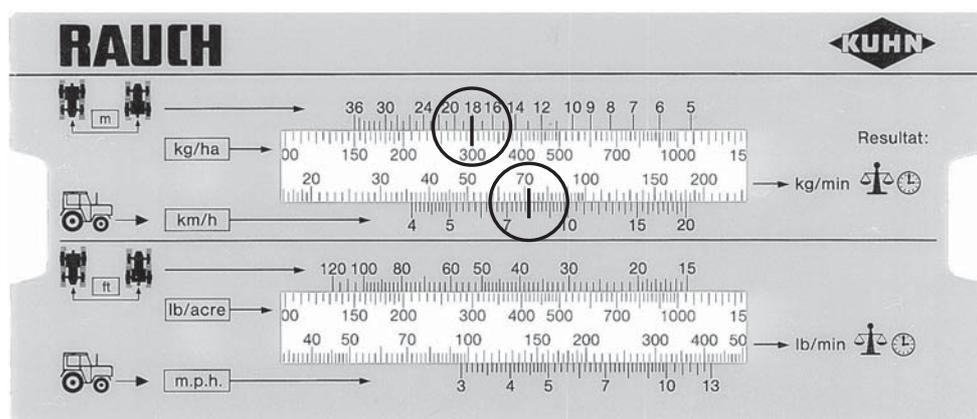


Figure 9.2: Scale for calculation of the nominal output quantity per minute

Calculation with formula

The nominal output quantity can also be calculated using the following formula:

$$\text{Nominal output quantity (kg/min)} = \frac{\text{Forward speed (km/h)} \times \text{Working width (m)} \times \text{Application rate (kg/ha)}}{600}$$

Calculation for example:

$$\frac{8 \text{ km/h} \times 18 \text{ m} \times 300 \text{ kg/ha}}{600} = 72 \text{ kg/min}$$

NOTICE

Constant fertiliser application is only possible at an even forward speed.

Example: a 10 % increased speed results in 10 % underfertilisation.

9.2 Carrying out the calibration

⚠ WARNING



Risk of injury due to chemicals

Escaping fertiliser may lead to injury to eyes and nasal mucous membrane.

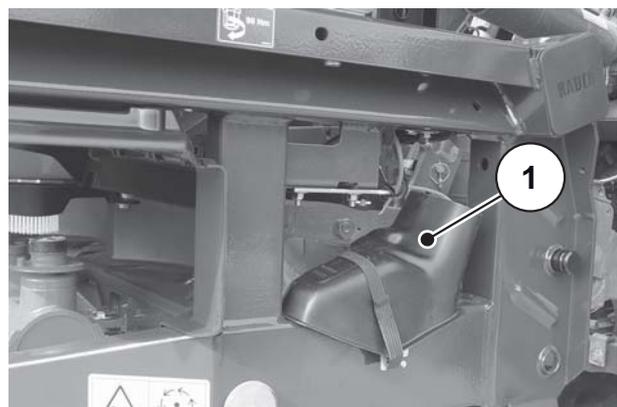
- ▶ Wear safety goggles during the calibration.
- ▶ Before running the calibration test, ensure that all people leave the hazard zone of the machine.

Requirements:

- The metering slides are closed.
- PTO and tractor engine are switched off and locked to prevent unauthorised starting.
- An adequately sized hopper is ready for collecting the fertiliser (minimum capacity **25 kg**).
 - Determine the empty weight of the collecting vessel.
- Prepare the calibration test chute. See [figure 9.3](#).
- A sufficient quantity of fertiliser is placed in the hopper.
- The preliminary settings for the metering slide stop, the PTO speed and the calibration test time are specified and known from the fertiliser charts.

NOTICE

Select the values for the calibration test in a way that the largest quantities of fertiliser possible are calibrated. The higher the quantity, the higher the precision of the measurement.



[1] Calibration test chute

Figure 9.3: Position of the calibration test chute

Proceed as follows:

NOTICE

Carry out the calibration **on the left side of the machine only** (viewed from the direction of travel). For safety reasons, however, **both** spreading discs must be removed.

1. Take the adjustment lever [1] from the bracket.

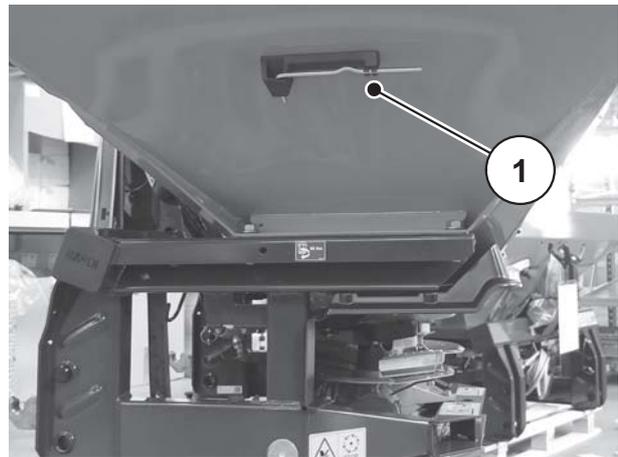


Figure 9.4: Adjustment lever position

2. Loosen the cap nut [3] of the spreading disc with the adjustment lever.
3. Remove the spreading disc from the hub.

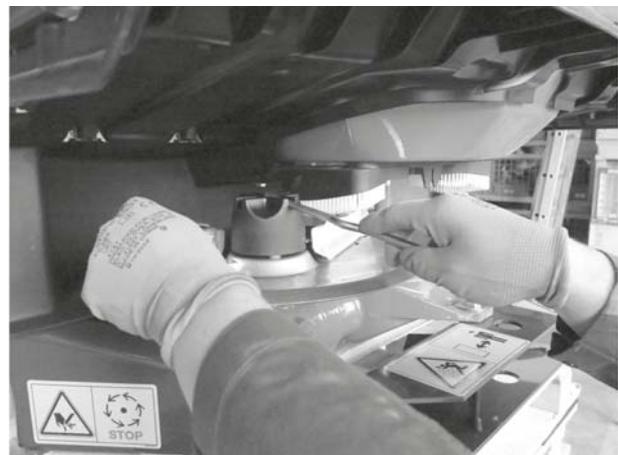


Figure 9.5: Loosen cap nut

4. Hang the calibration test chute [1] under the left outlet.

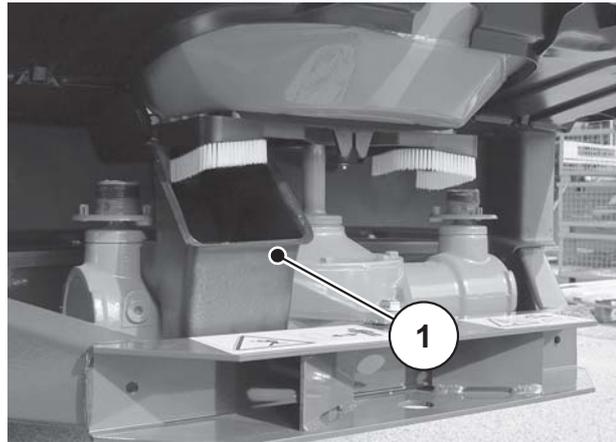


Figure 9.6: Attach the calibration test chute

5. Set the metering slide stop end to the scale value from the fertiliser chart.

NOTICE

The **Q version** machines include an **electronic adjustment** feature for the metering slide opening.

The metering slide is automatically moved to the opening position by the QUANTRON control unit if the calibration test function is selected.

Please observe the operating manual for the operating unit.

▲ WARNING



Risk of injury due to rotating machine components

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

- ▶ Always stay outside the area of rotating hubs while the machine is running.
 - ▶ When the drive shaft is rotating, the metering slides are to be operated from the tractor seat **at all times**.
 - ▶ Ensure that nobody is present in the hazard zone of the machine.
-



6. Position a collection vessel under the left outlet.

Figure 9.7: Implement the calibration test

7. Start the tractor.
8. Set the PTO speed according to the values in the fertiliser chart.
9. Open the left metering slide for the calibration test time stipulated before from the tractor seat.
10. Close the metering slide when this time has elapsed.
11. Switch off the PTO shaft and tractor engine and lock them to prevent unauthorised starting.
12. Determine the fertiliser weight (taking into consideration the empty weight of the collection vessel).
13. Compare the actual quantity with the target quantity.
 - ▷ Actual output volume = target outlet volume: application rate stop/stopper is set correctly. End calibration test.
 - ▷ Actual outlet volume < target outlet volume: Set the application rate stop/stopper to a higher position and repeat the calibration test.
 - ▷ Actual outlet volume > target outlet volume: Set the application rate stop/stopper to a lower position and repeat the calibration test.

NOTICE

You can use the percentage scale to reset the position of the application rate stop/stopper. For example, if the calibration test weight is down by 10%, the application rate stop/stopper is set to a 10% higher position (e.g. from 150 to 165).

Calculation with formula

The position of the application rate stop/stopper can also be calculated using the following formula:

| | | |
|--|---|--|
| New position of the output rate stopper. | = | $\frac{\text{Position of the application rate stopper during current calibration test} \times \text{Target outlet volume}}{\text{Actual outlet volume during the current calibration test}}$ |
|--|---|--|

14. End calibration test. Switch off the PTO shaft and tractor engine and lock them to prevent unauthorised starting.
15. Mount the spreading discs. Make sure that the left and right spreading discs are not reversed.

NOTICE

The pins on the spreading disc holders have different positions on the left and right side. The correct spreading disc is the one that fits precisely into the spreading disc holder.

16. Carefully position the cap nut (do not tilt).
17. Tighten the cap nut with approx. **25 Nm**. Do **not** use the adjustment lever.



Figure 9.8: Screwing on the cap nuts

NOTICE

The cap nuts have an internal catching mechanism that prevents them from coming loose. The catching mechanism must be noticeable while tightening the nut. Otherwise, the cap nut is worn and must be replaced.

18. Check that there is clearance between the spreading vanes and the outlet by turning the spreading discs by hand.
19. Re-mount the calibration test chute and the adjustment lever at their specified locations at the machine.

9.3 Discharging residual material

⚠ WARNING



Risk of injury due to rotating machine components

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

- ▶ Always stay outside the area of rotating hubs while the machine is running.
- ▶ When the drive shaft is rotating, the metering slides are to be operated from the tractor seat **at all times**.
- ▶ 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. Proceed as with the calibration test to discharge the residue.

Instructions for completely discharging the residual material:

Small amounts of fertiliser may remain in the machine when discharging residual material normally. If you wish to discharge the residual material completely (e.g. at the end of the spreading season, when changing spreading material), please proceed as follows:

1. Set the metering slide to the maximum opening position.
2. Empty the hopper until no more spreading material is discharged (normal discharge of residual material).
3. Switch off the PTO and the tractor engine and lock them to prevent unauthorised starting. Remove the ignition key of the tractor.
4. Remaining fertiliser can be removed with a soft water jet when cleaning the machine; [See also "Cleaning" on page 114](#).

⚠ DANGER



Risk of injury due to moving parts in the hopper

There are moving parts in the hopper.

The rotating agitator can cause injury to hands and feet.

- ▶ Turn off the agitator.
- ▶ Climb into the hopper **only** for troubleshooting purposes.
- ▶ The protective grid may **only** be opened for maintenance purposes or in the event of a fault.

Before opening the protective grid:

- Disengage the PTO shaft.
- Switch off the tractor motor.
- Lower the machine.

10 Important information on spreading

10.1 Safety

⚠ DANGER



Danger of injury from running engine

Working on the machine while the engine is running may result in serious injuries caused by mechanical components and escaping fertiliser.

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

The following points should be noted before carrying out adjustments on the machine:

- Always set the quantity while the metering slide is closed.
- In the event of metering slide actuators with return springs (version K/R), close the ball cocks in order to prevent inadvertent escaping of fertiliser from the hopper.

⚠ CAUTION



Risk of crushing or shearing by tensioned return springs

Versions K/R only (single-acting slide actuator):

If the return spring is tensioned when the set screw is loosened, the stop lever may jerk and hit the end of the guide slot.

This may cause crushing injuries to fingers and/or result in injury to the operating personnel.

- ▶ **Closely** observe the procedure for adjusting the spreading volume.
- ▶ **Never** put your fingers in the guide slots of the spreading quantity adjustment unit.
- ▶ Before carrying out any adjustment work (e.g. setting of the application rate), **always close the metering slide hydraulically.**

10.2 General information

The modern technology and design of our machines, and exhaustive, continuous testing in the factory's fertiliser spreader test facilities are the prerequisites for a perfect spreading pattern.

Despite the fact that we have manufactured the machine with utmost diligence, deviations in the application rate or possible faults cannot be excluded, even when complying with the intended use.

The reasons for this may be:

- Changes in the physical characteristics of the spreading material (e.g. deviating grain size distribution, varying density, grain form and surface, treatment, sealing, humidity).
- Clumping and moist fertiliser.
- Drifting caused by wind (in the case of excessive wind speed, cancel the spreading work).
- Clogging or bridging can occur (e.g. due to foreign bodies, bag residue or moist fertiliser etc.).
- Uneven ground.
- Wearing down of wearing parts (e.g. agitator finger, spreading vane, outlet).
- Damage from external causes.
- Inadequate cleaning and care to prevent corrosion.
- Incorrect drive speeds and forward speeds.
- Calibration test has not been carried out.
- Incorrect machine adjustments.

Make sure that the machine is correctly set. Even a minor deviation from the correct setting may lead to a significant impairment of the spread pattern. Therefore, before each operation and during operation, check the correct functioning of your machine and ensure that the application accuracy is sufficient (run calibration).

Particularly hard types of fertiliser (e.g. Thomas fertiliser, kieserite) increase wear to the spreading vanes.

The spreading width at the rear is approx. one half of the working width. The overall spreading width corresponds to approx. 2 working widths for a triangular spreading pattern (M1 spreading disc: 10-18 m depending on the type of fertiliser).

Always use the protective grid included in delivery to avoid clogging e.g. due to foreign particles or clumping fertiliser.

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

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

10.3 Fertiliser spreading process

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

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

Preparation

- Attach the spreader to the tractor [Page 43](#)
- Close the metering slide
- Pre-set the mounting height [Page 47](#)
- Fill with fertiliser [Page 56](#)
- Implement the calibration test [Page 81](#)
- Set spreading vane [Page 68](#)
- Set the application rate [Page 60](#)

Spreading

- Travel to the spreading location
- Check the mounting height
- Engage the PTO shaft
- Open the slide and start spreading
- Finish spreading and close the slide
- Disengage the PTO shaft
- Discharge residual material [Page 89](#)

Cleaning/maintenance

- Open metering slider
- Remove the spreader from the tractor
- Cleaning and maintenance [Page 109](#)

10.4 Filling level scale

A filling level scale (tolerance range of the individual graduation marks maximum +/- 10%) is installed in the hopper to monitor the filling level.

This scale can be used to estimate how long spreading can continue until the hopper must be refilled.

The filling level can be checked through the inspection window in the side wall of the hopper (depending on the type).

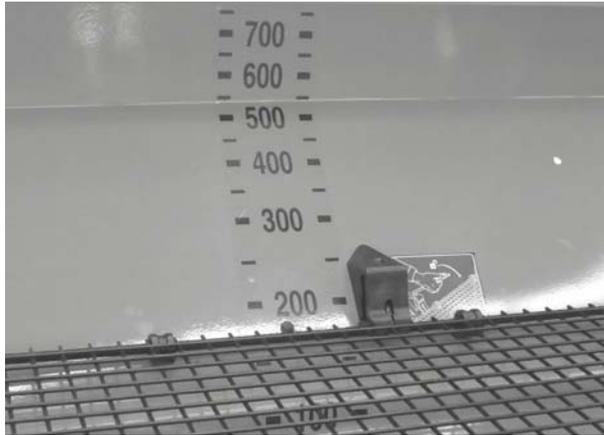


Figure 10.1: Fill level scale (in litres)

10.5 TELIMAT T1 (optional equipment)

TELIMAT T1 is a remote-controlled full and limited border spreading unit for working widths of **10 - 24 m** (20-24m only limited border spreading).

TELIMAT T1 is mounted on the **left** side of the machine in the direction of travel. You can control the TELIMAT set-up from the tractor via a single-acting control valve.

NOTICE

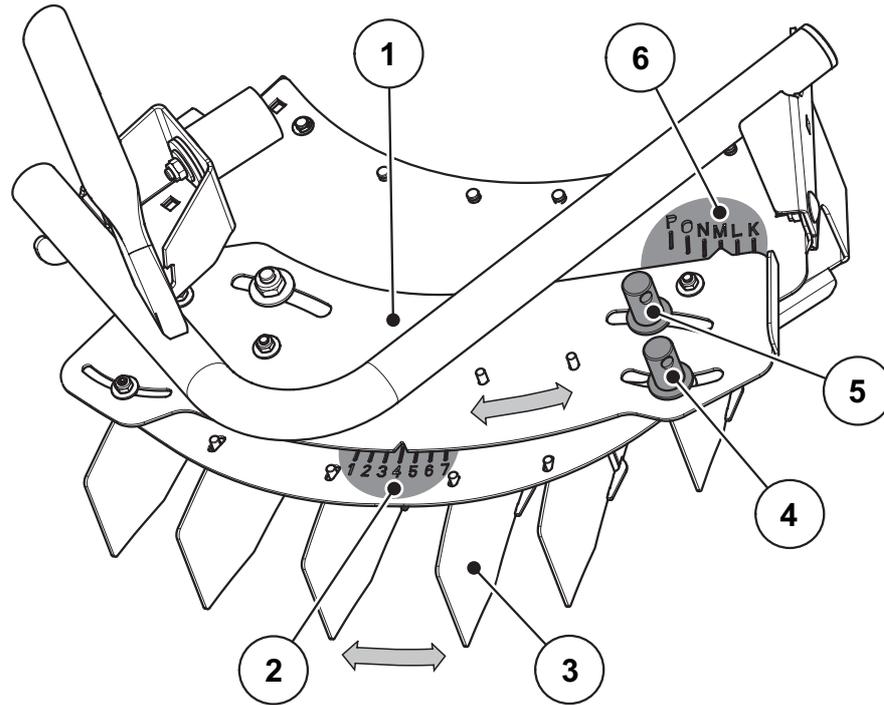
The attachment of TELIMAT to the machine is described in detail in a separate assembly instruction manual. This assembly manual is included in the delivery of the TELIMAT unit.

10.5.1 Setting TELIMAT

You prepare TELIMAT for spreading in accordance with the **fertiliser type**, the **working width** and the desired **type of boundary spreading** (limited or full border spreading) according to the details in the calibration chart (see sticker) for the spreading work.

NOTICE

The setting values for TELIMAT can be found on the sticker.



| MDS | 10m | | 12m | |
|--|-------|-------|-------|-------|
| 17.1/19.1 | | | | |
| KAS / NPK - Dünger KAN / NPK - fertilizer Organic NPK | K - 2 | L - 3 | K - 2 | L - 3 |
| K - Dünger K - fertilizer Organic K | - | M - 6 | K - 4 | M - 6 |
| PK / P / MgO - Dünger PK / P / MgO - fertilizer Organic PK / P / MgO | K - 3 | M - 4 | K - 3 | M - 4 |
| SSA - Dünger Ammonium sulphate surface of ammoniumsulphate | M - 3 | M - 5 | M - 3 | M - 5 |
| Harnstoff granulat UREA granular white granular | M - 2 | M - 4 | M - 2 | M - 4 |
| Harnstoff geröllt UREA prilled white prilled | M - 4 | - | M - 4 | - |

Figure 10.2: Setting the TELIMAT

- [1] Sliding part
- [2] Numeric scale
- [3] Guide plates
- [4] Adjustment nut for numeric scale
- [5] Adjustment nut for alphabetic scale
- [6] Alphabetic scale
- [7] Limited border spreader settings
- [8] Full border spreader settings

Adjusting the guide plates (alphabetic scale):

On the alphabetic scale (K to P, [6]), the guide plates [3] are adjusted to the respective type of fertiliser and type of fertilisation (limited border or full border spreading).

1. Loosen both adjustment nuts [4], [5] using the adjustment lever of the machine.
2. Move The sliding part [1] with its display arrow to the letter specified in the calibration chart.
 - ▷ The arrow is exactly above the specified letter.
3. Tighten the adjustment nut near the alphabetic scale [5] using the adjustment lever of the machine.

Adjusting the guide plates (numeric scale):

The numeric scale [2] is basically used for fine adjustments of the working width.

1. Adjust the corresponding numeric value at the indentation of the sliding part [1] by moving the guide plates [3] to the outer end.
2. Fix the overall adjustment unit with the adjustment nut [4] on the outside.
 - ▷ The adjustment example in [figure 10.2](#) corresponds to the full border spreading setting [8] for granulated urea, for a working width of 12 m = **M-4 [6], [2]**.

NOTICE

Limited border spreading for working widths of 20-24 m

For an optimal spreading pattern, it is recommended that the material quantity be reduced by 30% on the border spreading side .

If the symbol - - is entered into the TELIMAT T1 calibration chart (sticker), the following applies:

- Full border spreading with TELIMAT is not possible, as the spreading pattern for field spreading is already similar to the spreading pattern for full border spreading. This also applies for full border spreading from 20 to 24 m.

10.5.2 Correcting the spreading distance

The values in the calibration chart are standard values. If there are deviations in the fertiliser quality, it may be necessary to correct the setting.

To correct the stated TELIMAT settings, it is only necessary in most cases to change the numeric value to optimise the spreading width to the field border.

- To **decrease** the spreading distance relative to the calibration chart setting: Change the numeric scale guiding plate position in the direction of the **lesser value**.
- To **increase** the spreading distance relative to the calibration chart setting: Change the numeric scale guiding plate position in the direction of the **greater value**.

If there are greater deviations, move the TELIMAT housing along the alphabetic scale.

- To **decrease** the spreading distance relative to the calibration chart setting: Move the TELIMAT on the alphabetic scale towards the **smaller character** (according to alphabetic order).
- To **increase** the spreading distance relative to the calibration chart setting: Move the TELIMAT on the alphabetic scale towards the **greater character** (according to alphabetic order).

NOTICE

Guide plate adjustment

- To adjust the guide plate along the numeric scale, only the outer adjustment nut [4] must be loosened.
- If the guide plates must also be adjusted along the alphabetic scale, both adjustment nuts [4], [5] must be loosened.

10.5.3 Instructions for spreading with TELIMAT

The TELIMAT settings are changed to the position required for the spreading type from the tractor through a double-acting control valve.

- Limited border spreading: lower position
- Normal spreading: upper position

⚠ CAUTION



Spreading errors caused by the TELIMAT not reaching its end position

If the TELIMAT is not completely at its end position, you may encounter spreading errors.

- ▶ Make sure that the TELIMAT is always in the specified end position.
- ▶ When switching from boundary spreading to normal spreading, actuate the control valve until the TELIMAT is **completely** in the top end position.
- ▶ During extended boundary spreading (depending on the state of your operating unit), actuate the control valve occasionally to return the TELIMAT to its end position.

10.6 Spreading in the headlands with the optional equipment TELIMAT T1

A precise arrangement of the tramlines is essential to achieve a good fertiliser distribution in the headlands.

Limited border spreading

Spreading at the headland with the remote-controlled TELIMAT border spreading system:

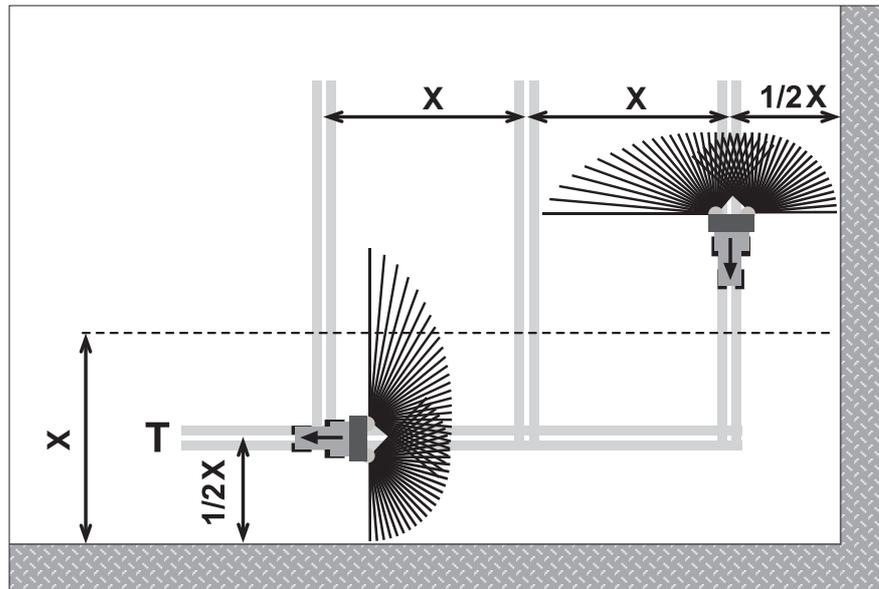


Figure 10.3: Limited border spreading

[T] Headlands tramline
[X] Working width

- Place the headlands tramline [T] at a distance of half the working width [X] from the edge of the field.

Normal spreading in or out of the headlands tramline

When continuing spreading in the field after headland tramline spreading, please note the following:

- Move the border spreading unit TELIMAT out of the spreading area.

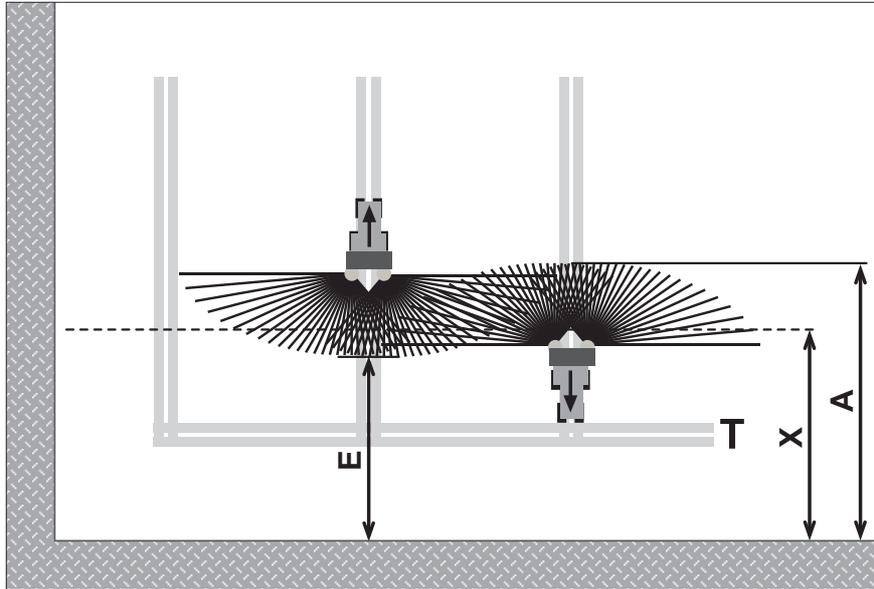


Figure 10.4: Normal spreading

- [A] End of spreading fan when spreading in the headlands tramline
- [E] End of spreading fan when spreading in the field
- [T] Headlands tramline
- [X] Working width

The metering slides must be opened or closed at different distances to the field border of the headlands when travelling backwards and forwards.

Driving out of the headlands tramline

- **Open** the metering slides if the following requirement is met:
 - The end of the spreading fan on the field [E] is at approx. half of the working width + 4 to 8 m from the field boundary of the headlands.

The tractor is then located at different distances in the field, depending on the spreading distance of the fertiliser.

Driving into the headlands tramline

- Close the metering slides **as late as possible**.
 - The end of the spreading fan should ideally come to lie on the field [A] at a distance of approx. 4 to 8 m further than the working width [X] of the headlands.
 - This cannot always be achieved, depending on the spreading distance of the fertiliser and the working width.
- Alternatively, the headlands tramline can be passed or a 2nd headlands track can be prepared.

Follow these instructions in order to ensure an environmentally friendly and economical working method.

10.7 Row spreading device RV 2M1 (optional equipment)

The row spreading device RV 2M1 is attached in the upper lug of the drawbar. The row spreading device is designed in such a way that a row [X] on both the right and left of the machine (row distance: approx. 2-5 m) is spread with fertiliser in a 1-metre wide planting row [Y].

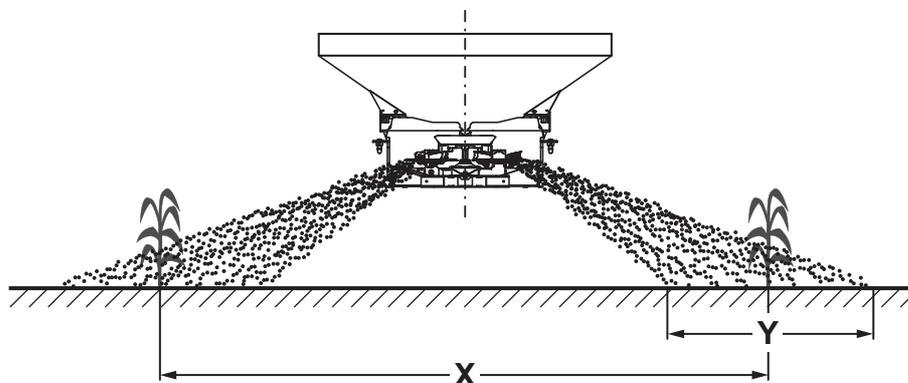


Figure 10.5: Spreading with the row spreading device

[X] Row distance
[Y] Width of the planting row

10.7.1 Machine pre-settings

Before installing the RV 2M1, the spreading vanes on both spreading discs must be set to the position A2-A2.

▲ CAUTION



Material damage to spreading vanes and row spreading device RV 2M1

If the spreading vanes are set to a value **higher** than **A2-A2**, the spreading vanes can hit the guide plates on the row spreading device RV 2M1.

- ▶ Never set the spreading vanes to a value higher than A2-A2.
- ▶ After assembling the row spreading device RV 2M1, check the free passage of the spreading discs when the tractor is at a stand-still (turn the spreading discs by hand).

10.7.2 Row distance and spreading width adjustment

The row distance can be adjusted by moving the plates [1].

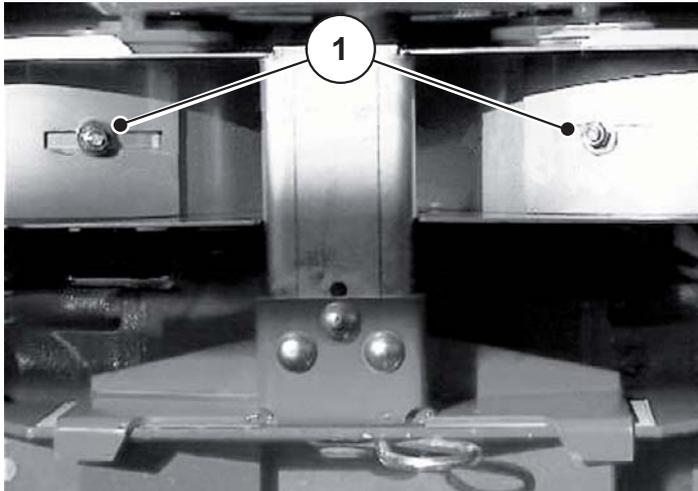


Figure 10.6: Plates on the row spreading device

[1] Plates

The strip width to be spread can be adjusted by adjusting the side plates [2].

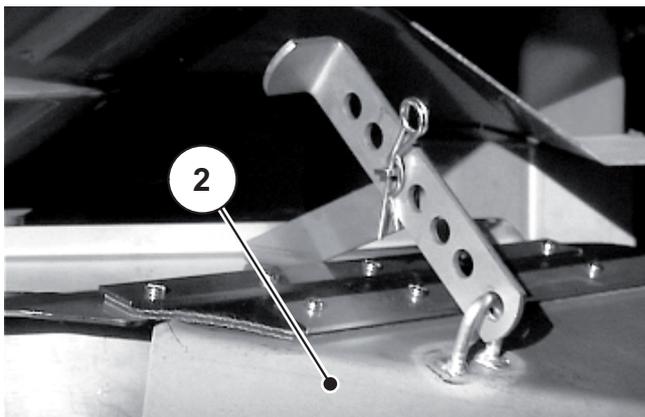


Figure 10.7: Adjustment to the row spreading device

[2] Side plate

Small corrections between the graduations of the settings can be achieved with a higher or lower mounting of the machine.

10.7.3 Application rate adjustments

Example for calculating the application rate:

- Two rows are to be spread.
- The distance between both of these rows is 3 m.
 - ▷ This means that the effective working width is 6 m (passage through each second tramline).

However, as there is no information about the machine setting for a working width of 6 m in the fertiliser chart, it is recommended to take the setting values from the fertiliser chart for a working width of 12 m.

If you want to spread 200 kg/ha with a working width of 6 m, you must take the setting values for a 12 m working width from the fertiliser chart and adjust the metering slide settings for 100 kg/ha.

11 Faults and possible causes

⚠ WARNING



Risk of injury when rectifying faults inappropriately

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**.
- ▶ Only carry out repairs yourself if you have the appropriate **qualifications**.

Troubleshooting requirements

- Switch off the PTO and the tractor engine and lock them to prevent unauthorised starting.
- Put down the machine on the ground.

| Fault | Possible cause | Measure |
|--------------------------------|--|---|
| Uneven fertiliser distribution | ● Clumps of fertiliser on spreading discs, spreading vanes, outlet channels. | ● Remove the caked-on fertiliser |
| | ● Metering slides do not open completely. | ● Check function of opening slide. |
| | ● Spreading vane incorrectly adjusted. | ● Correct adjustment according to fertiliser chart. |

| Fault | Possible cause | Measure |
|---|---|--|
| Too little fertiliser in the overlap area | <ul style="list-style-type: none"> Defective spreading vanes, outlets. | <ul style="list-style-type: none"> Replace defective parts immediately. Spreading vane incorrectly adjusted. Correct adjustment according to fertiliser chart. |
| | <ul style="list-style-type: none"> The fertiliser has a smoother surface than the fertiliser that was tested for the fertiliser chart. | <ul style="list-style-type: none"> Push forward the spreading vane mentioned second in the fertiliser chart (for larger numbers). <ul style="list-style-type: none"> e.g. E4-C1 to setting E4-C2 If the angle correction of the spreading vane mentioned second is not sufficient, increase the length of the spreading vane. <ul style="list-style-type: none"> e.g. E4-C2 to setting E4-D2 Spreading vane incorrectly adjusted. Correct adjustment according to fertiliser chart. |
| | <ul style="list-style-type: none"> Spreading vane incorrectly adjusted. | <ul style="list-style-type: none"> Correct adjustment according to fertiliser chart. |
| Too little fertiliser in the tractor track. | <ul style="list-style-type: none"> The fertiliser has a rougher surface than the fertiliser that was tested for the fertiliser chart. | <ul style="list-style-type: none"> Push back the spreading vane mentioned second in the fertiliser chart (for smaller numbers). <ul style="list-style-type: none"> e.g. C3-B2 to setting C3-B1 If the angle correction of the spreading vane mentioned second is not sufficient, shorten the length of the spreading vane. <ul style="list-style-type: none"> e.g. C3-B1 to setting C3-A1 |
| | <ul style="list-style-type: none"> PTO speed is higher than what the tractor tachometer indicates. | <ul style="list-style-type: none"> Check the RPM and correct if necessary. |
| | <ul style="list-style-type: none"> Spreading vane incorrectly adjusted. | <ul style="list-style-type: none"> Correct adjustment according to fertiliser chart. |
| Spreader applies a larger application rate on one side. | | <ul style="list-style-type: none"> Check the adjustment of the metering slide. Check the agitator function. Check outlet. |

| Fault | Possible cause | Measure |
|---|---|--|
| Irregular fertiliser feed to spreading disc | <ul style="list-style-type: none"> ● Outlet blocked | <ul style="list-style-type: none"> ● Clear blockages. |
| Irregular fertiliser feed to spreading disc | <ul style="list-style-type: none"> ● Defective agitator | <ul style="list-style-type: none"> ● Check agitator and replace it, if required. |
| Spreading discs are fluttering. | | <ul style="list-style-type: none"> ● Check plastic cap nuts for tight fit and check threads. |
| If the metering slide is closed, the fertiliser trickles out of the hopper. | <ul style="list-style-type: none"> ● Too great a distance between agitator and hopper base. | <ul style="list-style-type: none"> ● Check the distance between the agitator and hopper base. ● If the distance is greater than 2 mm, please observe chapter 12.9: Checking the agitator setting, page 123. |
| Metering slide does not open | <ul style="list-style-type: none"> ● Metering slides do not move easily. | <ul style="list-style-type: none"> ● Check for smooth slide movement, check the lever and the joints, and improve if necessary. ● Check the extension spring. |
| | <ul style="list-style-type: none"> ● The reducing plate at the hose connection of the plug-in connector is contaminated. | <ul style="list-style-type: none"> ● Clean the reduction plate. |
| The metering slide opens too slowly. | | <ul style="list-style-type: none"> ● Clean the restrictor plate. ● Replace the 0.7mm restrictor plate with a 1.0mm restrictor plate. The plate is located at the hose connection of the plug-in connector. |
| Blockage of the metering openings due to: Fertiliser clumps, damp fertiliser, miscellaneous impurities (leaves, straw, sack residues) | <ul style="list-style-type: none"> ● Clogging | <ol style="list-style-type: none"> 1. Park tractor, remove ignition key. 2. Open metering slides. 3. Place collecting vessel underneath. 4. Remove spreading discs. 5. Clean the outlet from below with a wooden pole or the adjustment lever and push through the metering opening. 6. Remove any foreign objects in the hopper, see 12.4: Cleaning, page 114. |

12 Maintenance and service

12.1 Safety

NOTICE

Please note the warnings in chapter [3: Safety, page 5](#).

Take **particular note of the instructions** in the section [3.8: Maintenance and repair, page 11](#).

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

For this reason, any maintenance and repair work is to be conducted with increased alertness at all times. Work particularly thoroughly and cautiously.

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** eyebolts in the hopper for lifting the machine with hoisting gear.
- There is a **risk of crushing and shearing at power-operated components (adjustment lever, metering slide)**. 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 only with original spare parts.
- Before starting any cleaning, maintenance, or repair work, and when troubleshooting, switch off the tractor's engine 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.
- **ONLY an instructed and authorised workshop** may carry out any repair work.

12.2 Wear parts and screw connections

12.2.1 Checking wear-prone parts

Wear-prone parts are: **spreader vanes, agitator head, outlet, hydraulic hoses** and all plastic parts.

Plastic parts are subject to a certain ageing process even under normal spreading conditions. Plastic parts are e.g. **protective grid locks, connecting rod**.

- Inspect wear parts regularly.

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

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

12.2.2 Checking the bolted joints

Bolted joints have been tightened to the specified torque and locked at the factory. Vibrations and shocks, in particular during the initial operating hours, can loosen bolted joints.

- With new machines, all screw connections are to be checked for their tight seat after approx. 30 operating hours.
- Check all the bolted joints regularly for tightness, and definitely before the start of the spreading season.

Some components (e.g. spreader vanes) are mounted with self-locking nuts. When mounting these components **always use new self-locking** nuts.

12.2.3 Checking the flat springs of the spreading discs

CAUTION

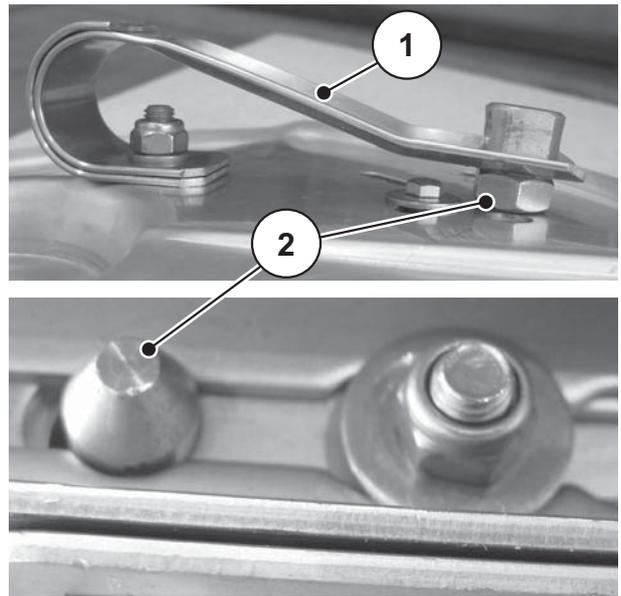


Risk of material damage: Do not bend flat springs

The flat spring tension must lock the main and extension vane reliably onto the spreading disc via the locking bolt. If the flat springs are bent, they lose the tension required to secure the spreading vanes.

If the flat spring tension is too low, the locking bolt becomes unlatched and can cause a high level of material damage.

- ▶ When setting the spreading vane position, press the locking bolt **carefully** into any position drill hole.
 - ▶ Replace flat springs immediately if they have **too little spring tension**.
-



- [1] Flat springs
- [2] locking bolts

Figure 12.1: Locking bolt locked in correctly

12.3 Opening the protective grid in the hopper

⚠ WARNING



Risk of injury due to moving parts in the hopper

There are moving parts in the hopper.

There is a risk of injury to hands and feet during commissioning and operation of the machine.

- ▶ It is important that the protective grid is installed and locked before commissioning and operating the machine.
- ▶ The protective grid may **only** be opened for maintenance purposes or in the event of a fault.

The protective grid in the hopper locks automatically by means of a protective grid lock.

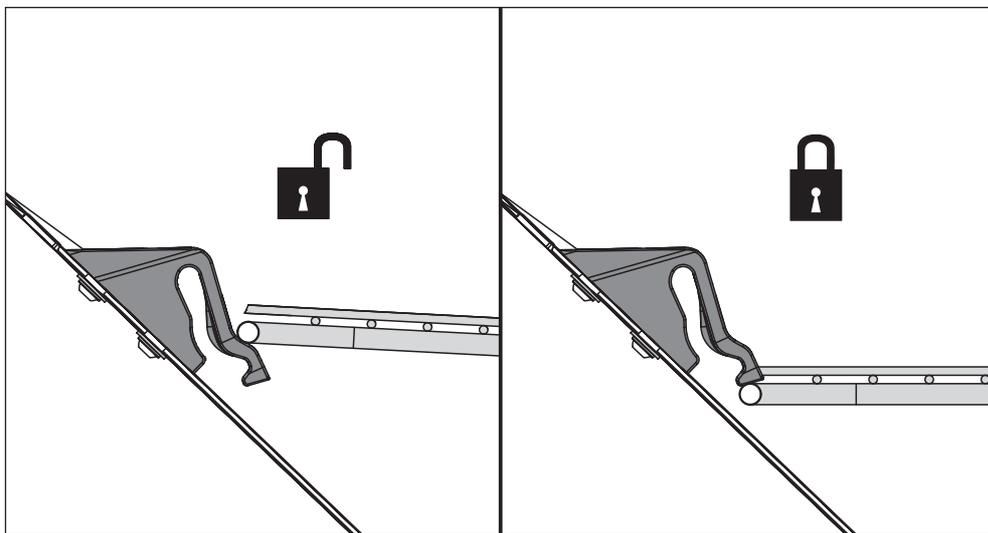
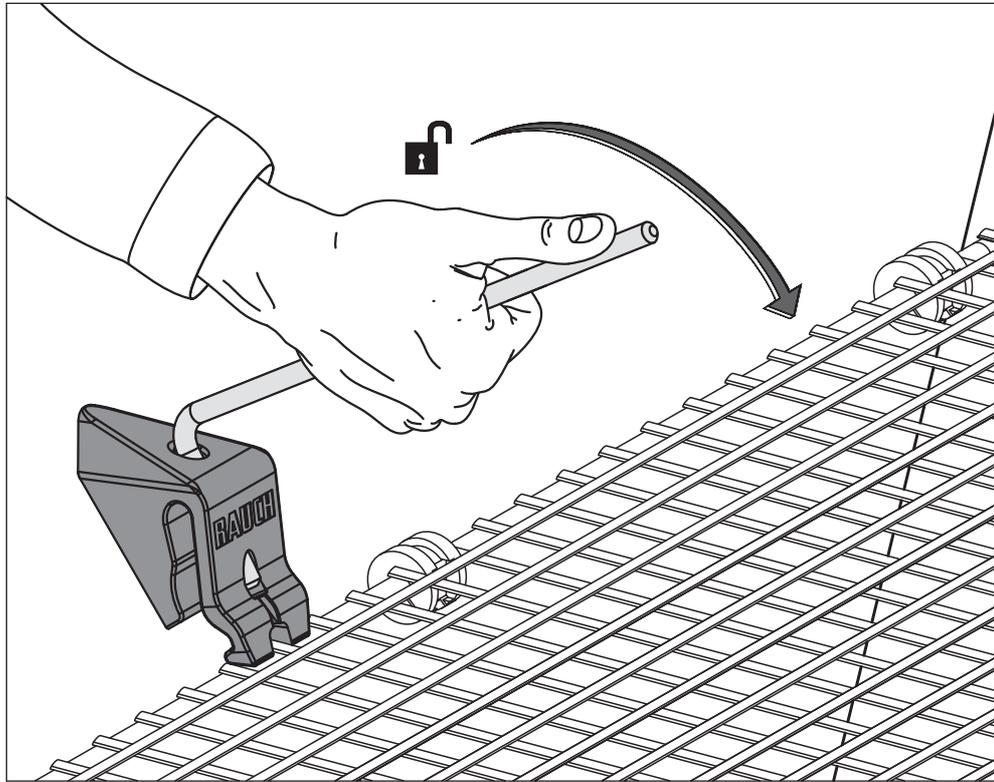


Figure 12.2: Protective grid lock open/closed

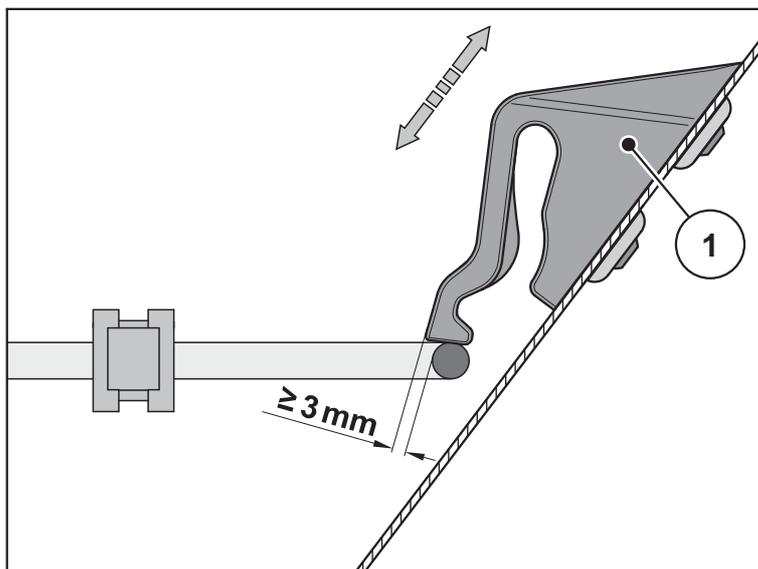
In order to avoid an inadvertent opening of the protective grid, the protective grid lock can only be released by using a tool (e.g. by means of the adjustment lever).

Before opening the protective grid:

- Disengage the PTO shaft.
- Lower the machine.
- Turn the tractor motor off. Remove the ignition key.

**Figure 12.3:** Open the protective grid lock

- Execute a regular function check of the protective grid lock. See figure below.
- Immediately replace defective protective grid locks.
- If required, correct the setting by moving the protective grid lock [1] up/down (see figure below).

**Figure 12.4:** Test dimension for functional check of the protective grid lock

12.4 Cleaning

We recommend cleaning the machine with a soft jet of water immediately after every use in order to maintain its value.

To facilitate cleaning, the protective grid in the hopper can be folded up (see chapter [12.3: Opening the protective grid in the hopper, page 112](#)).

In particular, the following instructions must be observed when cleaning:

- Clean the outlets and the area of the slide guide from below only.
- Only clean oiled machines at washing points fitted with an oil separator.
- When cleaning with high-pressure water, never aim the jet directly at warning signs, electrical equipment, hydraulic components, and sliding bearings.

After cleaning, we recommend treating the **dry machine, especially the coated spreading vanes and stainless steel parts**, with an environmentally friendly anti-corrosion agent.

A suitable polishing kit can be ordered from authorised dealers for use in treating rust spots.

12.5 Adjusting the metering slide

Check that the metering slides open smoothly before every working season and during the season, if necessary.

When spreading **seeds or slug pellets**, it is recommended to check the metering slide separately to ensure it opens evenly.

▲ WARNING



Danger of crushing and shearing due to components operated by an external force

When working on power-operated components (adjusting lever, metering slides), there is a crushing and shearing risk.

Pay attention to the shear point of the metering slide opening and the metering slide during all adjustment work.

- ▶ Switch the tractor motor off.
 - ▶ Remove the ignition key.
 - ▶ Disconnect the power supply between the tractor and the machine.
 - ▶ Never actuate the hydraulic metering slide during adjustment work.
-

12.5.1 Check

NOTICE

As the machine has a metering scale for each side, the adjustment work must be carried out on both the **right** and **left** sides.

In order to check the metering slide adjustment, the mechanism must be freely movable.

1. Park the machine safely on the ground or on a pallet. Ensure the ground is even and secure!
2. Remove both spreading discs.
3. **Versions K/R/D**
Connect the hydraulic hoses for the hydraulic metering slide actuator to the hydraulic unit or tractor.
- Versions C/Q**
Connect the E-CLICK terminal or QUANTRON to the tractor.
4. Start the tractor/unit/transformer.
5. Close the metering slide.
6. Switch off the tractor and remove the ignition key, or switch off the unit/transformer.
7. **Versions K/R/D/C:** Adjust the stopper on the spreading volume scale to position 130 (for seeds or slug pellets to position 9).
Start the tractor / unit / transformer.
Open the metering slide until you reach the previously set stopper.
- Version Q:** Open metering slide (position 130).
Move to the test points (see the operator's manual of the control unit).
8. Switch off the tractor and remove the ignition key, or switch off the unit / transformer.

9. Lower link pin $\varnothing = 28 \text{ mm}$
(for seeds or slug pellets, insert the adjustment lever $\varnothing = 8 \text{ mm}$) into the right or left metering opening.



Figure 12.5: Lower link pin in metering opening

Case 1:

Bolt can be inserted into the metering opening and has less than 1 mm clearance.

- The setting is **good**.
- Remove the bolt from the metering opening.
- Reassemble the spreading discs.

Case 2:

Bolt can be inserted into the metering opening and has more than 1 mm clearance.

- A new setting is required.
- Remove the bolt from the metering opening.
- Proceed with chapter [\[12.5.2\]](#).

Case 3:

Bolt cannot be inserted into the metering opening.

- A new setting is required.
- Remove the bolt from the metering opening.
- Proceed with chapter [\[12.5.2\]](#).

12.5.2 Adjusting

1. Start the tractor / unit / transformer.
2. **Versions K/R/D/C:** Close the metering slide.
Put the stopper into the maximum opened position (end of the slotted hole).
3. Open the metering slide until you reach the stopper.
Version K: The spring is now released.
4. Switch off the tractor and remove the ignition key, or switch off the unit / transformer.

5. **only versions K/R:** Unhook the spring using the adjustment lever.

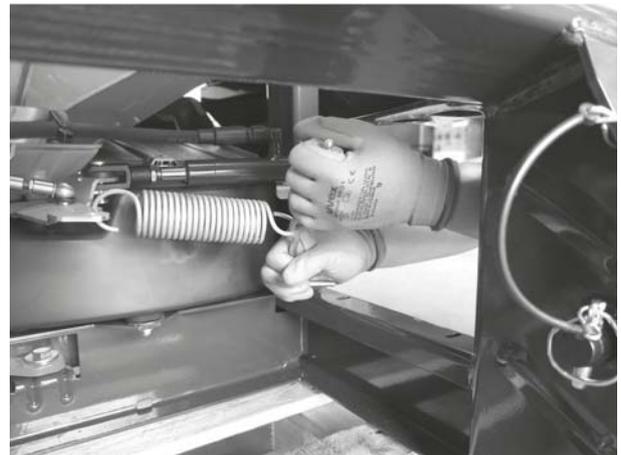


Figure 12.6: Unhook the spring



6. Disconnect the metering slide and hydraulic / electric cylinder.
7. Remove the retaining washer.
8. Dismount the bolt.

Figure 12.7: Unhook the cylinder

9. Pull out the hydraulic cylinder



Figure 12.8: Pull out the hydraulic cylinder

A second person is required for this stage.

10. **Person 1:** Insert the lower link pin into the metering opening (see stage [9](#)).

Person 2: Move the position pointer to smaller values until the metering slide is at the bolt [1].

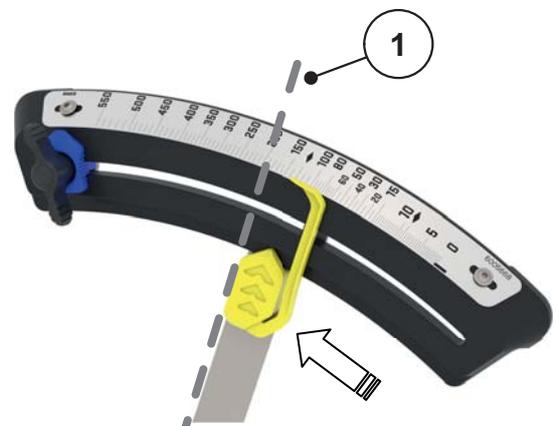


Figure 12.9: Move the position pointer

11. Move the stopper to the position pointer and clamp the stopper tightly.

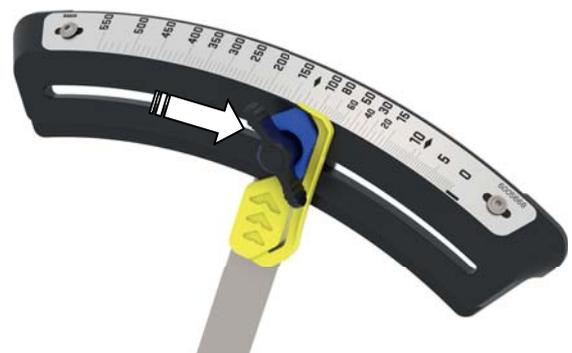


Figure 12.10: Move the stopper

12. Remove the bolt from the metering opening.
13. Loosen the screws [1] of the application rate scale.

14. Move the whole scale in such a way that the **stopper** is precisely on position **130** (for seeds or slug pellets on position **9** on the scale plate).
- ▷ If the slotted hole range of the scale is not sufficient, change the distance to the angle joint.

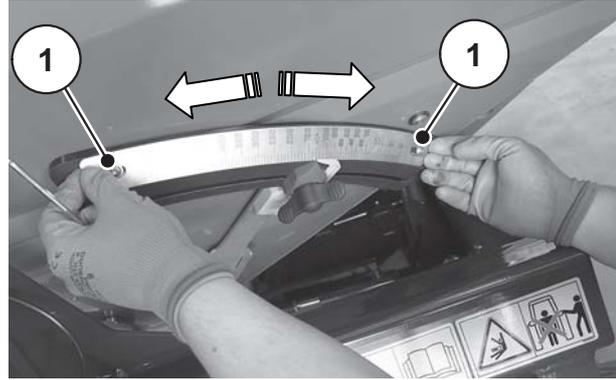


Figure 12.11: reposition the scale

15. Tighten the application rate scale again.
16. **Version Q:** Put the stopper into the maximum opened position (end of the slotted hole).
- Tighten the setscrew and also fix the stopper with the fillister head screw.
17. Connect the metering slide and hydraulic/electric cylinder (see step [\[6\]](#)).
- Assemble the bolt and retaining washer.
18. **Versions K/R:** Assemble the spring using the adjustment lever (see step [\[5\]](#)).
19. Mount both spreading discs again.
- ▷ **The adjustment is now complete. If you now connect the hydraulic hoses from the tractor/unit, the return springs of the single-acting hydraulic cylinders must first be de-tensioned. See [7.8: Parking and unhitching the machine, page 57](#).**
20. **Version Q:** Re-adjust the test points (see operator's manual).

NOTICE

Both metering slides must open **evenly** and to the same extent. Therefore, always check both metering slides.

12.6 Checking the agitator for wear

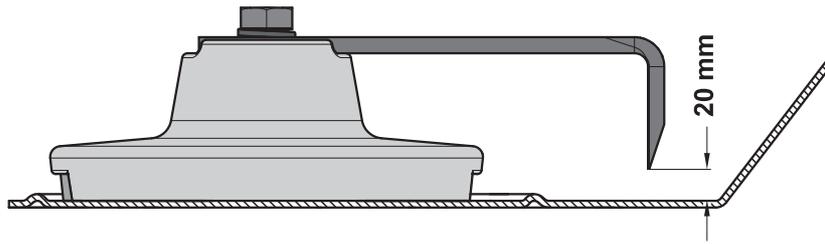


Figure 12.12: Agitator finger wearing zone

- Measure the distance between the agitator finger and the base of the hopper.
 - ▷ If the measured distance exceeds 20 mm, the agitator finger must be replaced.

12.7 Checking the spreading disc hub

In order to maintain the ease of movement of the cap nut on the disc hub, it is recommended to grease the disc hub (using graphite grease). Check the cap nut for cracks and damages. Immediately replace defective cap nuts.

12.8 Removing and mounting spreading discs

DANGER



Danger of injury from running engine

Working on the machine while the engine is running may result in serious injuries caused by mechanical components and escaping fertiliser.

- ▶ **Never** mount or dismount spreading discs while the engine is running or the PTO shaft of the tractor is rotating.
- ▶ Switch the tractor motor off.
- ▶ Remove the ignition key.

12.8.1 Removing the spreading discs

Proceed as follows for both sides (left and right):

1. Remove the adjustment lever from the bracket. See [figure 8.10, page 71](#).

2. Use the adjustment lever to loosen the cap nut of the spreading disc.
3. Remove the spreading disc from the hub.
4. Put the adjustment lever back into the specified bracket.



Figure 12.13: Loosen cap nut

12.8.2 Mounting the spreading discs

Requirements:

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

Assembly:

- Mount the left spreading disc on the left side in the direction of travel and the right spreading disc on the right side in the direction of travel. Make sure that the left and right spreading discs are not reversed.

The following procedure is for mounting the left-hand spreading disc. Mount the right-hand spreading disc according to these instructions as well.

1. Place the left spreading disc onto the left spreading disc hub.
The spreading disc must be evenly placed on the hub (if required, remove dirt).

NOTICE

The pins on the spreading disc holders have different positions on the left and right side. The correct spreading disc is the one that fits precisely into the spreading disc holder.

2. Carefully position the cap nut (do not tilt).
3. Tighten the cap nut with **25 Nm** until hand tight.

NOTICE

The cap nuts have an internal catching mechanism that prevents them from coming loose. The catching mechanism must be noticeable while tightening, otherwise, the cap nut is worn and must be replaced.

4. Check that there is clearance between the spreading vanes and the outlet /agitator shaft by turning the spreading discs by hand.

12.9 Checking the agitator setting

1. Insert the agitator into the agitator shaft and click the bayonet lock into place.
2. Pull the clicked-in agitator upwards.

The distance between the bottom edge of the agitator and the base of the hopper must now be **1 mm**.

3. To check, use a washer measuring **1 mm** in thickness or a metal strip.

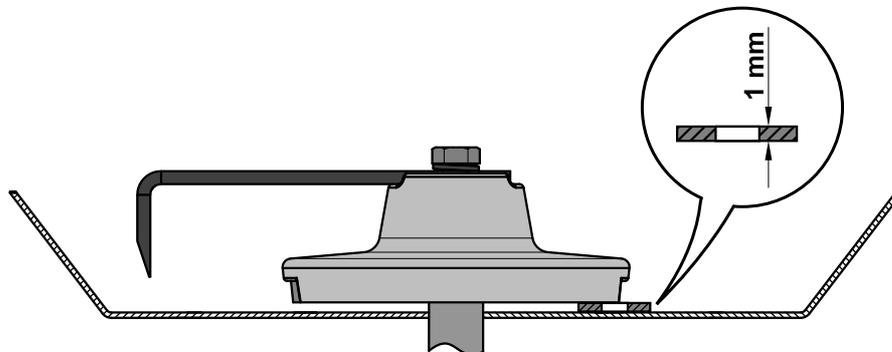


Figure 12.14: Adjusting the agitator

Case 1: The agitator has too much room before the base of the hopper.

- Position the gears lower on the 3 fastening screws by removing the washers. If necessary, place continuous metal strips onto the four screws evenly on the hopper.

Case 2: The distance is less than 1 mm.

- Place correspondingly thick washers onto the 3 fastening screws evenly on the gears.

Case 3: The agitator cannot click into place.

- The transverse pin is too low.
- Place correspondingly thick washers onto the 3 fastening screws evenly on the gears.

12.10 Replacing the spreading vanes

Worn spreading vanes can be replaced.

NOTICE

Worn spreading vanes must **only** be replaced by your dealer or your specialist workshop.

Requirement:

- The spreading discs are removed (see section [12.8.1: Removing the spreading discs, page 122](#)).
- A spreading vane consists of a **main vane** and an **extension vane**.
- The main vane on the **right** spreading disc is named **BR** and the corresponding extension vane is named **AR**.
- The main vane on the **left** spreading disc is named **BL** and the corresponding extension vane is named **AL**.

Example left spreading disc

BL: Main vane

AL: extension vane

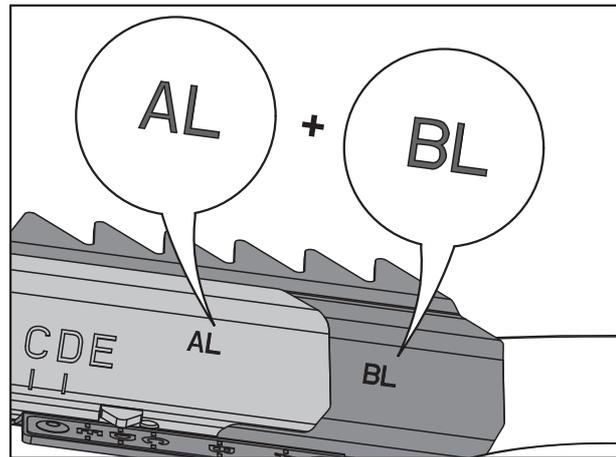


Figure 12.15: Spreading vane combination

12.10.1 Replacing the extension vane

Disassembling the extension vane

1. Disassemble the screw [1] with the corresponding nut and washers.

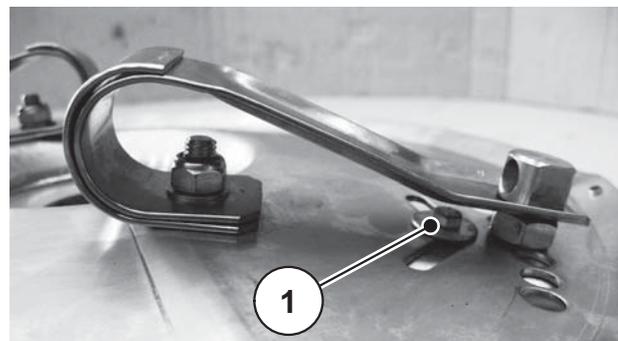


Figure 12.16: Flat spring on the spreading disc

2. Unlock the flat springs [2] with the adjustment lever [3].

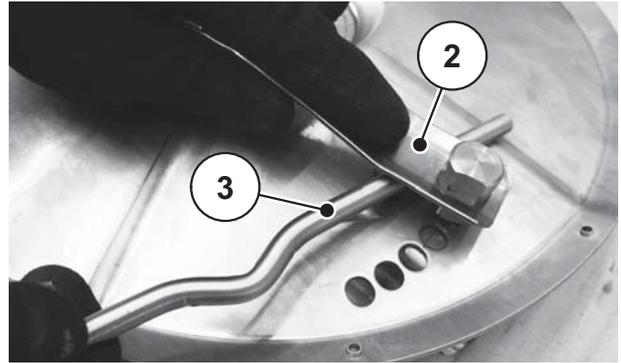


Figure 12.17: Unlock the flat springs

3. Push the old extension vane [4] off the main vane [5].

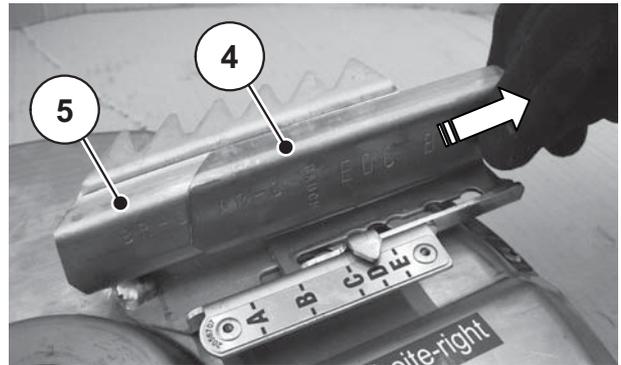


Figure 12.18: Extension and main vane

Mounting the new extension vane

⚠ DANGER



Risk of injury due to rotating machine parts

If the extension vanes are attached with the old screws and nuts, the spreading vanes can become loose and cause severe injuries.

- ▶ To assemble new components, **only** use the **new** screws, nuts and washers supplied.

1. Push the new extension vane [4] into the main vane [5].

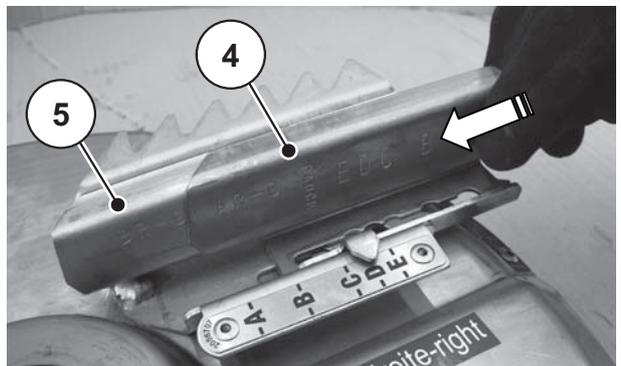


Figure 12.19: New extension vane

2. Attach the spreading vane to the spreading disc using the new screw [8], the new securing nuts [6] and the new washers [7].

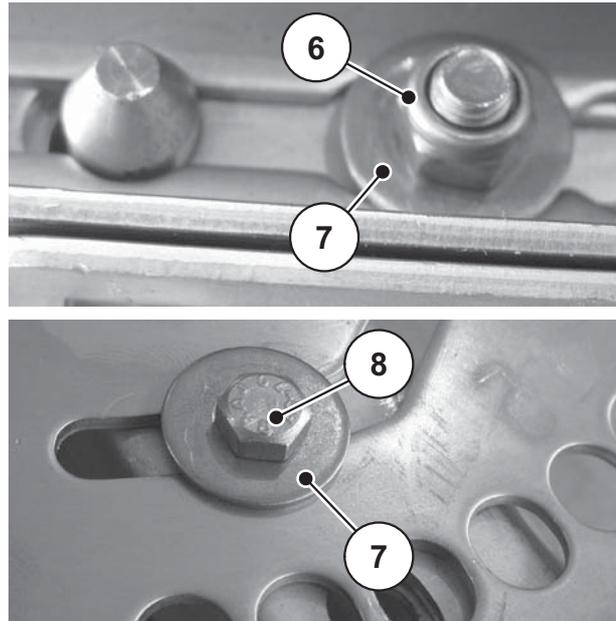


Figure 12.20: Spreading vane fastening points

3. Tighten the screw so that this lies flat and tight (tightening torque: approx. **8 Nm**).

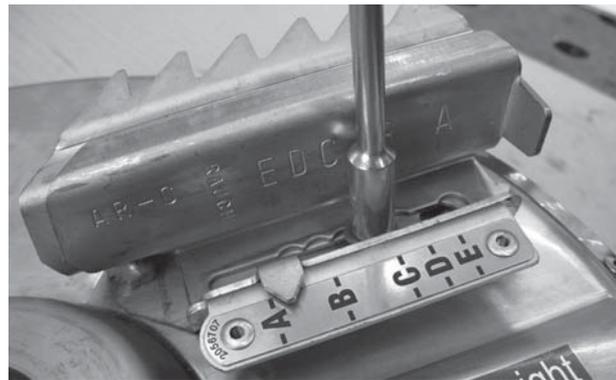


Figure 12.21: Spreading vane fastening points

4. Loosen the screw [8] again by approx. one half turn to guarantee easy adjustment of the extension vane position.
 - ▷ **The screw may only be loosened so that the extension vane position can be adjusted and the extension vane is still fastened tightly to the main vane.**
5. Click the flat spring back into place with the adjustment lever.
6. If necessary, repeat the work stages with other extension vanes which must be replaced.
 - ▷ **Reattach both spreading discs. See [12.8.2: Mounting the spreading discs, page 122](#).**

12.10.2 Replacing the main vane or the complete spreading vane

Removing the spreading vane

▲ WARNING



Danger of injury due to tensioned flat spring

The flat spring is tensioned and may spring out in an uncontrolled manner.

- ▶ Maintain an adequate safety distance during the dismantling process.
- ▶ Do not remove the spring towards you.
- ▶ Never bend directly over the spring.

1. Unscrew the self-locking spring fastening nut of the spreading vane with a SW 13 open-end spanner.



Figure 12.22: Remove the screws

2. Remove the flat springs [1] using a suitable screwdriver or adjustment lever [2].

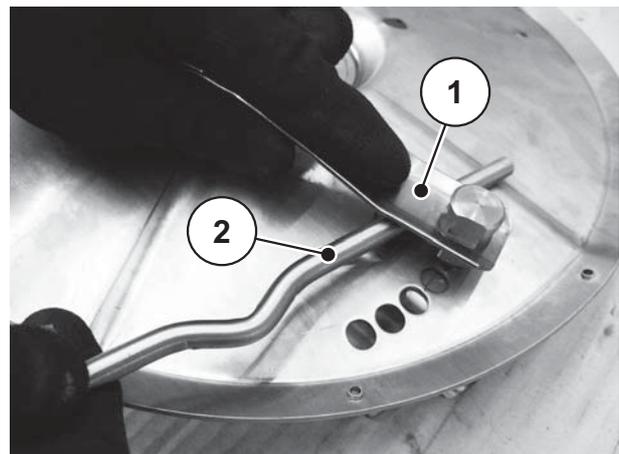


Figure 12.23: Removing the flat springs

3. Disassemble the screw [3] with the corresponding nut and washers.

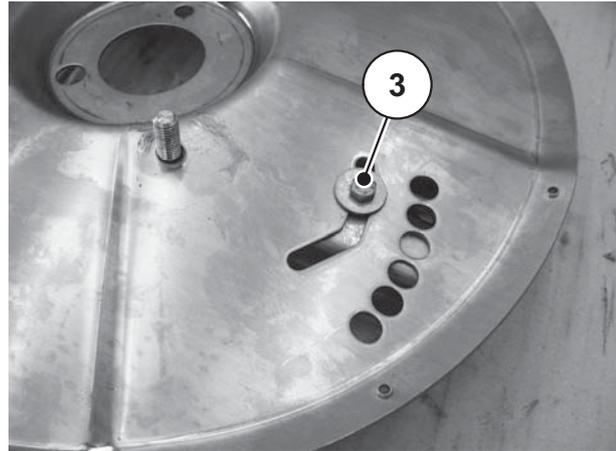


Figure 12.24: Screw on the underside of the spreading disc

4. Remove the old spreading vane [4] with the corresponding nut and washers.

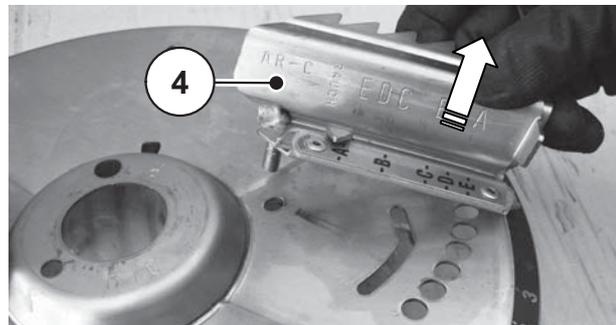


Figure 12.25: Remove the spreading vane

Mounting the new main vane or the complete spreading vane

1. Install the new main vane onto the spreading disc.

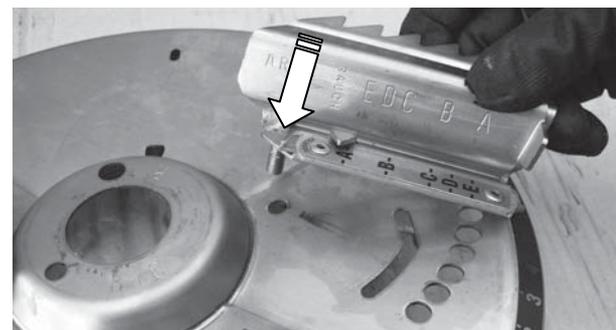


Figure 12.26: Main vane assembly

NOTICE

During assembly, ensure the correct combination of main and extension vane. See [figure 12.15](#).

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

If the spreading vanes are attached with the old screws, the spreading vanes can become loose and cause severe injuries.

- ▶ To assemble the new spreading vane, **only** use the **new** screws, nuts and washers supplied.

2. Screw the new extension vane and the new main vane onto the spreading disc.



Figure 12.27: Spreading vane on the spreading disc

3. Attach the complete spreading vane to the spreading disc using the new screw [3], the new securing nut [1] and the new washers [2].
4. Tighten the screw so that this lies flat and tight (tightening torque: approx. **8 Nm**).

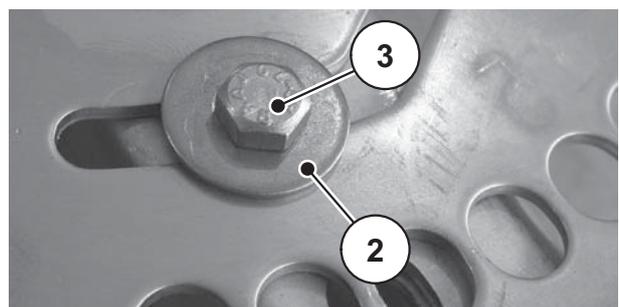
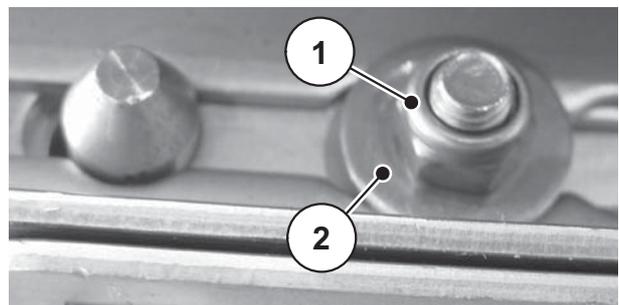


Figure 12.28: Spreading vane fastening points

5. Loosen the screw [3] again by approx. one half turn to guarantee easy adjustment of the extension vane position.
 - ▷ The screw may only be loosened so that the extension vane position can be adjusted and the extension vane is still fastened tightly to the main vane.

▲ WARNING



Danger of injury due to tensioned flat spring

The flat spring is tensioned and may spring out in an uncontrolled manner.

- ▶ Maintain an adequate safety distance during the dismantling process.
- ▶ Do not remove the spring towards you.
- ▶ Never bend directly over the spring.

6. Insert the flat spring [4] into the thread bolt [5] of the main vane.
7. Press the locking bolt [6] carefully into any position drill hole.

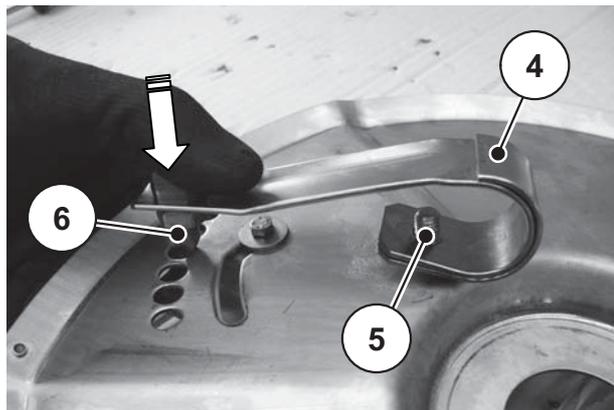


Figure 12.29: Flat springs on the spreading disc

8. Fasten the flat spring with a new washer and a new self-locking spring fastening nut.



Figure 12.30: Fastening the flat springs

9. Tighten the spring fastening nut in such a way that the flat spring sits flat and tight on the spreading disc.
10. Loosen the spring fastening nut again by around one half turn to guarantee easy adjustment of the extension vane position.

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

If the spring fastening nut is too loose, the spreading vane may become loosened from the spreading disc.

This can lead to damage to the machine and severe injuries.

- ▶ Only loosen the spring fastening nut so that the spreading vane position can be adjusted and the flat spring is still tight against the spreading disc.

-
11. If necessary, repeat the work stages with other spreading vanes which must be replaced.
- ▷ **Mount both spreading discs again. See [12.8.2: Mounting the spreading discs, page 122](#).**

12.11 Replacing the MDS-spreading vane with an X-spreading vane

NOTICE

Only have the standard spreading vane replaced by an X spreading vane by your dealer or your expert workshop.

Vane combination

CAUTION

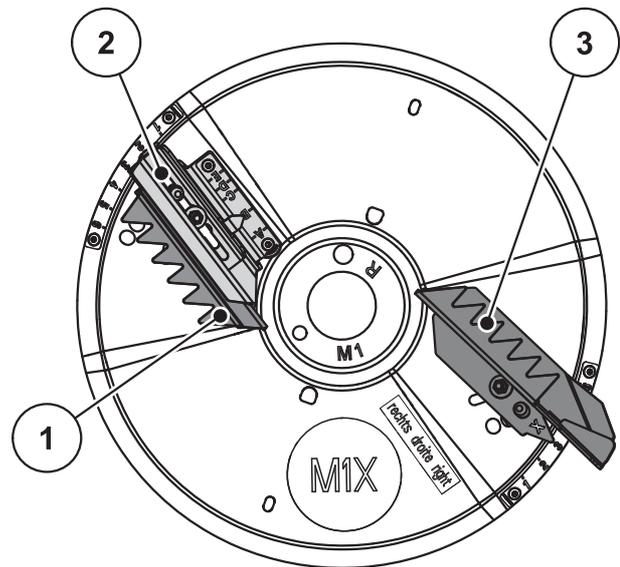


Environmental damage due to incorrectly assembled spreading vanes

Observe the prescribed vane combination exactly. Other combinations can lead to a significant impairment of the spreading pattern.

- ▶ **Only** one X-spreading vane may be attached for each spreading disc (left/right).

| | | Spreading disc type M1X | |
|----------------|-------|-------------------------|------------------|
| | | Main and extension vane | X-spreading vane |
| Spreading disc | left | BL and AL | XL |
| | right | BR and AR | XR |



- [1] Main vane
- [2] extension vane
- [3] X-spreading vane

Figure 12.31: Example right spreading disc with X-spreading vane

Assembling the X-vane

NOTICE

Observe the correct X-spreading vane - spreading disc combination;
See table.

1. Remove one main and additional vane on each spreading disc.
See: [Removing the spreading vane, page 127](#)
2. Attach the X-spreading vane to the spreading disc.
See chapter: [Mounting the new main vane or the complete spreading vane, page 128](#).
3. Attach the flat springs to the spreading disc and the X-spreading vane.
4. Observe the spreading disc assembly instructions.
See Chapter [12.8.2: Mounting the spreading discs, page 122](#).

12.12 Transmission oil

12.12.1 Quantity and types

The transmission is filled with approx. **2.2 l** transmission oil SAE 90 API-GL-4.

NOTICE

Use only one type of oil, never mix different types.

12.12.2 Checking the oil level, changing the oil

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 fertilisers with a high dust content are used and the spreader is frequently cleaned.

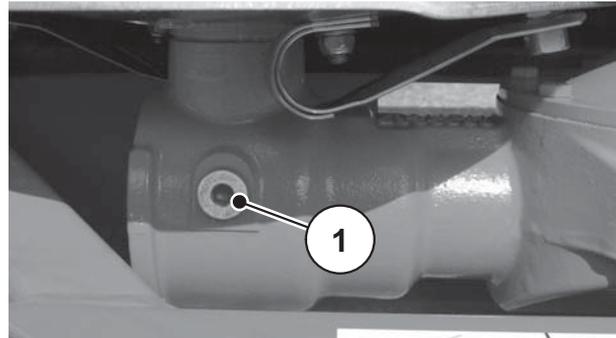
▲ WARNING



Environmental pollution due to unsuitable disposal of hydraulic and gear oil

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

- ▶ Collect/dam escaped oil with sand, earth or other absorptive material.
- ▶ Collect hydraulic and gear oil in a suitable container provided for the purpose, and dispose of it in accordance with the local statutory requirements.
- ▶ Oil must be prevented from spilling and draining into the sewers.
- ▶ The ingress of oil into the sewage system must be prevented by building dams made of sand and/or earth or by other suitable damming means.



[1] Oil level checking screw

Figure 12.32: Filling and draining points
Transmission oil

Checking the oil level

- Open the oil level checking screw.
 - ▷ The oil level is satisfactory when the oil reaches the lower edge of the hole.

12.13 Lubrication plan

| Lubrication points | Lubricant | Comment |
|----------------------------------|-----------------|---|
| Drive shaft | Grease | See operator's manual of the manufacturer. |
| Metering slide, stop lever | Grease, oil | Ensure smooth movement and grease regularly. |
| Spreading disc hub | Graphite grease | Keep the threads and contact area clean and grease regularly. |
| Agitator shaft, agitator fingers | Graphite grease | Grease before and after each spreading season. |
| Upper and lower hitch balls | Grease | Grease regularly. |
| Joints, bushes | Grease, oil | They are designed for dryness but can be slightly lubricated. |

13 Disposal

13.1 Safety

▲ WARNING



Environmental pollution due to unsuitable disposal of hydraulic and gear oil

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

- ▶ Collect/dam escaped oil with sand, earth or other absorptive material.
- ▶ Collect hydraulic and gear oil in a suitable container provided for the purpose, and dispose of it in accordance with the local statutory requirements.
- ▶ Oil must be prevented from spilling and draining into the sewers.
- ▶ The ingress of oil into the sewage system must be prevented by building dams made of sand and/or earth or by other suitable damming means.

▲ WARNING



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.

▲ WARNING



Environmental pollution caused by inappropriate disposal of components

The incorrect disposal of ingredients and materials is a threat to the environment.

- ▶ Only authorised companies may be commissioned with the disposal.

13.2 Disposal

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

1. All components, auxiliary and operating materials from the machine must be removed by specialist staff.

Hereby, these components and substances must be cleanly separated into categories.

2. All waste products are then to be disposed of in accordance with local regulations and directives for recycling or special refuse categories by authorised companies.

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Terms/conditions of warranty

RAUCH units are manufactured with modern production methods and with the greatest care and are subject to numerous inspections.

Therefore RAUCH offers a 12-month warranty subject to the following conditions:

- The warranty begins on the date of purchase.
- The warranty covers material and manufacturing faults. Our liability for third-party products (hydraulic system, electronics) is limited to the warranty of the manufacturer of the equipment. During the warranty period, manufacturing and material faults are corrected free of charge by replacement or repair of the affected parts. Other rights extending beyond the above, such as claims for conversion, reduction or replacement for damages that did not occur in the object of supply are explicitly excluded. Warranty services are provided by authorised workshops, by RAUCH factory representatives or the factory.
- The following are excluded from coverage by the warranty: natural wear, dirt, corrosion and all faults caused by improper handling and external causes. The warranty is rendered void if the owner carries out repairs or modifications to the original state of the supplied product. Warranty claims are rendered void if RAUCH original spare parts were not used. Therefore, the directions in the operating manual must be observed. In all cases of doubt contact our sales representatives or the factory directly. Warranty claims must be submitted to the factory by 30 days at the latest after occurrence of the problem. The date of purchase and the serial number must be indicated. If repairs under the warranty are required, they must be carried out by the authorised workshop only after consultation with RAUCH or the company's appointed representatives. The warranty period is not extended by work carried out under warranty. Shipping faults are not factory faults and therefore are not part of the warranty obligation of the manufacturer.
- No claims for compensation for damages that are not part of RAUCH machines themselves will be accepted. This also means that no liability will be accepted for damage resulting from spreading errors. Unauthorised modifications of RAUCH machines may result in consequential damage, for which the manufacturer will not accept any liability. The manufacturer's liability exclusion will not apply in case of wilful 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. It will also not apply in the event that assured properties are absent, if the purpose of the assured properties was to protect the purchaser against damage that does not involve the supplied product itself.

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Tabele wysiewu RAUCH
RAUCH Strooitabellen
RAUCH Tabella di spargimento
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RAUCH Levitystaulukot
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<http://www.rauch-community.de/streutabelle/>



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