



SCHMOTZER

Original operating manual

Front-mounted hoeing machine

Select KPP-F

Select EKP-F



SCHMOTZER  SCHMOTZER Hacktechnik GmbH & Co. KG D-91438 Bad Windsheim		CE UK CA	Baujahr / year of construction <input type="text"/> Maschinen-Nr. <input type="text"/> 
Produkt <input type="text"/>			
Modelljahr <input type="text"/>		zul. technisches Maschinengewicht kg <input type="text"/>	

Please enter the identification data of the implement. The identification data can be found on the rating plate.



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About this operating manual

1

CMS-T-00000081-I.1

1.1 Copyright

CMS-T-00012308-A.1

Reprinting, translation and reproduction in any form, including excerpts, require the written approval of AMAZONEN-WERKE.

1.2 Diagrams

CMS-T-005676-F.1

1.2.1 Warnings and signal words

CMS-T-00002415-A.1

Warnings are marked with a vertical bar with a triangular safety symbol and the signal word. The signal words *"DANGER"*, *"WARNING"* or *"CAUTION"* describe the severity of the potential danger and have the following meanings:



DANGER

- Indicates a direct threat with high risk for severe physical injury, such as loss of limbs or death.



WARNING

- Indicates a possible threat with moderate risk for severe physical injury or death.



CAUTION

- Indicates a threat with low risk for light or moderately severe physical injuries.

1.2.2 Further instructions

CMS-T-00002416-A.1



IMPORTANT

- Indicates a risk for damage to the implement.



ENVIRONMENTAL INFORMATION

- Indicates a risk for environmental damage.



NOTE

Indicates application tips and instructions for optimal use.

1.2.3 Instructions

CMS-T-00000473-D.1

1.2.3.1 Numbered instructions

CMS-T-005217-B.1

Actions that have to be performed in a specific sequence are represented as numbered instructions. The specified sequence of the actions must be observed.

Example:

1. Instruction 1
2. Instruction 2

1.2.3.2 Instructions and responses

CMS-T-005678-B.1

Reactions to instructions are marked with an arrow.

Example:

1. Instruction 1
- ➡ Reaction to instruction 1
2. Instruction 2

1.2.3.3 Alternative instructions

CMS-T-00000110-B.1

Alternative instructions are introduced with the word "or".

Example:

1. Instruction 1

or

Alternative instruction

2. Instruction 2

1.2.3.4 Instructions with only one action

CMS-T-005211-C.1

Instructions with only one action are not numbered, but rather shown with a arrow.

Example:

► Instruction

1.2.3.5 Instructions without sequence

CMS-T-005214-C.1

Instructions that do not require a specific sequence are shown as a list with arrows.

Example:

► Instruction

► Instruction

► Instruction

1.2.3.6 Workshop work

CMS-T-00013932-B.1



WORKSHOP WORK

- Identifies maintenance work that must be performed at a workshop that is adequately equipped in terms of agricultural technology, safety and environmental technology by specialist personnel with appropriate training.

1.2.4 Lists

CMS-T-000024-A.1

Lists without an essential order are shown as a list with bullets.

Example:

- Point 1
- Point 2

1.2.5 Item numbers in figures

CMS-T-000023-B.1

A framed number in the text, e.g. a 1, indicates an item number in an adjacent figure.

1.2.6 Direction information

CMS-T-00012309-A.1

Unless otherwise specified, all directions are always seen in the direction of travel.

1.3 Other applicable documents

CMS-T-00000616-B.1

A list of other applicable documents can be found in the Appendix.

1.4 Digital operating manual

CMS-T-00002024-B.1

The digital operating manual and e-learning can be downloaded from the Info Portal on the AMAZONE website.

1.5 Your opinion is important

CMS-T-000059-D.1

Dear reader, our documents are updated on a regular basis. Your suggestions for improvement help us to create ever more user-friendly documents. Please send us your suggestions by post, fax or email.

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CMS-I-00000638

Safety and responsibility

2

CMS-T-00012024-C.1

2.1 Basic safety instructions

CMS-T-00012025-C.1

2.1.1 Meaning of the operating manual

CMS-T-00006180-A.1

Observe the operating manual

The operating manual is an important document and a part of the implement. It is intended for the user and contains safety-related information. Only the instructions provided in the operating manual are reliable. If the operating manual is not observed, it can result in serious injury or death.

- ▶ The safety section must be completely read and observed before initial operation of the implement.
- ▶ Before starting work, also read and observe each section of the operating manual.
- ▶ Keep the operating manual in a safe place.
- ▶ Keep the operating manual available.
- ▶ Hand over the operating manual to the subsequent user.

2.1.2 Safe operating organisation

CMS-T-00002302-D.1

2.1.2.1 Personnel qualification

CMS-T-00002306-B.1

2.1.2.1.1 Requirements for persons working with the implement

CMS-T-00002310-B.1

If the implement is used improperly, people can be injured or killed: To prevent accidents due to improper use, every person who works with

the implement must meet the following minimum requirements:

- The person is physically and mentally capable of checking the implement.
- The person can safely perform work with the machine within the scope of this operating manual.
- The person understands the functioning of the machine within the scope of their work and can recognise and prevent dangers arising during operation.
- The person had understood the operating manual and can implement the information that is conveyed in the operating manual.
- The person must be familiar with safe driving of vehicles.
- For road travel, the person knows the relevant road traffic regulations and has the prescribed driving permit.

2.1.2.1.2 Qualification levels

CMS-T-00002311-A.1

For working with the machine, the following qualification levels are provided:

- Farmer
- Agricultural helper

As a matter of principle, the activities described in this operating manual can be performed by persons with the qualification level "Agricultural helper".

2.1.2.1.3 Farmer

CMS-T-00002312-A.1

Farmers use agricultural implement to cultivate fields. They decide on the use of an implement for a specific purpose.

Farmers are basically familiar with working with agricultural implements and can instruct agricultural helpers in how to use the implements if necessary. They can perform odd tasks and simple maintenance and repair work on agricultural implements themselves.

Farmers can be e.g.:

- Farmers with higher education or training from a technical college
- Farmers by experience (e.g. inherited farm, comprehensive practical knowledge)
- Contractors who work by order of farmers

Activity example:

- Safety training for agricultural helpers

2.1.2.1.4 Agricultural helpers

CMS-T-00002313-A.1

Agricultural helpers use agricultural implements by order of the farmer. They are instructed on the use of the implement by the farmer, and work independently according to the work assignment from the farmer.

Agricultural helpers can be e.g.:

- Seasonal workers and labourers
- Prospective farmers in training
- Employees of the farmer (e.g. tractor driver)
- Family members of the farmer

Activity examples:

- Driving the machine
- Adjusting the working depth

2.1.2.2 Workplaces and passengers

CMS-T-00002307-B.1

Passengers

Passengers can fall, be run over and severely injured or killed due to machine movements. Ejected objects can hit and injure passengers.

- ▶ Do not let anybody ride on the machine.
- ▶ Do not let anybody climb onto the driving machine.

2.1.2.3 Danger for children

CMS-T-00002308-A.1

Danger for children

Children cannot assess dangerous situations and can behave unpredictably. As a result, children are at a higher risk.

- ▶ Keep children away.
- ▶ *When you drive out or actuate machine movements,*
make sure that there are no children in the danger area.

2.1.2.4 Operational safety

CMS-T-00002309-D.1

2.1.2.4.1 Perfect technical condition

CMS-T-00002314-D.1

Only use properly prepared machines

Without correct preparation according to this operating manual, operational safety of the machine is not ensured. This can result in accidents and serious personal injury or even death.

- ▶ Prepare the machine according to this operating manual.

Danger due to damage to the machine

Damage to the machine can impede the operational safety of the machine and cause accidents. This can result in serious injury or death.

- ▶ *If you suspect or observe damage:*
Secure the tractor and machine.
- ▶ Repair safety-relevant damage immediately.
- ▶ Fix the damage according to this operating manual.
- ▶ *If you are not able to fix the damage according to this operating manual yourself:*
Have the damage repaired by a qualified specialist workshop.

Observe the technical limit values

Non-observance of the technical limits values of the machine can result in accidents and serious personal injury or even death. Moreover, the machine can be damaged. The technical limit values can be found in the Technical Data.

- ▶ Comply with the technical limit values.

2.1.2.4.2 Personal protective equipment

CMS-T-00002316-B.1

Personal protective equipment

Wearing personal protective equipment is an important safety element. Missing or unsuitable personal protective equipment increases the risk of damage to health and personal injury. Personal protective equipment includes: work gloves, safety shoes, protective clothing, breathing protection, hearing protection, face protection, and eye protection

- ▶ Determine the personal protective equipment required for each job and have it ready.
- ▶ Use only protective equipment that is in proper condition and offers effective protection.
- ▶ Adjust the personal protective equipment to the person, e.g. the size.
- ▶ Observe the manufacturer's instructions regarding operating materials, seed, fertiliser, crop protection products, and cleaning agents.

Wear suitable clothing

Loosely worn clothing increases the risk of getting caught or entangled on rotating parts and getting stuck on protruding parts. This can result in serious injury or death.

- ▶ Wear close-fitting, snag-free clothes.
- ▶ Never wear rings, necklaces and other jewellery.
- ▶ *If you have long hair,*
wear a hairnet.

2.1.2.4.3 Warning symbols

CMS-T-00002317-B.1

Keep warning symbols legible

Warning symbols on the machine warn you of risks in danger areas and are an important element of the machine's safety equipment. Missing warning symbols increase the risk of serious and lethal personal injury.

- ▶ Clean dirty warning symbols.
- ▶ Immediately replace any damaged and illegible warning symbols.
- ▶ Put the intended warning symbols on spare parts.

2.1.3 Knowing and preventing dangers

CMS-T-00012021-B.1

2.1.3.1 Safety hazards on the implement

CMS-T-00002318-F.1

Liquids under pressure

Escaping high pressure hydraulic fluid can penetrate into the body through the skin and cause serious personal injuries. A hole the size of a needle can already result in serious personal injuries.

- ▶ *Before you uncouple the hydraulic hose lines or check for damage,*
depressurise the hydraulic system.
- ▶ *If you suspect damage on a pressure system,*
have the pressure system checked by a qualified specialist workshop.
- ▶ Never look for leaks with your bare hands.
- ▶ Keep your body and face away from leaks.
- ▶ *If liquids penetrate the body,*
consult a doctor immediately.

Risk of injury on the universal joint shaft

Persons can be caught, pulled in and severely injured by the universal joint shaft and driven components. If the universal joint shaft is overloaded, the implement can be damaged, parts can be ejected at high speed, and persons can be injured.

- ▶ Maintain sufficient coverage of the profile tube, universal joint shaft guard and PTO shaft protective cap.
- ▶ Maintain the direction of rotation and the permissible speed of the universal joint shaft.
- ▶ *If the universal joint shaft is angled down too strongly:*
Switch off the universal joint shaft drive.
- ▶ *If you do not need the universal joint shaft:*
Switch off the universal joint shaft drive.

Risk of injury on the PTO shaft

Persons can be caught, pulled in and severely injured by the PTO shaft and driven components. If the PTO shaft is overloaded, the implement can be damaged, parts can be ejected at high speed, and persons can be injured.

- ▶ Maintain sufficient coverage of the profile tube, universal joint shaft guard and PTO shaft protective cap.
- ▶ Allow the locks on the PTO shaft to engage.
- ▶ *To secure the universal joint shaft guard against rotating:*
Hook on the safety chains.
- ▶ *To secure the coupled hydraulic pump against rotating:*
Put on the torque support.
- ▶ Maintain the direction of rotation and the permissible speed of the PTO shaft.
- ▶ *To prevent implement damage due to torque peaks:*
Slowly couple the PTO shaft at low tractor engine speed.

Danger due to machine parts still running

When the drives are switched off, machine parts can continue running and cause serious personal injury or death.

- ▶ Before approaching the machine, wait until any machine parts that are still running have come to a stop.
- ▶ Only touch machine parts that are standing still.

2.1.3.2 Danger areas

CMS-T-00012022-A.1

Dangers areas on the implement

The following basic dangers are encountered in the danger areas:

The implement and its work tools move during operation.

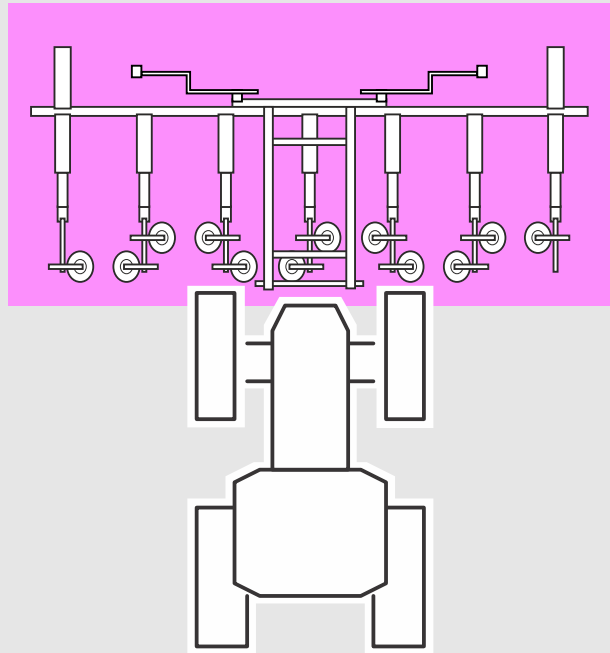
Hydraulically raised implement parts can descend unnoticed and slowly.

The tractor and implement can roll away unintentionally.

Materials or foreign objects can be ejected out of or away from the implement.

If the danger area is not observed, it can result in serious personal injury or death.

- ▶ Keep people out of the danger area of the implement.
- ▶ *If people enter the danger area, immediately switch off the engines and drives.*
- ▶ *Before you work in the danger area of the implement, secure the tractor and implement. This also applies for quick checking work.*



CMS-I-00007709

Risk of falling between the hoeing elements

- ▶ *When you are moving between the hoeing elements to adjust the implement, be very careful.*

2.1.4 Safe operation and handling of the machine

CMS-T-00002304-I.1

2.1.4.1 Coupling implements

CMS-T-00002320-D.1

Coupling the implement on the tractor

Incorrectly coupling of the implement to the tractor results in hazards that can cause serious accidents.

There are crushing and shear points in the area of the coupling points between the tractor and the implement.

- ▶ *If you couple or uncouple the implement to or from the tractor, be very careful.*
- ▶ Use only suitable tractors for coupling and transporting the implement.
- ▶ *When the implement is coupled onto the tractor, make sure that the tractor's connecting device meets the implement requirements.*
- ▶ Couple the implement properly to the tractor.

2.1.4.2 Driving safety

CMS-T-00002321-E.1

Risk when driving on roads and fields

Any mounted or towed implement as well as front or rear ballast weights on the tractor influence the driving behaviour and the steering and braking power of the tractor. The driving characteristics also depend on the operating condition, the fill level of the load, and on the ground. If the driver does not take account of changing driving characteristics, he can cause accidents.

- ▶ Always ensure that the tractor's steering and braking systems are operating correctly.
- ▶ *The tractor must provide the required brake lag for the tractor and mounted implement.*
Check the function of the brakes before moving off.
- ▶ *The tractor front axle must always be loaded with at least 20 % of the empty tractor weight to ensure sufficient steering power.*
Use front ballast weights if necessary.
- ▶ Always attach the front or rear ballast weights properly on the specified fixing points.
- ▶ Calculate and observe the permitted payload for the mounted or towed implement.
- ▶ Observe the permissible axle loads and drawbar loads of the tractor.
- ▶ Observe the permissible drawbar load of the hitch device and drawbar.
- ▶ Drive in such a way that you always have full control over the tractor with the mounted or towed implement. In so doing, take your personal abilities into account, as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor, and the influence of the mounted implement.

When driving on roads, risk of accident caused by uncontrolled lateral motions of the implement

- ▶ Lock the tractor lower links for road travel.

Preparing the machine for road travel

If the machine is not properly prepared for road travel, it can result in serious traffic accidents.

- ▶ Check the lighting and identification for road travel for proper function.
- ▶ Remove coarse dirt from the implement.
- ▶ Follow the instructions in the section "Preparing the implement for road travel".

Parking the implement

The parked machine can tip over. People can be crushed and killed.

- ▶ Only park the machine on stable and even ground.
- ▶ *Before you perform setting or maintenance work,*
make sure that the implement is in a stable position. In case of doubt, support the implement.
- ▶ Follow the instructions in the section "*Parking the implement*".

Unsupervised parking

Parked tractors with coupled implements that are insufficiently secured and unsupervised represent danger for people and playing children.

- ▶ *Before you leave the machine,*
shutdown the tractor and the implement.
- ▶ Secure the tractor and machine.

2.1.5 Safe maintenance and modification

CMS-T-00006617-E.1

2.1.5.1 Changes on the implement

CMS-T-00006619-B.1

Only authorised design changes

Design changes and extensions can impede the functioning and operational safety of the implement. This can result in serious injury or death.

- ▶ Have any design changes and extensions performed only by a qualified specialist workshop.
- ▶ *To ensure that the operating permit remains valid in accordance with national and international regulations:*
Ensure that the specialist workshop only uses conversion parts, spare parts and special equipment approved by SCHMOTZER.

2.1.5.2 Work on the machine

CMS-T-00002323-I.1

Only work on the machine when it is at a standstill

If the machine is not standing still, part can move unintentionally or the machine can be set in motion. This can result in serious injury or death.

- ▶ *If you have to work on or under raised loads:*
Lower the loads or secure the loads with a hydraulic or mechanical locking device.
- ▶ Switch off all drives.
- ▶ Actuate the parking brake.
- ▶ Particularly on slopes, additionally secure the machine against rolling away with wheel chocks.
- ▶ Remove the ignition key and carry it with you.
- ▶ Wait until all parts that are still running come to a stop and that hot parts cool down.

Maintenance work

Improper maintenance work, particularly on safety-related components, endangers operational safety. This can result in accidents and serious personal injury or even death. Safety-related components include, for example, hydraulic components, electronic components, frames, springs, trailer coupling, axles and axle suspensions, lines and tanks containing flammable substances.

- ▶ *Before you adjust, maintain or clean the machine,*
secure the machine.
- ▶ Repair the machine according to this operating manual.
- ▶ Only perform the work that is described in this operating manual.
- ▶ Have maintenance work that is labelled as "*WORKSHOP WORK*" performed at a workshop that is adequately equipped in terms of agricultural technology, safety and environmental technology by specialist personnel with appropriate training.
- ▶ Never perform welding, drilling, sawing, grinding, and cutting work on the frame, running gear or coupling devices of the implement.
- ▶ Never modify safety-related components.
- ▶ Never drill out existing holes.
- ▶ Perform all maintenance work at the prescribed maintenance intervals.

Raised implement parts

Raised implement parts can descend unintentionally and crush or kill people.

- ▶ Never linger under raised implement parts.
- ▶ *If you have to work on or under raised machine parts,*
lower the implement parts or secure the raised implement parts with a mechanical support or hydraulic locking device.

Danger due to welding work

Improper welding work, particularly on or close to safety-related components, endangers the operational safety of the implement. This can result in accidents and serious personal injury or even death. Safety-related components include, for example, hydraulic components and electronic components, frames, springs, coupling devices to the tractor such as the three-point mounting frame, drawbar, trailer support, trailer coupling or tensioned crosspiece as well as axles and axle suspensions, lines and tanks containing flammable substances.

- ▶ Allow only qualified specialist workshops with suitably approved personnel to perform welding work on safety-related components.
- ▶ Only allow qualified personnel to perform welding work on all other components.
- ▶ *If you have doubts as to whether a component can be welded:*
Ask a qualified specialist workshop.
- ▶ *Before welding on the implement:*
Uncouple the implement from the tractor.
- ▶ Do not weld close to a crop protection sprayer that was previously used to spread liquid fertiliser.

2.1.5.3 Operating materials

CMS-T-00006618-B.1

Unsuitable operating materials

Operating materials that do not meet SCHMOTZER requirements can cause implement damage and accidents.

- ▶ Only use operating material that meet the requirements in the Technical Data.

2.1.5.4 Special equipment and spare parts

CMS-T-00006620-B.1

Special equipment, accessories, and spare parts

Special equipment, accessories, and spare parts that do not meet SCHMOTZER requirements can impede the operational safety of the implement and cause accidents.

- ▶ Only use original parts or parts that meet SCHMOTZER requirements.
- ▶ *If you have any questions regarding special equipment, accessories or spare parts:*
Contact your dealer or SCHMOTZER.

2.2 Safety routines

CMS-T-00002300-D.1

Securing the tractor and implement

If the tractor and implement are not secured against unintentional starting and rolling away, the tractor and implement can be set in motion in an uncontrolled manner, and can run over, crush and kill people.

- ▶ Lower the raised implement or raised implement parts.
- ▶ Relieve pressure in the hydraulic hose lines by actuating the operating devices.
- ▶ *If you have to stand under the raised implement or components,* secure the raised implement and components against lowering with a mechanical safety support or hydraulic locking device.
- ▶ Switch off the tractor.
- ▶ Apply the tractor's parking brake.
- ▶ Remove the ignition key.

Securing the machine

After uncoupling, the implement has to be secured. If the implement and implement parts are not secured, there is a risk of personal injury due to crushing and cutting.

- ▶ Only park the implement on stable and level ground.
- ▶ *Before you depressurise the hydraulic hose lines and disconnect them from the tractor,* move the implement into working position.
- ▶ Protect people against direct contact with sharp-edged or protruding implement parts.

Make sure that the protective equipment is functional

If protective equipment is missing, damaged or removed, implement parts can cause serious personal injury or even death.

- ▶ Check the implement at least once a day for damage, proper installation, and functioning of the protective equipment.
- ▶ *If you are not sure if the protective equipment is properly installed and functional,* have the protective equipment checked by a qualified specialist workshop.
- ▶ Make sure that the protective devices are properly installed and functional before any work on the implement.
- ▶ Replace damaged protective equipment.

Climbing on and off

Negligent behaviour while climbing on and off can cause people to fall off the ladder. People who climb onto the implement without using the intended access steps can slip, fall, and suffer severe injury. Dirt and operating materials can impair stepping and standing safety. Accidental actuation of control elements can unintentionally activate potentially dangerous functions.

- ▶ Use only the intended access steps.
- ▶ *To ensure safe stepping and standing:*
Always keep steps and platforms clean and in proper condition.
- ▶ *When the implement is moving:*
Never climb onto or off of the implement.
- ▶ Climb up and down facing the implement.
- ▶ When climbing up and down, maintain contact with at least 3 points on the steps and handrails: always keep 2 hands and one foot or 2 feet and one hand on the implement.
- ▶ When climbing up and down, never hold onto the control elements.
- ▶ When climbing down, never jump off of the implement.

Intended use

3

CMS-T-00010662-B.1

- The implement is intended solely for professional use for soil tillage on agricultural crop lands according to Good Agricultural Practices.
- The implement is an agricultural implement to be mounted on the front three-point power lift of a tractor that meets the technical requirements.
- The implement is suitable and intended for mechanical removal of weeds and grasses between and on the plant rows of crops such as cereals, turnips, maize or vegetables.
- The implement is suitable and intended for burying and exposing weeds or grasses between and on the plant rows of crops such as cereals, turnips, maize or vegetables.
- The implement is used for the cultivation and growth promotion of crops by loosening the soil between and on the plant rows and allowing it to absorb more air and water.
- The implement is used for the cultivation and growth promotion of crops by ridging the soil on the plant rows and providing the plants with additional warmth and growth stimulus.
- For driving on public roads, depending on the provisions of the applicable road traffic regulations, the implement can be mounted and transported at the front of a tractor that meets the technical requirements.
- The implement may be used and maintained only by persons who meet the requirements. The personnel requirements are described in the section "*Personnel qualification*".
- The operating manual is part of the implement. The implement is solely intended for use in compliance with this operating manual. Uses of the implement that are not described in this operating manual can lead to serious personal injuries or even death and to implement and material damage.
- The applicable accident prevention regulations as well as generally accepted safety-related, occupational health and road traffic regulations must also be observed by the users and the owner.

- Further instructions for intended use in special cases can be requested from SCHMOTZER.
- Uses other than those specified under the intended use are considered as improper. The manufacturer is not liable for any damage resulting from improper use, solely the operator is responsible.

Product description

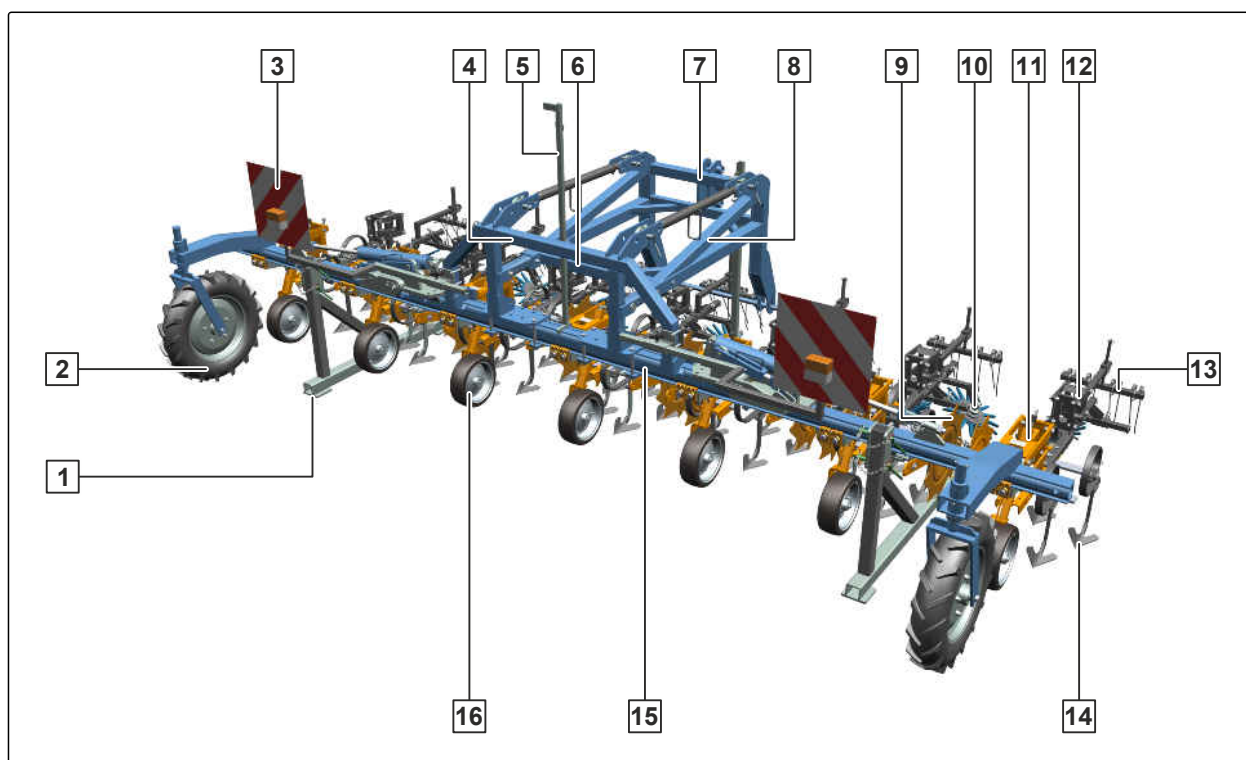
4

CMS-T-00010647-B.1

4.1 Implement overview

CMS-T-00010654-B.1

The basic implement consists of a front-mounting carrier with three-point mounting frame, a rigid or mechanically or hydraulically folding implement slide rail, and hoe units. A hoe unit, also called a parallelogram, works between two plant rows. The parallelograms carry hoeing tools such as hoe shares, hoeing chisels, spring tines or spring hoe tines. Additional finger hoes, row protection elements, ridging tools, ridge cutting discs and harrows are installed if necessary. Depending on the requirements, the implement can be fitted with special equipment.



CMS-I-00007437

1 Parking support

2 Support wheel

- | | |
|--|---|
| 3 Lighting and identification for road travel | 4 Rating plate on the implement |
| 5 Lifting rod for mechanically lifting parallelograms | 6 Section Control parallelograms |
| 7 Three-point mounting frame | 8 Front-mounting carrier |
| 9 Hoe protection disc or row protection panel | 10 Finger hoe or ridging disc or roller harrow |
| 11 Parallelogram | 12 Star parallelogram |
| 13 Tine weeder | 14 Hoeing tool |
| 15 Implement slide rail | 16 Guide wheel |

4.2 Function of the implement

CMS-T-00010652-B.1

The front-mounting carrier with three-point mounting frame connects the implement to the tractor and carries the lighting and identification for road travel.

The rigid or folding implement slide rail carries the front-mounting carrier with three-point mounting frame, the parking supports, and the support wheels. The implement slide rail also carries the hoe units, which consist of the parallelograms and various special equipment. The implement slide rail also carries certain versions of the hoe protection discs.

The parallelograms precisely guide the depth of the hoeing tools.

The hoeing tools on the parallelograms cut the weeds just below the soil surface and deposit them at the surface to desiccate.

When cultivating ridge crops, the ridge cutting discs shave off the weeds on the flanks of the ridges.

The hoe protection discs or row protection panels prevent the crops from being damaged or buried when hoeing.

The finger hoes remove weeds on the crop rows.

The ridging tools pile up the soil on the crop plant rows, taking away the light that the weeds require to grow and providing the crops with additional warmth and growth stimulus. When cultivating ridge crops, the ridging discs and the share ridgers build up the ridges after the ridge cutting discs have shaved off the weeds.

The harrows crumble the soil and deposit cut-off plant residues on the soil surface.

4.3 Special equipment

CMS-T-00010653-B.1

Special equipment is equipment that is not fitted on the implement or is only available in certain markets. The sales documents provide information on the equipment of your implement, or consult your dealer for more detailed information.

The following equipment is considered special equipment:

- Lighting and identification for road travel
- Parking supports
- Section Control parallelograms
- RAPIDO duckfoot share
- RapidoClip duckfoot shares
- Rotavator blade
- Hoeing chisel
- Spring tine hoe set
- Spring hoe tine with share
- Hoe protection discs
- Row protection panels
- Star parallelograms
- Finger hoes
- Ridging discs
- Shallow ridger
- Share ridgers
- Ridge cutting discs
- Tine weeder
- Roller harrow
- Toolbox
- Share bracket

4.4 Warning symbols

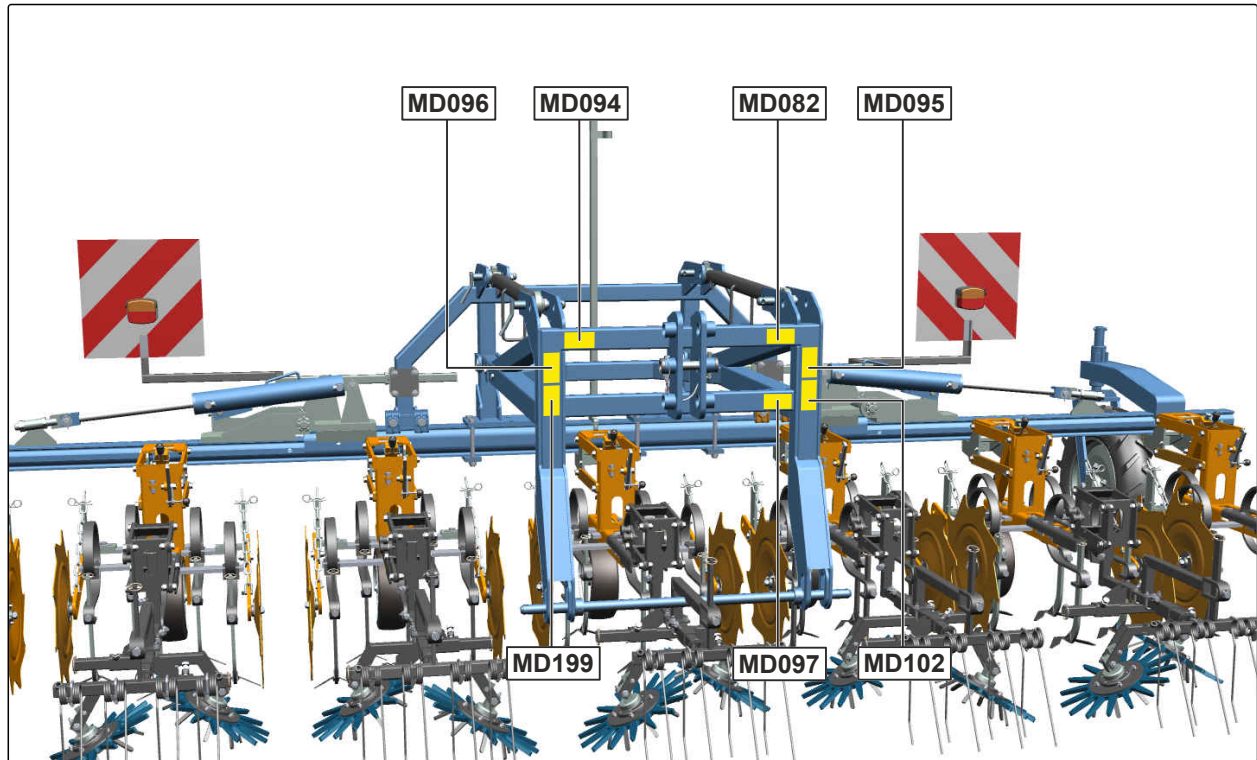
CMS-T-00010649-B.1

4.4.1 Positions of the warning symbols

CMS-T-00010650-A.1

4.4.1.1 Implement with front-mounting carrier VB6

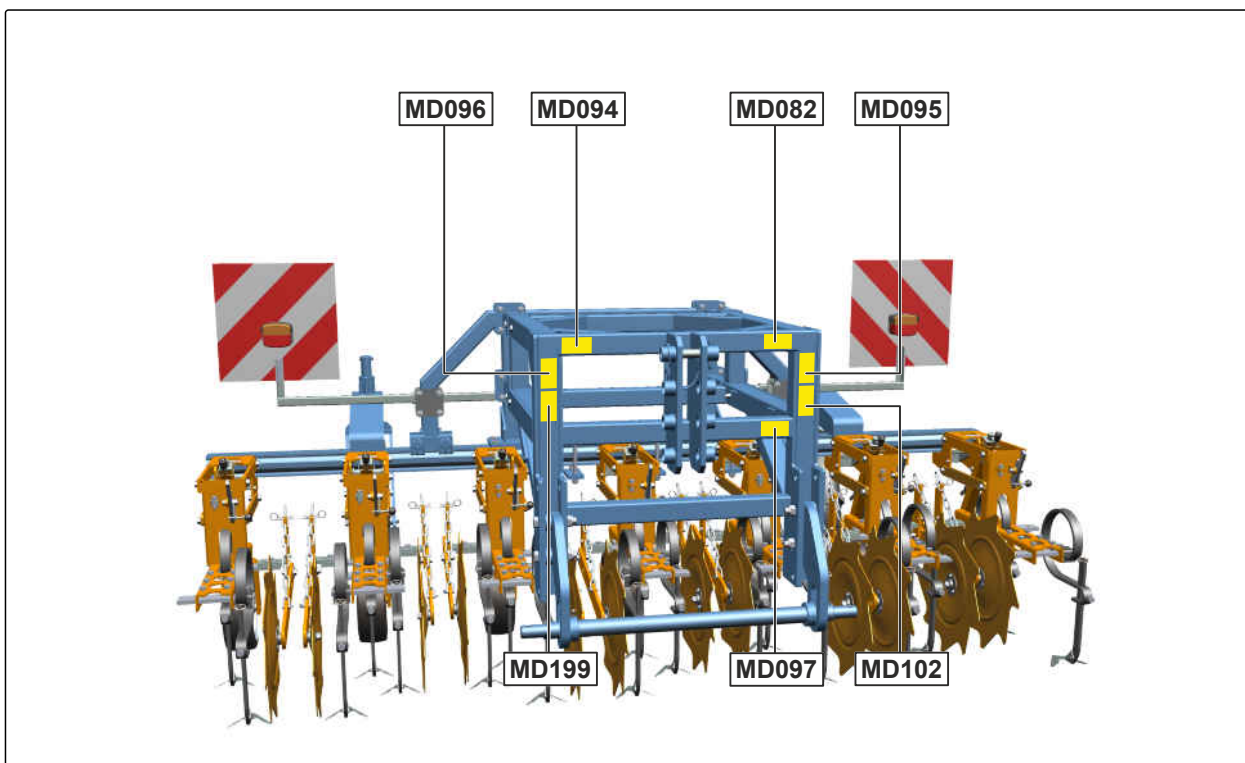
CMS-T-00011815-A.1



CMS-I-00007664

4.4.1.2 Implement with front-mounting carrier VB10

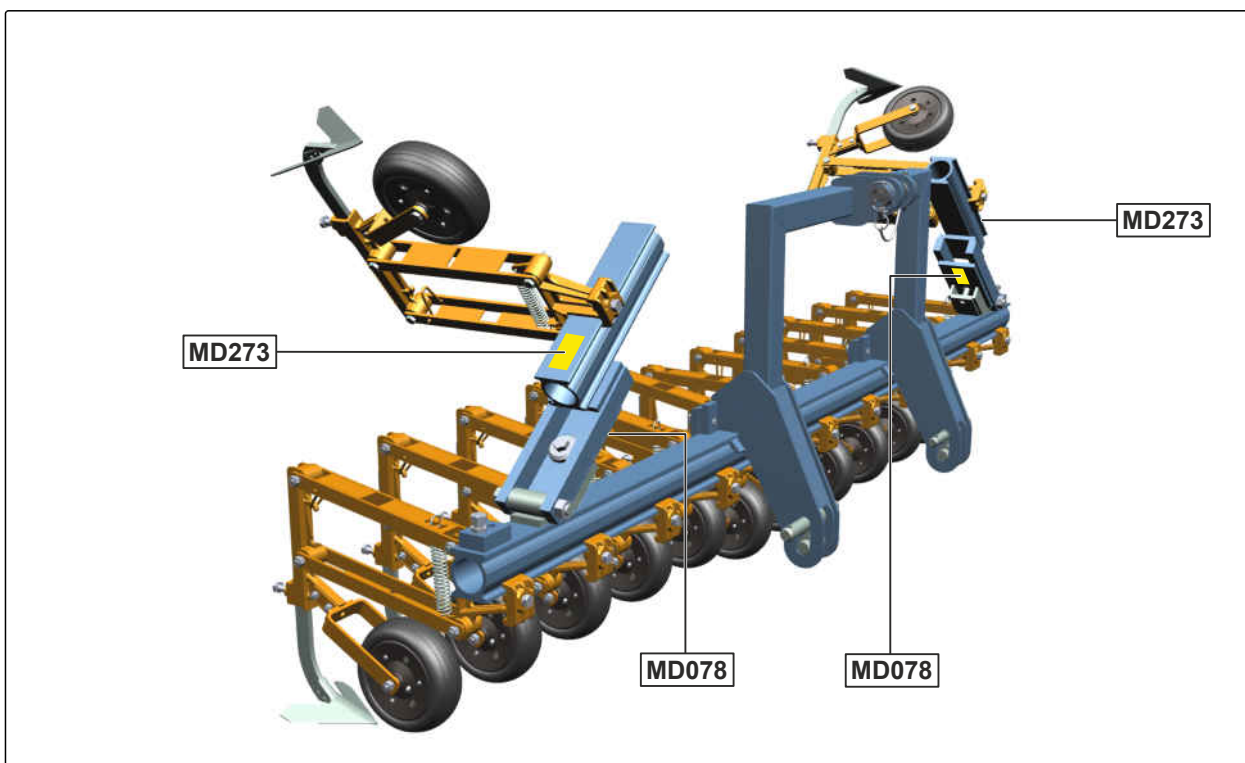
CMS-T-00011835-A.1



CMS-I-00007665

4.4.1.3 Implement with mechanical folding of the implement slide rails

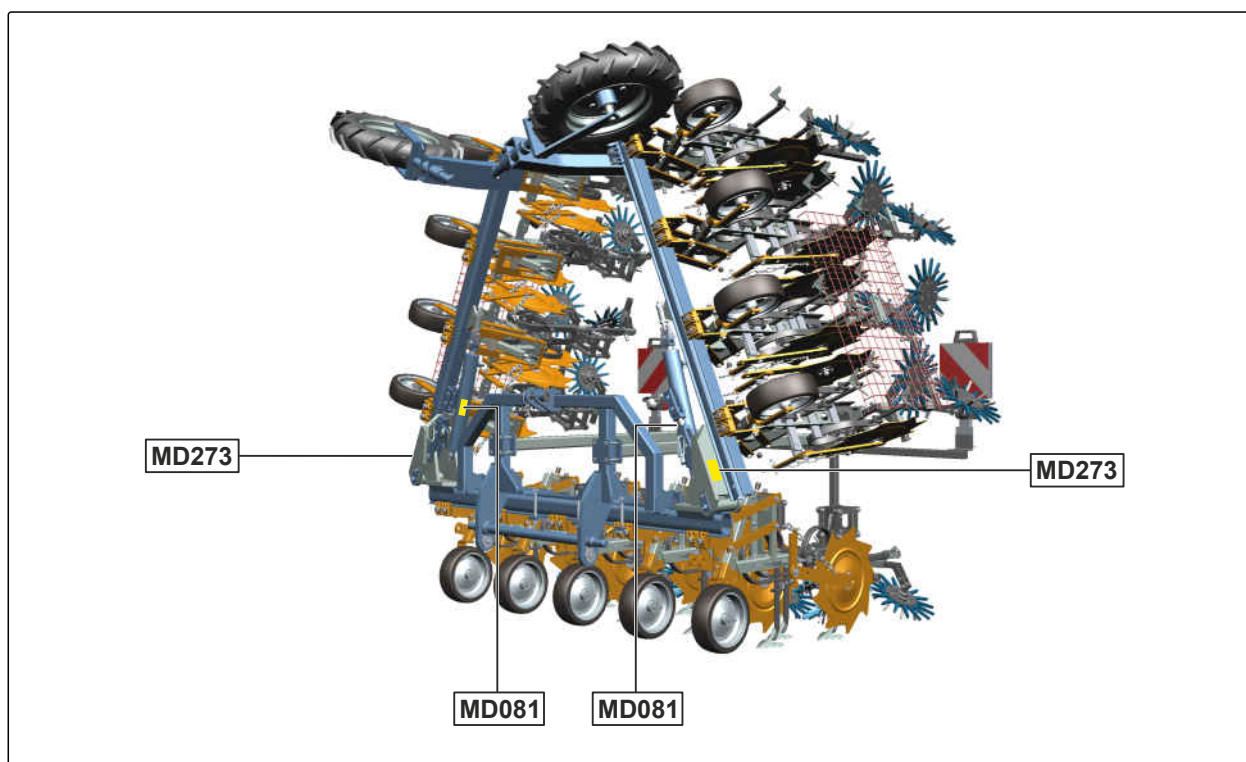
CMS-T-00010534-A.1



CMS-I-00007213

4.4.1.4 Implement with single hydraulic folding of the implement slide rails

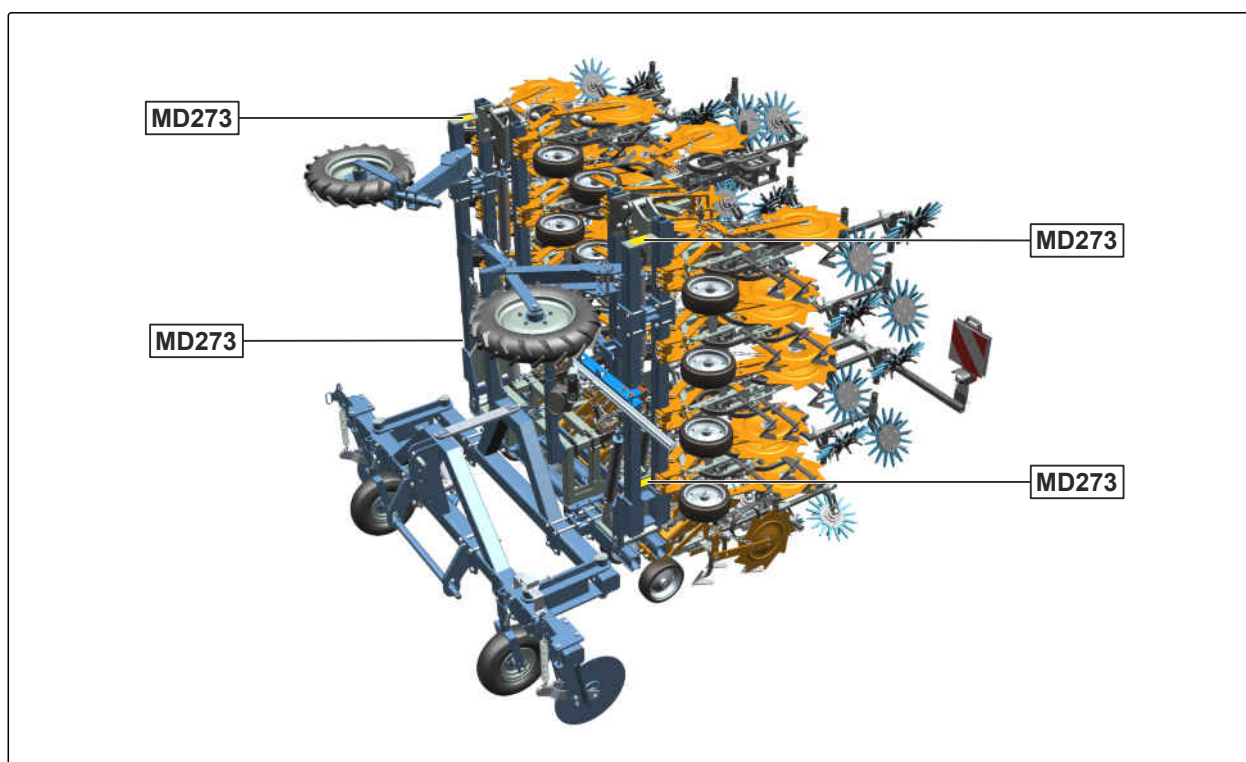
CMS-T-00010532-A.1



CMS-I-00007215

4.4.1.5 Implement with double hydraulic folding of the implement slide rails

CMS-T-00010533-A.1



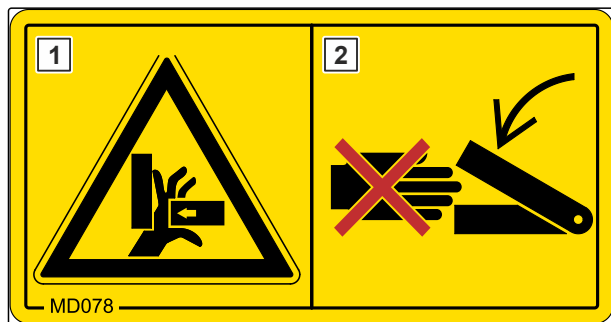
CMS-I-00007216

4.4.2 Layout of the warning symbols

Warning symbols indicate danger areas on the machine and warn against residual dangers. In these danger areas, there are permanent or unexpected dangers.

A warning symbol consists of two fields:

- Field **1** shows the following:
 - A pictogram depicting the danger area, surrounded by triangular safety symbol
 - The order number
- Field **2** shows a pictogram depicting how to avoid the danger.

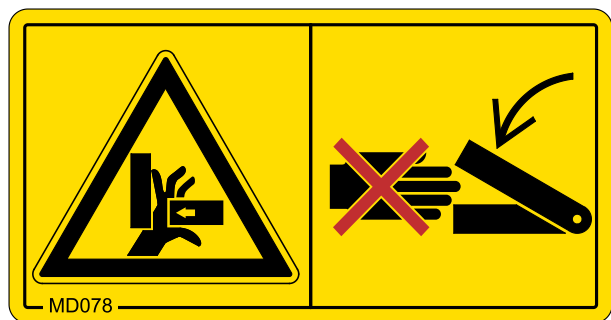


4.4.3 Description of the warning symbols

MD 078

Risk of crushing fingers or hands

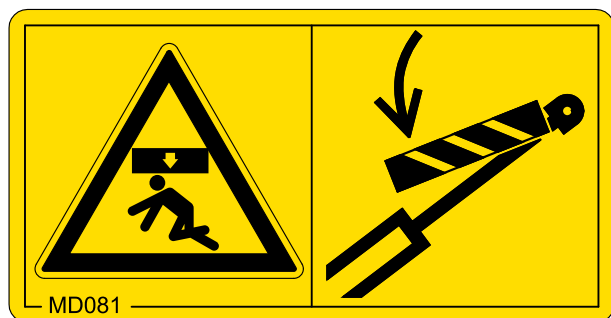
- *As long as the tractor engine or implement motor is running,*
stay away from the danger area.
- *If you have to move marked parts with your hands,*
pay attention to the crushing areas.
- Make sure that there is nobody standing in the danger area.



MD 081

Risk of crushing due to lowering implement parts

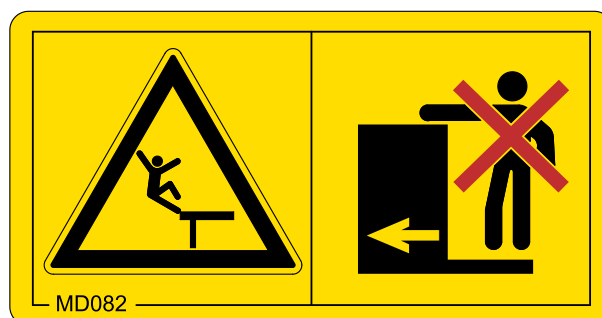
- *Before entering the danger area,*
secure raised machine parts with a hydraulic or mechanical locking device.



MD 082

Risk of falling from tread surfaces and platforms

- ▶ Do not let anybody ride on the implement.
- ▶ Do not let anybody climb onto the driving implement.

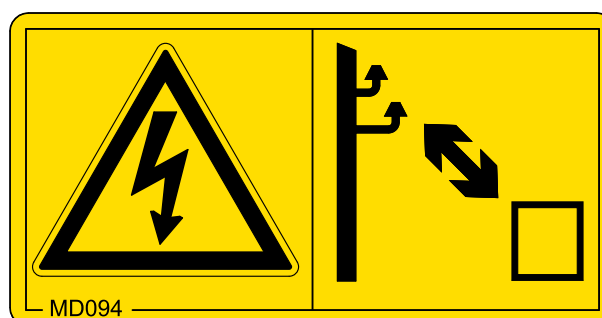


CMS-I-000081

MD094

Danger due to transmission lines

- ▶ Never touch transmission lines with the implement.
- ▶ Maintain an adequately safe distance from electrical transmission lines, especially when folding or unfolding implement parts.
- ▶ Please note that the voltage can flash over when the distance is too small.



CMS-I-000692

MD095

Risk of accident due to non-compliance with the instructions in this operating manual

- ▶ Before your work on or with the implement, read and understand the operating manual.



CMS-I-000138

MD 096

Risk of infection from escaping hydraulic fluid under high pressure

- ▶ Never look for leaks in hydraulic hose lines using your hand or fingers.
- ▶ Never attempt to plug leaks in hydraulic hose lines using your hand or fingers.
- ▶ *If you are injured by hydraulic oil, consult a doctor immediately.*

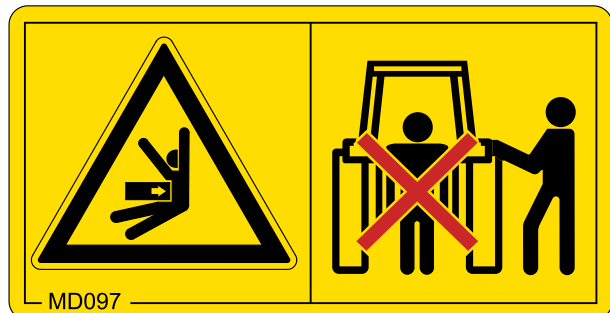


CMS-I-000216

MD 097

Risk of crushing between the tractor and the implement

- ▶ *Before you actuate the tractor hydraulic system, instruct persons away from the area between the tractor and the implement.*
- ▶ Actuate the tractor hydraulic system only from the designated work station.



CMS-I-000139

MD 102

Risk due to unintentional starting and rolling away of the machine

- ▶ Before performing any work, secure the implement against unintentional starting and rolling away.

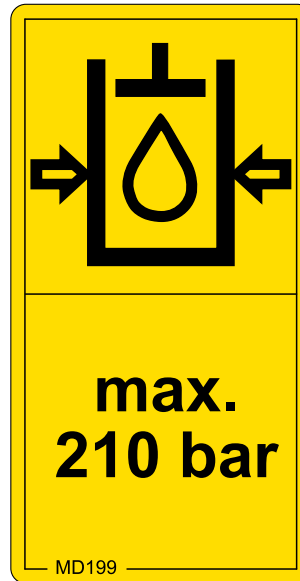


CMS-I-00002253

MD 199

Risk of accident if the hydraulic system pressure is too high

- Only couple the implement to tractors with a maximum tractor hydraulic pressure of 210 bar.

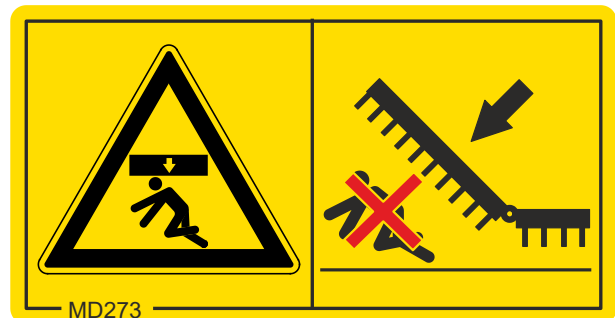


CMS-I-00000486

MD 273

Risk of crushing for the whole body from lowering implement parts

- Make sure that there is nobody standing in the danger area.

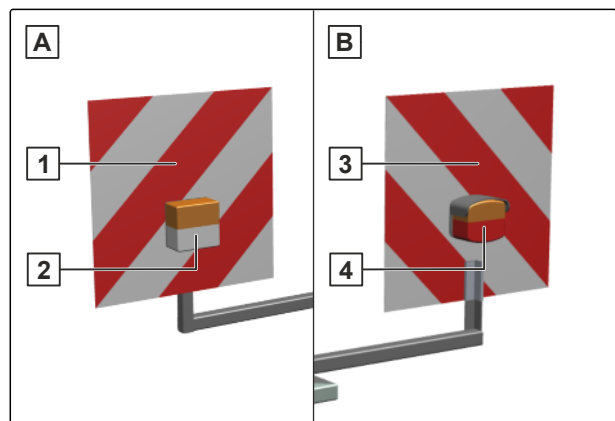


CMS-I-00004833

4.5 Lighting and identification for road travel

CMS-T-00010905-A.1

- A** Warning sign with lights, front side
- 1** Warning sign
- 2** Turn indicator yellow, marker light white
- B** Warning sign with lights, rear side
- 3** Warning sign
- 4** Turn indicator yellow, tail light red, brake light red



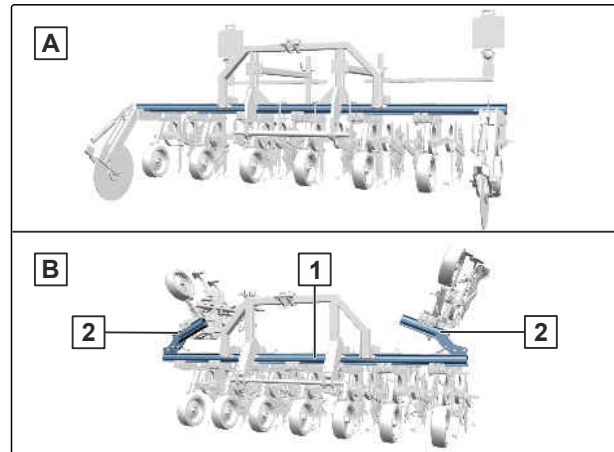
CMS-I-00007576

4.6 Implement slide rail

CMS-T-00010648-B.1

The implement slide rail is either **A** rigid and made of a profile tube or consists **B** of a rigid profile tube and one or several folding parts. Folding implement slide rails are folded either mechanically or hydraulically.

Mechanically folding implement slide rails consist of a rigid profile tube **1** and one or two folding sections **2**.

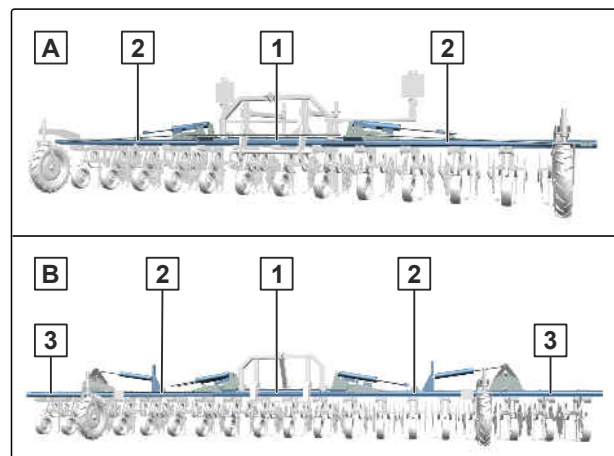


CMS-I-00007115

Hydraulically folding implement slide rails either have **A** single or **B** double folding. Implement slide rails with single hydraulic folding consist of a centre profile tube **1** and two folding sections **2**. Implement slide rails with double hydraulic folding consist of a centre profile tube **1** and two folding sections **2**, each of which carries a folding section extension **3**.

The following components are attached to the implement slide rail:

- Support wheels
- Parking supports
- Front-mounting carrier with three-point mounting frame
- Hoe units
- Hoe protection discs HS 85, HS 62, HSZ, HSR, and HSU



CMS-I-00007116

4.7 Section Control parallelograms

CMS-T-00009536-A.1

For implements with Section Control and hydraulically lifting parallelograms, Section Control regulates the parallelograms electronically through the lowering and lifting of the hoe units controlled by the ISOBUS software.



CMS-I-00007141

4.8 Hoeing tools

CMS-T-00010461-B.1

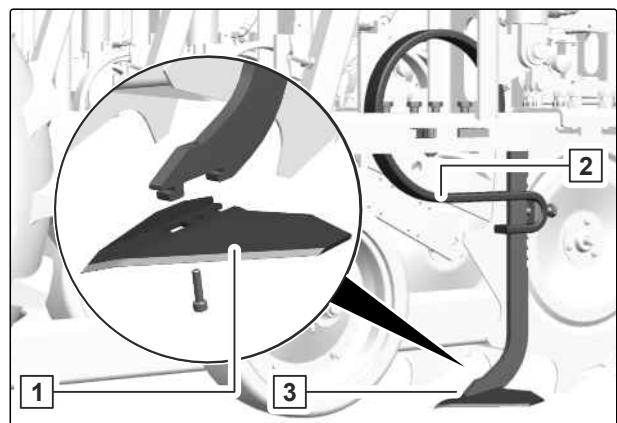
4.8.1 Hoe share

The hoe shares **3** cut the weeds between the plant rows just below the soil surface and deposit them at the surface to desiccate. The hoe shares are installed on the parallelograms either directly rigidly or indirectly with Vibro springs **2**.

Shares installed on the Vibro springs expose the weeds even more effectively than rigid mounted shares thanks to the vibrating effect of the springs. The Vibro springs enable more uniform hoeing and are more gentle on the roots and capillary water than rigid mounting. The Vibro springs maintain a precise working depth for the hoe shares and automatically adjust the best penetration angle for the hoe shares.

On the duckfoot shares, the share blade and shaft are firmly riveted together. In case of replacement, a new share plate is riveted into the old shaft.

With the Rapido duckfoot shares, the Rapido quick-change system **1** enables quick share replacement, since only the share plates that are fastened to the shaft with one single hexagon socket screw are replaced. Only one tool is required to loosen the bolts.

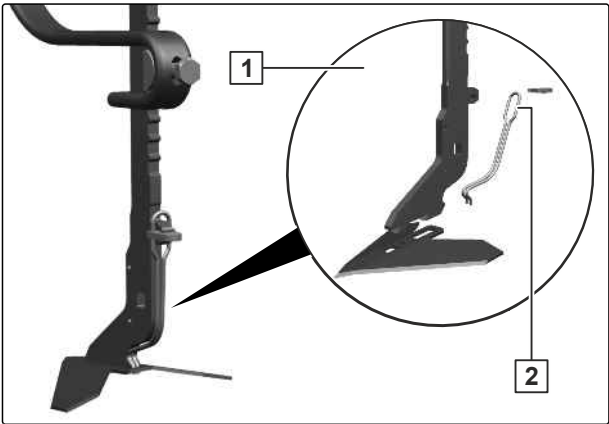


CMS-I-00004558






4 | Product description
Hoeing tools

With the Rapido-Clip duckfoot shares, the Rapido-Clip quick-change system **1** enables super easy share replacement within a very short time, since only the share plates that are clamped to the shaft with the Rapido-Clip **2** are replaced, and no tools are required.

The Rotavator blades work directly on the plant row. The one-sided blade guides the flow of soil away from the plant row.





CMS-I-00008658

Duckfoot share	RAPIDO duckfoot share	RapidoClip duckfoot shares	Rotavator blade, left	Rotavator blade, right
				
Share widths 80 mm, 100 mm, 120 mm, 140 mm, 160 mm, 180 mm, 200 mm, 240 mm, 300 mm, 340 mm, 380 mm	Share widths 80 mm, 100 mm, 120 mm, 300 mm, 340 mm, 380 mm	Share widths 140 mm, 160 mm, 180 mm, 200 mm, 240 mm	Share widths 120 mm, 140 mm, 160 mm, 180 mm	

4.8.2 Hoeing chisel

CMS-T-00010467-A.1

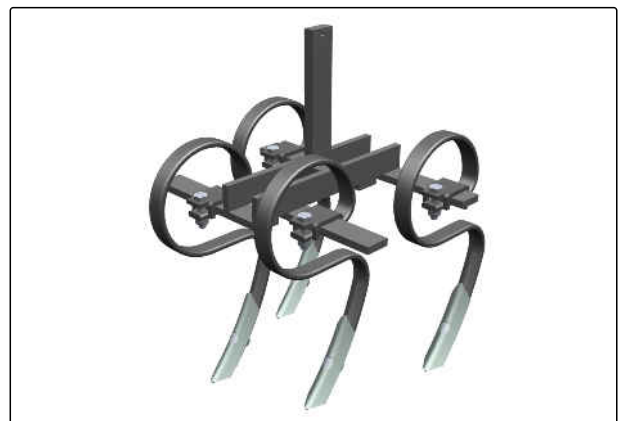
With narrow row spacings, the hoeing chisels are used in the connecting rows and can break up hard soils.

Hoeing chisel 30 x 10 x 400 mm	Hoeing chisel 35 x 15 x 520 mm
	

4.8.3 Spring tine hoe set

During hoeing operation, the spring tine hoe set simultaneously incorporates organic material into the soil. The spring tine hoe set can also be used in the rows for seedbed preparation.

CMS-T-00010471-A.1



CMS-I-00007131

4.8.4 Spring hoe tine with share

The spring hoe tines with shares are used on very stony soils instead of duckfoot shares on Vibro springs.

CMS-T-00010472-A.1



CMS-I-00007132

4.9 Rating plate on the implement

CMS-T-00006401-C.1

- 1 Year of manufacture
- 2 Implement number
- 3 Product
- 4 Model year
- 5 Permissible technical implement weight



Technical data

5

CMS-T-00010655-C.1

5.1 Dimensions

CMS-T-00010657-A.1

Working width, depending on the number of rows and row spacing	55 cm to 9 m
Transport width	< 3 m
Total length	1.22 m
Total length with finger hoes or ridging discs	1.49 m
Total length with finger hoes or ridging discs and harrows	1.89 m
Centre of gravity distance (a_2), depending on the equipment, e.g. number of rows, row spacing, finger hoes, ridging discs and tines	61.6 cm to 95.7 cm
Implement height for road transport	< 4 m

5.2 Hoeing tools

CMS-T-00005401-B.1

Working depth	5 mm to 4 cm
Optimal working depth	2 cm to 3 cm

5.3 Permitted mounting categories

CMS-T-00010656-B.1

Three-point mounting frame in the front-mounting carrier	Category 2 and Category 3N
--	----------------------------

5.4 Forward speed

CMS-T-00005405-B.1

Optimal working speed	1.5 km/h to 15 km/h
Permissible transport speed	60 km/h

5.5 Performance characteristics of the tractor

CMS-T-00005400-B.1

Engine rating	
Depending on the implement equipment, number of rows and row spacing: 30 hp to 200 hp	

Electrical system	
Battery voltage	12 V
Lighting socket	7-pin

Hydraulic system	
Maximum operating pressure	210 bar
Tractor pump output	Without Section Control: at least 25 l/min at 150 bar
	With Section Control: at least 40 l/min at 150 bar
Implement hydraulic oil	HLP 68 DIN 51524-2 The hydraulic fluid is suitable for the combined hydraulic fluid circuits of all standard tractor brands.

5.6 Noise development data



CMS-T-00002296-D.1



The workplace-related emission sound pressure level is lower than 70 dB(A), measured in operating condition at the ear of the tractor driver with the cab closed.

The emission sound pressure level mainly depends on the vehicle used.

5.7 Drivable slope inclination

CMS-T-00006026-B.1

Across the slope		
On left in direction of travel	10 %	
On right in direction of travel	10 %	

Up the slope and down the slope		
Up the slope	15 %	
Down the slope	15 %	

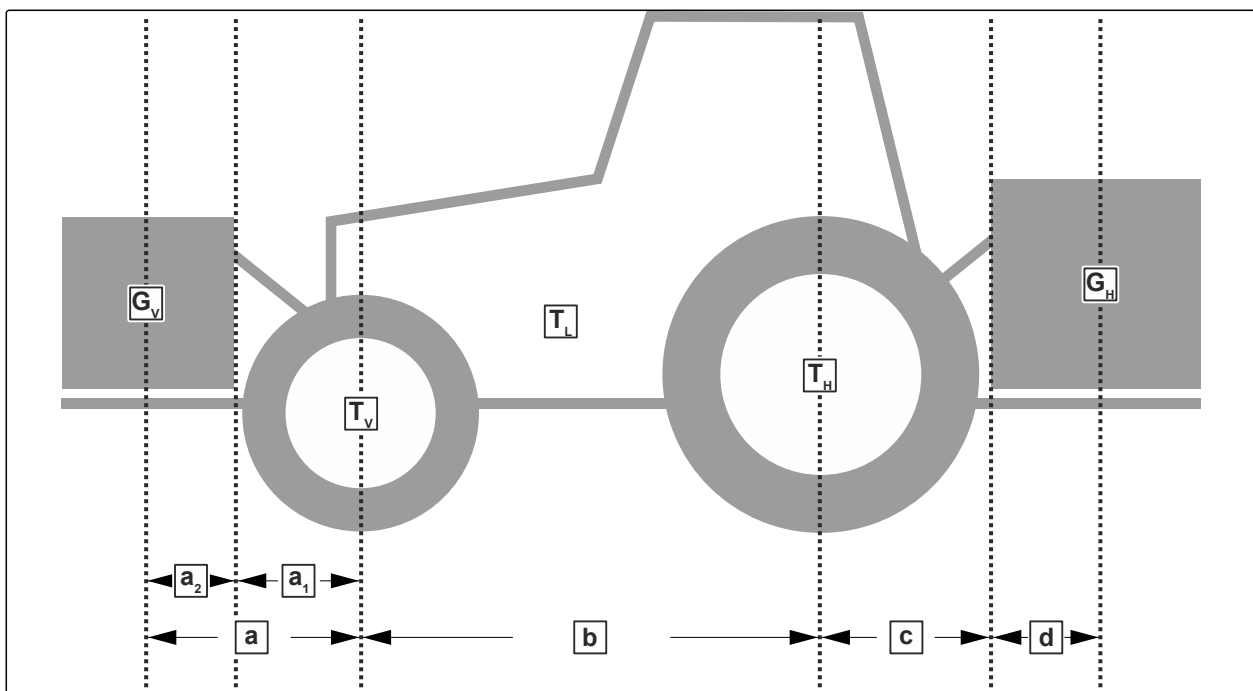
Preparing the machine

6

CMS-T-00010666-B.1

6.1 Calculating the required tractor characteristics

CMS-T-00000063-F.1



CMS-I-00000581

Designation	Unit	Description	Calculated values
T_L	kg	Tractor empty weight	
T_V	kg	Front axle load of the operational tractor without mounted implement or ballast weights	
T_H	kg	Rear axle load of the operational tractor without mounted implement or ballast weights	
G_V	kg	Total weight of front-mounted implement or front ballast	
G_H	kg	Permissible total weight of rear-mounted implement or rear ballast	
a	m	Distance between the centre of gravity of the front-mounted implement or the front ballast and the centre of the front axle	

6 | Preparing the machine

Calculating the required tractor characteristics

Designation	Unit	Description	Calculated values
a_1	m	Distance between the centre of the front axle and the centre of the lower link connection	
a_2	m	Centre of gravity distance: Distance between the centre of gravity of the front-mounted implement or the front ballast and the centre of the lower link connection	
b	m	Wheelbase	
c	m	Distance between the centre of the rear axle and the centre of the lower link connection	
d	m	Centre of gravity distance: Distance between the centre of the lower link coupling point and centre of gravity of the rear-mounted implement or rear ballast.	

1. Calculate the minimum front ballasting.

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

$$G_{Vmin} = \underline{\hspace{2cm}}$$

$$G_{Vmin} = \underline{\hspace{2cm}}$$

CMS-I-00000513

2. Calculate the actual front axle load.

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

$$T_{Vtat} = \underline{\hspace{2cm}}$$

$$T_{Vtat} = \underline{\hspace{2cm}}$$

CMS-I-00000516

3. Calculate the actual total weight of the tractor-implement combination.

$$G_{tat} = G_V + T_L + G_H$$
$$G_{tat} =$$
$$G_{tat} =$$


CMS-I-00000515

4. Calculate the actual rear axle load.

$$T_{Htat} = G_{tat} - T_{Vtat}$$
$$T_{Htat} =$$
$$T_{Htat} =$$

CMS-I-00000514

5. Determine the tyre load capacity for two tractor tyres in the manufacturer specifications.
6. Write down the determined values in the following table.

**IMPORTANT**

Danger of accident due to implement damage caused by excessive loads

► Make sure that the calculated loads are smaller or equal to the permissible loads.

	Actual value according to calculation			Permitted value according to tractor operating manual			Tyre load capacity for two tractor tyres	
Minimum front ballasting		kg	≤		kg		-	-
Total weight		kg	≤		kg		-	-
Front axle load		kg	≤		kg	≤		kg
Rear axle load		kg	≤		kg	≤		kg

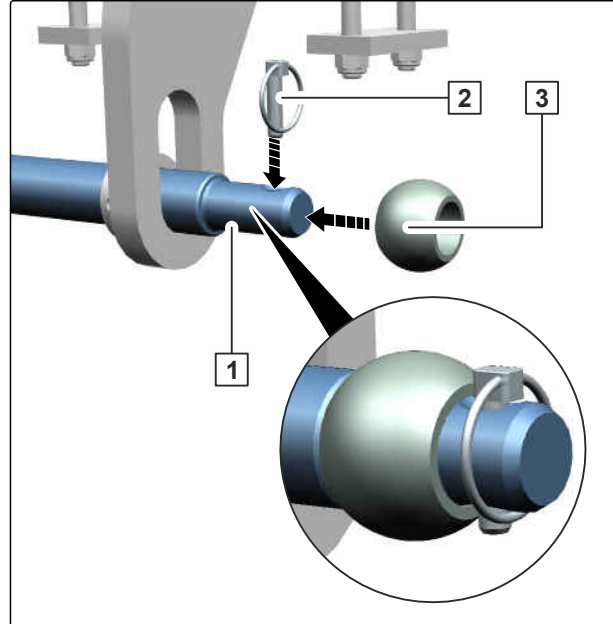
6.2 Coupling the implement

CMS-T-00010668-B.1

6.2.1 Attaching the lower link ball sleeves

CMS-T-00005636-B.1

1. On the three-point mounting frame, put the ball sleeve **3** on the lower link shaft **1** or lower link pin.
2. Secure the ball sleeve with a linch pin **2**.
3. Attach the ball sleeve on the other side of the three-point frame in the same way.

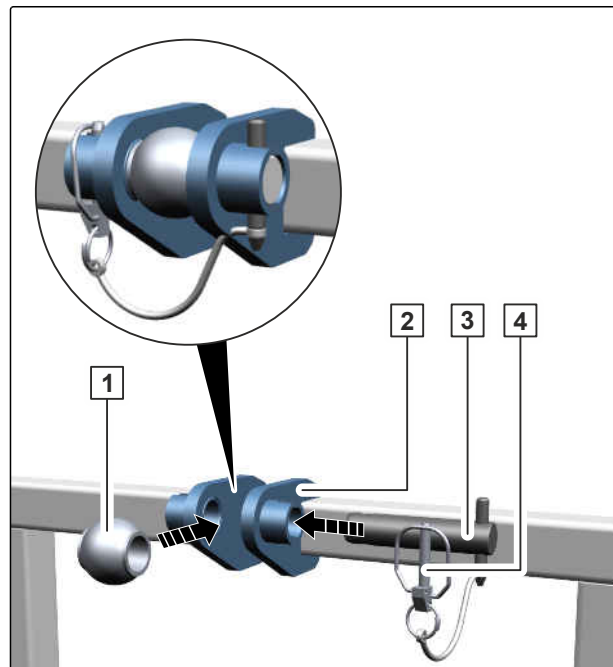


CMS-I-00003983

6.2.2 Attaching the top link ball sleeve

CMS-T-00005638-B.1

1. On the three-point mounting frame, fix the ball sleeve **1** with the top link pin **3** in the mount **2**.
2. Secure the top link pin with a linch pin **4**.



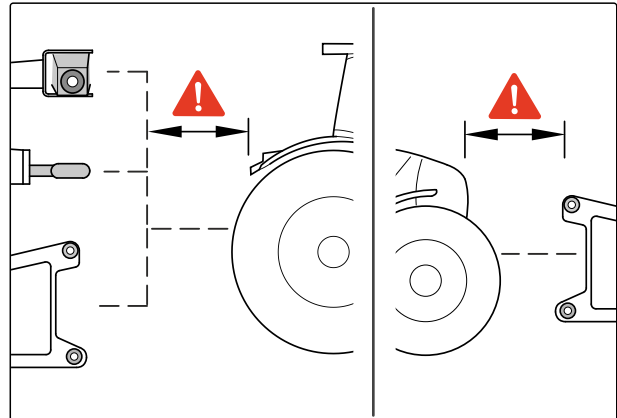
CMS-I-00004028

6.2.3 Driving the tractor towards the implement

CMS-T-00005794-D.1

Enough space must remain between the tractor and implement so that the supply lines can be coupled without obstructions.

- Drive the tractor towards the implement, leaving a sufficient distance.



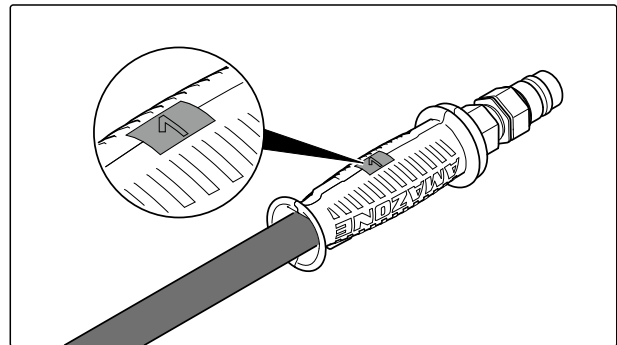
CMS-I-00004045

6.2.4 Coupling the hydraulic hose lines

CMS-T-00000276-H.1


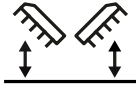



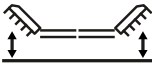



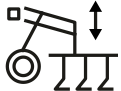


All hydraulic hoses are equipped with handles. The handles have colour markings with a code number or a code letter. The markings are assigned to the respective hydraulic functions of the pressure line of a tractor control unit. Stickers are applied on the implement for the markings, which illustrate the respective hydraulic functions.

The tractor control unit is used with different types of actuation, depending on the hydraulic function:



CMS-I-00000121

Type of actuation	Function	Symbol
Latching	Permanent oil circulation	
Momentary	Oil circulation until action is executed	
Floating	Free oil flow in the tractor control unit	

Designation		Function			Tractor control unit	
Blue			Section	Unfold	Double-acting	
				Fold		
Blue			Section extensions	Unfold	Double-acting	
				Fold		
Green			Parallelograms	Lower	Double-acting	
				Lift		



WARNING

Risk of injury or even death

If the hydraulic hose lines are incorrectly connected, the hydraulic functions may be faulty.

- ▶ When coupling the hydraulic hose lines, observe the coloured markings on the hydraulic plugs.



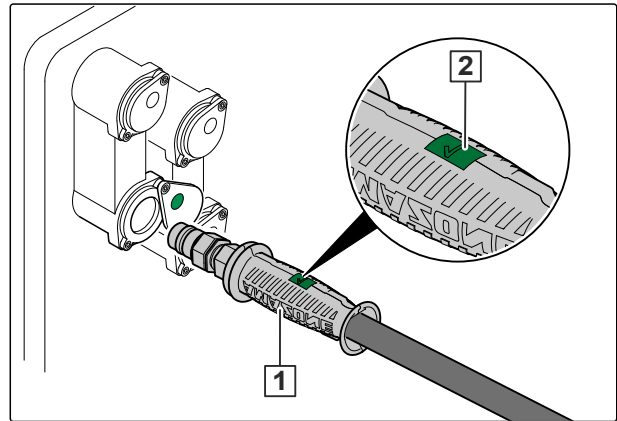
IMPORTANT

Implement damage due to insufficient hydraulic oil return flow

- ▶ Only use lines of size DN16 or larger for the pressureless hydraulic oil return flow.
- ▶ Select short return paths.
- ▶ Connect the pressureless hydraulic return flow to the intended coupling.
- ▶ *Depending on the implement equipment:* couple the leakage oil line in the intended coupling.
- ▶ Install the supplied coupling sleeve on the pressureless hydraulic oil return.

1. Depressurise the hydraulic system between the tractor and the implement using the tractor control unit.
2. Clean the hydraulic plugs.

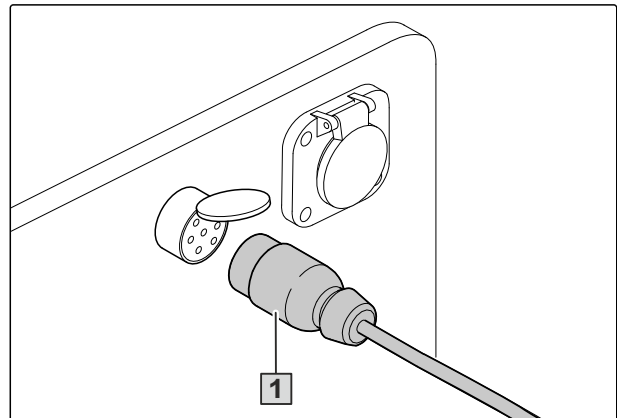
3. Couple the hydraulic hose lines **1** to the hydraulic sockets of the tractor according to the marking **2**.
- ➔ The hydraulic plugs lock perceptibly.
4. Route the hydraulic hose lines with sufficient freedom of movement and without chafing points.



CMS-I-00001045

6.2.5 Coupling the power supply

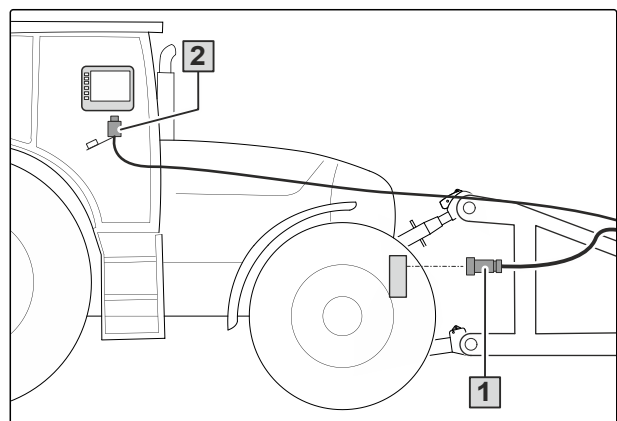
1. Insert the plug **1** for the power supply.
2. Route the power supply cable with sufficient freedom of movement and without chafing or pinching points.
3. Check the lighting on the implement for proper function.



CMS-I-00001048

6.2.6 Coupling the ISOBUS or control computer

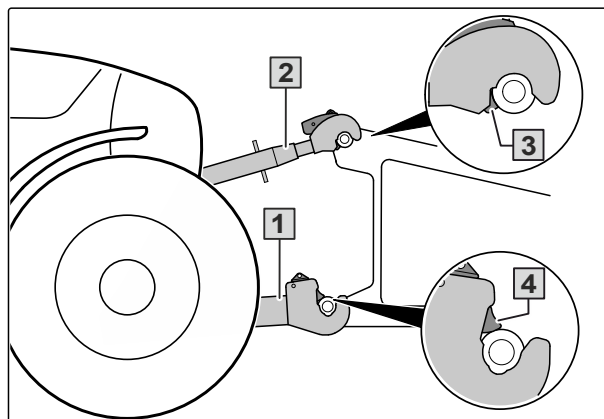
1. Insert the plug of the ISOBUS line **1** or control computer line **2**.
2. Route the ISOBUS line with sufficient freedom of movement and without chafing or pinching points.



CMS-I-00007978

6.2.7 Coupling the three-point mounting frame

1. Couple the lower links **1** from the tractor seat.
2. Couple the top link **2**.
3. Check whether the top link catch hooks **3** and lower link catch hooks **4** are correctly locked.



CMS-T-00012430-B.1

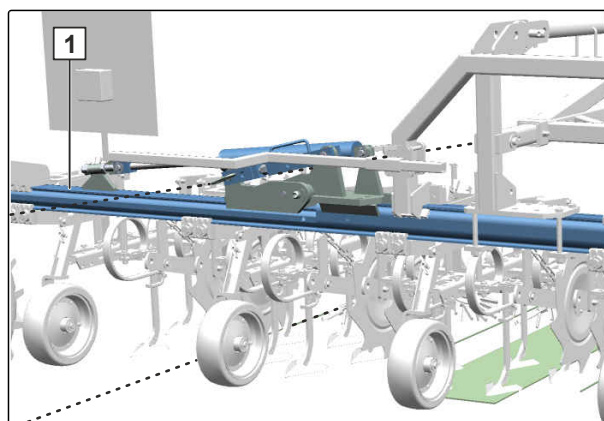
CMS-I-00007979

6.2.8 Aligning the implement

To align the implement, either the upper side of the implement slide rail or the vertical braces of the front-mounting carrier can be used for orientation.

1. *To align the implement using the upper side of the implement slide rail:*

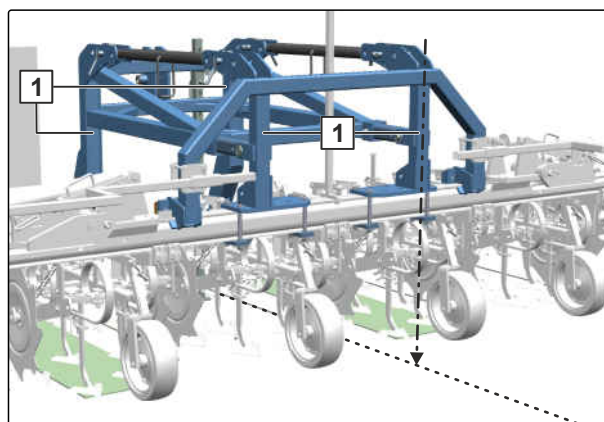
Align the implement with the top link such that the upper side **1** of the implement slide rail is parallel to the ground.



CMS-I-00007599

2. *To align the implement using the vertical brace of the front-mounting carrier:*

Align the implement with the top link such that the vertical braces **1** of the front-mounting carrier are vertical to the ground.



CMS-I-00007601

6.3 Preparing the machine for road travel

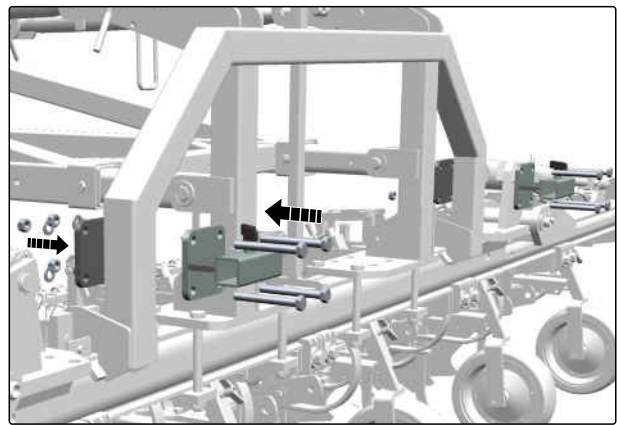
CMS-T-00010667-B.1

6.3.1 Attaching the lighting and identification for road travel

CMS-T-00011714-B.1

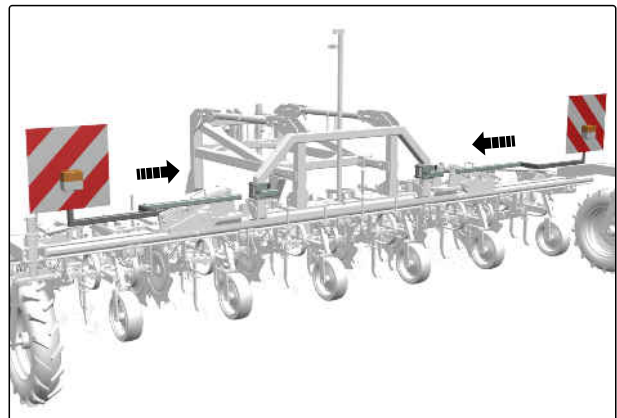
If the implement does not have factory-mounted lighting and identification, the implement must be equipped accordingly before road travel. The following instructions describe how the implement is retrofitted with the original lighting and original identification. If the implement is retrofitted with different lighting or identification, the warning signs must be attached such that they mark the outermost points of the implement.

1. Bolt the section holders onto the front-mounting carrier.



CMS-I-00007580

2. Slide the warning signs with lights onto the sections in the section holders.

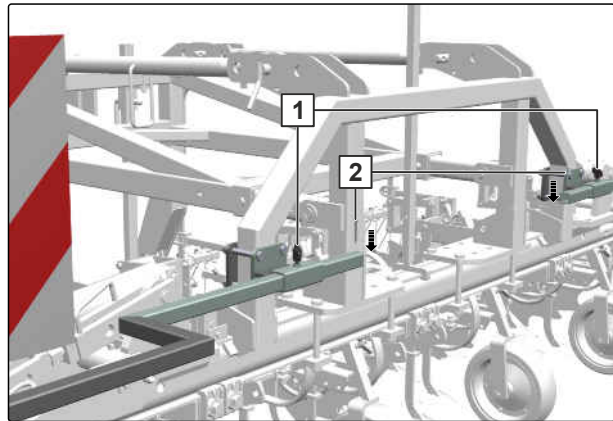


CMS-I-00007581

6 | Preparing the machine

Preparing the machine for road travel

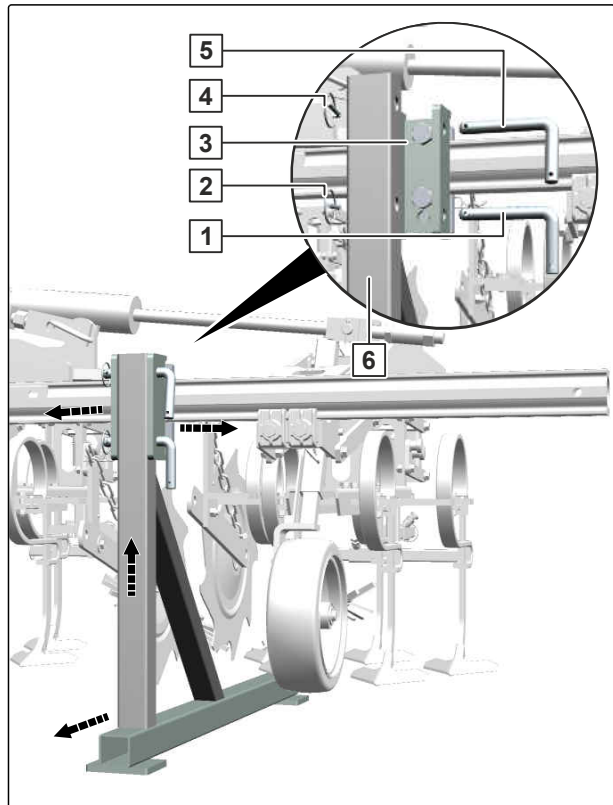
3. Fix the sections in the correct position with the retaining bolts **1**.
4. Put on the cotter pin **2**.
5. Route the connection cable and fasten it to the sections.
6. Plug in the connection cable.
7. Couple the power supply, see page 45.



CMS-I-00007588

6.3.2 Removing the parking supports

1. Lift the coupled implement with the three-point power lift.
2. Pull the linch pin **2** out of the lower fixing pin **1**.
3. Pull the lower fixing pin out of the holes of the clamp **3** and the holes of the parking support **6**.
4. Pull the linch pin **4** out of the upper fixing pin **5**.
5. Slightly lift the parking support.
6. Pull the upper fixing pin out of the holes of the clamp and the holes of the parking support.
7. Pull the parking support away from the implement.
8. Repeat steps 2 to 7 for the second parking support.



CMS-I-00006292

6.3.3 Moving the hoe protection discs or row protection panels into transport position

CMS-T-00015314-A.1

With folding implements, the hoe protection discs or row protection panels of the parallelograms on the sections must be moved into the passive position to ensure that the folded implement does not exceed the permissible transport width during road travel.

- Move the hoe protection discs HS on the sections into passive position according to section "Activating or deactivating hoe protection discs HS", see page 76

or

Move the RowDisc hoe protection discs on the sections into passive position according to section "Activating or deactivating RowDisc hoe protection discs", see page 93

or

Move the row protection panels on the sections into passive position according to section "Activating or deactivating row protection panels", see page 93.

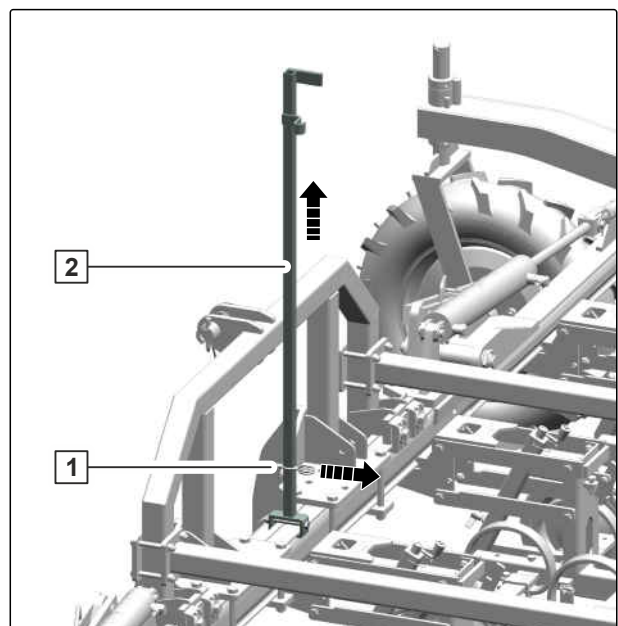
6.3.4 Moving the parallelograms into transport position

CMS-T-00005828-B.1

6.3.4.1 Moving the KPP-M into transport position

CMS-T-00005865-A.1

1. Pull the spring cotter pin **1** out of the lifting rod **2**.
2. Lift the lifting rod out of the holder.



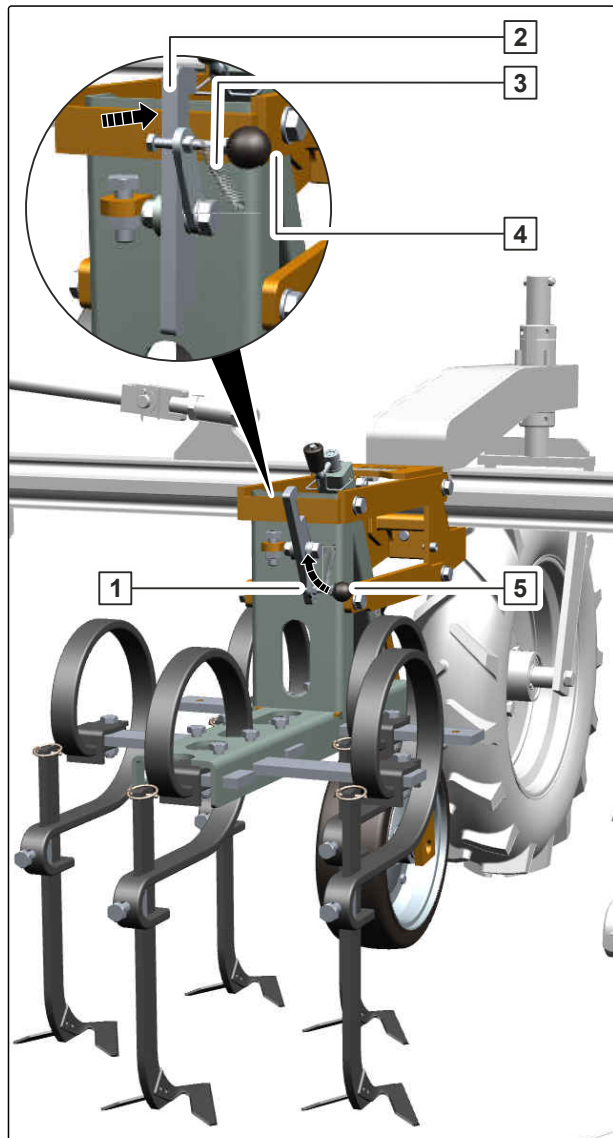
CMS-I-00004275

6 | Preparing the machine

Preparing the machine for road travel

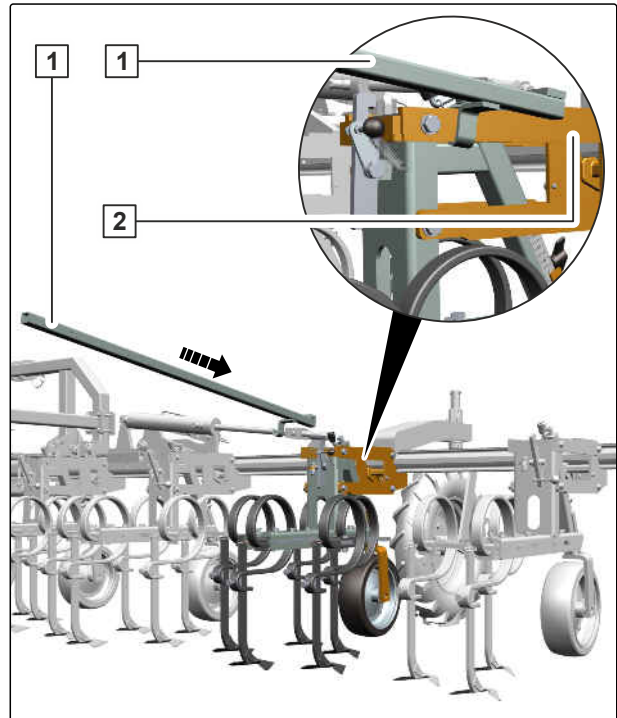
3. Swivel up the lever **1** for locking on the ball head **5**.

➔ The locking bar **2** is pressed against the parallelogram **4** with the tension spring **3**.



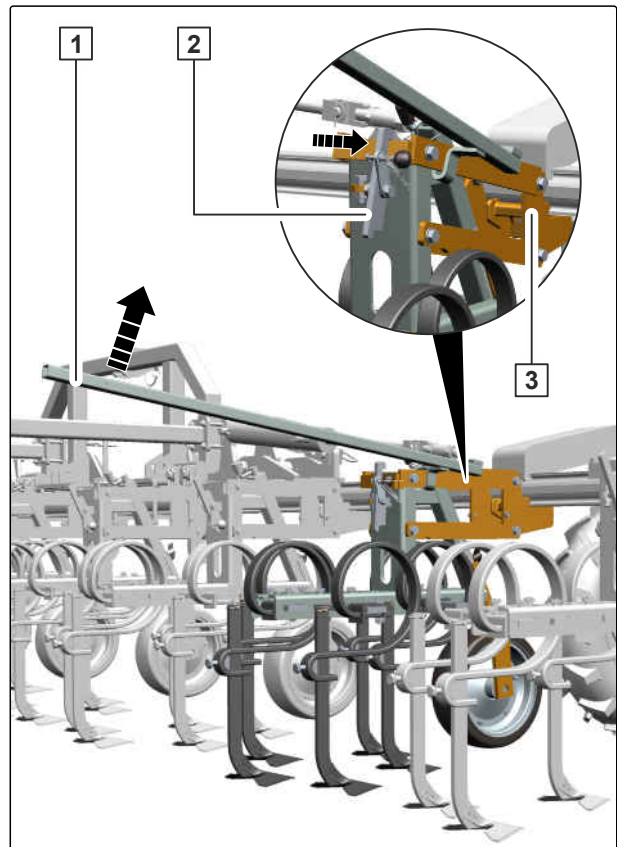
CMS-I-00004277

4. Place the lifting rod **1** on the parallelogram **2**.



CMS-I-00004278

5. Lift up the parallelogram **3** with the lifting rod **1** until the locking bar **2** engages.
6. Remove the lifting rod from the parallelogram.
7. Move all of the parallelograms into transport position in the same way.
8. Insert the lifting rod into the holder.
9. Secure the lifting rod with the spring cotter pin.



CMS-I-00004283

6.3.4.2 Moving the KPP-M SC into transport position

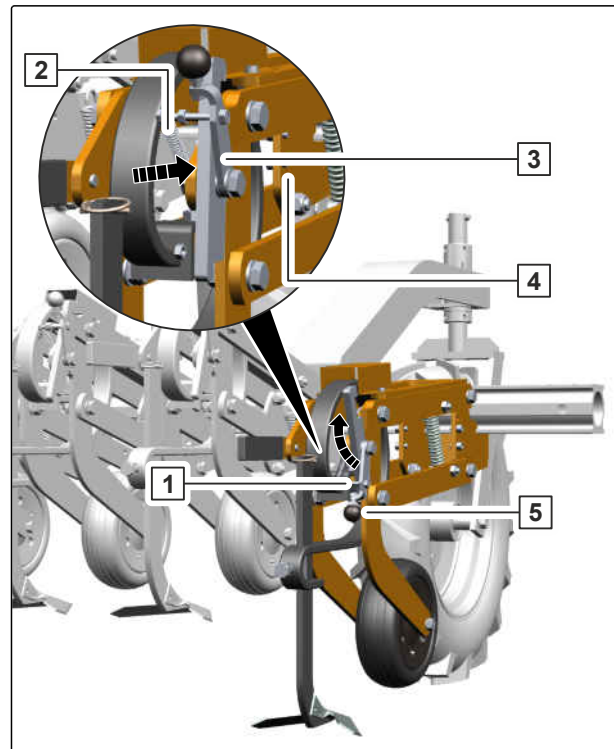
CMS-T-00005866-A.1

- observe the sections *"Display for the status and the position of the parallelograms"* and *"Switching parallelograms manually"* in the operating manual for the ISOBUS hoeing machine software.

6.3.4.3 Moving the EKP-M and EKP-S into transport position

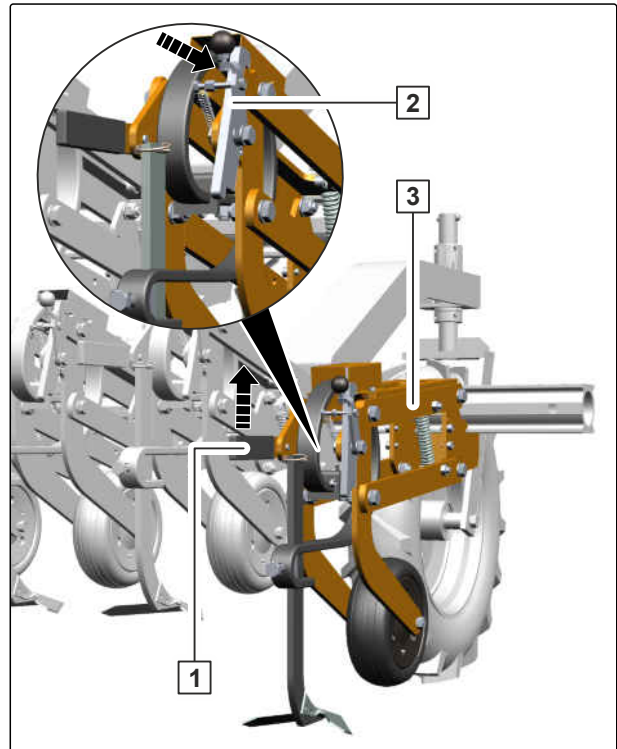
CMS-T-00005830-A.1

1. Swivel up the lever **1** for locking on the ball head **5**.
- ➔ The locking bar **3** is pressed against the parallelogram **4** with the tension spring **2**.



CMS-I-00004288

2. Lift up the parallelogram **3** with the hand lever **1** until the locking bar **2** engages.
3. Move all of the parallelograms into transport position in the same way.



CMS-I-00004289

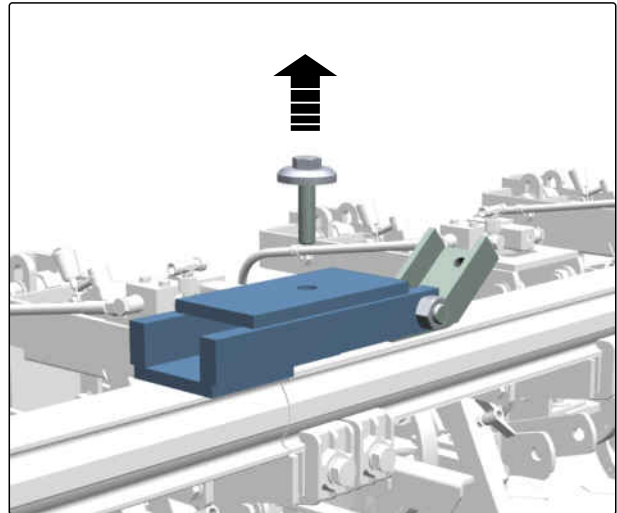
6.3.5 Converting the implement to transport width

CMS-T-00005932-B.1

6.3.5.1 Folding the mechanically folding implement slide rail

CMS-T-00009540-A.1

1. Unscrew the locking bolt.

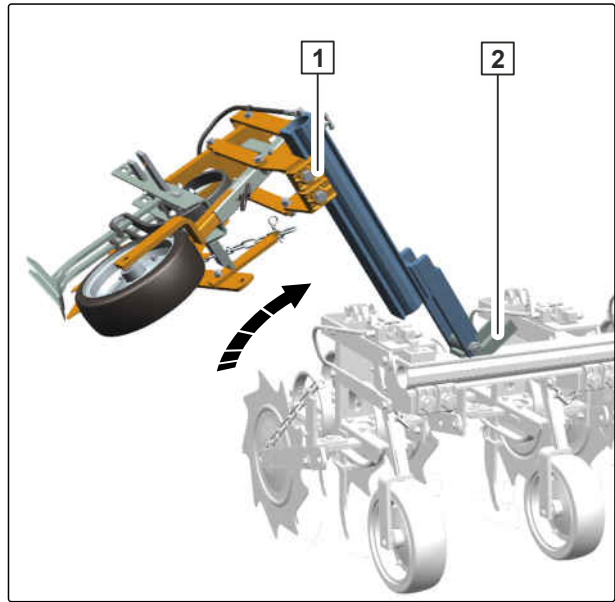


CMS-I-00004079

6 | Preparing the machine

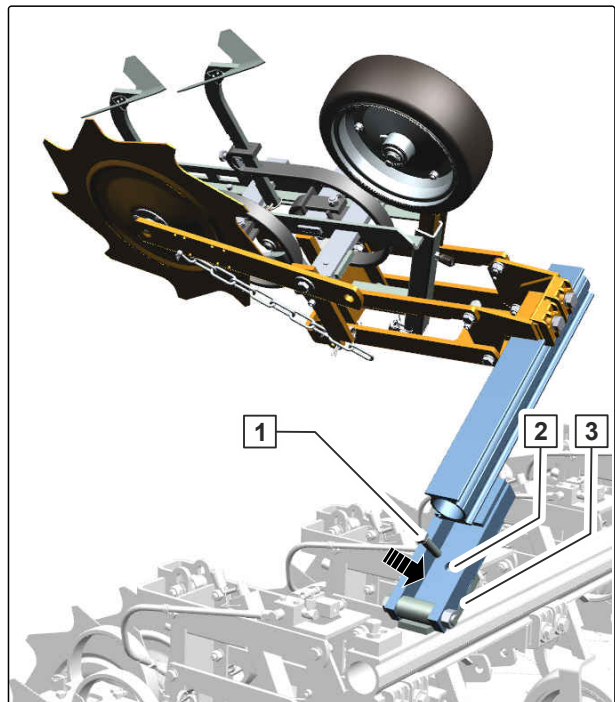
Preparing the machine for road travel

2. Fold the section **1** up to the stop **2**.



CMS-I-00004080

3. Screw the locking bolt **1** through the hole **2** in the slide rail into the stop **3**.
4. *If the implement cannot be folded on both sides:* Repeat steps 1 to 3 on the other side of the implement.

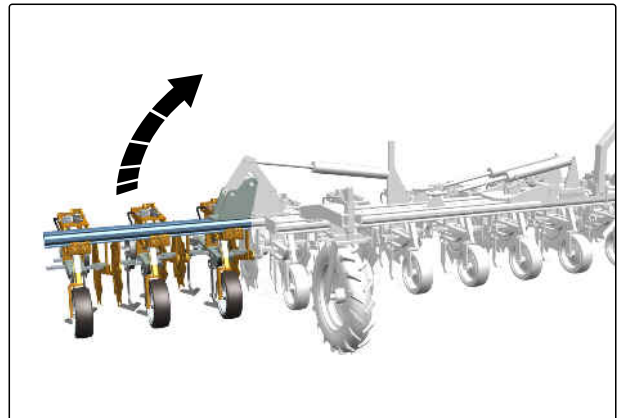


CMS-I-00004081

6.3.5.2 Folding the hydraulically folding implement slide rail

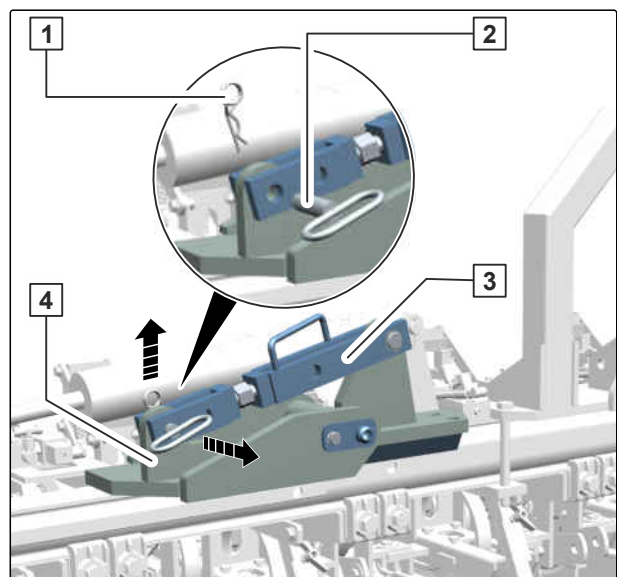
CMS-T-00005808-B.1

1. *If the implement has double folding:*
Actuate the tractor control unit to which hydraulic hose lines "blue 3" and "blue 4" are connected until the section extensions are completely folded in.



CMS-I-00007094

2. Pull the spring cotter pin **1** out of the fixing pin **2**.
3. Pull the fixing pin out of the upper holes of the clamp **3** and the hole of the locking tab **4**.



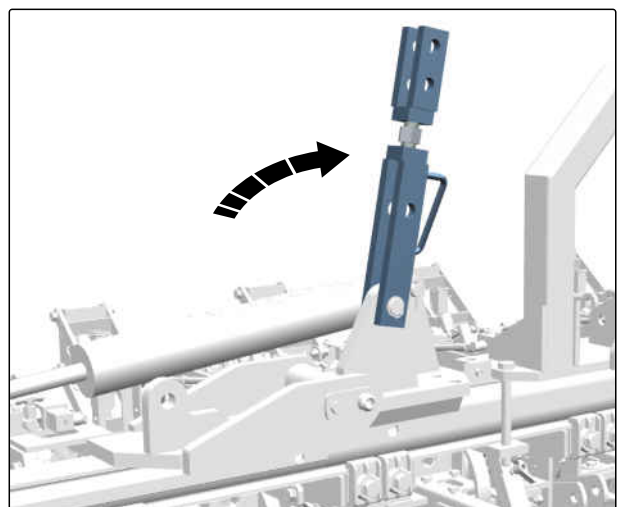
CMS-I-00004122

4. Swivel the clamp towards the centre of the implement.
5. *If the implement can be folded on both sides or has double folding:*
Repeat steps 2 to 4 on the other side of the implement.
6. Actuate the "blue" tractor control unit until the section is folded in

or

If the implement can be folded on both sides or has double folding:

Actuate the "blue" tractor control unit until both sections or both sections with section extensions are completely folded in.

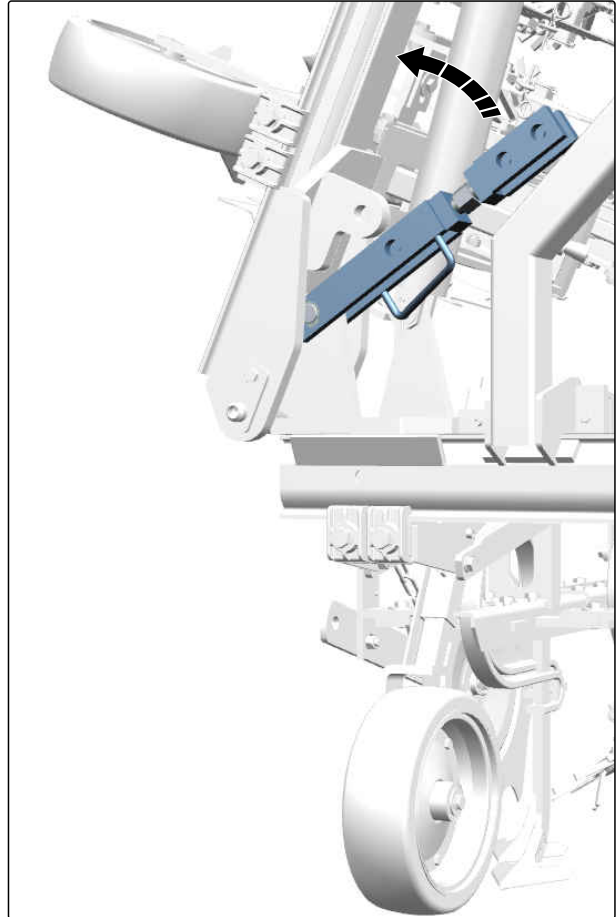


CMS-I-00004124

6 | Preparing the machine

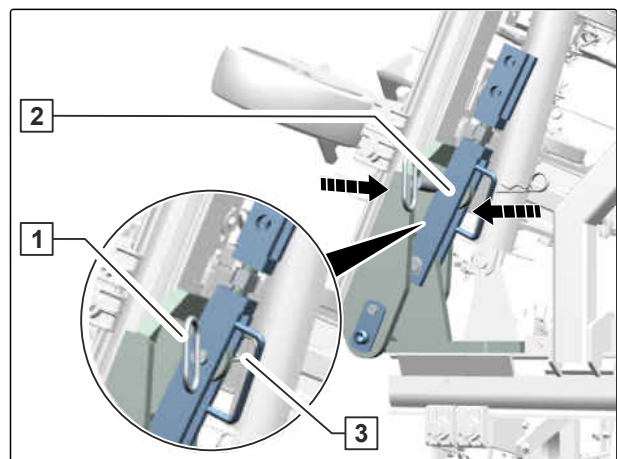
Preparing the machine for road travel

7. Swivel the clamp towards the folded section until the lower holes of the clamp and the hole of the locking tab are aligned.



CMS-I-00004125

8. Insert the fixing pin **1** through the holes **2**.
9. Secure the fixing pin with the spring cotter pin **3**.
10. *If the implement can be folded on both sides or has double folding:*
Repeat steps 7 to 9 on the other side of the implement.

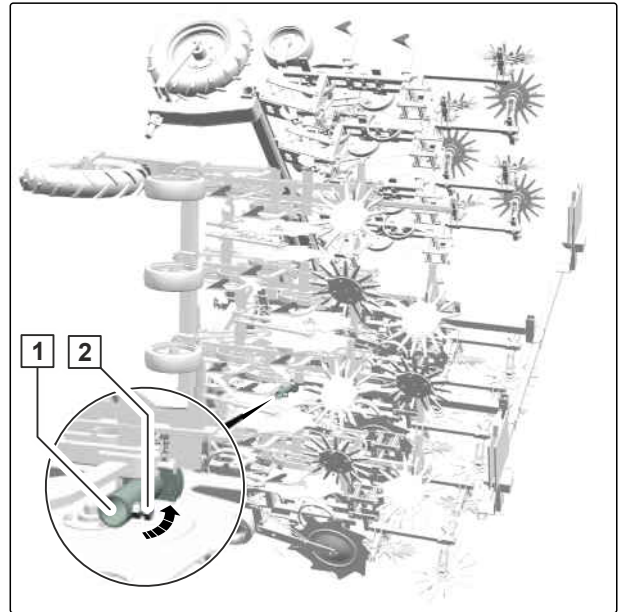


CMS-I-00004127

6.3.6 Attaching the guard screen

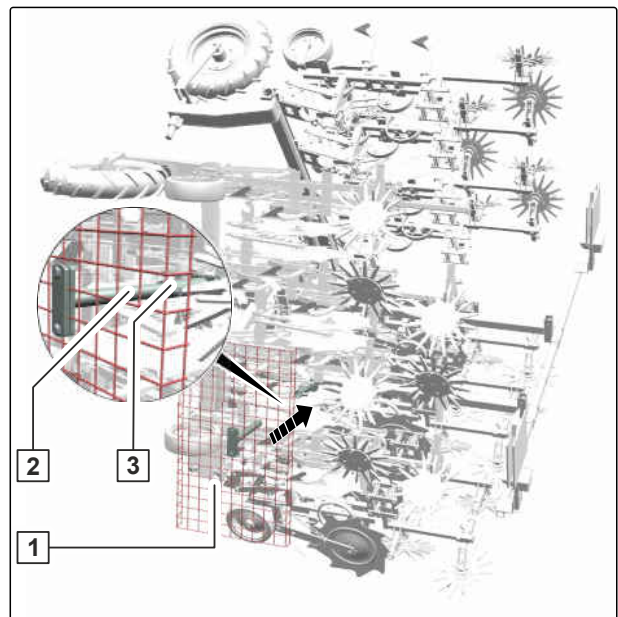
CMS-T-00005805-A.1

1. Loosen the bolt **2** for the holder **1**.



CMS-I-00004248

2. Position the guard screen **1** with the support tube **2** such that the support tube slides into the holder **3**.
3. Tighten the bolt for the holder.
4. *If the implement cannot be folded on both sides:*
Repeat steps 1 to 3 on the other side of the implement.



CMS-I-00004249

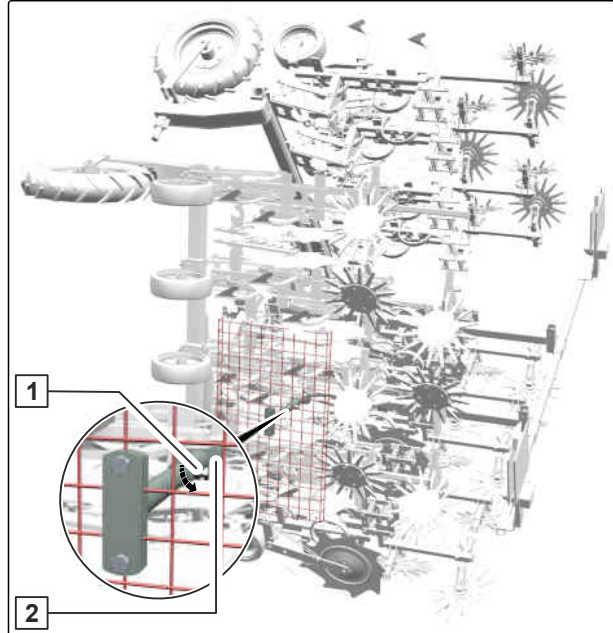
6.4 Preparing the implement for operation

CMS-T-00010670-B.1

6.4.1 Removing the guard screen

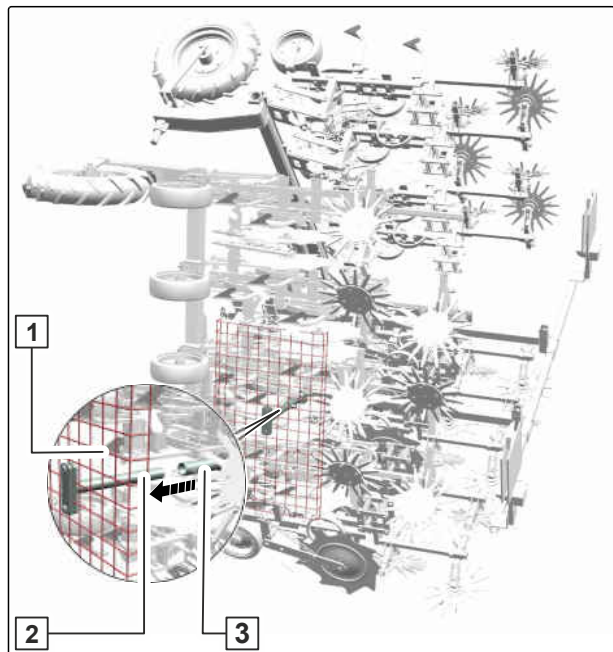
CMS-T-00005816-A.1

1. Loosen the bolt **1** for the holder **2**.



CMS-I-00004250

2. Move the guard screen **1** with the support tube **2** away from the implement so that the support tube is pulled out of the holder **3**.
3. Put down the guard screen with the support tube.
4. Tighten the bolt for the holder.
5. *If the implement cannot be folded on both sides:* Repeat steps 1 to 4 on the other side of the implement.



CMS-I-00004252

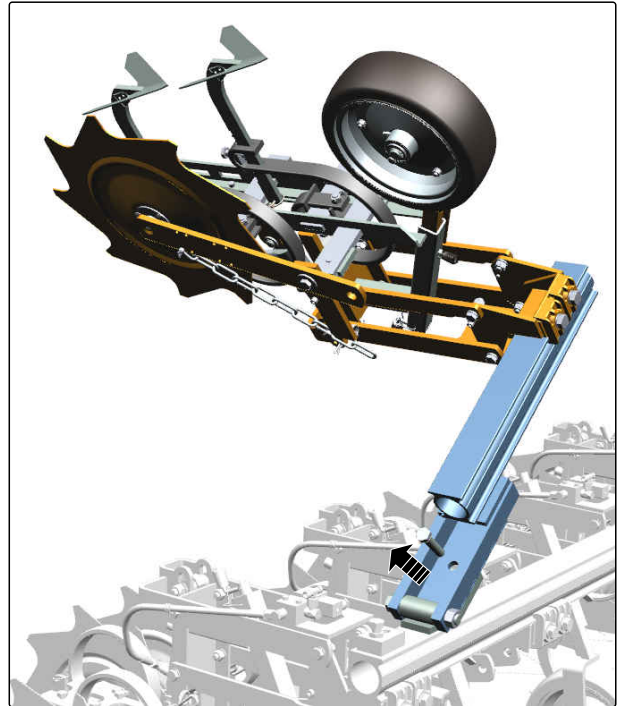
6.4.2 Converting the implement to working width

CMS-T-00005933-B.1

6.4.2.1 Unfolding the mechanically folding implement slide rail

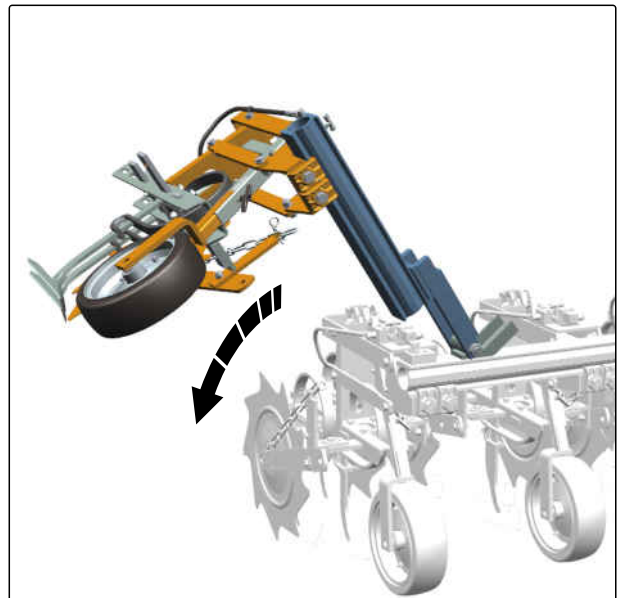
CMS-T-00009541-A.1

1. Unscrew the locking bolt.



CMS-I-00004102

2. Completely unfold the sections.

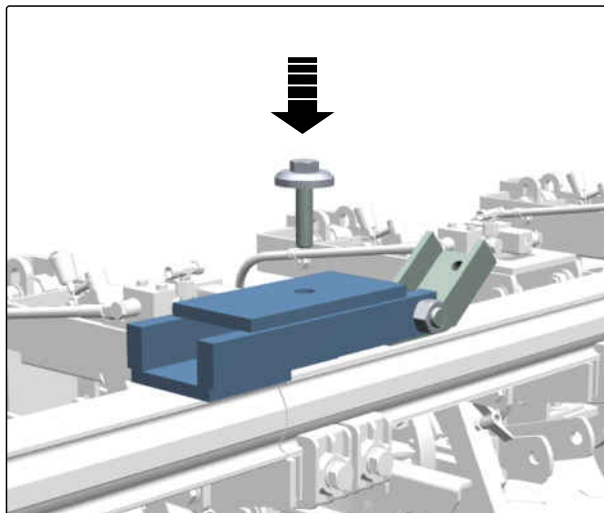


CMS-I-00004103

6 | Preparing the machine

Preparing the implement for operation

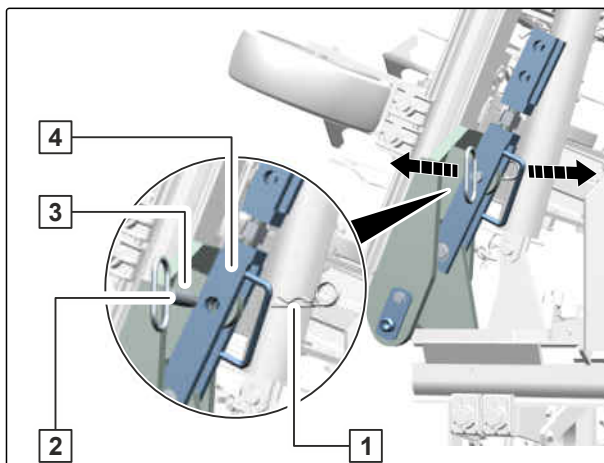
3. Tighten the locking bolt.
4. *If the implement cannot be folded on both sides:*
Repeat steps 1 to 3 on the other side of the implement.



CMS-I-00004104

6.4.2.2 Unfolding the hydraulically folding implement slide rail

1. Pull the spring cotter pin **1** out of the fixing pin **2**.
2. Pull the fixing pin out of the hole of the locking tab **3** and the lower holes of the clamp **4**.



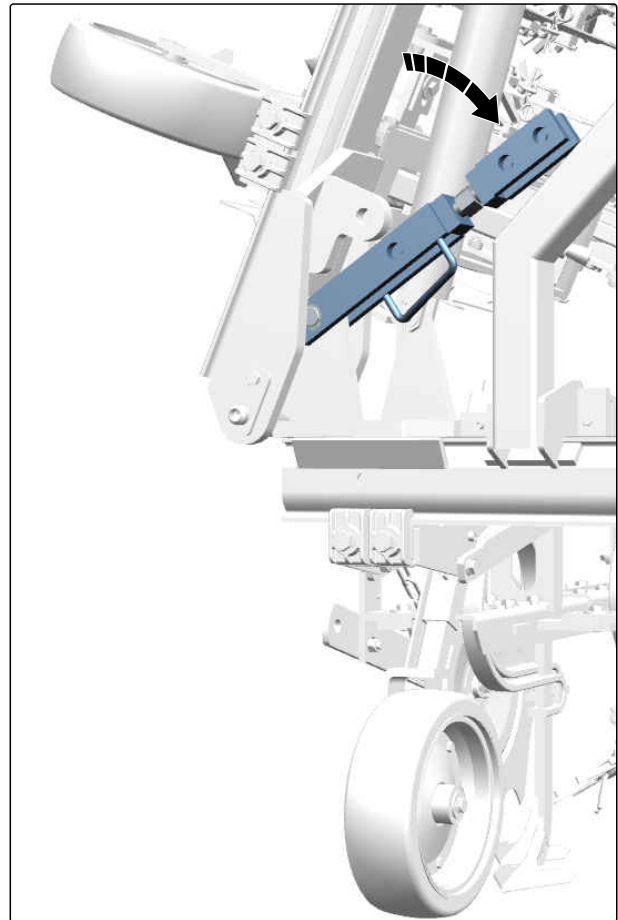
CMS-I-00004131

3. Swivel the clamp towards the centre of the implement.
4. *If the implement can be folded on both sides or has double folding:*
Repeat steps 1 to 3 on the other side of the implement.
5. Actuate the "blue" tractor control unit until the section is unfolded

or

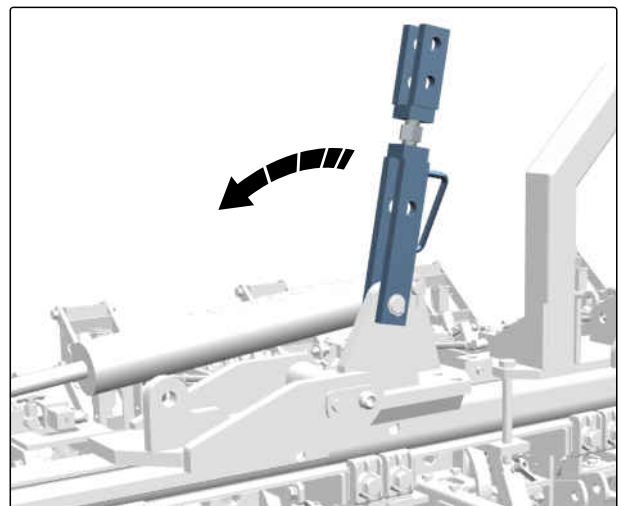
If the implement can be folded on both sides or has double folding:

Actuate the "blue" tractor control unit until both sections or both sections with section extensions are completely unfolded.



CMS-I-00004132

6. Swivel the clamp towards the unfolded section until the holes of the upper part of the clamp and the hole of the locking tab are aligned.

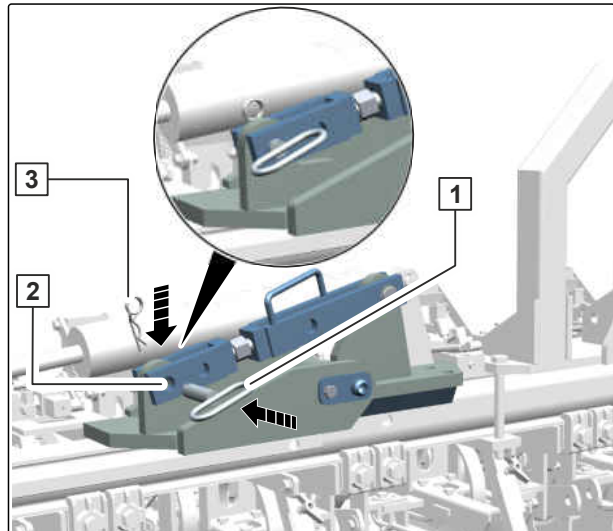


CMS-I-00004133

6 | Preparing the machine

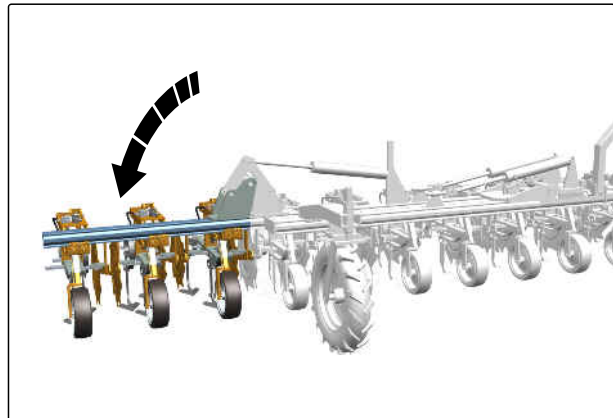
Preparing the implement for operation

7. Insert the fixing pin **1** through the holes **2**.
8. Secure the fixing pin with the spring cotter pin **3**.
9. *If the implement can be folded on both sides or has double folding:*
Repeat steps 6 to 8 on the other side of the implement.



CMS-I-00004134

10. *If the implement has double folding:*
Actuate the tractor control unit to which hydraulic hose lines "blue 3" and "blue 4" are connected until the section extensions are completely unfolded.



CMS-I-00007093

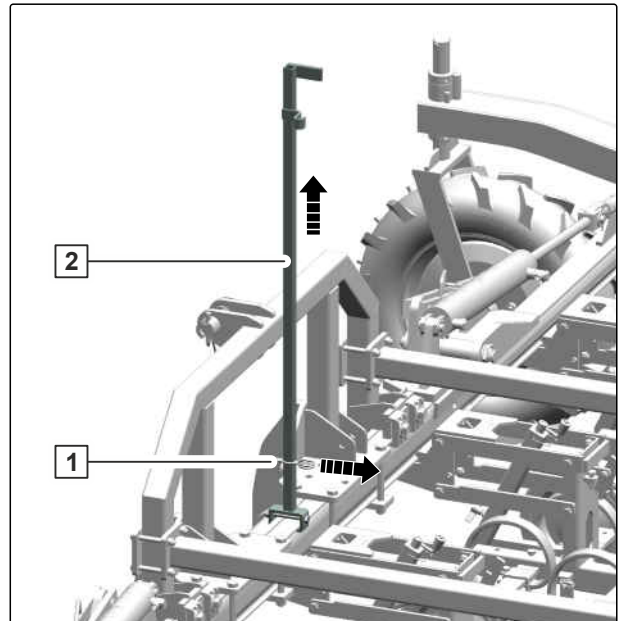
6.4.3 Moving the parallelograms into working position

CMS-T-00005834-B.1

6.4.3.1 Moving the KPP-M into working position

CMS-T-00005869-A.1

1. Pull the spring cotter pin **1** out of the lifting rod **2**.
2. Lift the lifting rod out of the holder.

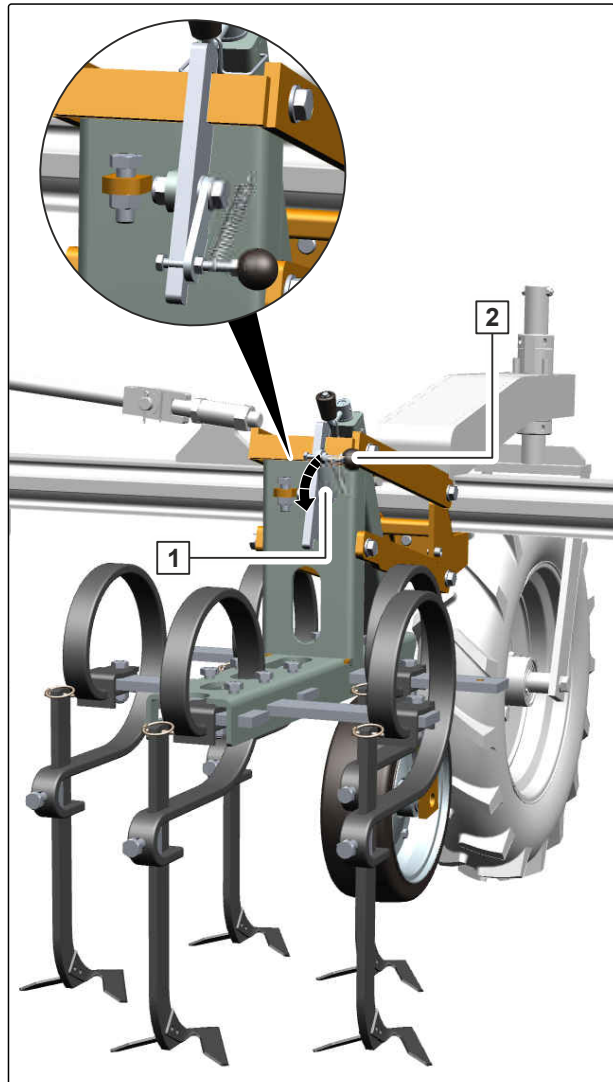


CMS-I-00004275

6 | Preparing the machine

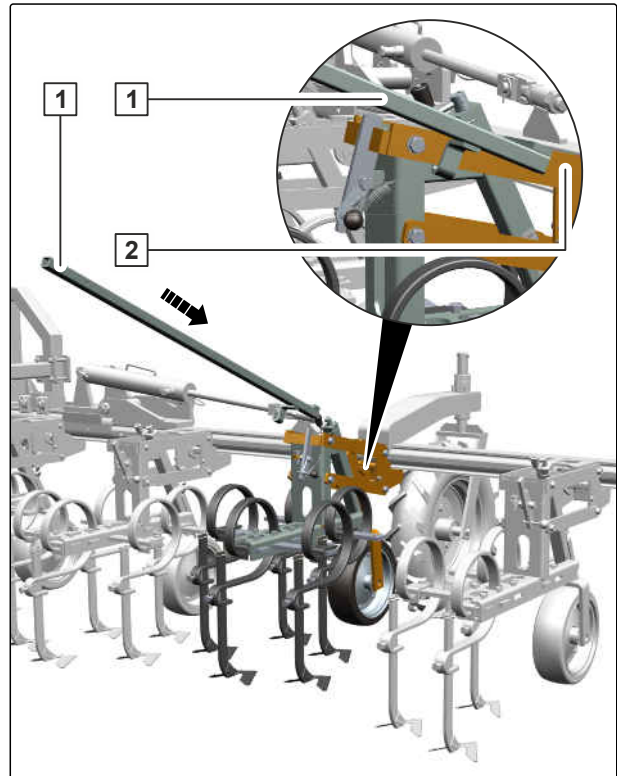
Preparing the implement for operation

3. Swivel down the lever **1** for locking on the ball head **2**.



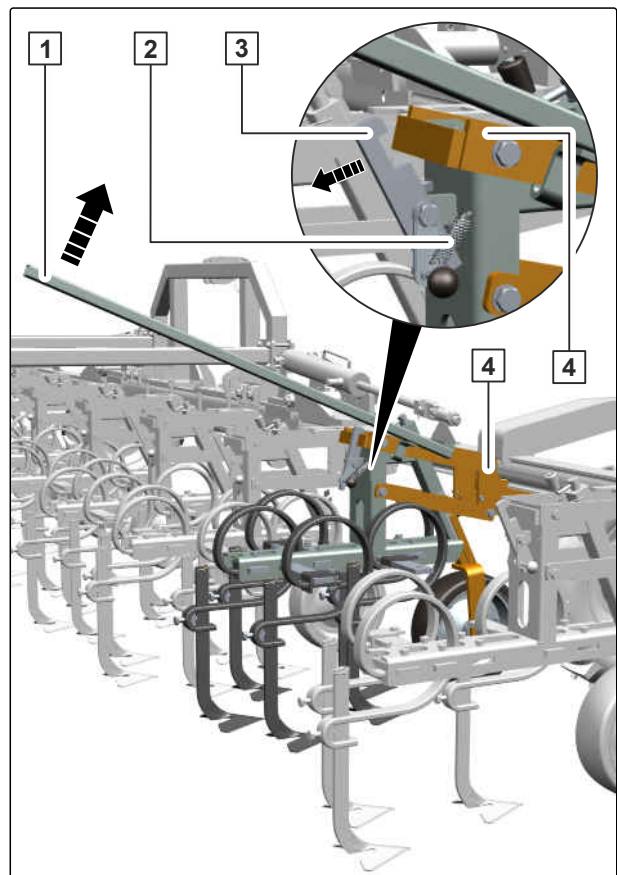
CMS-I-00004284

4. Place the lifting rod **1** on the parallelogram **2**.



CMS-I-00004285

5. Lift up the parallelogram **4** with the lifting rod **1** until the locking bar **3** disengages and the tension spring **2** releases it from the parallelogram **4**.

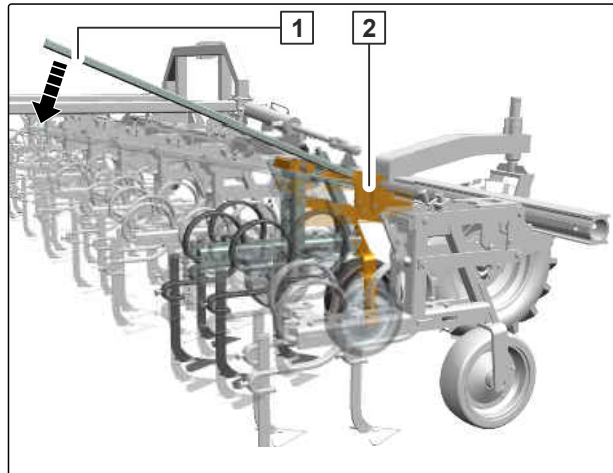


CMS-I-00004286

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Preparing the implement for operation

6. Lower the parallelogram **2** all the way down with the lifting rod **1**.
7. Remove the lifting rod from the parallelogram.
8. Move all of the parallelograms required for hoeing operation into working position in the same way.
9. Insert the lifting rod into the holder.
10. Secure the lifting rod with the spring cotter pin.



CMS-I-00004287

6.4.3.2 Moving the KPP-M SC into working position

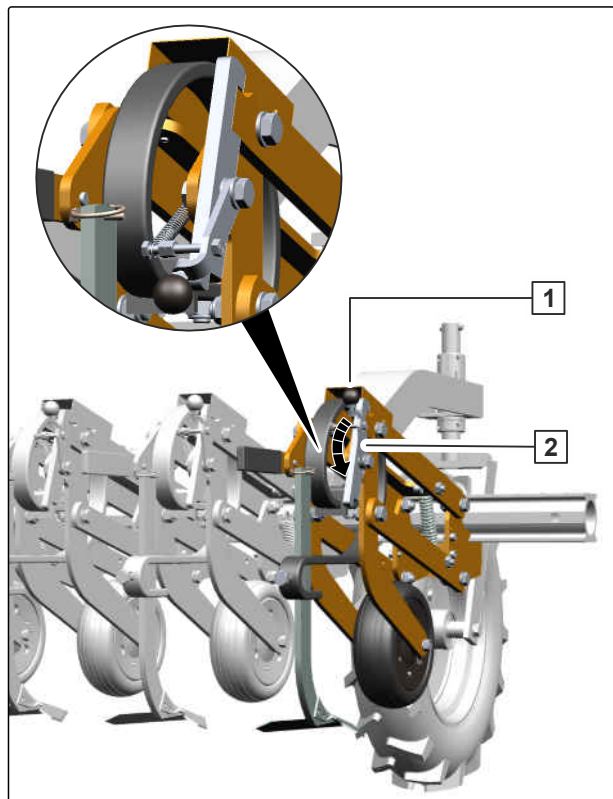
CMS-T-00005870-A.1

- observe the sections *"Display for the status and the position of the parallelograms"* and *"Switching parallelograms manually"* in the operating manual for the ISOBUS hoeing machine software.

6.4.3.3 Moving the EKP-M and EKP-S into working position

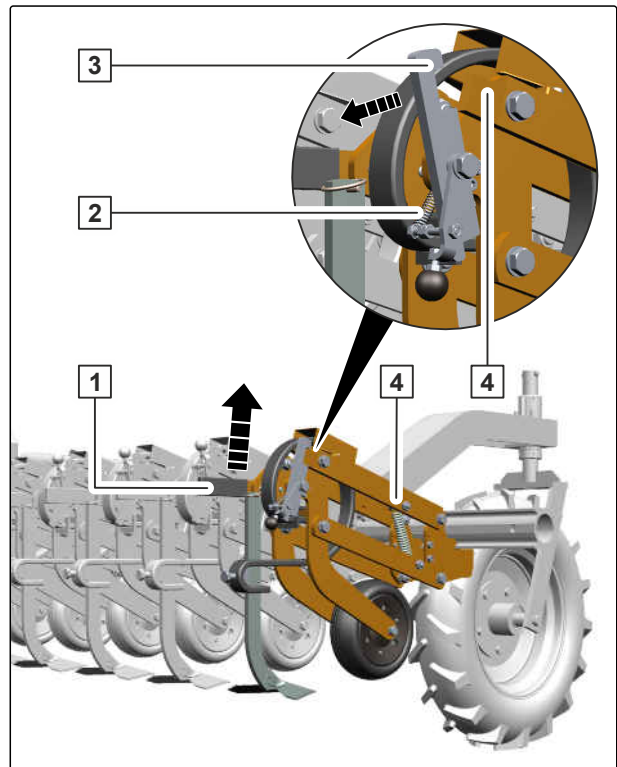
CMS-T-00005871-A.1

1. Swivel down the lever **2** for locking on the ball head **1**.



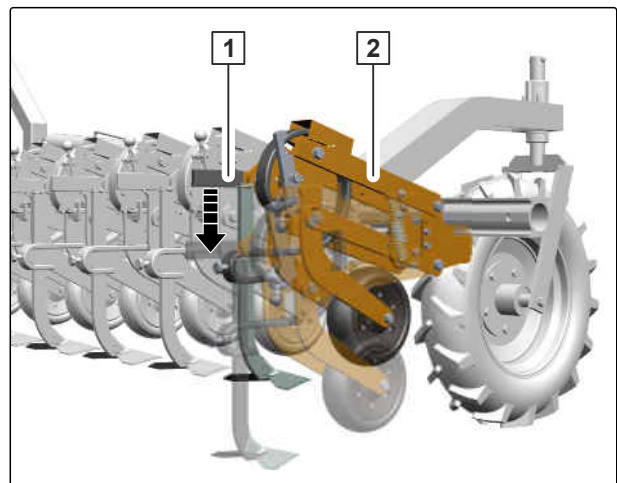
CMS-I-00004290

2. Lift up the parallelogram **4** with the hand lever **1** until the locking bar **3** disengages and the tension spring **2** releases it from the parallelogram **4**.



CMS-I-00004291

3. Lower the parallelogram **2** all the way down with the hand lever **1**.
4. Move all of the parallelograms required for hoeing operation into working position in the same way.



CMS-I-00004292

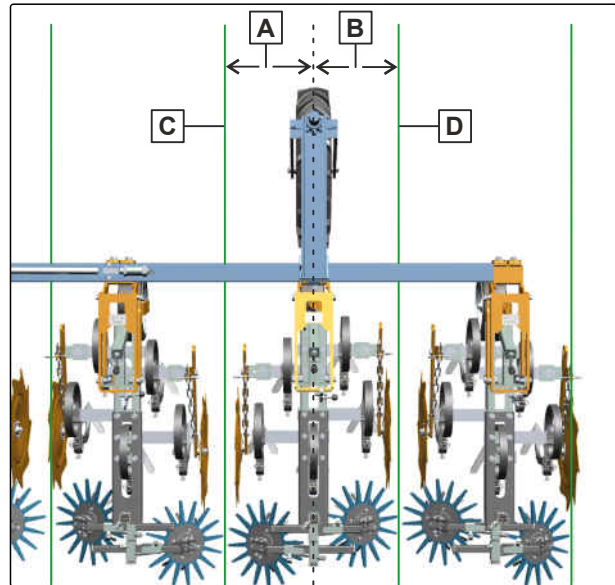
6.4.4 Aligning the support wheels

CMS-T-00005835-C.1

6.4.4.1 Aligning the support wheels on the rows

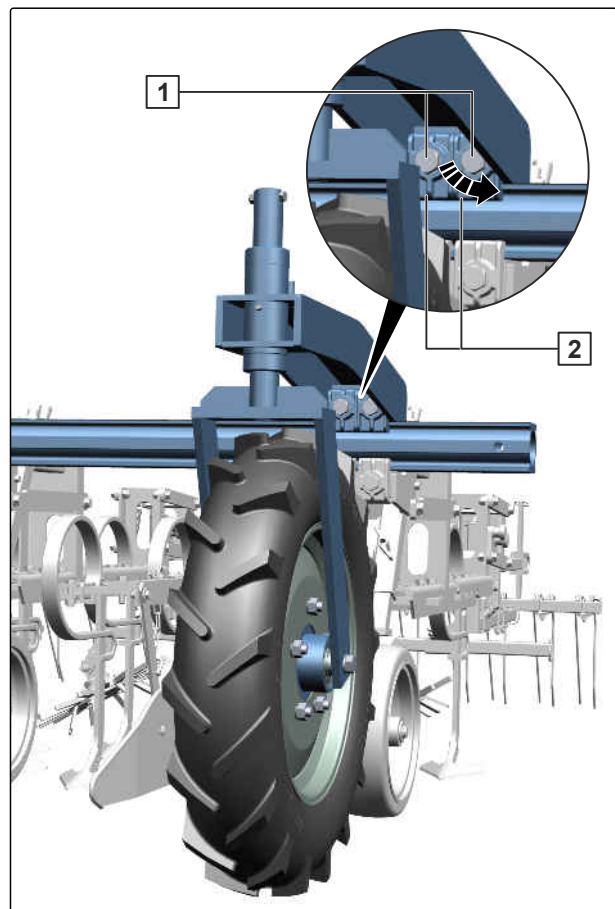
CMS-T-00005901-C.1

The support wheels must be aligned such that distances **A** and **B** are exactly the same and each support wheel runs precisely between the two plant rows **C** and **D** on the left and right of the support wheel.



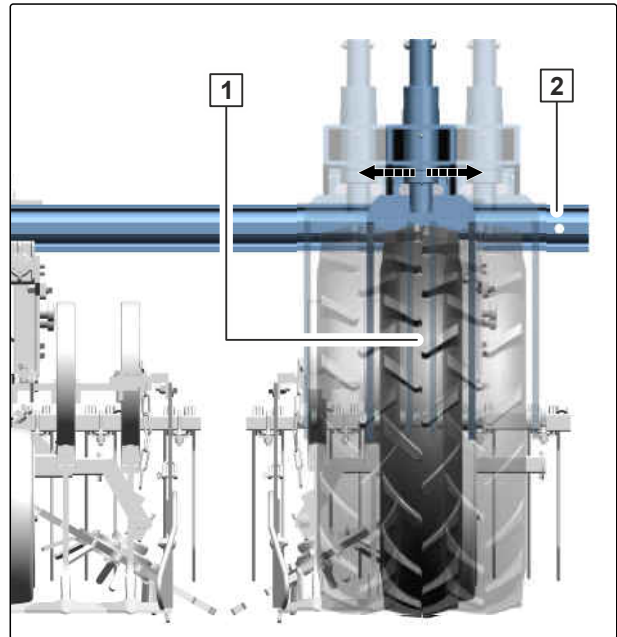
CMS-I-00004262

1. Lower the implement on the field with the three-point power lift.
2. Loosen the bolts **1** for fastening claws **2**.



CMS-I-00004264

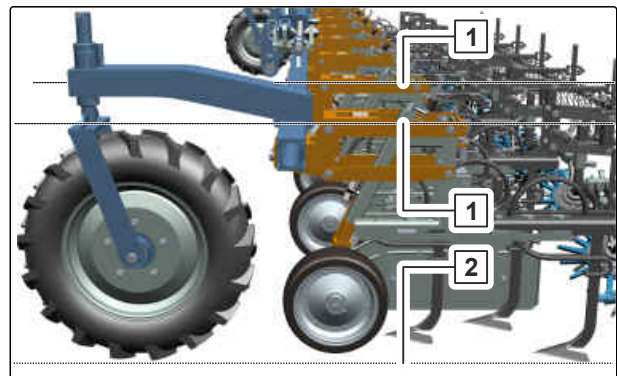
3. Lift the implement with the three-point power lift until the support wheel **1** can be moved on the implement slide rail **2**.
4. Move the support wheel to the correct position.
5. Tighten the bolts for the fastening claws.
6. Align the support wheel in the same way on the other side of the implement.



CMS-I-00004270

6.4.4.2 Adjusting the height of the support wheels

The height of the support wheels must be adjusted such that the top link bars **1** of the parallelograms run parallel to the ground **2** when in working position.



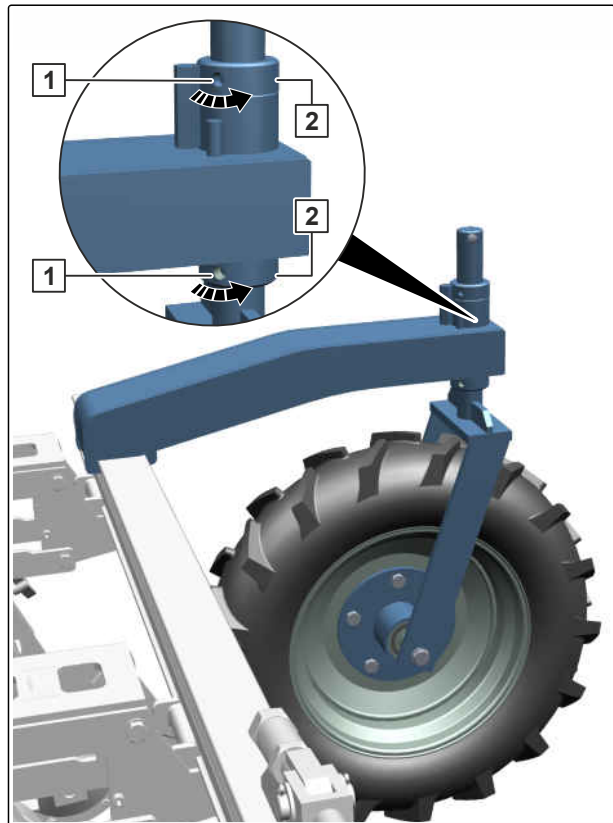
CMS-T-00009542-B.1

CMS-I-00004271

6 | Preparing the machine

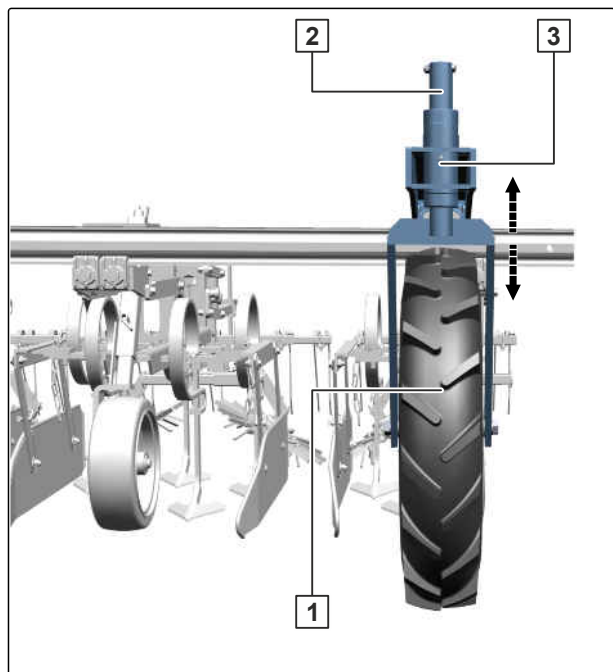
Preparing the implement for operation

1. Lower the implement on the field with the three-point power lift.
2. Loosen the socket head screws **1** in the adjusting rings **2**.



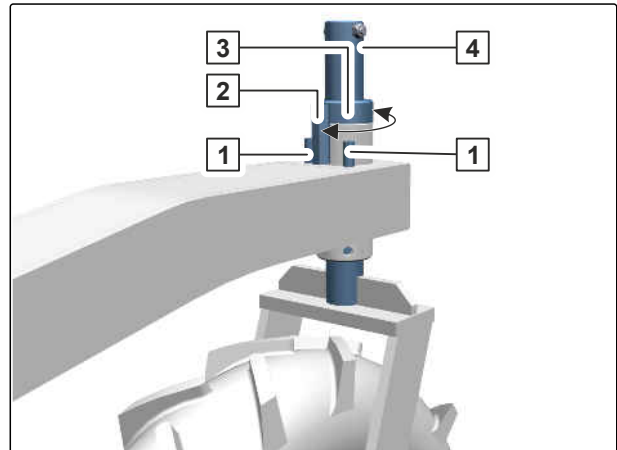
CMS-I-00004272

3. Move the support wheel **1** up or down in the head tube **3** with the fork stem tube **2** until the support wheel is in the right position.



CMS-I-00004273

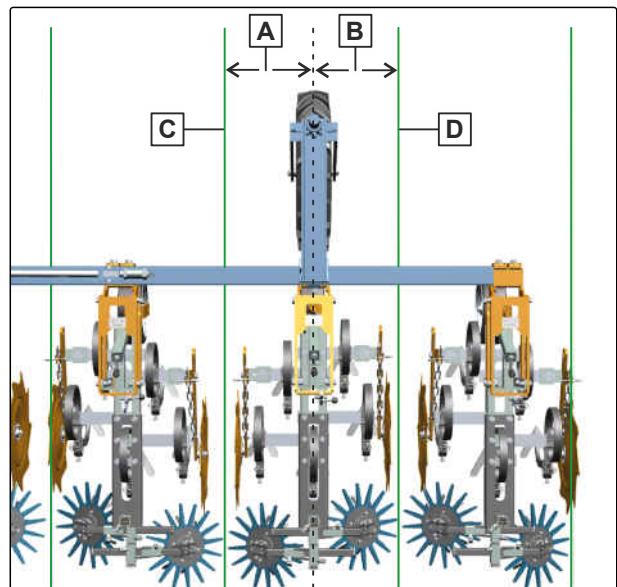
4. Turn the upper adjusting ring **3** on the fork stem tube **4** so that the steering stop **2** is centred between the two stop pins **1**.
5. Tighten the socket head screws in the adjusting rings.
6. Align the support wheel in the same way on the other side of the implement.



CMS-I-00004274

6.4.5 Aligning the parallelograms on the rows

The parallelograms must be aligned such that distances **A** and **B** are exactly the same and each parallelogram runs precisely between the two plant rows **C** and **D** on the left and right of the parallelogram during hoeing operation.



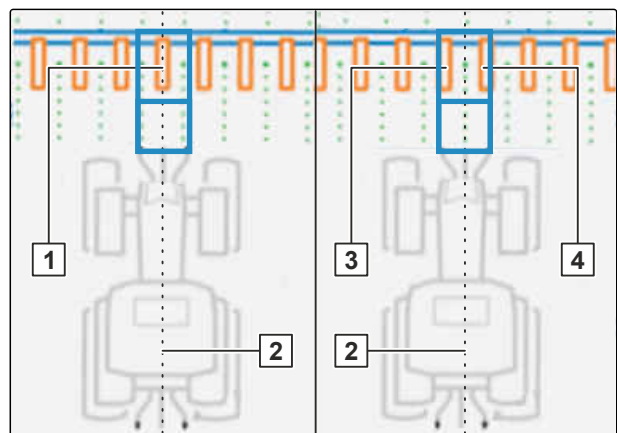
CMS-I-00004262

1. Lower the implement on the field with the three-point power lift.
2. *If the implement is symmetrical:*
Drive onto the field with the implement such that the parallelogram **1** on the tractor's longitudinal axis **2** is positioned exactly at the centre between the plant rows

or

If the implement is asymmetrical:

Drive onto the field with the implement such that the one of the two parallelograms on the left **3** and right **4** of the tractor's longitudinal axis **2** is positioned exactly at the centre between the plant rows.

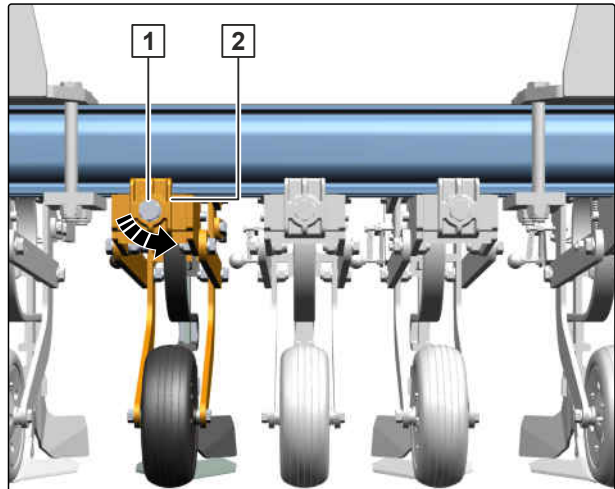


CMS-I-00007318

6 | Preparing the machine

Preparing the implement for operation

- Loosen the bolt **1** of the fastening claw **2** on the parallelogram on the right or left of the parallelogram positioned at the centre

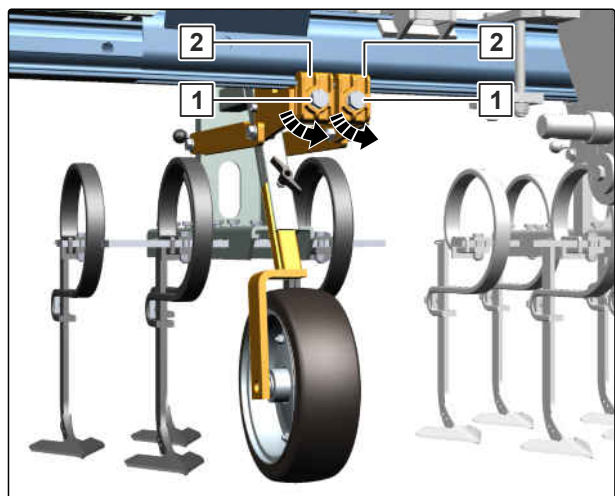


CMS-I-00004313

or

If the parallelogram is a KKP:

Loosen the bolts **2** of the two fastening claws **1** on the parallelogram on the right or left of the parallelogram positioned at the centre.



CMS-I-00004314

- Lift the implement with the three-point power lift until the parallelogram **1** can be moved to the right or left on the implement slide rail **2**.

- Move the parallelogram to the correct position.

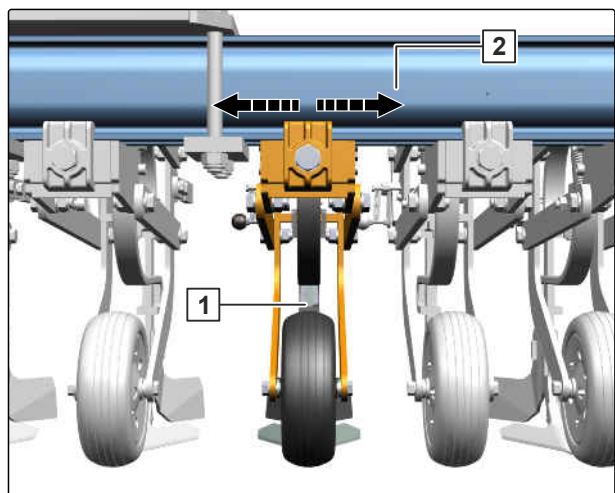
- Tighten the bolt for the fastening claw

or

If the parallelogram is a KKP:

Tighten the bolts for both fastening claws.

- Position all of the other parallelograms in the same way centred between the plant rows.



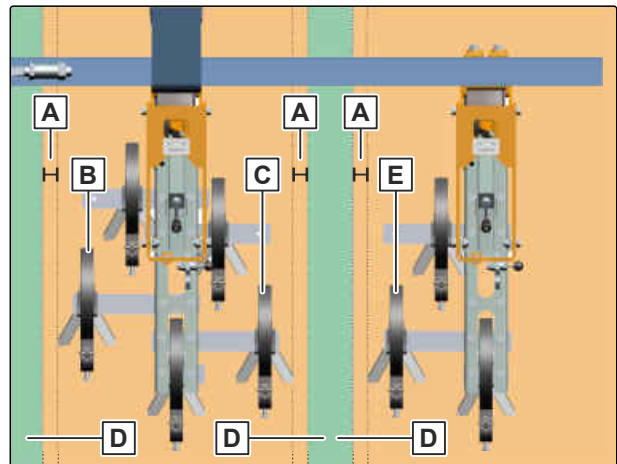
CMS-I-00004315

6.4.6 Adjusting the hoeing width

CMS-T-00005837-B.1

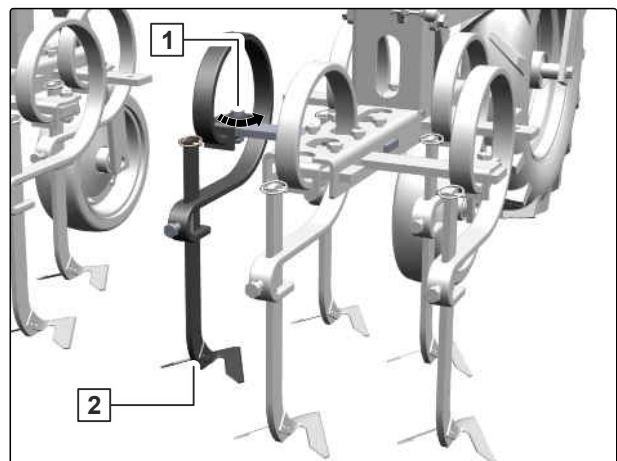
On parallelograms with more than one hoeing tool, the hoeing tools must be set up such that the outer hoeing tool **E** or the two outer hoeing tools **B** and **C** each have a distance **A** of at least 4 cm from the plant row **D**.

If the hoeing tools are hoe shares, the hoe shares of each parallelogram must overlap by at least 2 cm. If the overlap becomes less due to the position of the outer hoe shares, the inner hoe shares must also be moved towards the plant row until the overlap is at least 2 cm again.



CMS-I-00004317

1. Lower the implement on the field with the three-point power lift.
2. *If the hoeing tool is spring suspended:*
Loosen the bolt **1** for the hoeing tool **2**

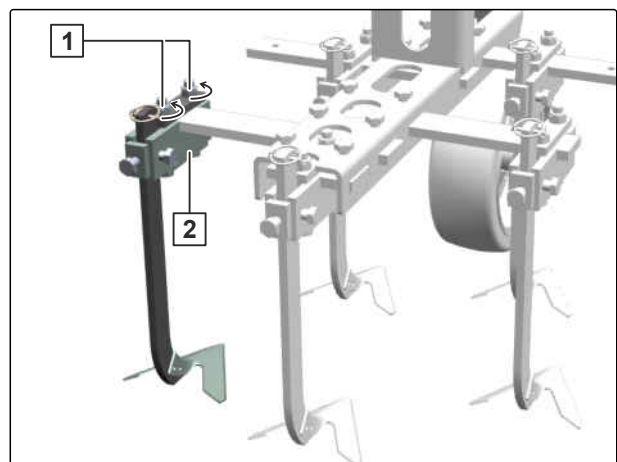


CMS-I-00004318

or

If it is a rigid hoeing tool:

Loosen the nuts **1** of the adapter **2**.

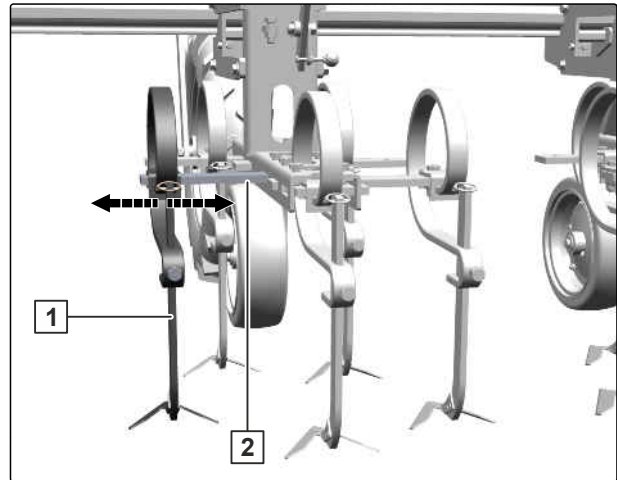


CMS-I-00007096

6 | Preparing the machine

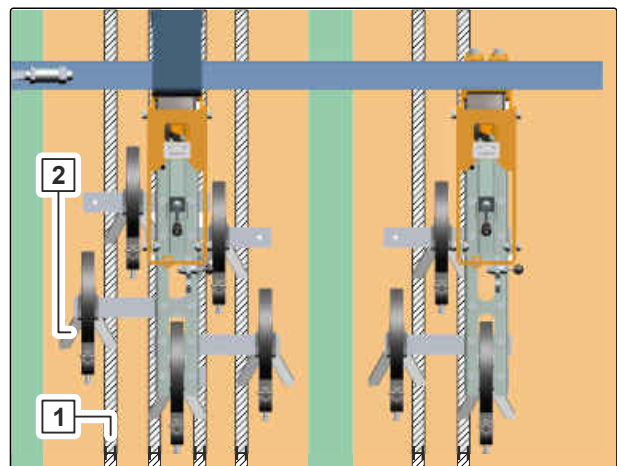
Preparing the implement for operation

3. Lift the implement with the three-point power lift until the hoeing tool **1** can be moved on the tool carrier **2**.
4. Move the hoeing tool to the correct position.
5. Tighten the bolt of the hoeing tool or nuts of the adapter.
6. *If the parallelogram has two outer hoeing tools:* Align the second outer hoeing tool of the parallelogram in the same way.



CMS-I-00004320

7. *If the hoeing tools are hoe shares:* Determine the overlaps **1** of the hoe shares **2**.
8. *If there are overlaps of less than 2 cm:* Move the inner hoe shares towards the plant row until the overlap is at least 2 cm again.
9. Adjust the hoeing width all of the other parallelograms in the same way.



CMS-I-00004321

6.4.7 Adjusting the hoeing depth

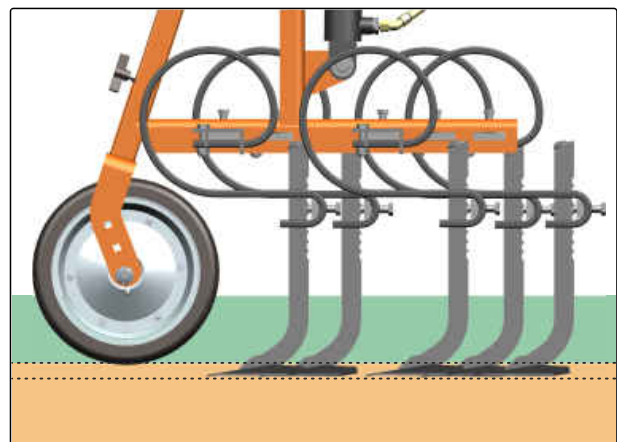
CMS-T-00005838-B.1

6.4.7.1 Adjusting the hoeing depth on the KPP

CMS-T-00005934-B.1

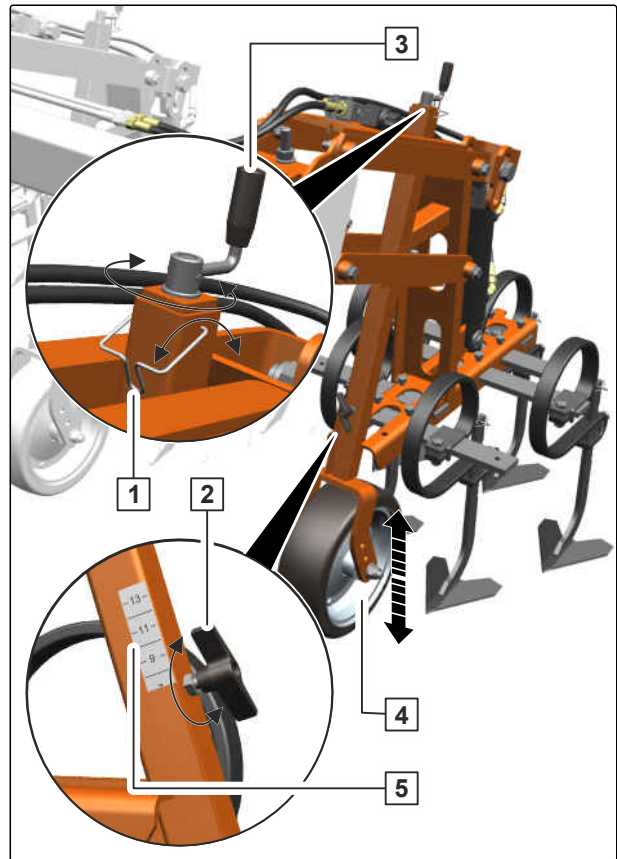
The hoeing depth must be adjusted such that during hoeing operation, the blades of the hoeing tools are guided 2 bis 3 cm below the surface of the arable soil.

On the parallelograms of type KPP-M SC and KPP-M, the hoeing depth is adjusted via the guide wheel.



CMS-I-00004342

1. Lower the implement on the field with the three-point power lift.
 2. Fold open the safety clip **1** on the hand crank **3** of the hoeing depth adjustment.
 3. Open the wing screw **2** on the hoeing depth display **5**.
 4. Turn the hand crank to the left or right until the correct hoeing depth adjustment is reached.
- ➔ The guide wheel **4** of the parallelograms will be lifted or lowered.
5. Tighten the wing screw on the hoeing depth display.
 6. Fold down the safety clip on the hand crank.
 7. Adjust the hoeing depth for all of the other parallelograms in the same way.
 8. Hoe for 10 m.
 9. Check the hoeing depth and readjust if necessary.

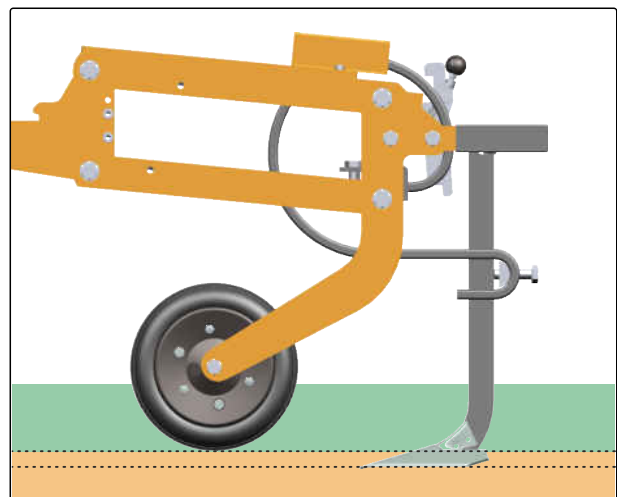


CMS-I-00004346

6.4.7.2 Adjusting the hoeing depth on the EKP

The hoeing depth must be adjusted such that during hoeing operation, the blades of the hoeing tools are guided 2 bis 3 cm below the surface of the arable soil.

On the parallelograms of type EKP-M and EKP-S, the hoeing depth is adjusted via the hoeing tools.

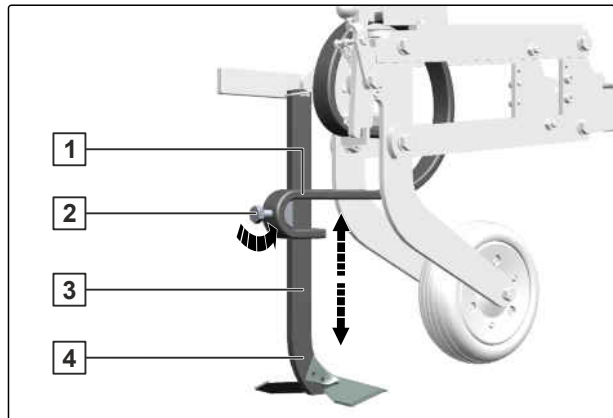


CMS-I-00005115

6 | Preparing the machine

Preparing the implement for operation

1. Lower the implement on the field with the three-point power lift.
2. Remove the bolt **2**.
3. Lift the implement with the three-point power lift until the shaft **3** of the hoeing tool **4** can be moved in the holder **1**.
4. Move the hoeing tool in the correct position.
5. Tighten the bolt.
6. Adjust all of the other hoeing tools in the same way.
7. Hoe for 10 m.
8. Check the hoeing depth and readjust if necessary.



CMS-I-00005123

6.4.8 Adjusting the row protection elements

CMS-T-00005839-B.1

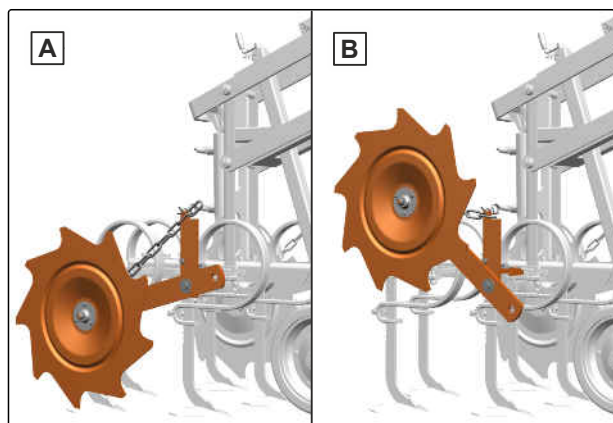
6.4.8.1 Activating or deactivating the hoe protection discs HS

CMS-T-00009224-B.1

6.4.8.1.1 Activating or deactivating the HS hoe protection discs HSZ and HSR

CMS-T-00009225-B.1

- If the hoe protection discs should be used for a hoeing pass, the hoe protection discs must be moved to the active position **A** and adjusted according to the section "Adjusting the lateral distance of the HS hoe protection discs".
- If the hoe protection discs should not be used for a hoeing pass, the hoe protection discs must be moved to the passive position **B**.



CMS-I-00004362



CAUTION

Risk of injury for legs and feet due to falling hoe protection disc

If the released chain slips out of your hand when adjusting the height of the hoe protection disc, the hoe protection disc can fall down and injure your legs and feet.

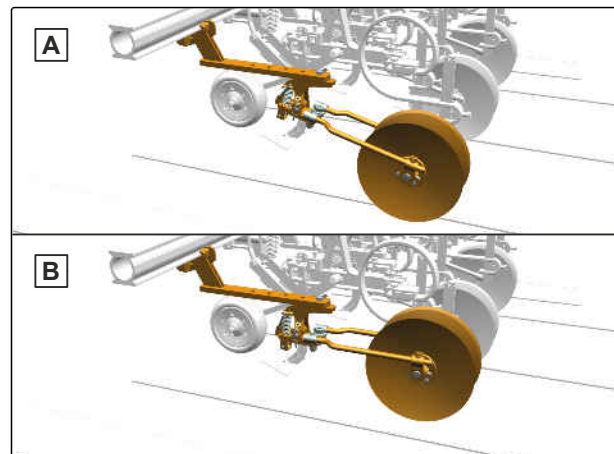
- ▶ Keep your legs and feet out of the area underneath and on the sides of the hoe protection disc.
- ▶ When making adjustments, hold the released chain tightly.

1. *To activate and adjust a hoe protection disc:*
Adjust the hoe protection disc according to the steps 2 to 7 of the section "*Adjusting the height of the HS hoe protection discs*", see page 81. At step 5, however, lower the deactivated hoe protection disc to the position required for the hoeing pass.
2. Follow the instructions in the section "*Adjusting the lateral distance of the HS hoe protection discs*", see page 85.
3. Activate and adjust all hoe protection discs in the same way.
4. *To deactivate a hoe protection disc:*
Adjust the hoe protection disc according to the steps 2 to 7 of the section "*Adjusting the height of the HS hoe protection discs*", see page 81. At step 5, however, lift the hoe protection disc all the way up to the passive position.
5. Deactivate all hoe protection discs in the same way.

6.4.8.1.2 Activating or deactivating HS hoe protection discs HS 85 and HS 62

CMS-T-00009226-B.1

- If the hoe protection discs should be used for a hoeing pass, the hoe protection discs must be moved to the active position **A** and adjusted according to the section "Adjusting the lateral distance of the HS hoe protection discs".
- If the hoe protection discs should not be used for a hoeing pass, the hoe protection discs must be moved to the passive position **B**.



CMS-I-00006495



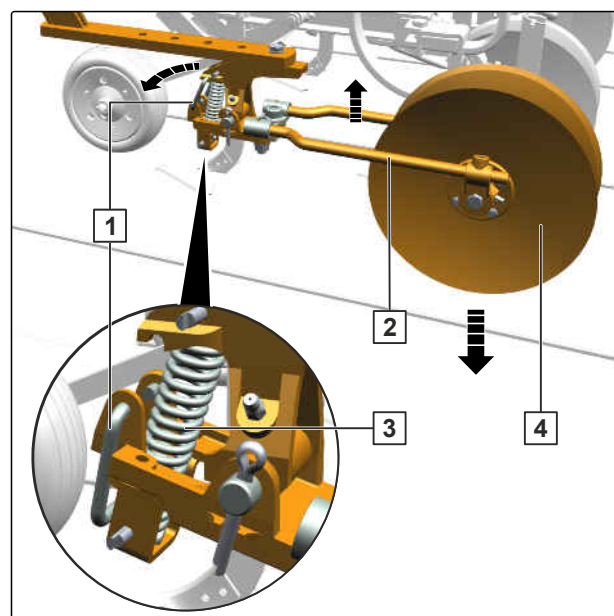
CAUTION

Risk of injury for legs and feet due to falling hoe protection disc

If the hoe protection disc slips out of your hand when adjusting the height of the hoe protection disc, the hoe protection disc can fall down and injure your legs and feet.

- Keep your legs and feet out of the area underneath and on the sides of the hoe protection disc.
- When making adjustments, hold the hoe protection disc tightly.

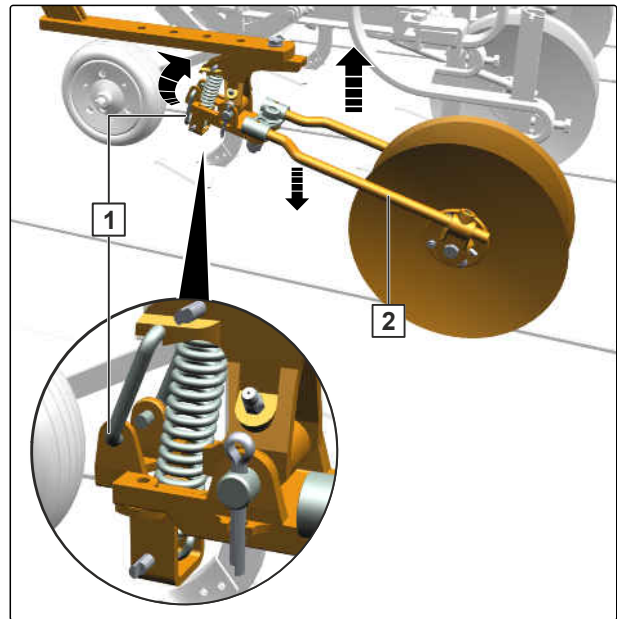
1. To activate and adjust a hoe protection disc set:
Follow steps 2 to 6.
 2. Hold the hoe protection disc set by one of the disc holders **2** and pull it up.
 3. Swivel the locking bracket **1** to the front.
 4. Lower the hoe protection disc set.
- ➔ The hoe protection discs **4** are pulled down by the spring **3** until the hoe protection discs reach the ground.
5. Follow the instructions in the section "Adjusting the lateral distance of the HS hoe protection discs", see page 85.
 6. Activate and adjust all hoe protection discs in the same way.



CMS-I-00006524

7. *To deactivate a hoe protection disc set:*
Follow steps 8 to 10.

8. Hold the hoe protection disc set by one of the disc holders **2** and pull it up and away from the ground.
9. Swivel the locking bracket **1** to the rear until the locking bracket engages.
10. Let go of the hoe protection disc set.

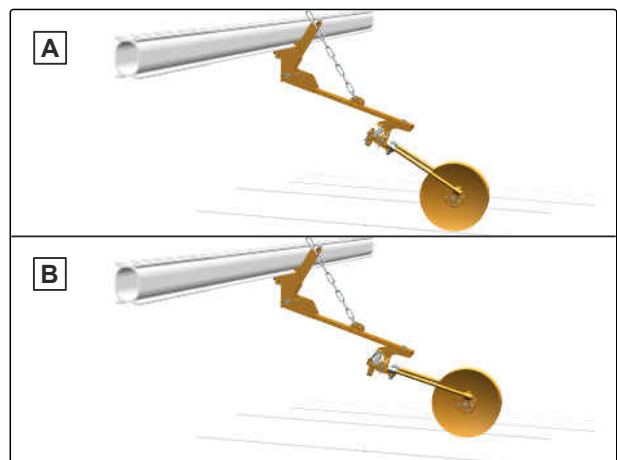


CMS-I-00006523

6.4.8.1.3 Activating or deactivating HS hoe protection discs HSU

CMS-T-00009635-B.1

- If the hoe protection discs should be used for a hoeing pass, the hoe protection discs must be moved to the active position **A** and adjusted according to the section "Adjusting the lateral distance of the HS hoe protection discs".
- If the hoe protection discs should not be used for a hoeing pass, the hoe protection discs must be moved to the passive position **B**.



CMS-I-00006645



CAUTION

Risk of injury for legs and feet due to falling hoe protection disc

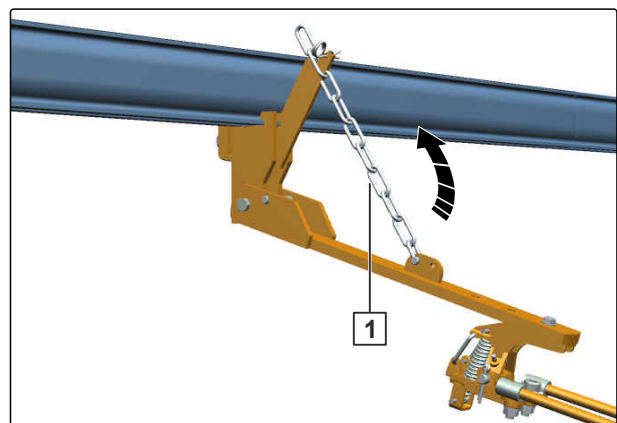
If the released chain or hoe protection disc slips out of your hand when adjusting the height of the hoe protection disc, the hoe protection disc can fall down and injure your legs and feet.

- Keep your legs and feet out of the area underneath and on the sides of the hoe protection disc.
- When making adjustments, hold the released chain or hoe protection disc tightly.

1. To activate and adjust a hoe protection disc set:
Follow steps 2 to 8.

2. When the hoe protection discs are activated for the first time:

Hook the hoe protection disc set in the highest position with the chain **1** according to section "Adjusting the height of HS hoe protection discs", see page 81.



CMS-I-00006641

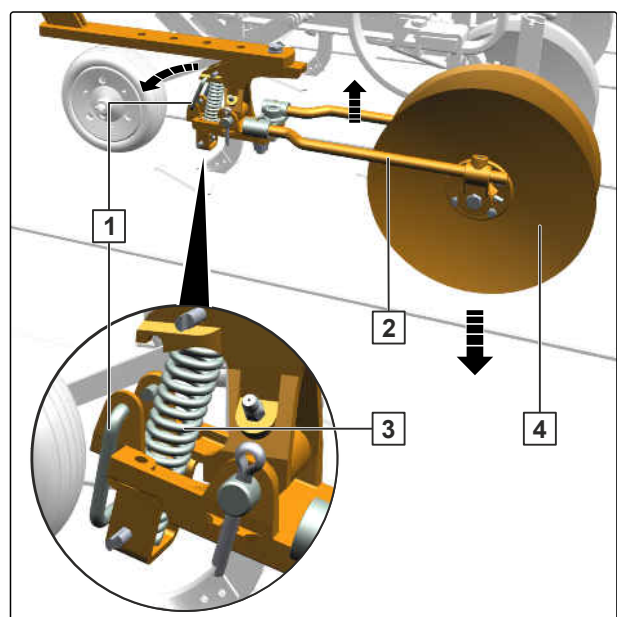
3. Hold the hoe protection disc set by one of the disc holders **2** and pull it up.

4. Swivel the locking bracket **1** to the front.

5. Lower the hoe protection disc set.

➔ The hoe protection discs **4** are pulled down by the spring **3** until the hoe protection discs reach the ground.

➔ When activated for the first time, the hoe protection discs are pulled to the lowest position by the spring.



CMS-I-00006524

6. *When the hoe protection discs are activated for the first time:*

Using the chain **1**, lower the hoe protection disc set according to section "Adjusting the height of HS hoe protection discs", see page 81, until the hoe protection discs touch the ground.

7. Follow the instructions in the section "Adjusting the lateral distance of the HS hoe protection discs", see page 85.

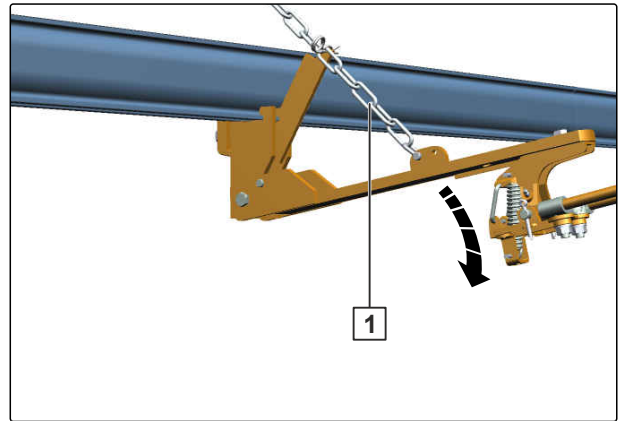
8. Activate and adjust all hoe protection discs in the same way.

9. *To deactivate a hoe protection disc set:*
Follow steps 10 to 12.

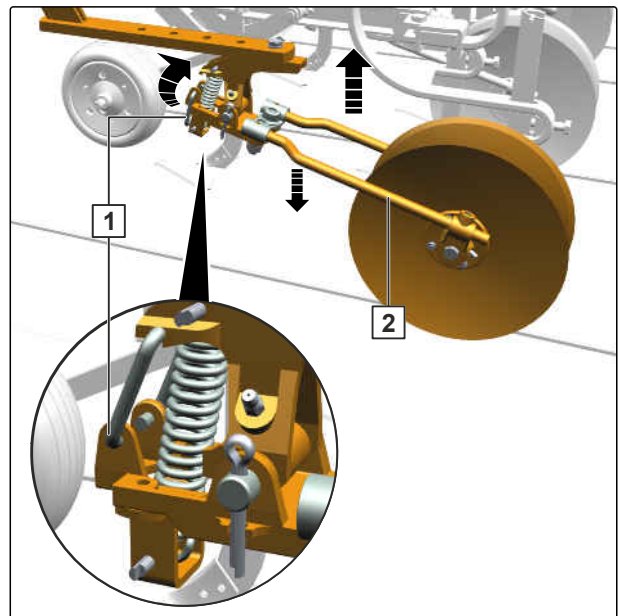
10. Hold the hoe protection disc set by one of the disc holders **2** and pull it up and away from the ground.

11. Swivel the locking bracket **1** to the rear until the locking bracket engages.

12. Let go of the hoe protection disc set.



CMS-I-00006642



CMS-I-00006523

6.4.8.2 Adjusting HS hoe protection discs

CMS-T-00009227-B.1

6.4.8.2.1 Adjusting the height of HS hoe protection discs

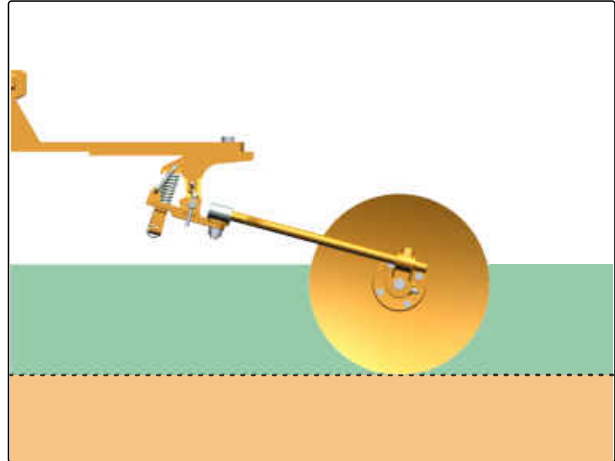
CMS-T-00009228-B.1

The height adjustment depends on the design of the hoe protection disc.

6 | Preparing the machine

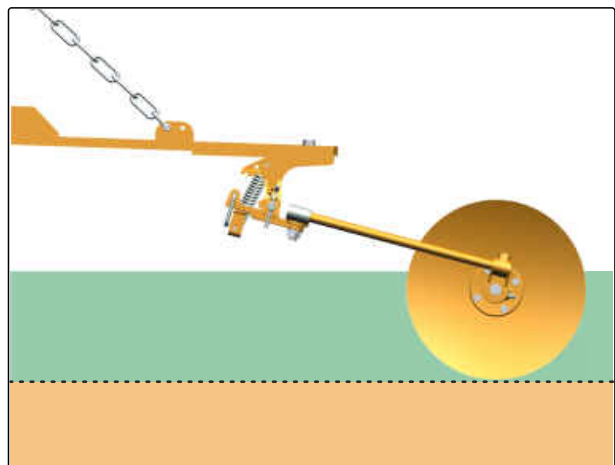
Preparing the implement for operation

For the round HS hoe protection discs HS 85 and HS 62, it is not possible and also not necessary to adjust the height. When these discs are activated, they automatically run along on the ground during hoeing operation thanks to the spring tension.



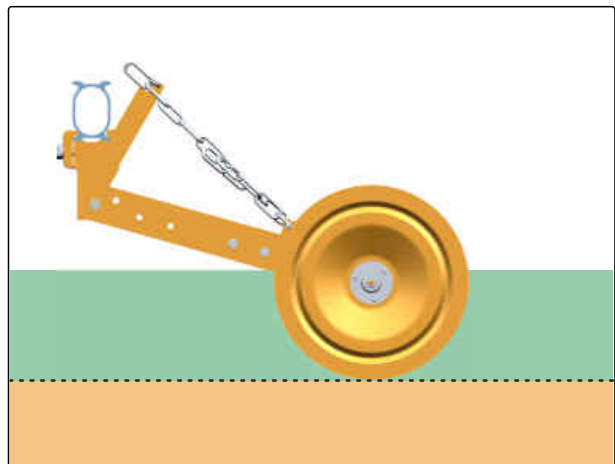
CMS-I-00006652

The height of the round HS hoe protection discs HSU must be adjusted with the chain such that the hoe protection discs that are lowered via the locking bracket have contact with and are driven by the ground during hoeing operation.



CMS-I-00006643

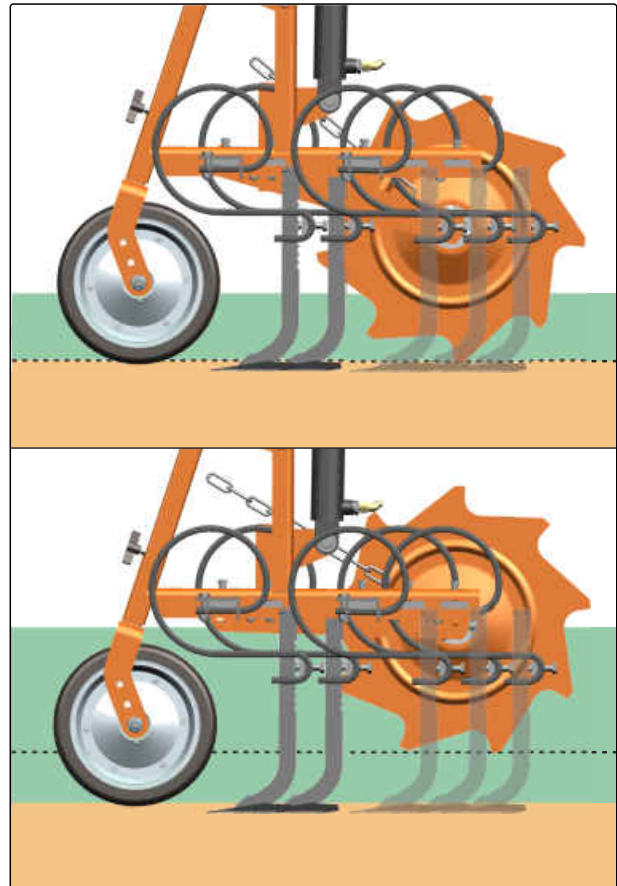
The height of the round HS hoe protection discs HSR must be adjusted with the chain such that each hoe protection disc has contact with and is driven by the ground during hoeing operation.



CMS-I-00006644

With the serrated HS hoe protection discs HSZ, the adjustment of the height depends on the growth stage and size of the crops at the time of the hoeing pass:

- For younger or small crops, the hoe protection discs must be adjusted such that each hoe protection disc has contact with and is driven by the ground during hoeing operation.
- For older or tall crops, the hoe protection discs must be adjusted such that each hoe protection disc also has contact with and is driven by the leaves of the crops during hoeing operation.



CMS-I-00004348



CAUTION

Risk of injury for legs and feet due to falling hoe protection disc

If the released chain slips out of your hand when adjusting the height of the hoe protection disc, the hoe protection disc can fall down and injure your legs and feet.

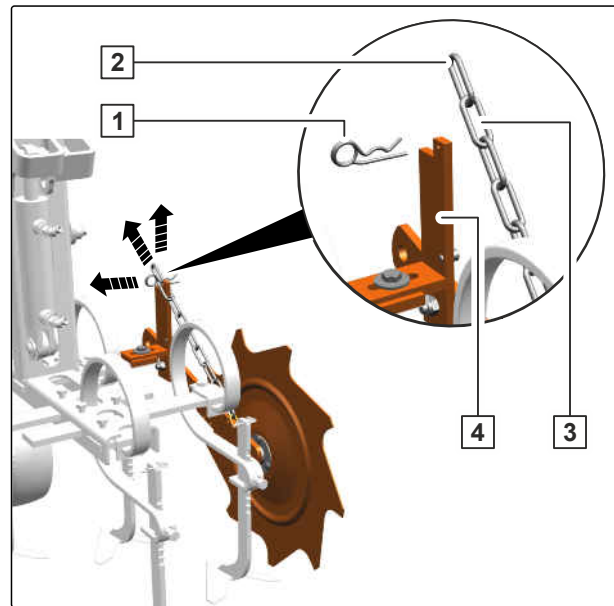
- ▶ Keep your legs and feet out of the area underneath and on the sides of the hoe protection disc.
- ▶ When making adjustments, hold the released chain tightly.

1. *To lift the hoe protection disc:*
Follow steps 2 to 7.
2. Lower the implement on the field with the three-point power lift.

6 | Preparing the machine

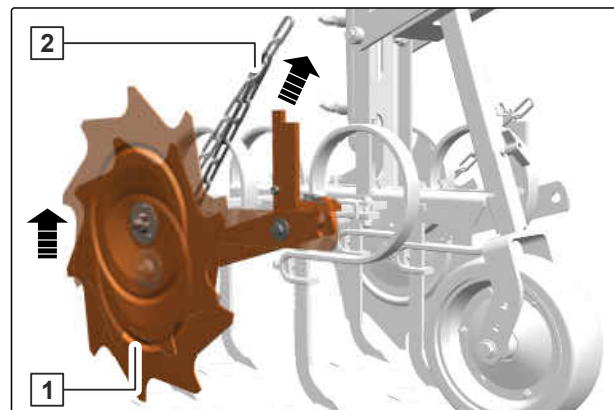
Preparing the implement for operation

3. Pull the spring cotter pin **1** out of the hoe protection disc carrier **4**.
4. Pull the chain **2** towards the implement slide rail and release the chain link **3** from the hoe protection disc carrier.



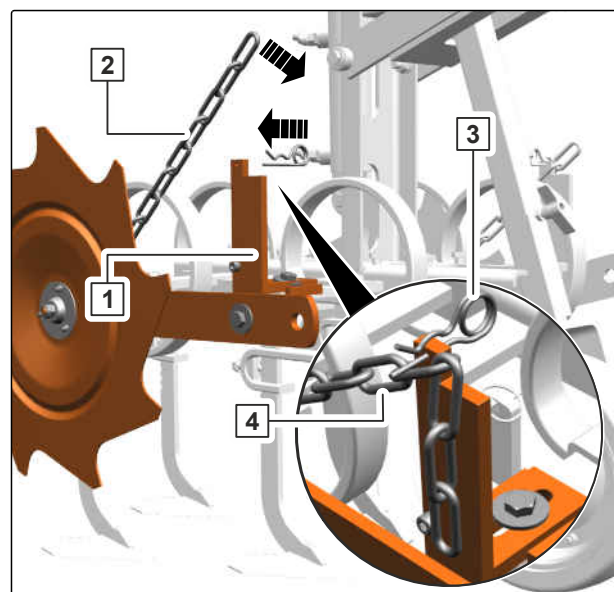
CMS-I-00004349

5. Lift the hoe protection disc **1** with the chain **2** until the hoe protection disc is in the right position.



CMS-I-00004350

6. Hook the chain on the hoe protection disc carrier **1** with the suitable chain link **2**.
7. Secure the chain **4** again with the spring cotter pin **3**.



CMS-I-00004351



CAUTION

Risk of injury for legs and feet due to falling hoe protection disc

If the released chain slips out of your hand when adjusting the height of the hoe protection disc, the hoe protection disc can fall down and injure your legs and feet.

- Keep your legs and feet out of the area underneath and on the sides of the hoe protection disc.
- When making adjustments, hold the released chain tightly.

8. *To lower the hoe protection disc:*
Perform steps 2 to 7 as described, but lower the hoe protection disc in step 5.
9. Adjust the height for all of the hoe protection discs in the same way.

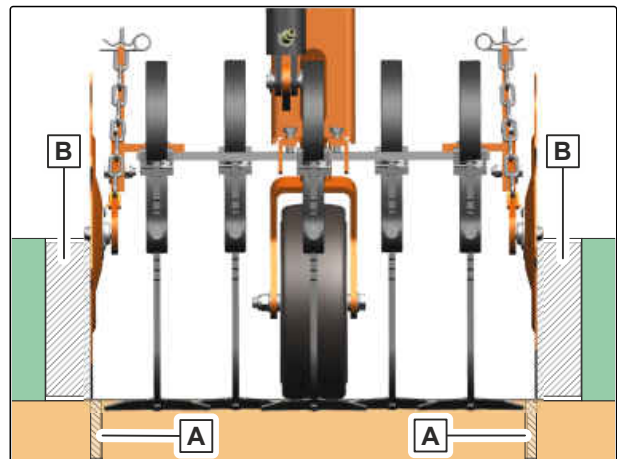
6.4.8.2.2 Adjusting the lateral distance of the HS hoe protection discs

CMS-T-00009229-B.1

6.4.8.2.2.1 Adjusting the lateral distance of HS hoe protection discs mounted on a parallelogram

CMS-I-00009230-B.1

During hoeing operation, each hoe protection disc must run at a distance of 1 cm **A** from the end of the blade of the outermost hoe share and at a distance of 4 cm **B** from the plant row.

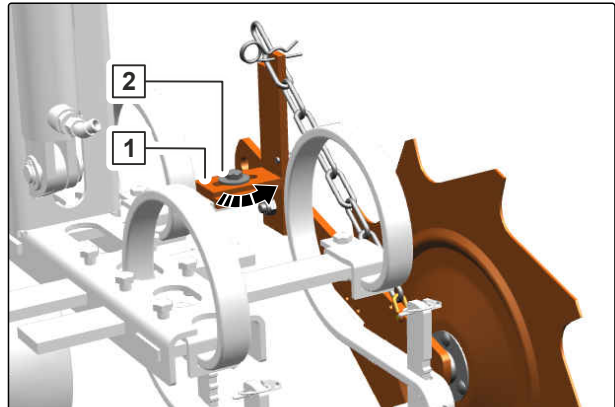


CMS-I-00004352

6 | Preparing the machine

Preparing the implement for operation

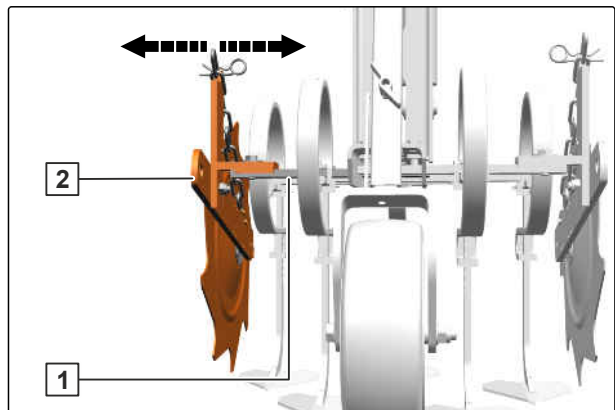
1. Lower the implement on the field with the three-point power lift.
2. Loosen the bolt **2** for the hoe protection disc carrier **1**.



CMS-I-00004353

3. Move the hoe protection disc **2** inwards or outwards on the tool carrier **1** until the hoe protection disc is in the right position.
4. *If the sliding path is sufficient for the required position of the hoe protection disc:*
Tighten the bolt for the hoe protection disc carrier

or

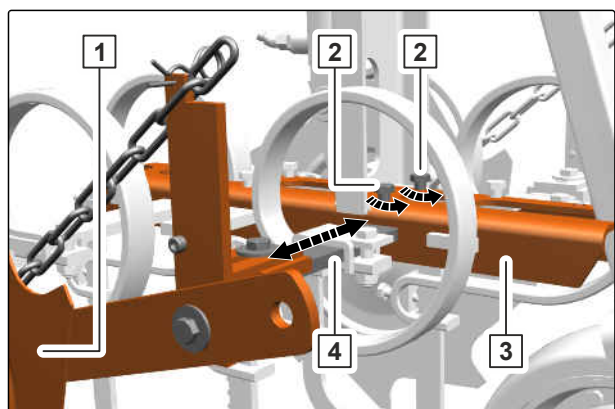


CMS-I-00004354

If the sliding path is not sufficient for the required position of the hoe protection disc:
Follow steps 5 to 12.

5. Move the hoe protection disc inwards or outwards on the tool carrier up to the stop.
6. Tighten the bolt for the hoe protection disc carrier.

7. Loosen the bolts **2** on the tool carrier **4**.
8. Move the hoe protection disc **1** with the tool carrier inwards or outwards in the share bracket **3** until the hoe protection disc is in the right position.



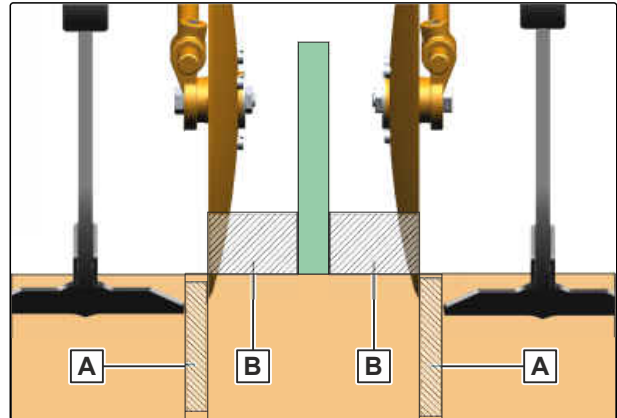
CMS-I-00004355

9. Tighten the bolts on the tool carrier.
10. *If one hoe share is installed on the tool carrier:*
Move the hoe share on the shifted tool carrier to the previous position, see page 73, section "Adjusting the hoeing width".
11. Adjust the lateral distance for all of the hoe protection discs in the same way.

6.4.8.2.2.2 Adjusting the lateral distance of HS hoe protection discs mounted on the implement slide rail

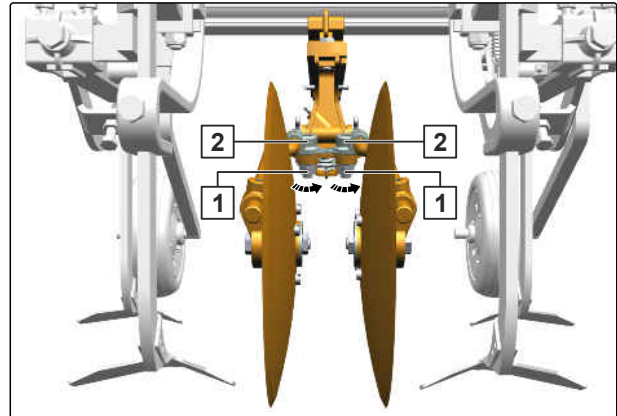
CMS-T-00009231-B.1

During hoeing operation, each hoe protection disc must run at a distance of 1 cm **A** from the end of the blade of the outermost hoe share and at a distance of 4 cm **B** from the plant row.



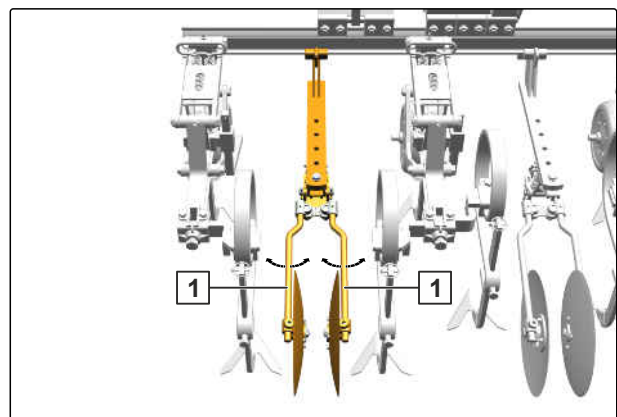
CMS-I-00006655

1. Lower the implement on the field with the three-point power lift.
2. *To adjust the lateral distance of HS hoe protection discs HS 85, HS 62 or HSU mounted on the implement slide rail:*
follow steps 3 to 6, and skip to step 7 for all other hoe protection disc mounted on the implement slide rail.
3. Loosen the nuts **1** of the pivot bearing **2** on a hoe protection disc set.



CMS-I-00006539

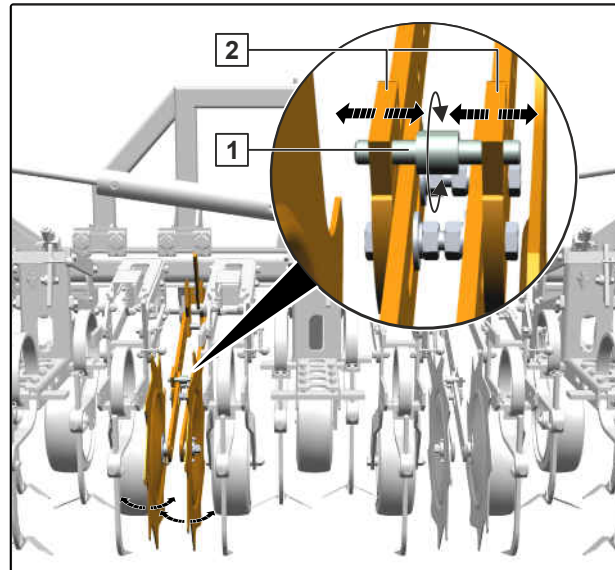
4. Swivel the disc holder **1** inwards or outwards until the two hoe protection discs are in the right position.
5. Retighten the nuts of the pivot bearing.
6. Adjust the lateral distance for all of the hoe protection discs in the same way.



CMS-I-00006540

7. *To adjust the lateral distance of HS hoe protection discs HSZ or HSR mounted on the implement slide rail:*
 Follow steps 8 and 9.

8. Screw the double threaded screw **1** into the hoe protection disc carriers **2** or out of the hoe protection disc carriers until the two hoe protection discs are in the right position.
9. Adjust the lateral distance for all of the hoe protection discs in the same way.



CMS-I-00006541

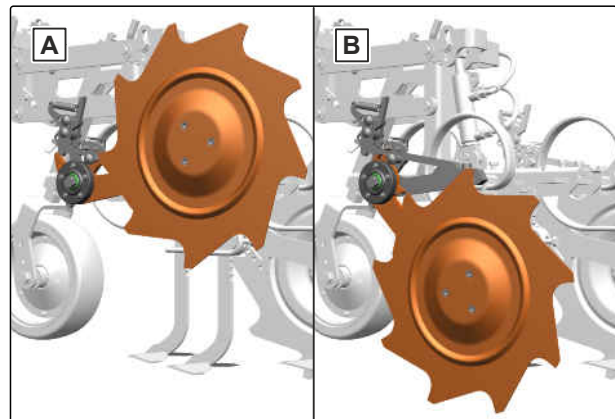
6.4.8.3 Adjusting the RowDisc hoe protection discs

CMS-T-00012821-B.1

6.4.8.3.1 Activating and adjusting the height of RowDisc hoe protection discs

CMS-T-00012817-B.1

If you want to use the RowDisc hoe protection discs for a hoeing pass, the RowDisc hoe protection discs must be moved from the passive position **A** to the active position **B** and their height must be adjusted.



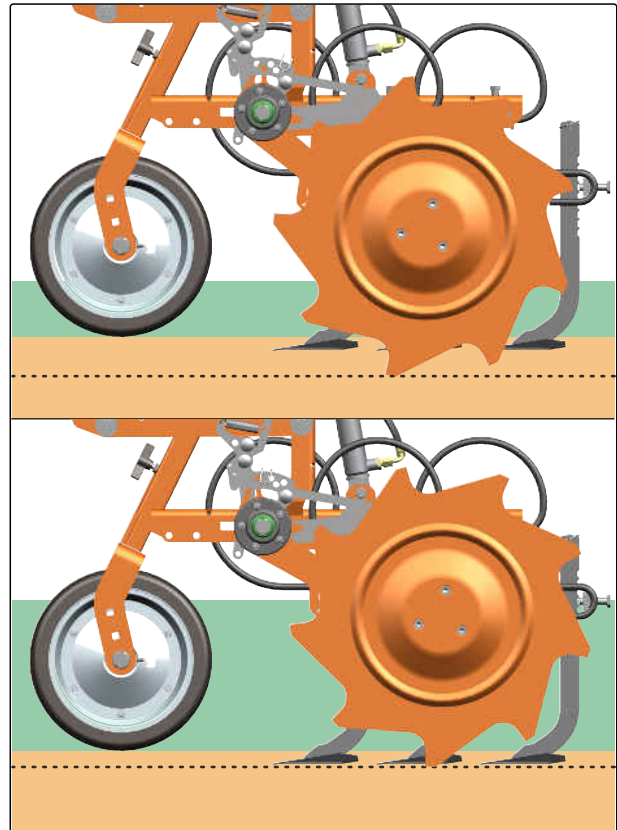
CMS-I-00008392

The height adjustment depends on the design of the hoe protection discs:

With the RowDisc SR hoe protection discs with serrated discs and RowDisc RD hoe protection discs with smooth discs, the adjustment of the height depends on the growth stage and size of the crops at the time of the hoeing pass:

- For younger or small crops, the hoe protection discs should have contact with and be driven by the ground during hoeing operation. During activation, the hoe protection disc is lowered onto the ground. Afterwards, no more adjustments are made to the height.
- For older or large crops, the hoe protection discs should have contact with and be driven by the leaves of the crops during hoeing operation. After activation, the hoe protection discs must be positioned higher relative to the leaves.

The RowDisc SD hoe protection discs with concave discs should always have contact with and be driven by the soil during hoeing operation. During activation, the hoe protection disc is lowered onto the ground. Afterwards, no more adjustments are made to the height.



CMS-I-00008405

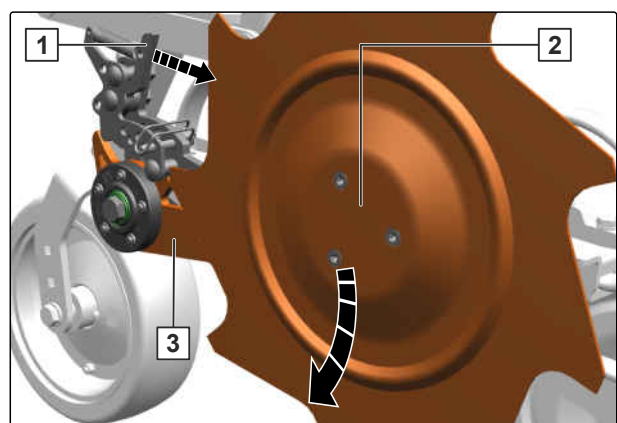


CAUTION

Risk of injury due to falling hoe protection disc

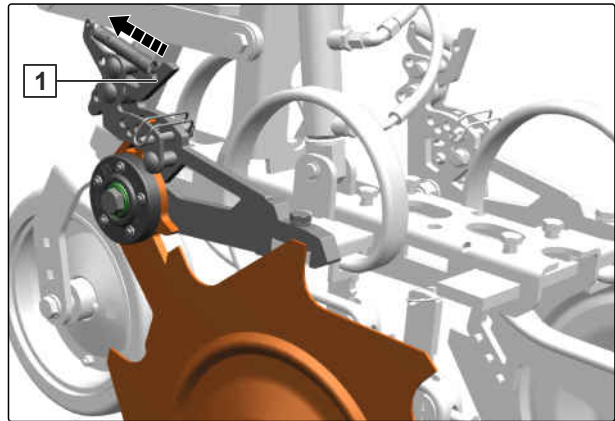
- Hold onto the hoe protection disc tightly when activating, adjusting and deactivating.

1. Lower the implement on the field with the three-point power lift.
2. Grab the RowDisc hoe protection disc **2** by the holder **3** and pull the bar **1** to the rear.
3. Lower the RowDisc hoe protection disc down to the ground.



CMS-I-00008397

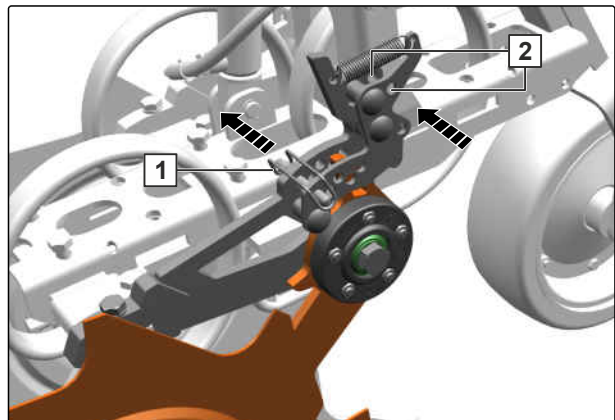
4. Allow the bar **1** to return to its initial position.



CMS-I-00008396

5. *If the RowDisc hoe protection discs should follow the ground contours at a greater depth that the linch pin allows in the rearmost position:*

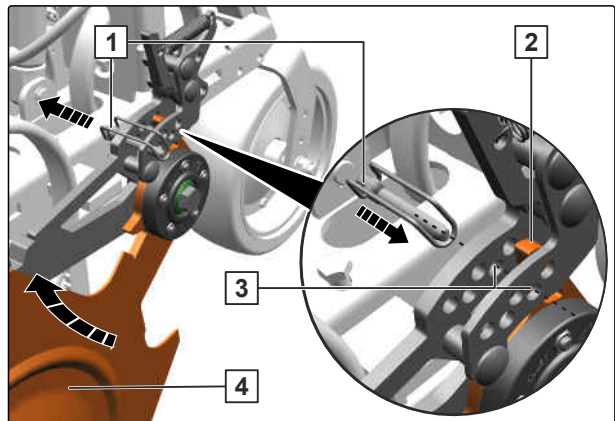
Pull out the linch pin **1** on the activated RowDisc hoe protection disc and park it in the holes **2**.



CMS-I-00008361

6. *If the SR and RD type RowDisc hoe protection discs should be used on older or large crops:*
 Follow steps 7 to 9.

7. Pull out the linch pin **1** on the activated RowDisc hoe protection disc.
8. Lift the RowDisc hoe protection disc **4** to the desired height.
9. Insert the linch pin through the holes **3** directly behind the retaining lug **2**.
10. Activate and adjust the height of the RowDisc hoe protection discs on all of the parallelograms in the same way.

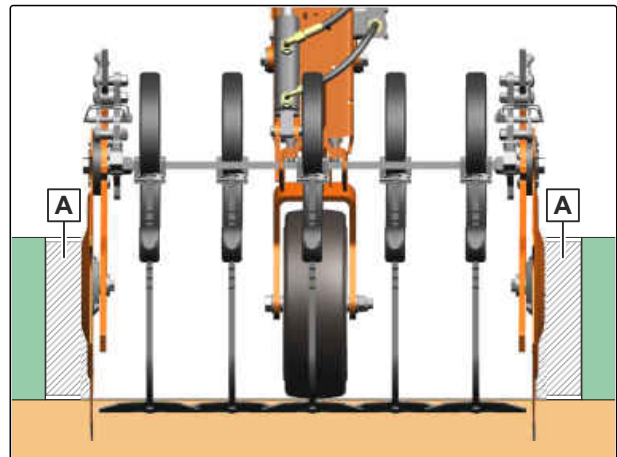


CMS-I-00008402

6.4.8.3.2 Adjusting the lateral distance of the RowDisc hoe protection discs

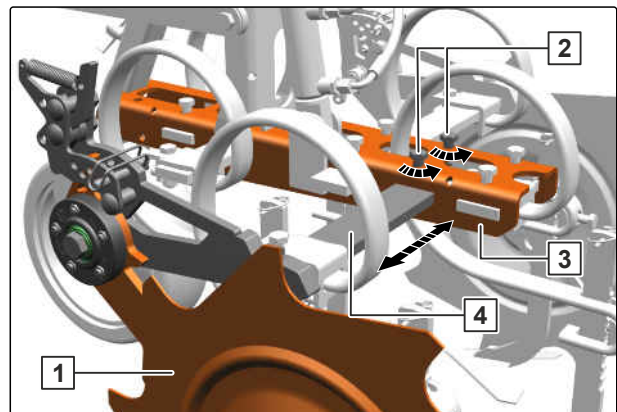
CMS-T-00012820-B.1

During hoeing operation, each RowDisc hoe protection disc should run at a distance **A** of 4 cm from the crop plant row.



CMS-I-00008304

1. Lower the implement on the field with the three-point power lift.
2. Loosen the bolts **2** on the tool carrier **4**.
3. Move the RowDisc hoe protection disc **1** with the tool carrier inwards or outwards in the share bracket **3** until the RowDisc hoe protection disc is in the right position.
4. Tighten the bolts.
5. Adjust the lateral distance for all of the RowDisc hoe protection discs in the same way.



CMS-I-00008306

6.4.8.3.3 Securing the RowDisc hoe protection discs against unintentional deactivation

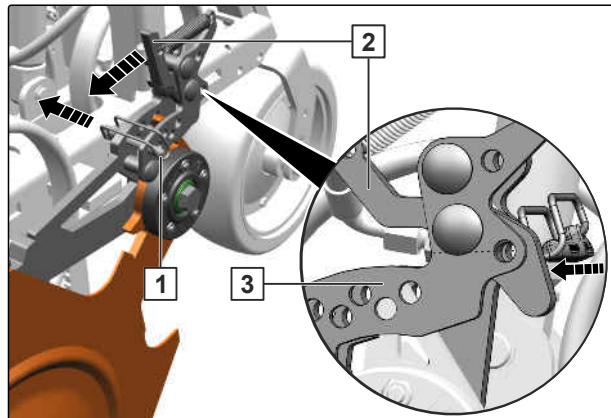
CMS-T-00012819-B.1

Hard soils or fast driving speeds or both together can make an activated RowDisc hoe protection disc spring up so strongly during hoeing operation that the retaining lug on the disc holder can overcome the bar and the RowDisc can unintentionally move into the passive position. To prevent this from happening, the bar can be locked with the linch pin.

6 | Preparing the machine

Preparing the implement for operation

1. Lower the implement on the field with the three-point power lift.
2. Pull out the linch pin **1** on the activated RowDisc hoe protection disc.
3. Pull the bar **2** to the rear far enough so that the holes in the positioning plate **3** and the hole in the bar are lined up.
4. Insert the linch pin through the holes.
5. Secure all of the RowDisc hoe protection discs against unintentional deactivation in the same way.



CMS-I-00008295

NOTE

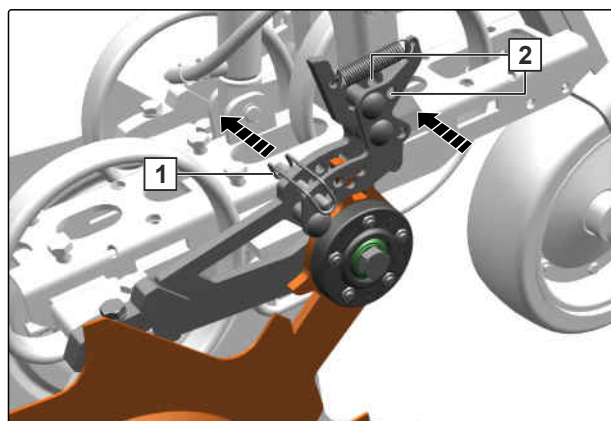
To prepare the implement for road travel, the securing device against unintentional deactivation must be released on all RowDisc hoe protection discs on the sections, and these RowDisc hoe protection discs must be moved into passive position to comply with the permissible transport width according to the section "Deactivating RowDisc hoe protection discs", see page 93.

6.4.8.3.4 Increasing the contact pressure of the RowDisc hoe protection discs

CMS-T-00012959-B.1

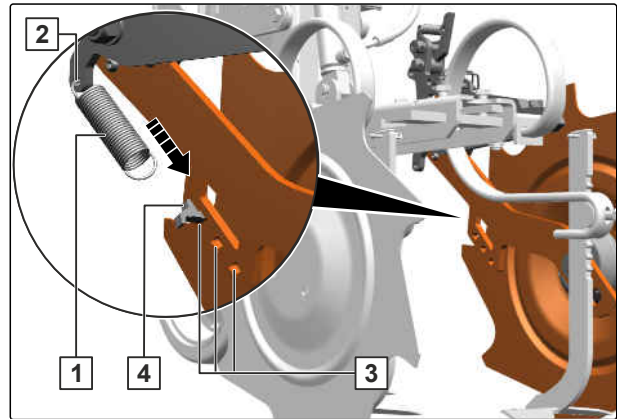
Using a tension spring, the contact pressure of the RowDisc hoe protection discs onto the soil can be increased. The further down the spring holder is inserted, the greater the contact pressure.

1. Lower the implement on the field with the three-point power lift.
2. Pull out the linch pin **1** on the activated RowDisc hoe protection disc and park it in the holes **2**.



CMS-I-00008361

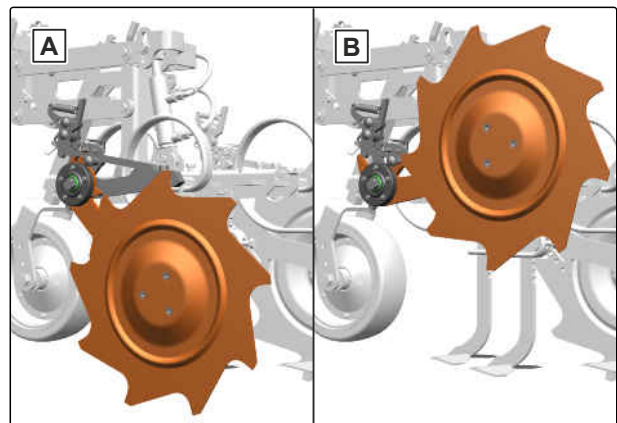
3. Hook one end of the tension spring **1** into the hole **2**.
4. Insert the spring holder **4** into one of the three openings **3**.
5. Pull the free end of the tension spring towards the spring holder and hook it onto the spring holder.
6. Increase the contact pressure for all of the RowDisc hoe protection discs in the same way.



CMS-I-00008364

6.4.8.3.5 Deactivating the RowDisc hoe protection disc

- If the RowDisc hoe protection discs should not be used for a hoeing pass, the RowDisc hoe protection discs must be moved from the active position **A** to the passive position **B**.
- To prepare the implement for road travel, the RowDisc hoe protection discs of the parallelograms on the sections must be moved from the active position **A** to the passive position **B**.



CMS-T-00012822-B.1

CMS-I-00008391



CAUTION

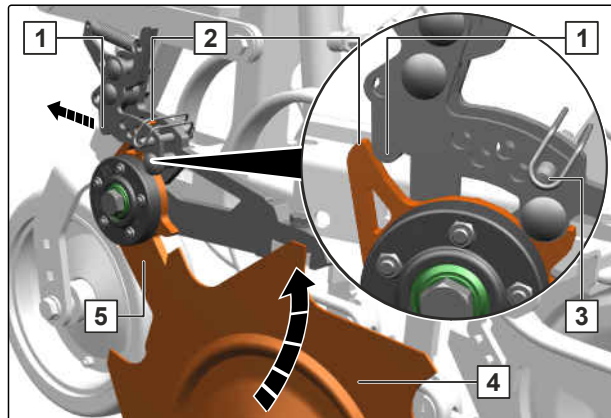
Risk of injury due to falling hoe protection disc

- Hold onto the hoe protection disc tightly when activating, adjusting and deactivating.

6 | Preparing the machine

Preparing the implement for operation

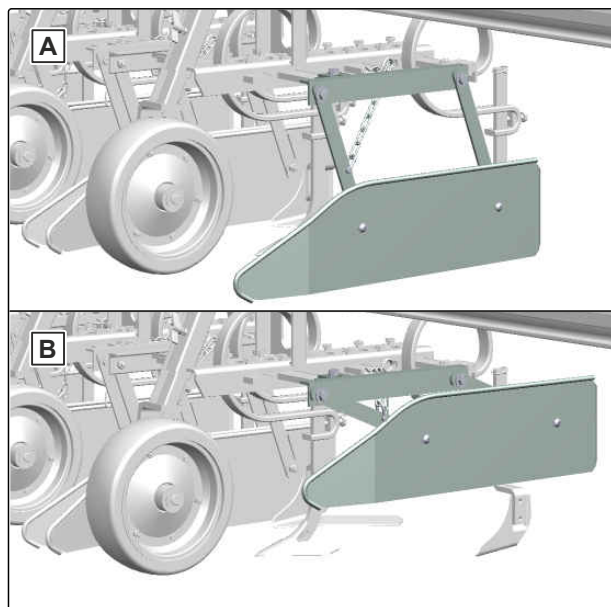
1. Lower the implement on the field with the three-point power lift.
2. *If the RowDisc hoe protection disc was secured against unintentional deactivation:*
Pull the linch pin **3** out of the bar **1** and insert it in the rearmost position.
3. Grab the RowDisc hoe protection disc **4** by the holder **5** and lift it far enough so that the retaining lug **2** presses the bar down and to the front and slides in front of the bar.
4. Deactivate the RowDisc hoe protection discs on all of the parallelograms or the parallelograms on the sections in the same way.



CMS-I-00008398

6.4.8.4 Activating or deactivating the row protection panels

- If the row protection panels should be used for a hoeing pass, the row protection panels must be moved to the active position **A** and adjusted according to the section "*Adjusting the lateral distance of the row protection panels*".
- If the row protection panels should not be used for a hoeing pass, the row protection panels must be moved to the passive position **B**.



CMS-I-00006558



CAUTION

Risk of injury for legs and feet due to falling row protection panel

If the released chain slips out of your hand when adjusting the height of the row protection panel, the row protective panel can fall down and injure your legs and feet.

- ▶ Keep your legs and feet out of the area underneath and on the sides of the row protection panel.
- ▶ When making adjustments, hold the released chain tightly.

1. *To activate and adjust a row protection panel:*
Adjust the row protection panel according to the steps 2 to 7 of the section "*Adjusting the height of the row protection panels*", see page 96. At step 5, however, lower the deactivated row protection panel to the position required for the hoeing pass.
2. Observe the section "*Adjusting the lateral distance of the row protection panels*", see page 98.
3. Activate and adjust all of the row protection panels in the same way.
4. *To deactivate a row protection panel:*
Adjust the row protection panel according to the steps 2 to 7 of the section "*Adjusting the height of the row protection panels*", see page 96. At step 5, however, lift the row protection panel all the way up to the passive position.
5. Deactivate all of the row protection panels in the same way.

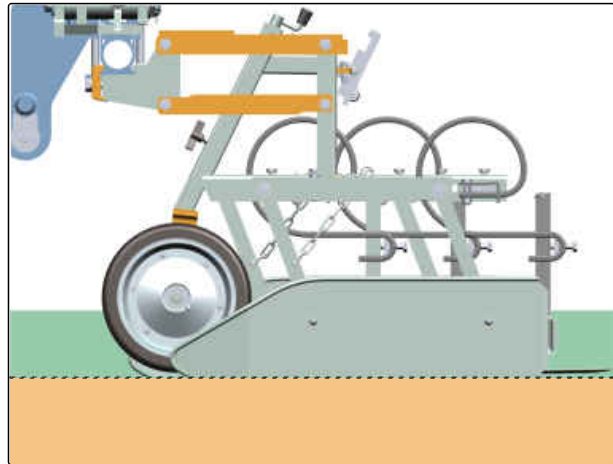
6.4.8.5 Adjusting the row protection panels

CMS-T-00009232-B.1

6.4.8.5.1 Adjusting the height of the row protection panels

CMS-T-00009233-B.1

The height of the row protection panels must be adjusted such that each row protection panel has contact with the ground during hoeing operation.



CMS-I-00006556



CAUTION

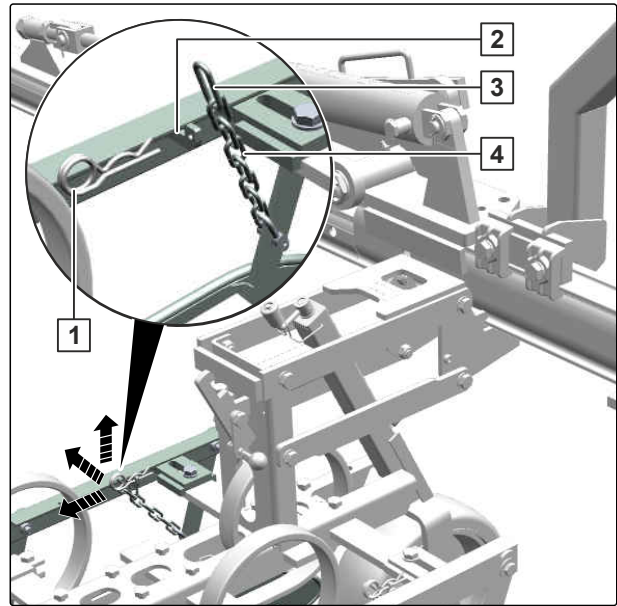
Risk of injury for legs and feet due to falling row protection panel

If the released chain slips out of your hand when adjusting the height of the row protection panel, the row protective panel can fall down and injure your legs and feet.

- Keep your legs and feet out of the area underneath and on the sides of the row protection panel.
- When making adjustments, hold the released chain tightly.

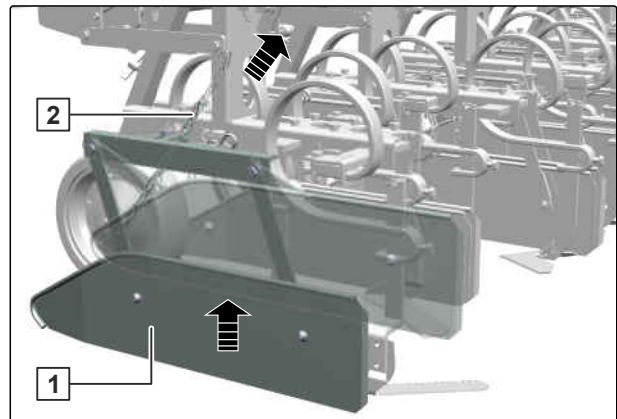
1. *To lift the row protection panel:*
Follow steps 2 to 7.
2. Lower the implement on the field with the three-point power lift.

3. Pull the spring cotter pin **1** out of the row protection panel carrier **2**.
4. Pull the chain **3** up and release the chain link **4** from the row protection panel carrier.



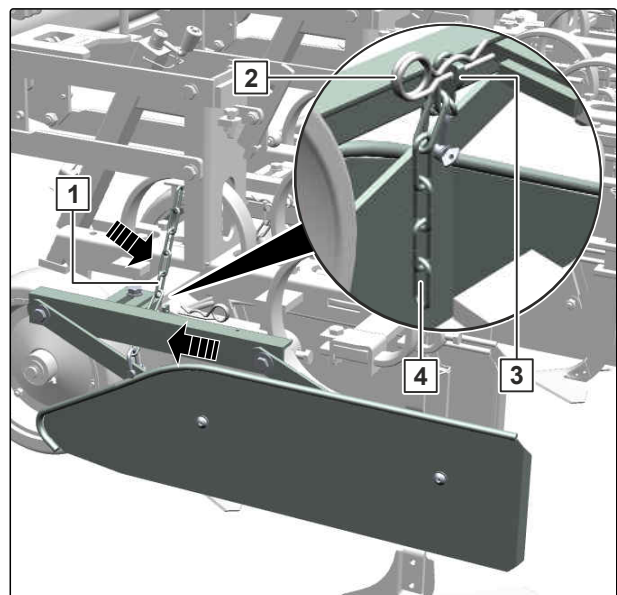
CMS-I-00006562

5. Lift the row protection panel **1** with the chain **2** until the row protection panel is in the right position.



CMS-I-00006563

6. Hook the chain **4** on the row protection panel carrier **3** with the suitable chain link **1**.
7. Secure the chain again with the spring cotter pin **2**.



CMS-I-00006564



CAUTION

Risk of injury for legs and feet due to falling row protection panel

If the released chain slips out of your hand when adjusting the height of the row protection panel, the row protective panel can fall down and injure your legs and feet.

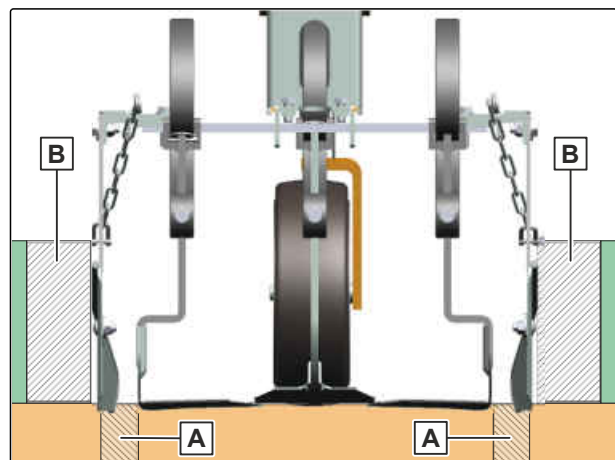
- Keep your legs and feet out of the area underneath and on the sides of the row protection panel.
- When making adjustments, hold the released chain tightly.

8. *To lower the row protection panel:*
Perform steps 2 to 7 as described, but lower the row protection panel in step 5.
9. Adjust the height for all of the row protection panels in the same way.

6.4.8.5.2 Adjusting the lateral distance of the row protection panels

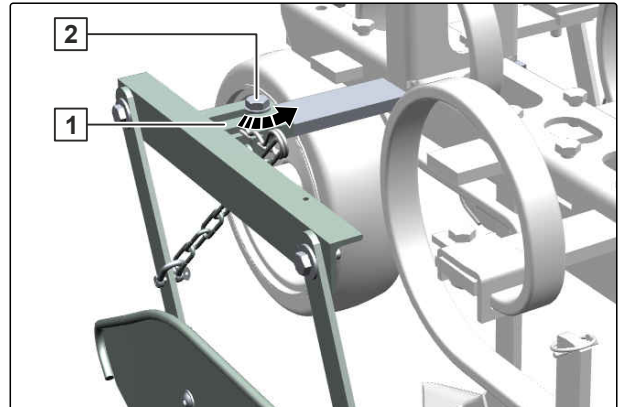
CMS-T-00009234-B.1

During hoeing operation, each row protection panel must run at a distance of 1 cm **A** from the end of the blade of the outermost hoe share and at a distance of 4 cm **B** from the plant row.



CMS-I-00006568

1. Lower the implement on the field with the three-point power lift.
2. Loosen the bolt **2** for the row protection panel carrier **1**.

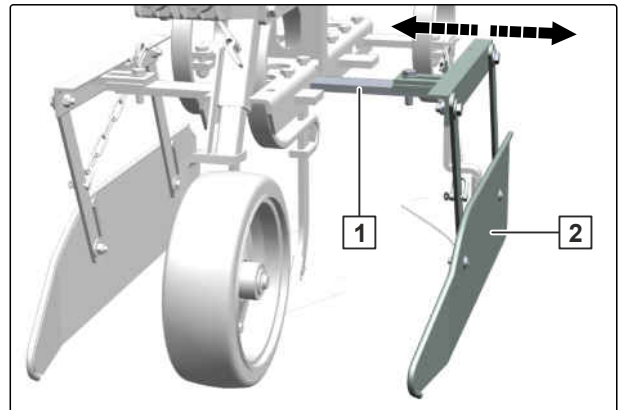


CMS-I-00006569

3. Move the row protection panel **2** inwards or outwards on the tool carrier **1** until the row protection panel is in the right position.
4. *If the sliding path is sufficient for the required position of the row protection panel:*
Tighten the bolt for the row protection panel carrier

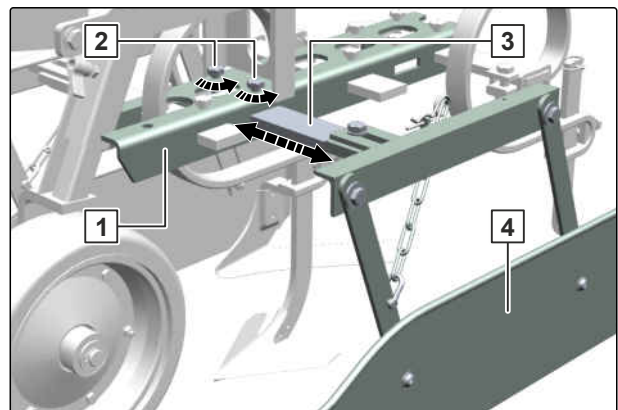
or

If the sliding path is not sufficient for the required position of the row protection panel:
Follow steps 5 to 12.



CMS-I-00006570

5. Move the row protection panel inwards or outwards on the tool carrier up to the stop.
6. Tighten the bolt for the row protection panel carrier.
7. Loosen the bolts **2** on the tool carrier **3**.
8. Move the row protection panel **4** with the tool carrier inwards or outwards in the share bracket **1** until the row protection panel is in the right position.
9. Tighten the bolts on the tool carrier.



CMS-I-00006572

10. *If a hoeing tool is installed on the tool carrier:*
Move the hoe share on the shifted tool carrier to the previous position, see page 73, section "Adjusting the hoeing width".
11. Adjust the lateral distance for all of the row protection panels in the same way.

6.4.9 Activating or deactivating the finger hoes

CMS-T-00006074-E.1

- If the finger hoes are to be used for a hoeing pass, the finger hoes must be activated or adjusted according to the section "Adjusting the finger hoes".
- If the finger hoes are not to be used for a hoeing pass, the finger hoes must be deactivated.



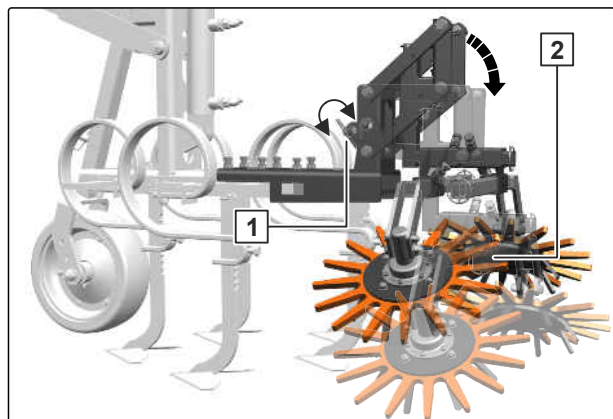
CAUTION

Risk of injury for hands due to the shearing action of the star parallelogram

When lifting and lowering the star parallelogram, the components of the star parallelogram can act like the scissors.

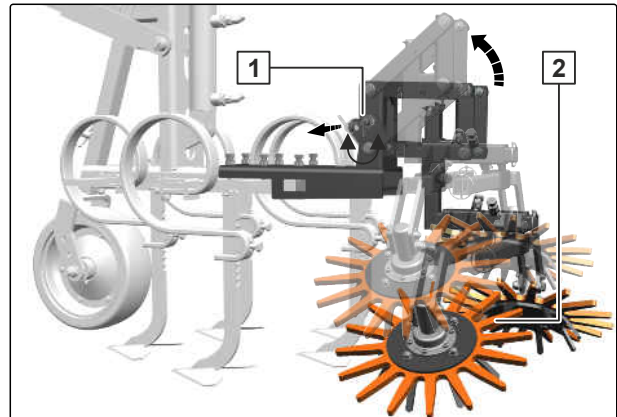
- ▶ Be particularly careful when lifting and lowering the star parallelogram.
- ▶ When lifting and lowering the star parallelogram, do not put your hands in the star parallelogram.

1. *To activate the finger hoe set on a parallelogram:*
Follow steps 2 to 6.
2. Lower the implement on the field with the three-point power lift.
3. Turn the locking latch **1** by 180 degrees and allow it to engage in the locking notch.
➔ The locking pin will be pulled out of the hole in the frame carrier and locked in the released position.
4. Completely lower the finger hoe set **2**.
5. Activate the finger hoe sets on all of the other parallelograms in the same way.



CMS-I-00004364

6. *To adjust the finger hoes:*
Follow the instructions in the section "Adjusting the finger hoes", see page 101.
7. *To deactivate the finger hoe set on a parallelogram:*
Follow steps 8 to 11.
8. Lower the implement on the field with the three-point power lift.
9. Slightly lift the activated finger hoe set **2**.
10. Pull the locking latch **1** out of the locking notch and turn by 180 degrees.
➔ The locking pin of the locking latch slides inwards against the frame carrier.
11. Lift the finger hoe set further until the locking pin of the locking latch slides into the hole in the frame carrier and holds the finger hoe set in the passive position.
12. Deactivate the finger hoe sets on all of the other parallelograms in the same way.



CMS-I-00004363

6.4.10 Adjusting the finger hoes

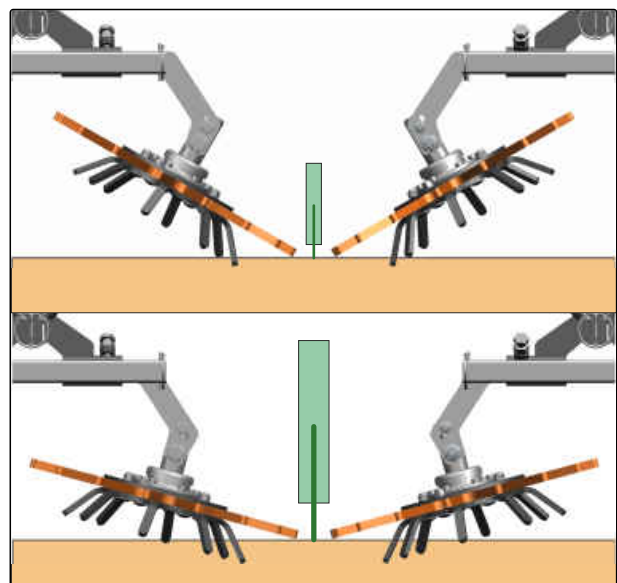
CMS-T-00006060-E.1

6.4.10.1 Adjusting the inclination angle of the finger hoes

CMS-T-00006071-E.1

The adjustment of the inclination angle depends on the growth stage of the crop during the hoeing pass:

- For young and small crops, the finger hoes must be adjusted such that the finger hoes stand at an angle of 40 degrees to the soil.
- For established and bigger crops, the finger hoes must be adjusted such that the finger hoes stand at an angle of 20 degrees to the soil.



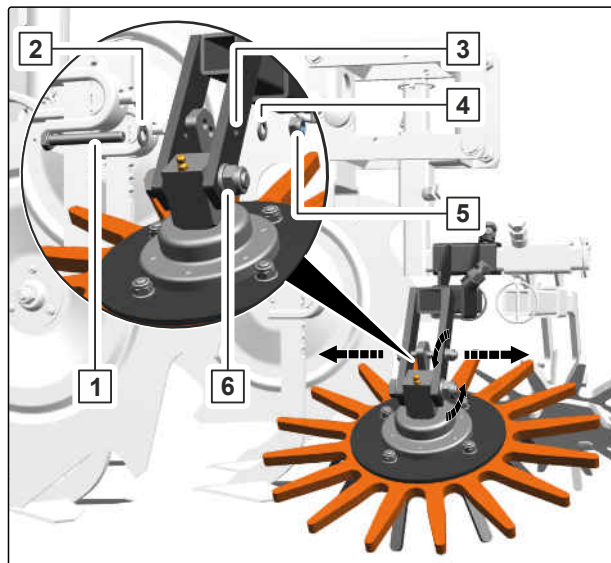
CMS-I-00004356



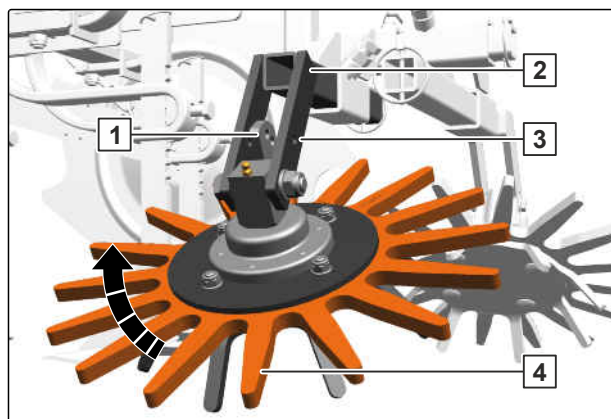
REQUIREMENTS

☑ The finger hoe set is activated, see page 100

1. *To change the inclination from 40 degrees to 20 degrees:*
Follow steps 2 to 11.
2. Lower the implement on the field with the three-point power lift.
3. Unscrew the nut **5** of the adjuster screw **1**.
4. Remove the washer **4**.
5. Pull the adjuster screw along with the washer **2** out of the holes **3**.
6. Loosen the nut **6** of the retaining screw.
7. Swivel the finger hoe **4** into a flatter position until the holes **3** of the section **2** and the upper hole of the bearing unit **1** are flush.
8. Insert the adjuster screw along with the washer through the holes.
9. Put the washer on the adjuster screw.
10. Screw on the nut of the adjuster screw and tighten it.
11. Tighten the nut of the retaining screw.
12. *To change the inclination from 40 degrees to 20 degrees:*
Repeat steps 2 to 11 as described, but at step 7, swivel the finger hoe to a steeper position until the lower holes of the section and the bearing unit are flush.
13. Adjust the inclination angle in the same way for all of the finger hoes.



CMS-I-00004429



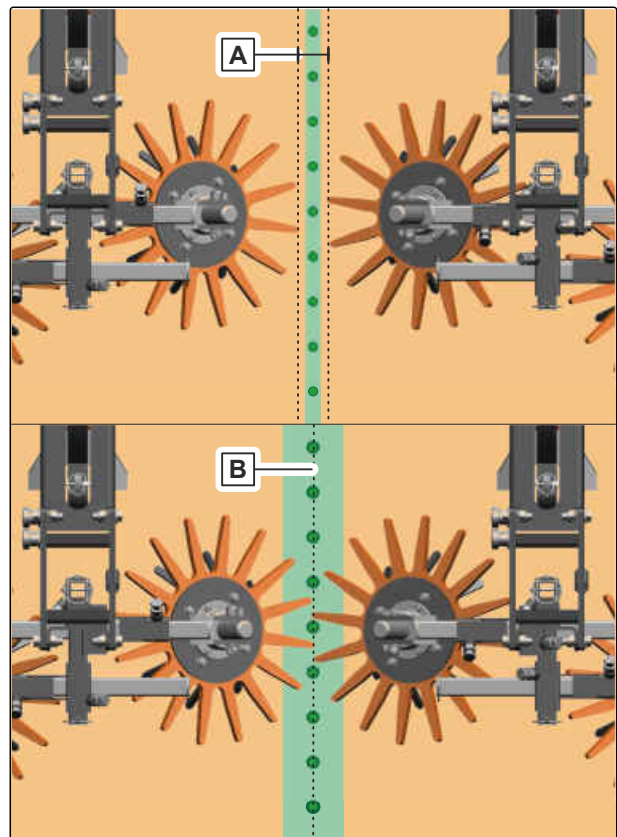
CMS-I-00004430

6.4.10.2 Adjusting the lateral distance of the finger hoes

CMS-T-00006072-E.1

The adjustment of the distance depends on the growth stage of the crop during hoeing operation:

- For young and smaller crops, the finger hoes must be adjusted such that each finger hoe has a distance of 3 bis 4 cm from the plant row. Between two adjacent finger hoes, there should always be a band **A** that is 6 bis 8 cm wide.
- For established and bigger crops, the finger hoes must be adjusted such that the finger hoes do not have a distance **B** from the plant rows. The fingers of two adjacent finger hoes should always interlock. However, the fingers must not overlap by more than 5 mm.

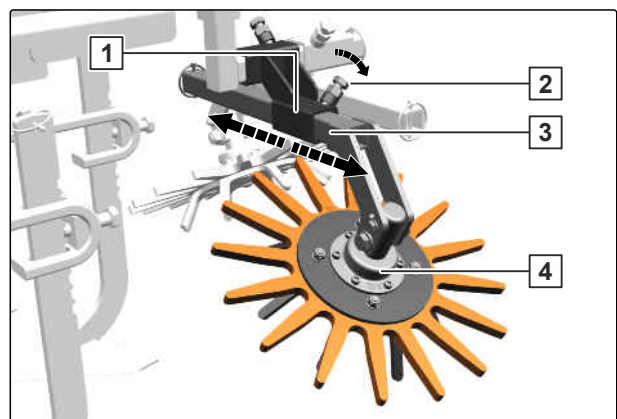


CMS-I-00004373

REQUIREMENTS

- ☑ The finger hoe set is activated, see page 100

1. Lower the implement on the field with the three-point power lift.
2. Loosen the bolt **2** for the guide tube **1**.
3. Move the finger hoe **4** with the sliding tube **3** in the guide tube inwards or outwards until the finger hoe is in the right position.
4. Tighten the bolt for the guide tube.
5. Adjust the lateral distance for all of the finger hoes in the same way.



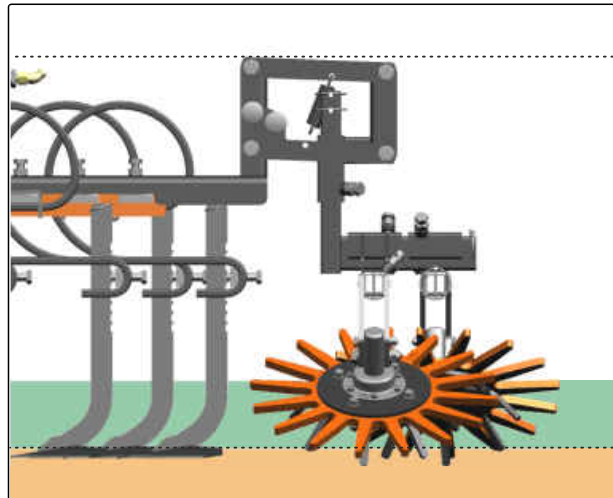
CMS-I-00004375

6.4.10.3 Adjusting the height of the finger hoes

The height of a finger hoe must be set on the star parallelogram as follows:

- The fingers that are pointing the furthest down must touch the soil in the activated position of the finger hoe set.
- When the finger hoe set is in activated position, the star parallelogram must be aligned virtually horizontal, so that the finger hoes can follow the ground contours upwards and downwards.

CMS-T-00010583-C.1

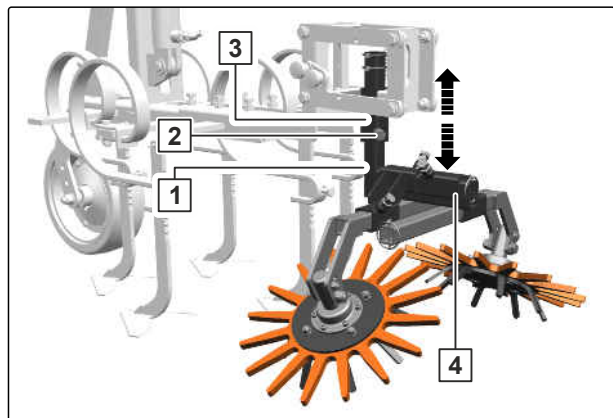


CMS-I-00007222



REQUIREMENTS

- ✓ The finger hoe set is activated, see page 100
1. Lower the implement on the field with the three-point power lift.
 2. Loosen the bolt **[2]** for the guide tube **[3]** in the star parallelogram.
 3. Push the finger hoe set **[4]** with the section tube **[1]** up or down in the guide tube until the finger hoes are in the right position.
 4. Tighten the bolt for the guide tube.
 5. Adjust the height for all of the finger hoes in the same way.



CMS-I-00007221

6.4.11 Adjusting the ridging tools

CMS-T-00005841-B.1

6.4.11.1 Activating or deactivating the ridging discs

CMS-T-00009650-C.1

6.4.11.1.1 Activating or deactivating ridging discs mounted on the star parallelogram

CMS-T-00009651-C.1

- If the ridging discs should be used during hoeing operation, the ridging discs must be activated and adjusted according to the section "*Adjusting the ridging discs*".
- If the ridging discs should not be used during hoeing operation, the ridging discs must be deactivated.



CAUTION

Risk of injury for hands due to the shearing action of the star parallelogram

When lifting and lowering the star parallelogram, the components of the star parallelogram can act like the scissors.

- ▶ Be particularly careful when lifting and lowering the star parallelogram.
- ▶ When lifting and lowering the star parallelogram, do not put your hands in the star parallelogram.

1. To activate the ridging discs on a parallelogram:

Follow steps 2 to 7.

2. Lower the implement on the field with the three-point power lift.

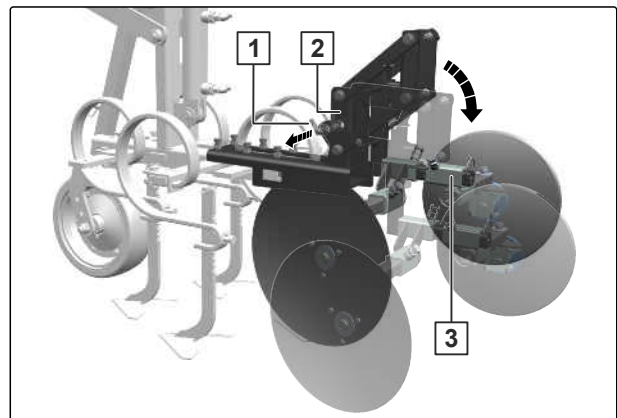
3. Hold the ridging disc set on the section **3** and pull and hold the locking latch **1** outwards.

- ➔ The locking pin of the locking latch is pulled out of the front hole **2**.

4. Slightly lower the ridging disc set and release the locking latch.

- ➔ The locking pin of the locking latch slides inwards against the frame carrier.

5. Lower the ridging disc set until the locking pin of the locking latch slides into the rear hole and holds the ridging disc set in the active position.



CMS-I-00004439

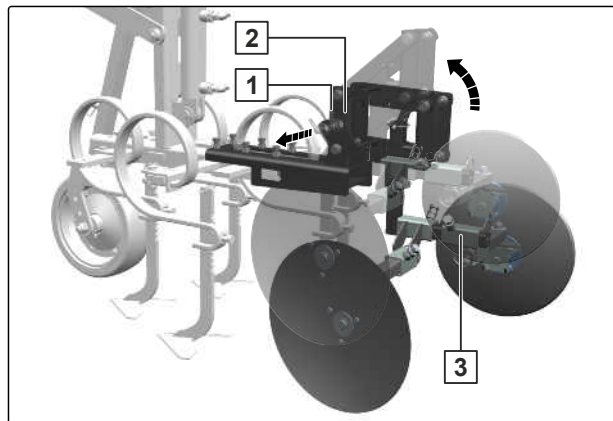
6 | Preparing the machine

Preparing the implement for operation

6. Activate the ridging discs on all of the other parallelograms in the same way.
7. *To adjust the ridging discs:*
Follow the instructions in the section "Adjusting the ridging discs", see page 108.
8. *To deactivate the ridging discs on a parallelogram:*
Follow steps 9 to 12.
9. Lower the implement on the field with the three-point power lift.
10. Hold the ridging disc set on the section **3** and pull and hold the locking latch **1** outwards.

➔ The locking pin of the locking latch is pulled out of the rear hole in the frame carrier **2**.
11. Slightly lift the ridging disc set and release the locking latch.

➔ The locking pin of the locking latch slides inwards against the frame carrier.
12. Lift the ridging disc set until the locking pin of the locking latch slides into the front hole in the frame carrier and holds the ridging disc set in passive position.
13. Deactivate the ridging discs on all of the other parallelograms in the same way.



CMS-I-00004440

6.4.11.1.2 Activating or deactivating ridging discs mounted on a rigid mount

CMS-T-00009652-B.1

- If the ridging discs should be used during hoeing operation, the ridging discs must be activated and adjusted according to the section "Adjusting the ridging discs".
 - If the ridging discs should not be used during hoeing operation, the ridging discs must be deactivated.
1. *To activate the ridging discs on a parallelogram:*
Follow steps 2 to 5.
 2. Lower the implement on the field with the three-point power lift.

3. Adjust the ridging discs according to the steps 7 to 12 of the section "*Adjusting the ridging discs*", see page 108. At step 10, however, lower the deactivated ridging discs to the position required for the hoeing pass.
4. *To adjust the ridging discs:*
Steps 13 to 26 in the section "*Adjusting the ridging discs*", see page 108.
5. Activate the ridging discs on all of the other parallelograms in the same way.
6. *To deactivate the ridging discs on a parallelogram:*
Follow steps 7 to 9.
7. Lower the implement on the field with the three-point power lift.
8. Adjust the ridging discs according to the steps 7 to 12 of the section "*Adjusting the ridging discs*", see page 108. At step 10, however, move the activated ridging discs all the way up to the passive position.
9. Deactivate the ridging discs on all of the other parallelograms in the same way.

6.4.11.2 Adjusting the ridging discs

The height of the ridging discs from the soil can be adjusted in pairs, and the distance and horizontal tilt relative to the plant row can be adjusted individually. The different settings must be coordinated with each other.

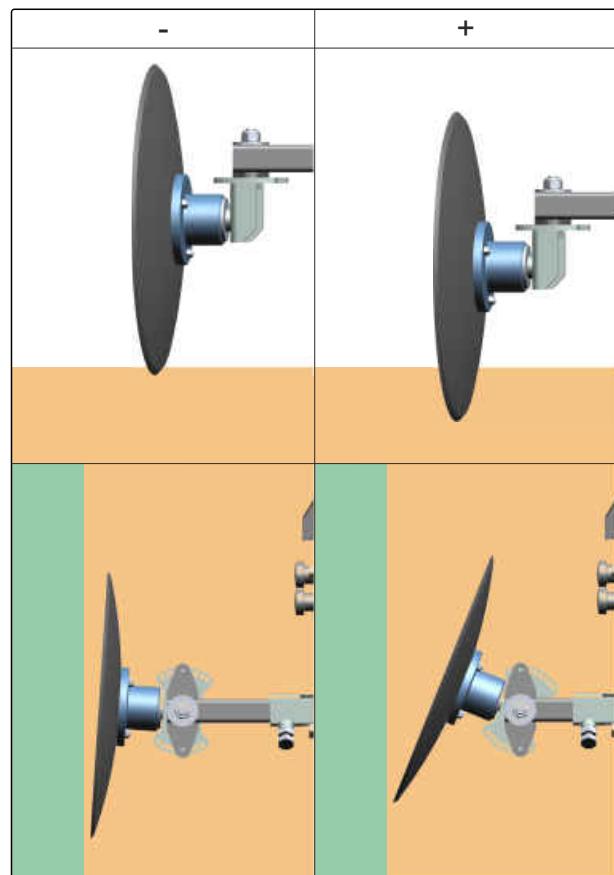
For the adjustment, the following applies:

- The deeper a horizontally tilted ridging disc cuts vertically into the arable soil, the more soil will be heaped onto the plant row.
- When the horizontal distance is greater and also the horizontal tilt is steeper relative to the plant row, a ridging disc heaps up more soil. When the horizontal distance is smaller and also the horizontal tilt is flatter relative to the plant row, a ridging disc heaps up less soil.
- The higher the forward speed during hoeing operation, the more soil is heaped by the ridging discs onto the plant rows. If the amount of soil that is heaped should remain the same when the forward speed is increased, the height of the ridging discs must be increased and the distance and horizontal tilt of the ridging discs relative to the plant rows must be reduced.
- If the hoeing depth is changed, see section "Adjusting the hoeing depth" and the amount of heaped soil should remain the same, the height of the ridging discs from the arable soil must also be changed.

1. To adjust the height of ridging discs that are installed on a parallelogram via a star parallelogram:

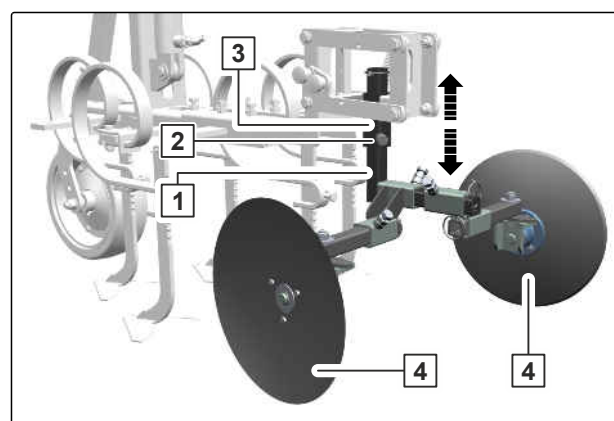
Follow steps 2 to 6.

2. Lower the implement on the field with the three-point power lift.
3. Loosen the bolt **2** for the guide tube **3** in the star parallelogram.
4. Push the ridging discs **4** with the section tube **1** up or down in the guide tube until the ridging discs are in the right position.
5. Tighten the bolt for the guide tube.
6. Adjust the height for all of the ridging discs in the same way.



CMS-T-00009657-B.1

CMS-I-00004448



CMS-I-00004443

7. *To adjust the height of ridging discs that are installed on a parallelogram via a rigid mount:*
Follow steps 8 to 12.

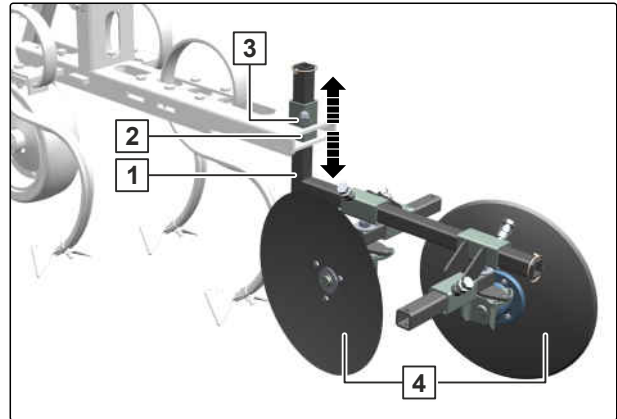
8. Lower the implement on the field with the three-point power lift.

9. Loosen the bolt [2] for the guide tube [3] in the share bracket.

10. Push the ridging discs [4] with the section tube [1] up or down in the guide tube until the ridging discs are in the right position.

11. Tighten the bolt for the guide tube.

12. Adjust the height for all of the ridging discs in the same way.



CMS-I-00006668

13. *To adjust the lateral distance of a ridging disc:*
Follow steps 14 to 18.

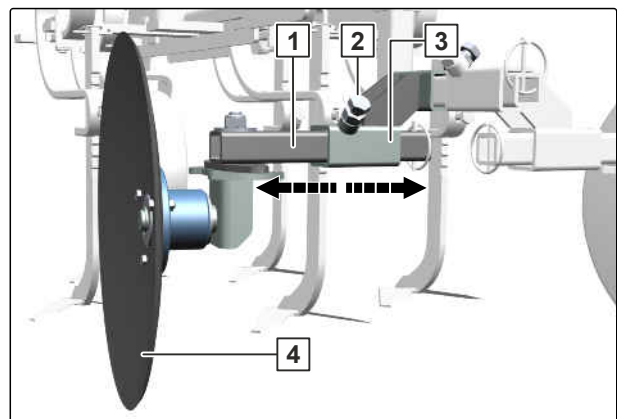
14. Lower the implement on the field with the three-point power lift.

15. Loosen the bolt [2] for the guide tube [3].

16. Push the ridging disc [4] with the sliding tube [1] in the guide tube inwards or outwards until the ridging disc is in the right position.

17. Tighten the bolt for the guide tube.

18. Adjust the lateral distance for all of the ridging discs in the same way.



CMS-I-00004445

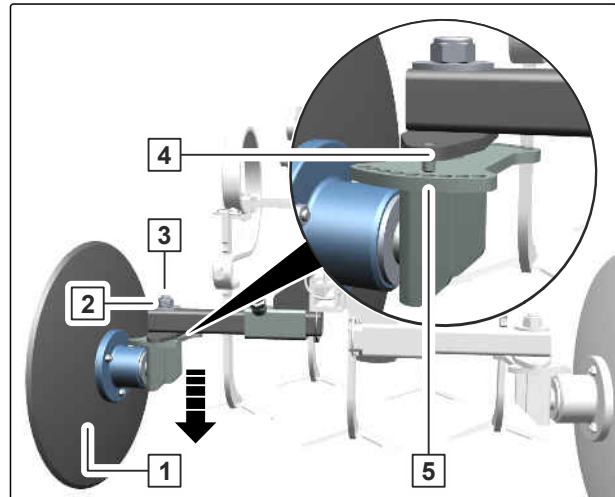
19. *To adjust the horizontal tilt of a ridging disc relative to the plant row:*
Follow steps 20 to 26.

20. Lower the implement on the field with the three-point power lift.

6 | Preparing the machine

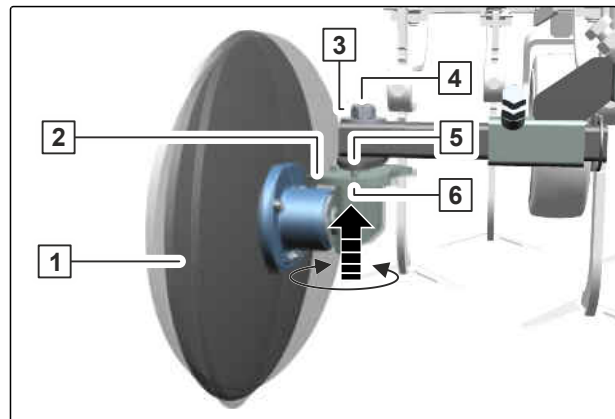
Preparing the implement for operation

21. Loosen the nut **2** on the bolt **3**.
22. Unscrew the nut and lower the ridging disc **1** until the cylinder dowel pins **4** no longer engage in the locking plate **5**.



CMS-I-00004446

23. Turn the ridging disc **1** with the locking plate **2** to the left or right around the longitudinal axis of the bolt **4** until the ridging disc has the right tilt angle.
24. Press the ridging disc up with the locking plate so that the cylinder dowel pins **5** slide into the locking holes **6**.
25. Tighten the nut **3** on the bolt.
26. Adjust the horizontal tilt for all of the ridging discs in the same way.



CMS-I-00004447

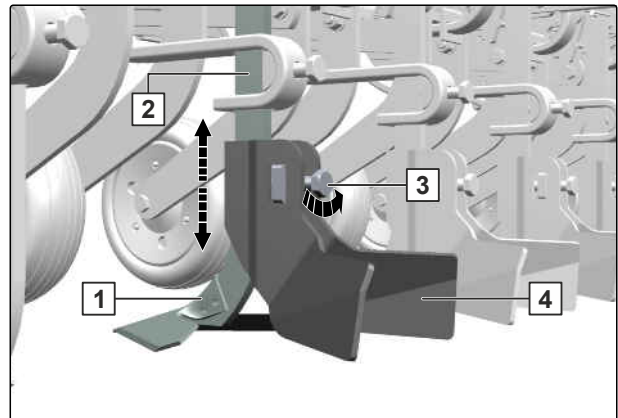
6.4.11.3 Adjusting the shallow ridger

CMS-T-00007017-B.1

Adjustments can be made to the working depth of the shallow ridgers. The following applies for adjustments:

- The deeper a shallow ridger cuts into the arable soil, the more soil will be heaped onto the plant row.
- The higher the forward speed during hoeing operation, the more soil is heaped by each shallow ridger onto the plant rows. If the amount of soil that is heaped should remain the same when the forward speed is increased, the working depth of the shallow ridgers must be reduced.
- If the hoeing depth is changed, see section *"Adjusting the hoeing depth"*, and the amount of heaped soil should remain the same, the distance of the shallow ridgers from the arable soil must also be changed.

1. Lower the implement on the field with the three-point power lift.
2. Remove the bolt **3**.
3. Lift the implement with the three-point power lift until the shallow ridger **4** can be moved on the shaft **2** of the hoeing tool **1**.
4. Slide the shallow ridger up or down until it reaches the desired position.
5. Tighten the bolt.
6. Adjust the working depth for all of the shallow ridgers in the same way.



CMS-I-00005144

6.4.11.4 Adjusting the shallow ridgers on the RapidoClip system

CMS-T-00013990-B.1

6.4.11.4.1 Activating the shallow ridger and adjusting the working depth

CMS-T-00013978-B.1

If you want to use the shallow ridgers for a hoeing pass, the shallow ridgers must be moved from the passive position to the active position and their working depth must be adjusted.

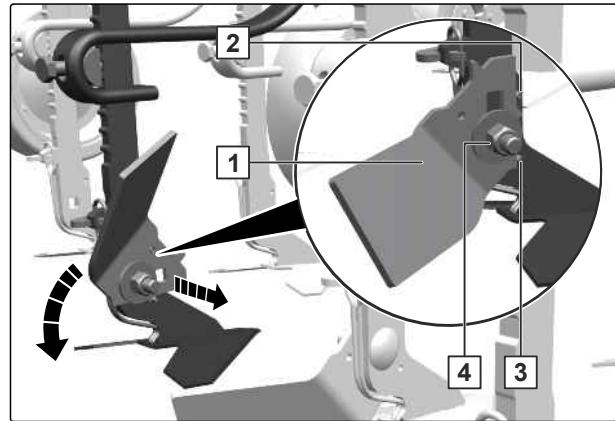
To adjust the working depth, the following applies:

- The deeper a shallow ridger cuts into the arable soil, the more soil will be heaped onto the plant row.
 - The higher the forward speed during hoeing operation, the more soil is heaped by each shallow ridger onto the plant rows. If the amount of soil that is heaped should remain the same when the forward speed is increased, the working depth of the shallow ridgers must be reduced.
 - If the hoeing depth is changed, see section *"Adjusting the hoeing depth"*, and the amount of heaped soil should remain the same, the distance of the shallow ridgers from the arable soil must also be changed.
1. *To move a shallow ridger from the passive position to the active position:*
Follow steps 2 to 6.
 2. Lower the implement on the field with the three-point power lift.

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Preparing the implement for operation

3. Unscrew the nut **4**.
4. Pull the shallow ridger outwards, until the roll pin **2** is no longer engaged in the hole.
5. Turn the shallow ridger 90 degrees to the rear.
6. Tighten the nut until the shallow ridger is resting against the shaft of the RapidoClip duckfoot share and is held by the two roll pins **2** and **3** in a horizontal position.

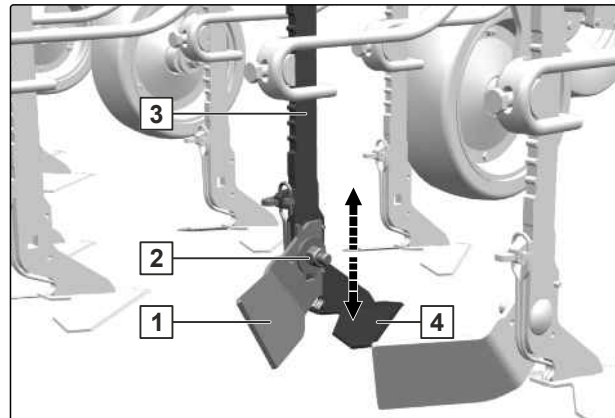


CMS-I-00008737

7. *To adjust the working depth of the shallow ridger in active position:*

Follow steps 8 and 9.

8. Slide the shallow ridger **1** down by the shaft **3** of the RapidoClip duckfoot share **4** up to the desired position.
9. Tighten the nut **2**.



CMS-I-00008682

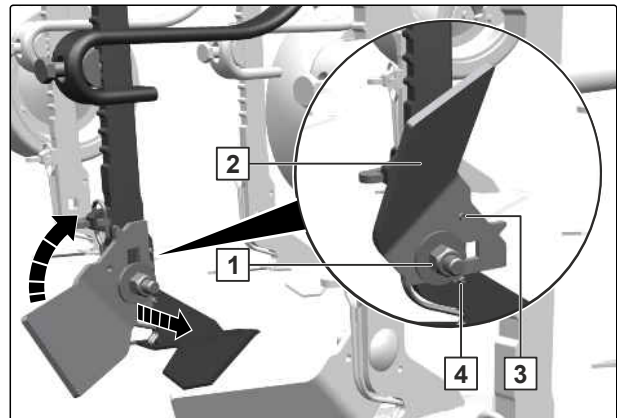
10. *To change the working depth of an activated shallow ridger:*
Follow steps 11 to 13.
11. Loosen the nut.
12. Slide the shallow ridger up or down up to the desired position.
13. Tighten the nut.
14. Activate all of the shallow ridgers in the same way and adjust their working depth.

6.4.11.4.2 Deactivating shallow ridgers

CMS-T-00013994-B.1

If the shallow ridgers should not be used for a hoeing pass, the shallow ridgers must be moved from the active position to the passive position.

1. Lower the implement on the field with the three-point power lift.
2. Loosen the nut **1** until the shallow ridgers **2** can be moved on the shaft of the RapidoClip duckfoot share.
3. Push the shallow ridger all the way up.
4. Unscrew the nut some more, until the shallow ridger can be pulled outwards until the roll pins **3** and **4** are no longer resting on the front edge of the shallow ridger.
5. Pull the shallow ridger outwards and turn by 90 degrees to the front.
6. Push the shallow ridger inwards, until the roll pin **3** is completely inserted in the hole in the shallow ridger and the shallow ridger is resting on the shaft of the RapidoClip duckfoot share.
7. Tighten the nut.
8. Deactivate all shallow ridgers in the same way.



CMS-I-00008738

6.4.11.5 Adjusting the share ridgers

CMS-T-00007018-B.1

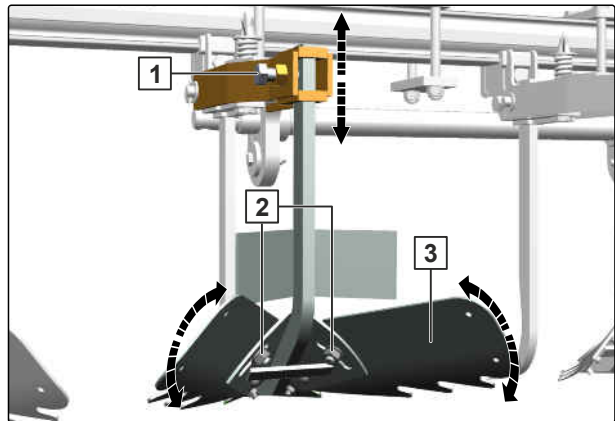
The heaping intensity of the share ridger can be adjusted with the working depth of the share ridgers and with the pressure angle of the mouldboards. The following applies for adjustments:

- The deeper the share ridger cuts into the arable soil, the more soil will be heaped onto the plant row.
- The steeper the position of the mouldboards relative to the arable soil, the more soil will be heaped onto the plant rows.
- The higher the forward speed during hoeing operation, the more soil is heaped by each share ridger onto the plant rows. If the amount of soil that is heaped should remain the same when the forward speed is increased, the working depth of the share ridgers and the pressure angle of the mouldboards must be reduced.
- If the hoeing depth is changed, see section *"Adjusting the hoeing depth"*, and the amount of heaped soil should remain the same, the distance of the share ridgers from the arable soil must also be changed.

6 | Preparing the machine

Preparing the implement for operation

1. Lower the implement on the field with the three-point power lift.
2. Remove the bolt **1**.
3. Lift the implement with the three-point power lift until the shaft of the share ridger can slide into the mount of the tool mounting bracket.
4. Slide the share ridger up or down until it reaches the desired working depth.
5. Tighten the bolt.
6. Loosen the nuts **2**.
7. Lift the implement with the three-point power lift until the two mouldboards **3** can be swivelled up or down.
8. Swivel the mouldboards up or down until the desired pressure angle is reached.
9. Tighten the nuts.
10. Adjust the working depth and pressure angle for all of the share ridgers in the same way.



CMS-I-00007101

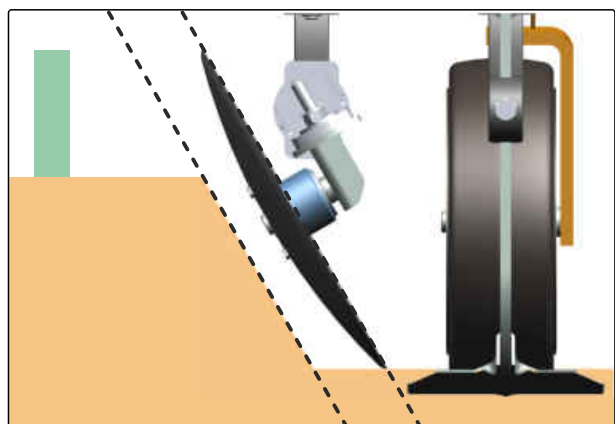
6.4.12 Adjusting the ridge cutting discs

CMS-T-00009706-B.1

The ridge cutting discs can be adjusted individually in the horizontal distance and in the horizontal and vertical tilt angle relative to the ridged row as well as in pairs in the height from the ridged rows. The different settings must be coordinated with each other.

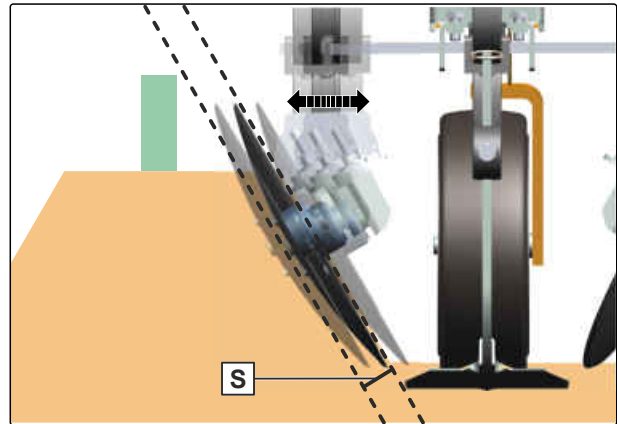
For the adjustment, the following applies:

To ensure that the ridge flanks are shaved off with a uniform thickness during hoeing operation, the vertical tilt of the ridge cutting discs relative to the ridge must be adjusted such that the ridge flanks and the ridge cutting discs run parallel to one another.



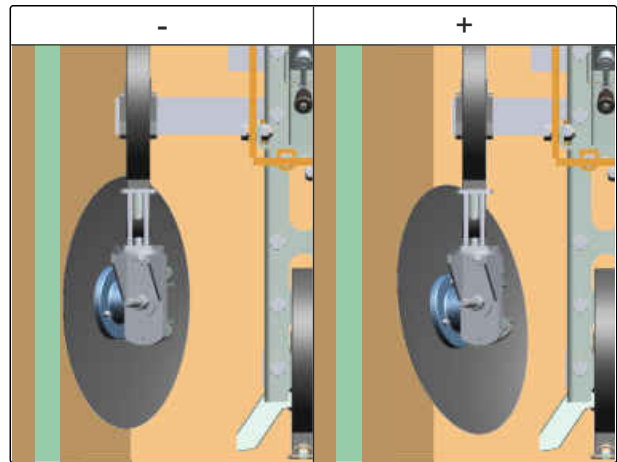
CMS-I-00006742

The horizontal distance from a ridge cutting disc to the ridge must be adjusted such that the thickness **S** of the layer shaved off of the ridge flank during hoeing operation is 1 bis 2 cm.



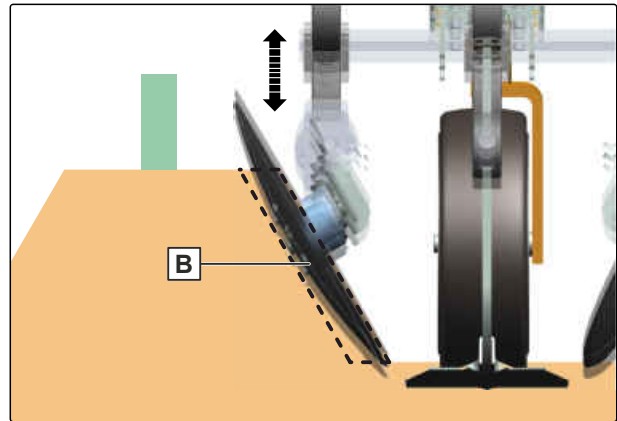
CMS-I-00006743

When the horizontal distance is greater and also the horizontal tilt is steeper relative to the ridged row, a ridge cutting disc cuts more soil from the ridge flank. When the horizontal distance is smaller and also the horizontal tilt is flatter relative to the ridged row, a ridge cutting disc cuts less soil from the ridge flank.



CMS-I-00006744

The height of the ridge cutting discs must be adjusted via the hoeing depth adjustment of the parallelogram so that the ridge flanks are not only partially shaved off during hoeing operation, but rather the full area **B** between the sole and the crown of the ridge is shaved off.



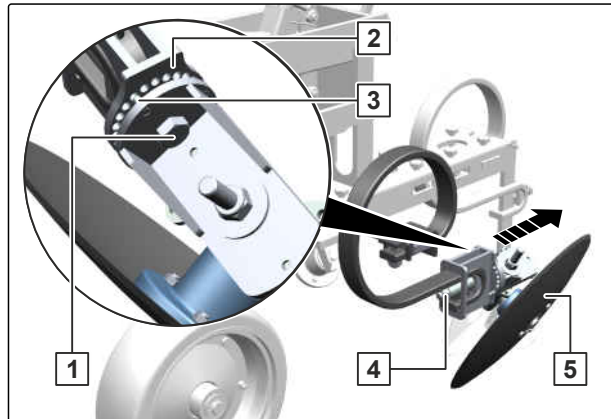
CMS-I-00006746

1. *To adjust the vertical tilt of a ridge cutting disc relative to the ridge:*
Follow steps 2 to 7.
2. Lower the implement on the field with the three-point power lift.

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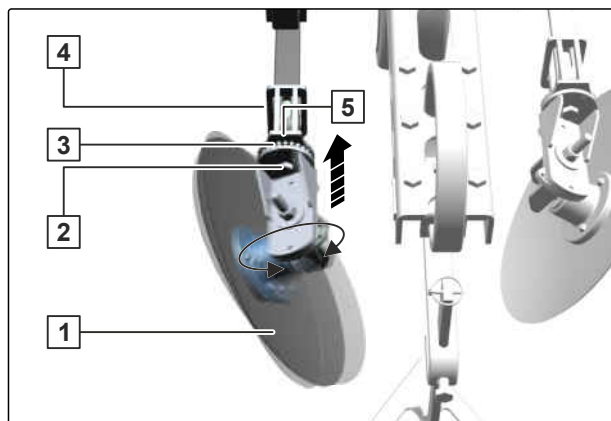
Preparing the implement for operation

3. Loosen the nut **4** on the bolt **1**.
4. Unscrew the nut and pull the ridge cutting disc **5** to the rear until the cylinder dowel pins **3** no longer engage in the locking plate **2**.



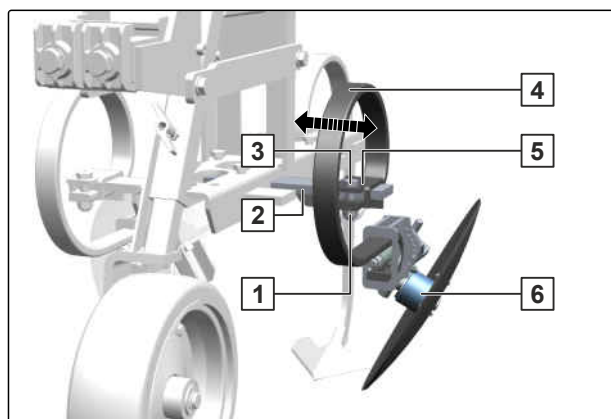
CMS-I-00006753

5. Turn the ridge cutting disc **1** to the left or right around the longitudinal axis of the bolt **2** until the ridge cutting disc has the right vertical tilt.
6. Push the ridge cutting disc to the front towards the locking plate **5** so that the cylinder dowel pins **3** slide into the locking holes.
7. Tighten the nut **4** on the bolt.
8. Adjust the vertical tilt for all of the ridge cutting discs in the same way.



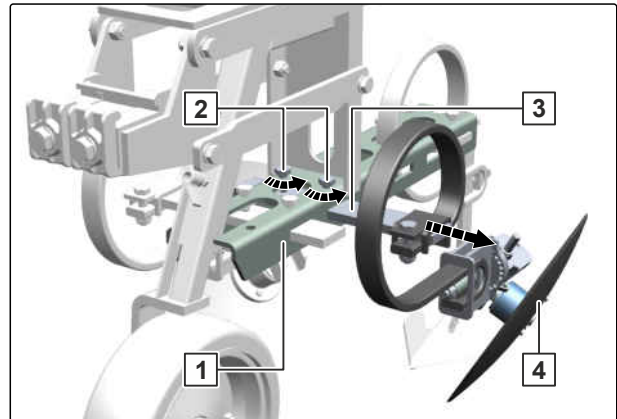
CMS-I-00006755

9. *To adjust the horizontal distance of a ridge cutting disc:*
Follow steps 10 to 17.
10. Lower the implement on the field with the three-point power lift.
11. Loosen the nut **1** of the bolt **3** on the Vibro spring holder **5** so that the Vibro spring **4** can be moved together with the holder and ridge cutting disc **6** on the tool carrier **2**.
12. Move the ridge cutting disc inwards or outwards on the tool carrier until the ridge cutting disc is in the right position.
13. Tighten the nut of the bolt on the Vibro spring holder.
14. *If the sliding path is not sufficient for the required position of the ridge cutting disc:*
Follow steps 15 to 17.



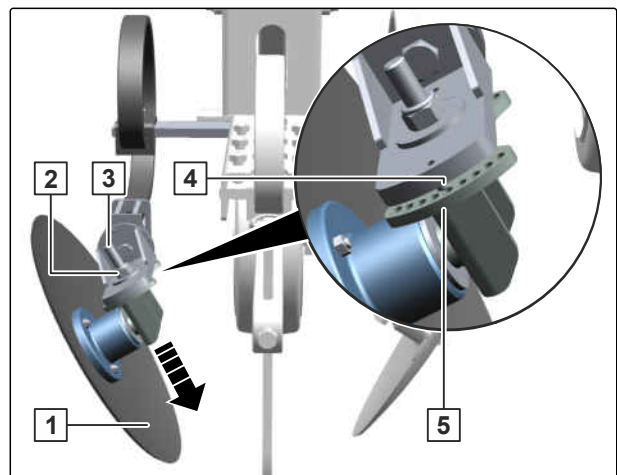
CMS-I-00006756

15. Loosen the bolts **2** on the tool carrier **3**.
16. Move the ridge cutting disc **4** with the tool carrier outwards in the coulter bracket **1** until the ridge cutting disc is in the right position.
17. Tighten the bolts on the tool carrier.
18. Adjust the horizontal distance for all of the ridge cutting discs in the same way.
19. *To adjust the horizontal tilt of a ridge cutting disc:*
Follow steps 20 to 25.



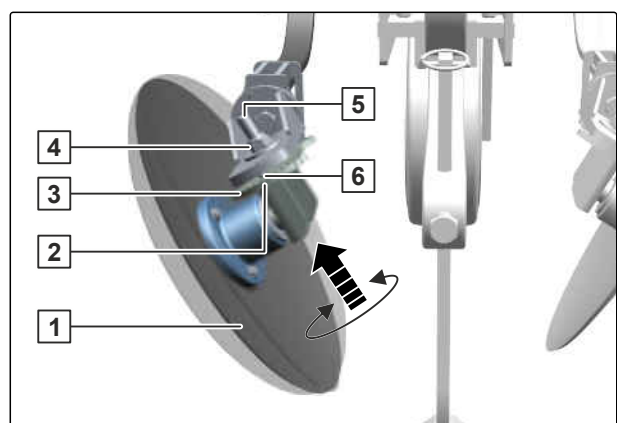
CMS-I-00006757

20. Lower the implement on the field with the three-point power lift.
21. Loosen the nut **2** on the bolt **3**.
22. Unscrew the nut and lower the ridge cutting disc **1** until the cylinder dowel pins **4** no longer engage in the locking plate **5**.



CMS-I-00006758

23. Turn the ridge cutting disc **1** with the locking plate **3** to the left or right around the longitudinal axis of the bolt **5** until the ridge cutting disc has the right horizontal tilt.
24. Press the ridge cutting disc up with the locking plate so that the cylinder dowel pins **6** slide into the locking holes **2**.
25. Tighten the nut **4** on the bolt.
26. Adjust the horizontal tilt for all of the ridge cutting discs in the same way.



CMS-I-00006759

27. *To adjust the height of the ridge cutting discs on a parallelogram:*
Follow steps 28 to 30.
28. Lower the implement on the field with the three-point power lift.
29. Follow steps 2 to 6 in section "*Adjusting the hoeing depth on the KPP*", see page 74, until the ridge cutting discs are moved to the right height.
30. Use the hoeing tools to compensate for the increased or reduced hoeing depth resulting from steps 2 to 5 of section "*Adjusting the hoeing depth on the EKP*", see page 75.
31. Adjust the height of the ridge cutting discs on all of the parallelograms in the same way.

6.4.13 Adjusting the harrow

CMS-T-00005842-B.1

6.4.13.1 Activating or deactivating the tine weeder

CMS-T-00010493-B.1

- If the tine weeders should be used during hoeing operation, the tine weeders must be activated.
 - If the tine weeders should not be used during hoeing operation, the tine weeders must be deactivated.
1. *To activate the tine weeder on a parallelogram:*
Follow steps 2 to 5.
2. Lower the implement on the field with the three-point power lift.
3. *If the tine weeder is not rigidly installed directly on the parallelogram, but rather on a star parallelogram behind a finger hoe set:*
Activate the finger hoe set according to the section "*Activating or deactivating the finger hoes*", see page 100.
4. Adjust the tine weeder according to the section "*Adjusting the tine weeder*", see page 119. At step 3, however, lower the deactivated tine weeder to the position required for the hoeing pass.
5. Activate the tine weeder on all of the other parallelograms in the same way.

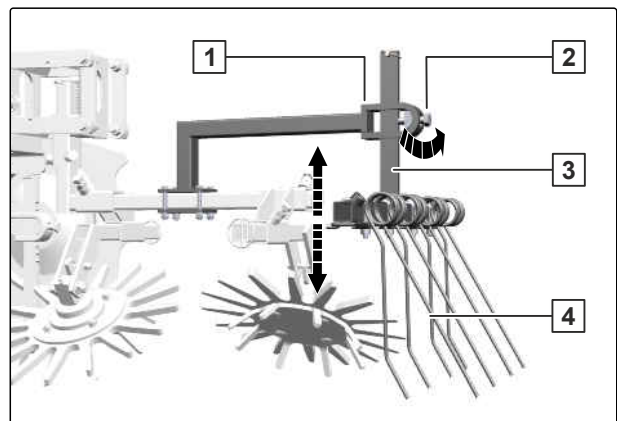
6. *To deactivate the tine weeder on a parallelogram:*
Follow steps 7 to 9.
7. Lower the implement on the field with the three-point power lift.
8. Adjust the tine weeder according to the section *"Adjusting the tine weeder"*, see page 119. At step 3, however, move the activated tine weeder all the way up to the passive position.
9. Deactivate the tine weeders on all of the parallelograms in the same way.

6.4.13.2 Adjusting the tine weeder

CMS-T-00006073-D.1

The harrow must be adjusted such that the harrow tines apply slight pressure on the hoed arable soil.

1. Lower the implement on the field with the three-point power lift.
2. Loosen the bolt **2** for the holder **1**.
3. Move the tine carrier **3** up or down in the holder until the harrow tines **4** are in the right position.
4. Tighten the bolt.
5. Adjust all of the tine weeders in the same way.



CMS-I-00004376

6.4.13.3 Activating or deactivating the roller harrow

CMS-T-00010489-B.1

6.4.13.3.1 Activating or deactivating a roller harrow mounted on the star parallelogram

CMS-T-00010490-B.1

- If the roller harrows should be used during hoeing operation, the roller harrows must be activated and adjusted according to the section *"Adjusting the roller harrows"*.
- If the roller harrows should not be used during hoeing operation, the roller harrows must be deactivated.



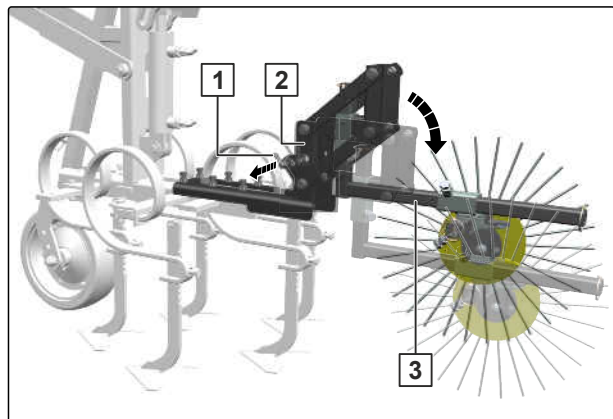
CAUTION

Risk of injury for hands due to the shearing action of the star parallelogram

When lifting and lowering the star parallelogram, the components of the star parallelogram can act like the scissors.

- ▶ Be particularly careful when lifting and lowering the star parallelogram.
- ▶ When lifting and lowering the star parallelogram, do not put your hands in the star parallelogram.

1. *To activate the roller harrow on a parallelogram:*
Follow steps 2 to 7.
2. Lower the implement on the field with the three-point power lift.
3. Hold the roller harrow on the boom section **3** and pull and hold the locking latch **1** outwards.
→ The locking pin of the locking latch is pulled out of the front hole **2**.
4. Slightly lower the roller harrow and release the locking latch.
→ The locking pin of the locking latch slides inwards against the frame carrier.
5. Lower the roller harrow until the locking pin of the locking latch slides into the rear hole and holds the roller harrow in the active position.
6. Activate the roller harrows on all of the other parallelograms in the same way.
7. *To adjust the roller harrow,*
observe section "Adjusting the roller harrow", see page 122.
8. *To deactivate the roller harrow on a parallelogram:*
Follow steps 9 to 12.
9. Lower the implement on the field with the three-point power lift.



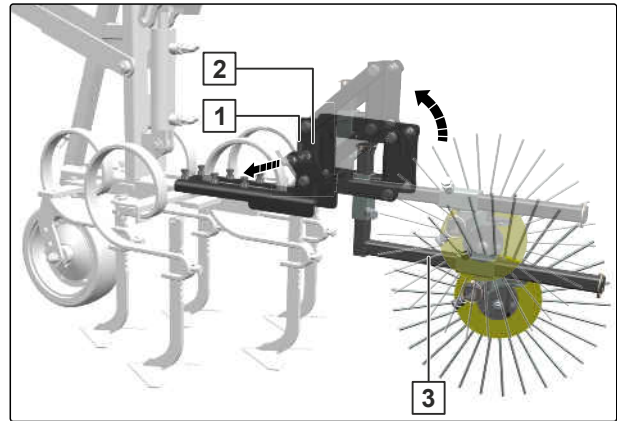
CMS-I-00007248

10. Hold the roller harrow on the boom section **3** and pull and hold the locking latch **1** outwards.

➔ The locking pin of the locking latch is pulled out of the rear hole in the frame carrier **2**.

11. Slightly lift the roller harrow and release the locking latch.

➔ The locking pin of the locking latch slides inwards against the frame carrier.



CMS-I-00007247

12. Lift the roller harrow until the locking pin of the locking latch slides into the front hole in the frame carrier and holds the roller harrow in passive position.

13. Deactivate the roller harrows on all of the parallelograms in the same way.

6.4.13.3.2 Activating or deactivating a roller harrow mounted on a rigid mount

CMS-T-00010491-B.1

- If the roller harrows should be used during hoeing operation, the roller harrows must be activated and adjusted according to the section *"Adjusting the roller harrows"*.
- If the roller harrows should not be used during hoeing operation, the roller harrows must be deactivated.

1. *To activate the roller harrow on a parallelogram:*
Follow steps 2 to 5.
2. Lower the implement on the field with the three-point power lift.
3. Adjust the roller harrows according to the steps 8 to 11 of the section *"Adjusting the roller harrows"*, see page 122. At step 10, however, lower the deactivated roller harrows to the position required for the hoeing pass.
4. *To adjust the roller harrows:*
steps 13 to 26 in the section *"Adjusting the roller harrows"*, see page 122.
5. Activate the roller harrows on all of the other parallelograms in the same way.
6. *To deactivate the roller harrow on a parallelogram:*
Follow steps 7 to 9.

6 | Preparing the machine

Preparing the implement for operation

7. Lower the implement on the field with the three-point power lift.
8. Adjust the roller harrows according to the steps 8 to 11 of the section *"Adjusting the roller harrows"*, see page 122. At step 10, however, move the activated roller harrows all the way up to the passive position.
9. Deactivate the roller harrows on all of the parallelograms in the same way.

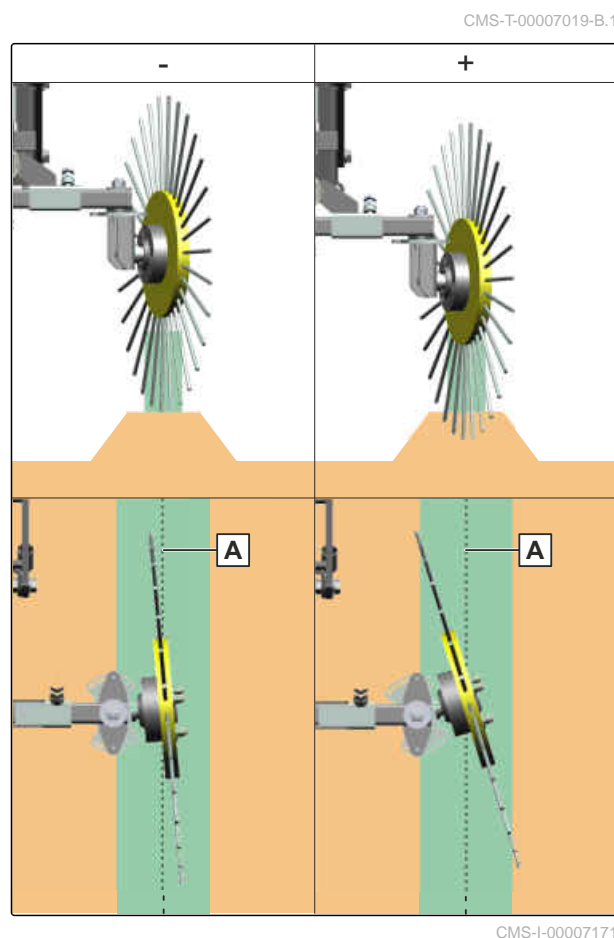
6.4.13.4 Adjusting the roller harrow

The roller harrows can be used until the crop plants have reached a height of 20 cm.

The height, lateral distance and horizontal tilt of the roller harrow of a parallelogram can be adjusted. The adjustment of the height and the horizontal tilt must be coordinated with each other.

For the adjustment, the following applies:

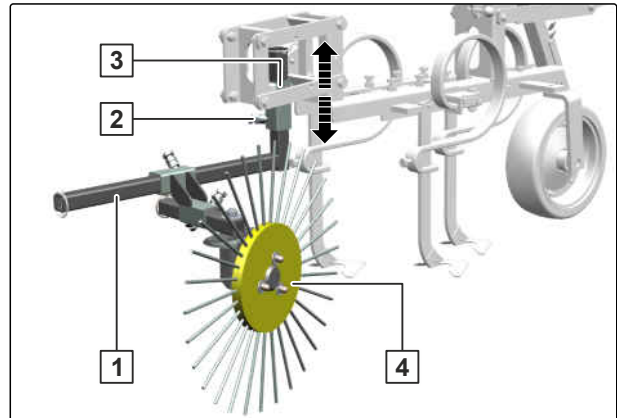
- The deeper a roller harrow is set towards the plant row, the more intensely the roller harrow works in the plant row area.
- The lateral distance of each roller harrow must be adjusted such that the roller harrow is positioned over the centre **A** of the plant row.
- A roller harrow works with higher intensity when the horizontal tilt towards the plant row is steeper. A roller harrow works with less intensity when the horizontal tilt towards the plant row is flatter.
- The higher the forward speed during hoeing operation, the more intensely the roller harrows work the soil. If the working intensity of the roller harrow should remain the same when the forward speed is increased, the height of each roller harrow must be increased and the horizontal tilt of each roller harrow must be reduced relative to the plant rows.
- If the hoeing depth is changed, see section *"Adjusting the hoeing depth"*, and the working intensity of the roller harrow should remain the same, the height of the roller harrow relative to the plant row must also be changed.



1. *To adjust the height of a roller harrow that is installed on a parallelogram via a star parallelogram:*

Follow steps 2 to 6.

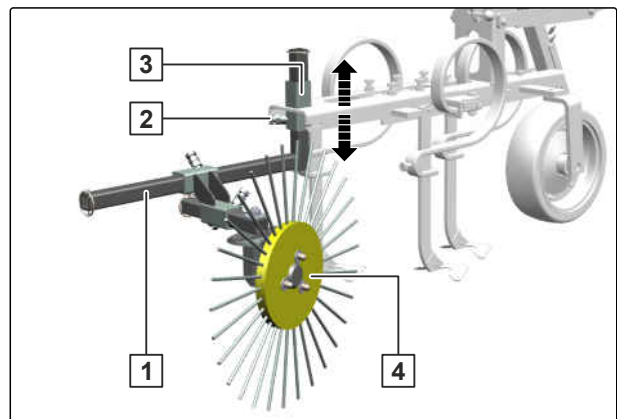
2. Lower the implement on the field with the three-point power lift.
3. Loosen the bolt **2** for the guide tube **3** in the star parallelogram.
4. Push the roller harrow **4** with the section tube **1** up or down in the guide tube until the roller harrow is in the right position.
5. Tighten the bolt for the guide tube.
6. Adjust the height for all of the roller harrows in the same way.



CMS-I-00007162

7. *To adjust the height of a roller harrow that is installed on a parallelogram via a rigid mount:*
- Follow steps 8 to 12.

8. Lower the implement on the field with the three-point power lift.
9. Loosen the bolt **2** for the guide tube **3** in the share bracket.
10. Push the roller harrow **4** with the section tube **1** up or down in the guide tube until the roller harrow is in the right position.
11. Tighten the bolt for the guide tube.
12. Adjust the height for all of the roller harrows in the same way.



CMS-I-00007164

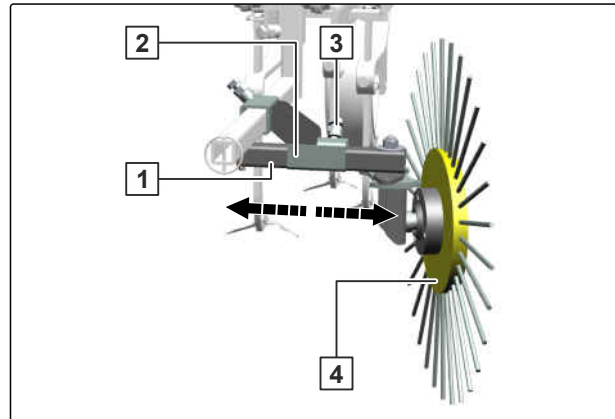
13. *To adjust the lateral distance of a roller harrow:*
- Follow steps 14 to 18.

14. Lower the implement on the field with the three-point power lift.

6 | Preparing the machine

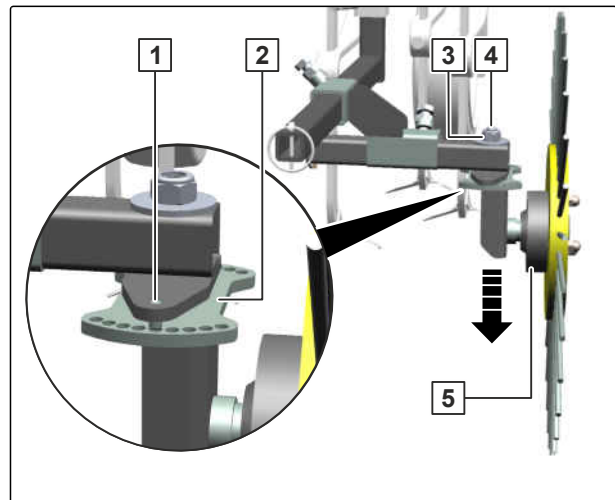
Preparing the implement for operation

15. Loosen the bolt **3** for the guide tube **2**.
16. Push the roller harrow **4** with the sliding tube **1** inwards or outwards in the guide tube until the roller harrow is in the right position.
17. Tighten the bolt for the guide tube.
18. Adjust the lateral distance for all of the roller harrows in the same way.
19. *To adjust the horizontal tilt of a roller harrow relative to the plant row:*
Follow steps 20 to 26.



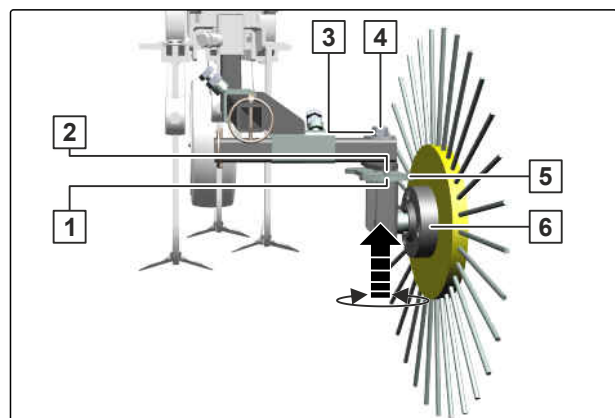
CMS-I-00007168

20. Lower the implement on the field with the three-point power lift.
21. Loosen the nut **3** on the bolt **4**.
22. Unscrew the nut and lower the roller harrow **5** until the cylinder dowel pins **1** no longer engage in the locking plate **2**.



CMS-I-00007169

23. Turn the roller harrow **6** with the locking plate **5** to the left or right around the longitudinal axis of the bolt **4** until the roller harrow has the right tilt angle.
24. Press the roller harrow up with the locking plate so that the cylinder dowel pins **2** slide into the locking holes **1**.
25. Tighten the nut **3** on the bolt.
26. Adjust the horizontal tilt for all of the roller harrows in the same way.



CMS-I-00007170

Using the implement

7

CMS-T-00007054-B.1

7.1 Using an implement with KPP-M SC and Section Control

CMS-T-00010388-B.1

7.1.1 Using the implement

CMS-T-00014019-A.1



REQUIREMENTS

- ☑ The implement is unfolded
- ☑ The parallelograms required for hoeing operation have been selected and moved into working position
- ☑ The implement is set up and adjusted for operation
- ☑ The implement is raised

1. Lift all of the parallelograms intended for hoeing operation, see sections *"Display for the status and the position of the parallelograms"* and *"Switching parallelograms manually"* in the operating manual for the ISOBUS hoeing machine software.
2. *If the parallelograms should be automatically lowered or lifted at the beginning and end of the plant rows:*
Switch on Section Control, see section *"Hoeing"* in the operating manual for the ISOBUS hoeing machine software.
3. Lower the implement on the field with the three-point power lift until the support wheels are resting on the ground.



NOTE

If the load on the support wheels is too high, the support wheels sink in.

4. Use the three-point power lift to distribute the load on the tractor lower link and the support wheels.

5. Drive into the field with the tractor.
 - ➔ If the Section Control function was activated in step 2 and the headland is straight, the parallelograms automatically switch to working position all at the same time at the beginning of the plant rows.
 - ➔ If the Section Control function was activated in step 2 and the headland is angular, the respective parallelogram automatically switches to working position at each beginning of a plant row.
6. *If the Section Control function is not being used and the headland is straight:*
After approaching the beginning of the plant rows, manually move all of the parallelograms into working position simultaneously, see sections "*Display for the status and the position of the parallelograms*" and "*Switching parallelograms manually*" in the operating manual for the ISOBUS hoeing machine software

or

If the Section Control function is not being used and the headlands is angular:
After approaching the beginning of each plant row, the respective parallelogram must be moved into working position manually, see sections "*Display for the status and the position of the parallelograms*" and "*Switching parallelograms manually*" in the operating manual for the ISOBUS hoeing machine software.

7.1.2 Turning on the headlands

CMS-T-00014020-A.1

1. When reaching the headland, drive out of the field.
 - ➔ If the Section Control function was activated and the headland is straight, all of the parallelograms are automatically lifted simultaneously when reaching the end of the plant rows.
 - ➔ If the Section Control function was activated and the headland is angular, the respective parallelogram is automatically individually lifted when reaching the end of each plant row.

2. *If the Section Control function is not being used and the headland is straight:*

When driving out of the field, manually lift all of the parallelograms simultaneously, see sections "Display for the status and the position of the parallelograms" and "Switching parallelograms manually" in the operating manual for the ISOBUS hoeing machine software

or

If the Section Control function is not being used and the headlands is angular:

When reaching the end of each plant row, manually lift the respective parallelogram individually, see sections "Display for the status and the position of the parallelograms" and "Switching parallelograms manually" in the operating manual for the ISOBUS hoeing machine software.

3. *To prevent lateral loads when driving in curves on the headlands:*

Lift the implement with the three-point power lift.

4. Turn around.

5. *When the direction of the implement matches that of the direction of travel:*

Lower the implement on the field with the three-point power lift until the support wheels are resting on the ground.



NOTE

If the load on the support wheels is too high, the support wheels sink in.

6. Use the three-point power lift to distribute the load on the tractor lower link and the support wheels.

7. Drive into the field with the tractor.

➔ If the Section Control function was activated and the headland is straight, all of the parallelograms are automatically lowered simultaneously when reaching the beginning of the plant rows.

➔ If the Section Control function was activated and the headland is angular, the respective parallelogram is automatically individually lowered when reaching the beginning of each plant row.

8. *If the Section Control function is not being used and the headland is straight:*

When reaching the beginning of the plant rows, manually lower all of the parallelograms simultaneously, see sections "*Display for the status and the position of the parallelograms*" and "*Switching parallelograms manually*" in the operating manual for the ISOBUS hoeing machine software

or

If the Section Control function is not being used and the headlands is angular:

When reaching the beginning of each plant row, manually lower the respective parallelogram individually, see sections "*Display for the status and the position of the parallelograms*" and "*Switching parallelograms manually*" in the operating manual for the ISOBUS hoeing machine software.

7.2 Using an implement with KPP-M/EKP-M/EKP-S

CMS-T-00010395-B.1

7.2.1 Using the implement

CMS-T-00010396-B.1



REQUIREMENTS

- ☑ The implement is unfolded
- ☑ The parallelograms required for hoeing operation have been selected and moved into working position
- ☑ The implement is set up and adjusted for operation
- ☑ The implement is raised

1. *If the headland is straight:*

Drive into the field with the tractor until the parallelograms have reached the beginning of the plant rows

or

If the headland is slanted:

Drive into the field with the tractor until one of the two outermost parallelograms has reached the beginning of a plant row.

2. Lower the implement on the field with the three-point power lift until the support wheels are resting on the ground.



NOTE

If the load on the support wheels is too high, the support wheels sink in.

3. Use the three-point power lift to distribute the load on the tractor lower link and the support wheels.
4. Drive off with the tractor.

7.2.2 Turning on the headlands

1. *If the headland is straight:*
Drive out of the field with the tractor until the parallelograms have reached the end of the plant rows

or

If the headland is slanted:
Drive out of the field with the tractor until the second outermost parallelogram has reached the end of the two plant rows between which it is driving.
2. Lift the implement with the three-point power lift.
3. Turn until the direction of the implement matches the direction of travel.
4. *If the headland is straight:*
Drive into the field with the tractor until the parallelograms have reached the beginning of the plant rows

or

If the headland is slanted:
Drive into the field with the tractor until one of the two outermost parallelograms has reached the beginning of a plant row.
5. Lower the implement on the field with the three-point power lift until the support wheels are resting on the ground.



NOTE

If the load on the support wheels is too high, the support wheels sink in.

6. Use the three-point power lift to distribute the load on the tractor lower link and the support wheels.
7. Drive into the field with the tractor.

Eliminating faults

8

CMS-T-00010658-B.1

Errors	Cause	Solution
The crop is buried	The forward speed is too high.	▶ Reduce the forward speed. Maintain the optimal working speed according to the section "Technical data", see page 37.
	The ridging discs are adjusted too aggressively.	▶ Adjust the setting of the ridging discs, see page 108.
	There are no active hoe protection discs.	▶ Activate the hoe protection discs, see page 76 or see page 88. ▶ Check the adjustment of the hoe protection discs. Adjust the setting if necessary, see page 81 or see page 88.
The parallelogram pulls to one side	The working depth of the hoeing tools is not evenly adjusted.	▶ Adjust all hoeing tools on the Vibro spring or on the tool mounting bracket to the same working depth, see page 74.
	The mounted additional tools are not evenly adjusted.	▶ Adjust all of the additional tools the same way.
The hoeing tool gets clogged with too much organic material	Too many hoeing tools are mounted.	▶ To increase the clearance between the hoeing tools, reduce the number of mounted hoeing tools.
	The soil flow is insufficient due to incorrect setting of the working depth.	▶ Increase or reduce the working depth of the hoeing tools to achieve better soil flow, see page 74.
Weeds are not removed between the rows	The hoeing width is not set correctly.	▶ Check the setting for the hoeing width. ▶ Set a hoeing width with at least 2 cm overlap, see page 73.
The tractor is strongly pulled down on slopes	The tractor is not properly balanced.	▶ Install rear ballast on the tractor.
	Unsuitable tyres are installed on the tractor.	▶ Use narrow cultivation tyres on the tractor.

Errors	Cause	Solution
The row widths vary greatly after seeding	The parallelograms are incorrectly aligned.	► Adjust the alignment of the parallelograms on each row, see page 71.
	Wrong direction of travel.	► Observe the direction of travel and drive through the field the same way as for seeding.
	The seed drill is not correctly set.	► Check the setting of the seed drill.
	The bearings of the seed drill are defective.	► Check the bearings on the seed drill. ► Replace defective bearings immediately.
The finger hoes run too deep	The finger hoes are not correctly set.	► Check the setting of the finger hoes. ► <i>To reduce the preload:</i> Move the finger hoes up, see page 101.
	The height of the finger hoe set on the star parallelogram is too low.	► Position the finger hoe set higher up in the star parallelogram using the section tube and the guide tube, see page 104.
The hoeing tools run too deep	The working depth setting for the hoeing tools is wrong.	► Check if the hoeing tools are set equally. ► Adjust the working depth of the hoeing tools at 2 bis 3 cm, see page 74. ► <i>If soil should be ridged:</i> Then mount the corresponding tools.
The hoeing tool is not running in the soil	The parallelograms are not in working position.	► Move the parallelograms into working position, see page 63.
The roller harrows remove too many plants from the plant rows	The roller harrows are not suitable for the crop.	► Deactivate the roller harrows, see page 119.
	The work intensity of the roller harrows is too high.	► Adjust the roller harrows to a lower working intensity via the height and the horizontal tilt, see page 122.

Parking the implement

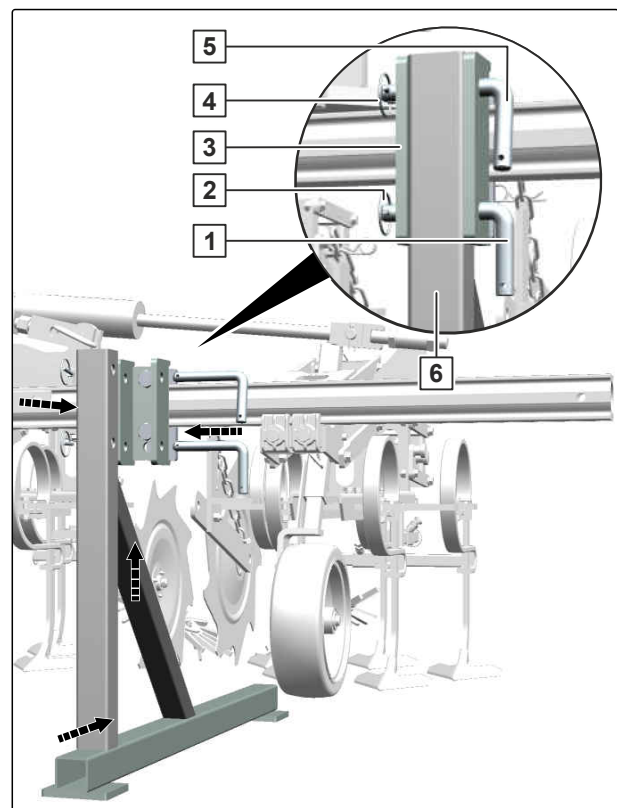
9

CMS-T-00012310-B.1

9.1 Attaching the parking supports

CMS-T-00007178-B.1

1. Move all parallelograms into transport position, see page 49.
2. Lift the coupled implement with the three-point power lift.
3. Lift the parking support **6** into the clamp **3** such that the holes of the parking support and the holes of the clamp are lined up.
4. Insert the upper fixing pin **5** through the upper holes on the clamp.
5. Secure the upper pin with the linch pin **4**.
6. Insert the lower fixing pin **1** through the lower holes on the clamp.
7. Secure the lower pin with the linch pin **2**.
8. Repeat steps 3 to 7 for the second parking support.

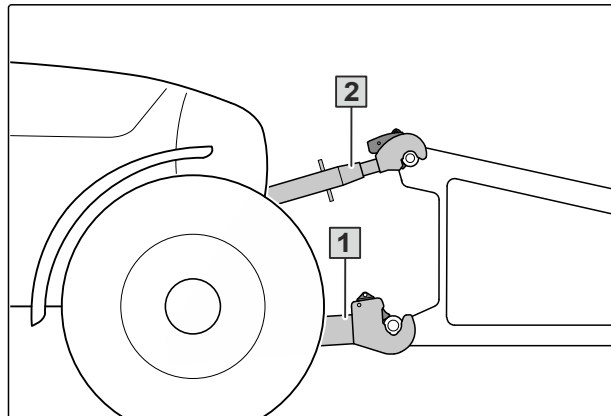


CMS-I-00006302

9.2 Uncoupling the three-point mounting frame

CMS-T-00012431-B.1

1. Park the implement on a level surface with solid ground.
2. Release the top link **2**.
3. Uncouple the top link from the implement.
4. Release the lower links **1**.
5. Uncouple the lower links from the implement from the tractor seat.



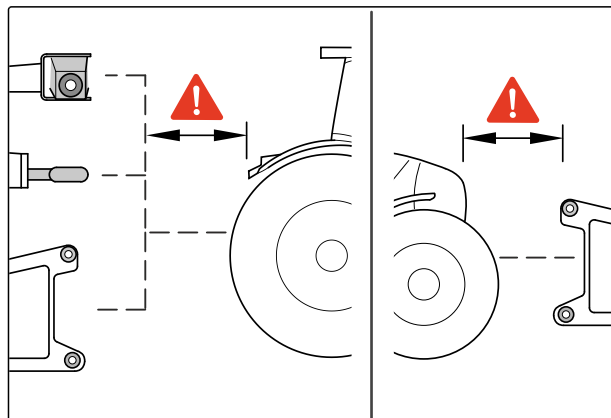
CMS-I-00007977

9.3 Driving the tractor away from the implement

CMS-T-00005795-D.1

There must be enough space between the tractor and implement so that the supply lines can be uncoupled without obstructions.

- Drive the tractor away from the implement, leaving a sufficient distance.

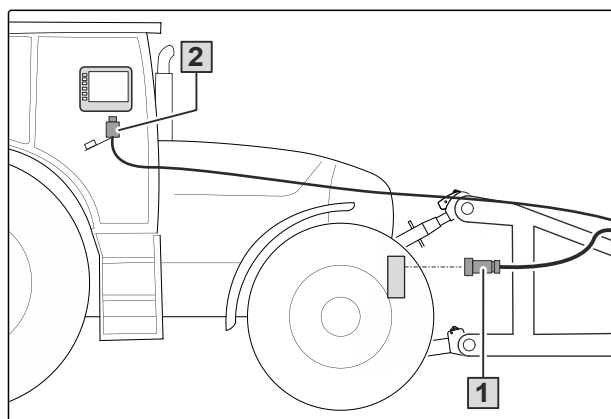


CMS-I-00004045

9.4 Uncoupling the ISOBUS or control computer

CMS-T-00012432-A.1

1. Unplug the connector of the ISOBUS line **1** or the control computer line **2**.
2. Protect the plug with a dust cap.
3. Hang the plug in the hose cabinet.

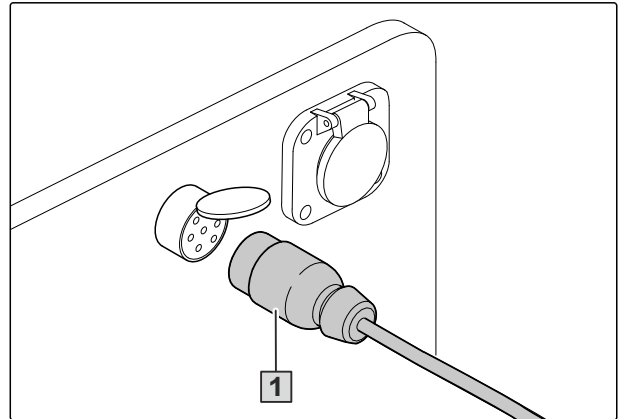


CMS-I-00007978

9.5 Uncoupling the power supply

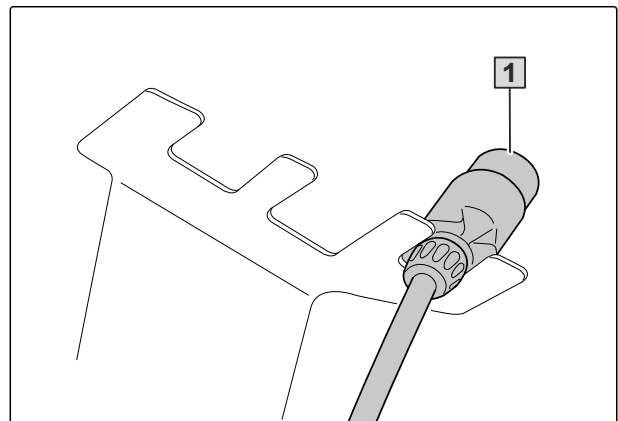
CMS-T-00001402-H.1

1. Pull out the plug **1** for the power supply.



CMS-I-00001048

2. Hang the plugs **1** in the hose cabinet.

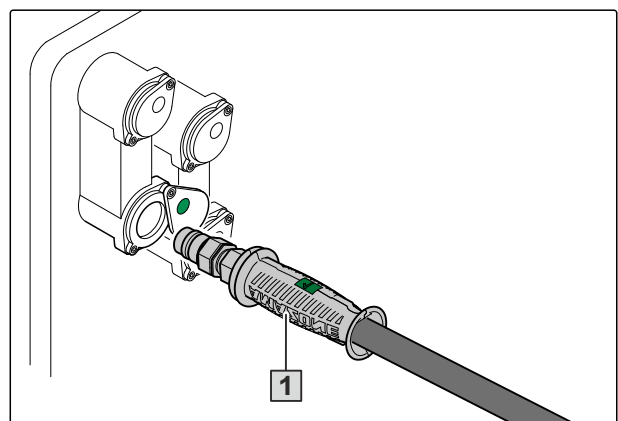


CMS-I-00001248

9.6 Disconnecting the hydraulic hose lines

CMS-T-00000277-F.1

1. Secure the tractor and implement.
2. Put the control lever on the tractor control unit in float position.
3. Disconnect the hydraulic hose lines **1**.
4. Put the dust caps on the hydraulic sockets.

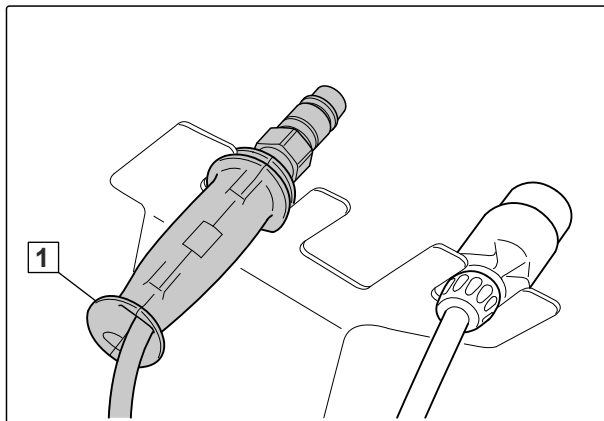


CMS-I-00001065

9 | Parking the implement

Disconnecting the hydraulic hose lines

5. Hang the hydraulic hose lines **1** in the hose cabinet.



CMS-I-00001250

Repairing the implement

10

CMS-T-00010663-C.1

10.1 Maintaining the implement

CMS-T-00007060-C.1

10.1.1 Maintenance schedule

After initial operation	
Checking the hydraulic hose lines	see page 138
As required	
Replacing duckfoot shares	see page 139
Replacing Rapido duckfoot shares	see page 140
Replacing RapidoClip duckfoot shares	see page 141
Replacing the Rotavator blade or hoeing chisel	see page 142
Replacing the spring tine or spring hoe tine share	see page 143
Replacing finger hoes	see page 143
Daily	
Checking the lower link pins and top link pins	see page 138
Every 50 operating hours / Weekly	
Checking the hydraulic hose lines	see page 138

10.1.2 Checking the hydraulic hose lines

CMS-T-00002331-F.1



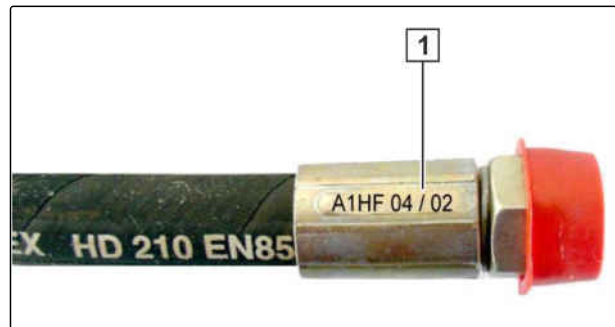
INTERVAL

- After initial operation
- Every 50 operating hours
- or
- Weekly

1. Check the hydraulic hose lines for damage, such as chafing point, cuts, tears and deformation.
2. Check the hydraulic hose lines for leaks.
3. Retighten loose bolted connections.

Hydraulic hose lines must not be more than 6 years old.

4. Check the manufacturing date **1**.



CMS-I-00000532



WORKSHOP WORK

5. Replace worn, damaged or aged hydraulic hose lines.

10.1.3 Checking the lower link pins and top link pins

CMS-T-00002330-J.1



INTERVAL

- Daily

Criteria for visual inspection of lower link pins and top link pins:

- Cracks
 - Fractures
 - Permanent deformations
 - Permissible wear: 2 mm
1. Check the lower link pins and top link pins for the listed criteria.
 2. Replace worn pins.

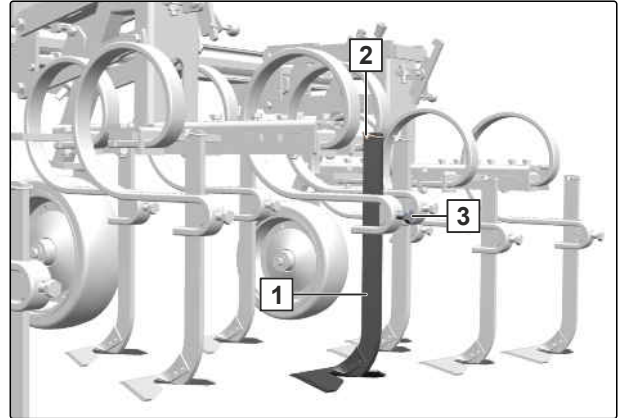
10.1.4 Replacing duckfoot shares

CMS-T-00010487-A.1

INTERVAL

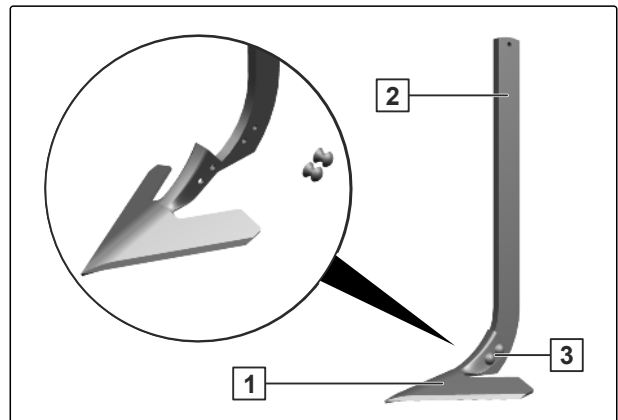
- As required

1. Lift the parallelogram and secure it.
2. Remove the loss prevention device **2**.
3. Loosen the bolt **3** for the holder on the tool mounting bracket or on the Vibro spring.
4. Pull the duckfoot shares **1** downwards out of the holder.



CMS-I-00007137

5. Drill the rivets **3** out of the share plate **1** and the shaft **2** with a metal drill.
6. Take off the share plate.
7. Put the new share plate on the shaft such that the holes are lined up.
8. Insert percussion rivets through the holes.
9. Flatten the percussion rivets with a hammer until the share plate and the shaft are firmly connected.
10. Slide the newly equipped duckfoot share into the holder from below up to the desired height.
11. Retighten the bolt for the holder.
12. Put the loss prevention device back on.



CMS-I-00007147

10.1.5 Replacing Rapido duckfoot shares

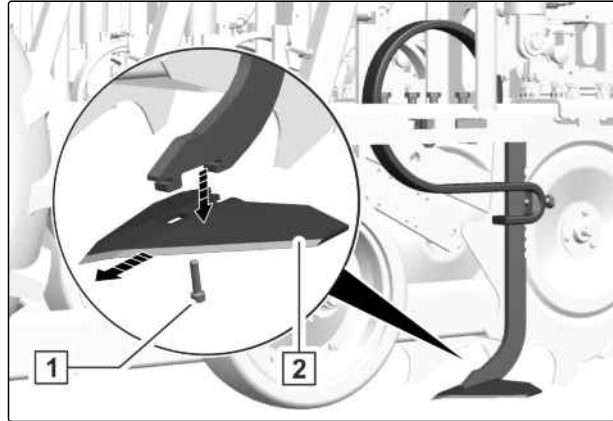
CMS-T-00010476-B.1



INTERVAL

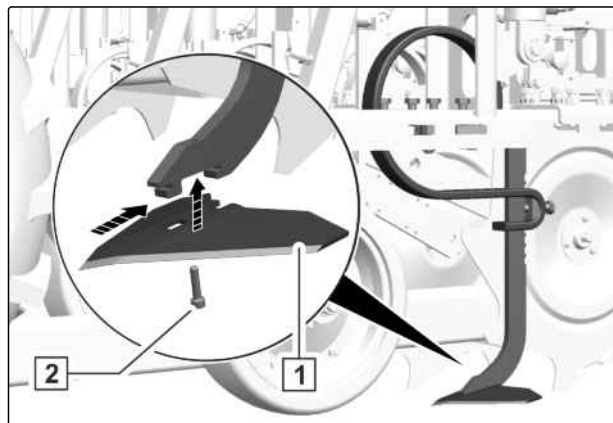
- As required

1. Lift the parallelogram and secure it.
2. Unscrew the bolt **1**.
3. Push the share plate **2** to the front and remove downwards.



CMS-I-00004576

4. Place the share plate **1** on the mount and push to the rear.
5. Screw in the bolt **2**.



CMS-I-00004575

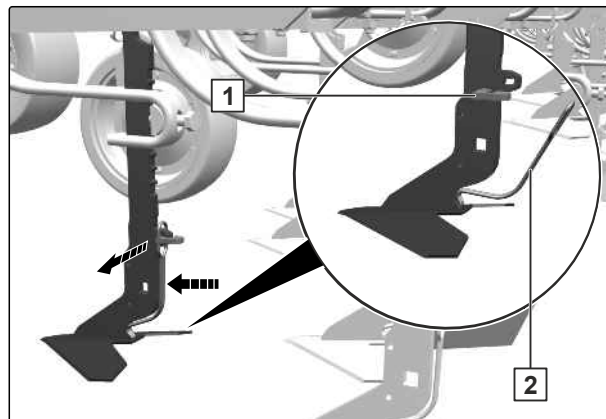
10.1.6 Replacing RapidoClip duckfoot shares

CMS-T-00013915-A.1

INTERVAL

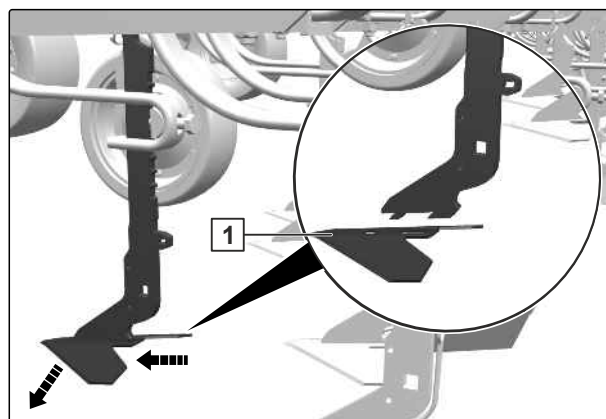
- As required

1. Lift the parallelogram and secure it.
 2. Push the RapidoClip **2** to the front and pull out the lock **1**.
- ➔ The RapidoClip swivels to the rear.
3. Take off the RapidoClip.



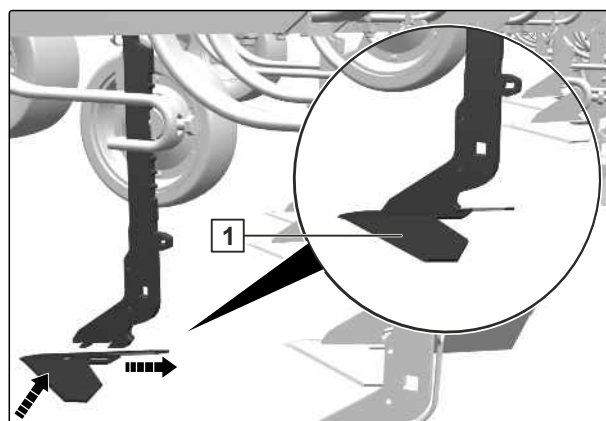
CMS-I-00008660

4. Push the old share plate **1** to the front out of the mounts and remove downwards.



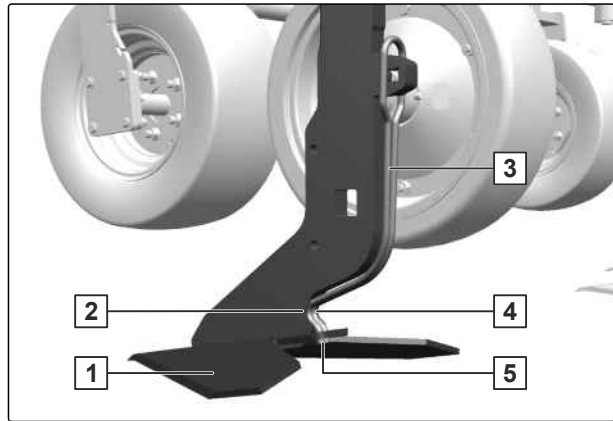
CMS-I-00008661

5. Make sure that the mounts are clean.
6. Place the new share plate **1** on the mount from below and push to the rear.
7. Make sure that the share plate is properly fitted.



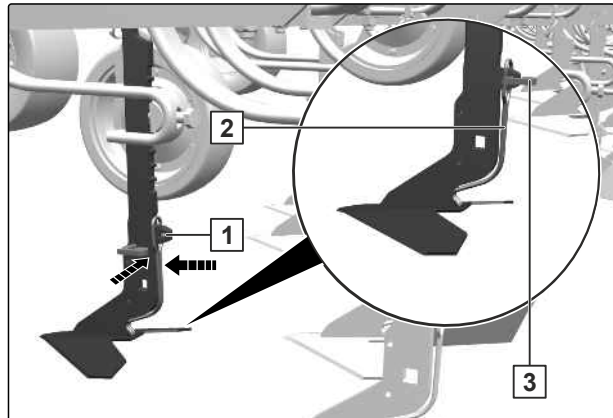
CMS-I-00008662

8. Insert the RapidoClip **3** such that the lower end **5** fits in the share plate **1** and the rounded part **2** is resting in the dent **4** of the shaft.



CMS-I-00008745

9. Press the RapidoClip **2** to the front against the shaft and insert the lock **3** through the opening **1**.
10. Make sure that the RapidoClip is pressed firmly to the rear against the inserted lock.



CMS-I-00008663

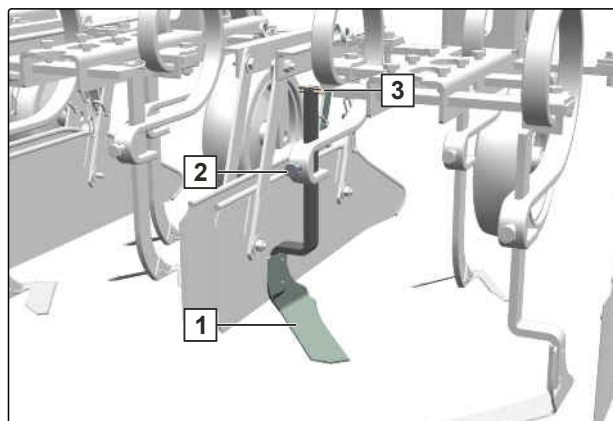
10.1.7 Replacing the Rotavator blade or hoeing chisel

CMS-T-00010477-A.1

INTERVAL

- As required

1. Lift the parallelogram and secure it.
2. Remove the loss prevention device **3**.
3. Loosen the bolt **2** for the holder on the tool mounting bracket or on the Vibro spring.
4. Pull out the Rotavator blade **1** or hoeing chisel downwards and remove it.
5. Slide the new Rotavator blade or hoeing chisel into the holder from below up to the desired height.
6. Retighten the bolt for the holder.
7. Put the loss prevention device back on.



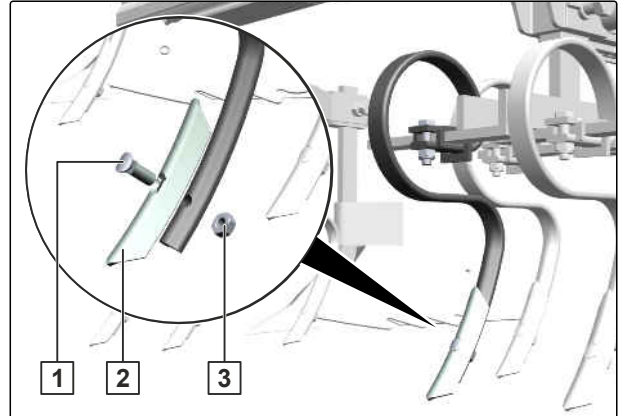
CMS-I-00007148

10.1.8 Replacing the spring tine or spring hoe tine share

CMS-T-00010488-A.1

INTERVAL • As required

1. Lift the implement or parallelogram and secure it.
2. Unscrew the nut **3**.
3. Pull out the planetary bolt **1**.
4. Take off the share **2**.
5. Put on the new share.
6. Slide in the bolt.
7. Screw on the nut.



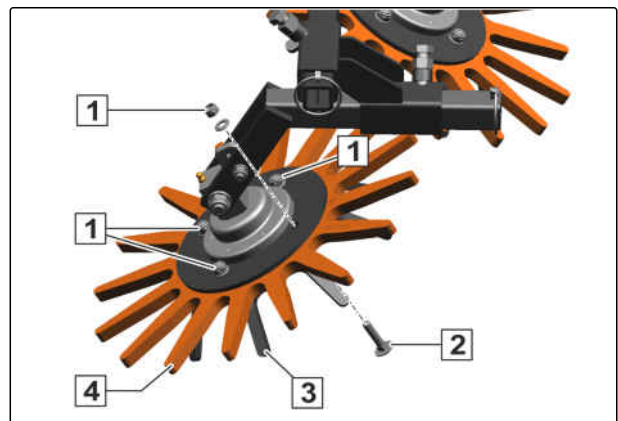
CMS-I-00007149

10.1.9 Replacing finger hoes

CMS-T-00006418-A.1

INTERVAL • As required

1. Lift the parallelogram and secure it.
2. Unscrew the nuts **1** with washers.
3. Pull out the bolts **2**.
4. Take off the finger hoe drive **3** and the finger hoe **4**.
5. Put on a new finger hoe with finger hoe drive.
6. Insert the bolts.
7. Screw on the nuts with washers.



CMS-I-00004577

10.2 Lubricating the implement

CMS-T-00010664-B.1



IMPORTANT

Implement damage due to improper lubrication

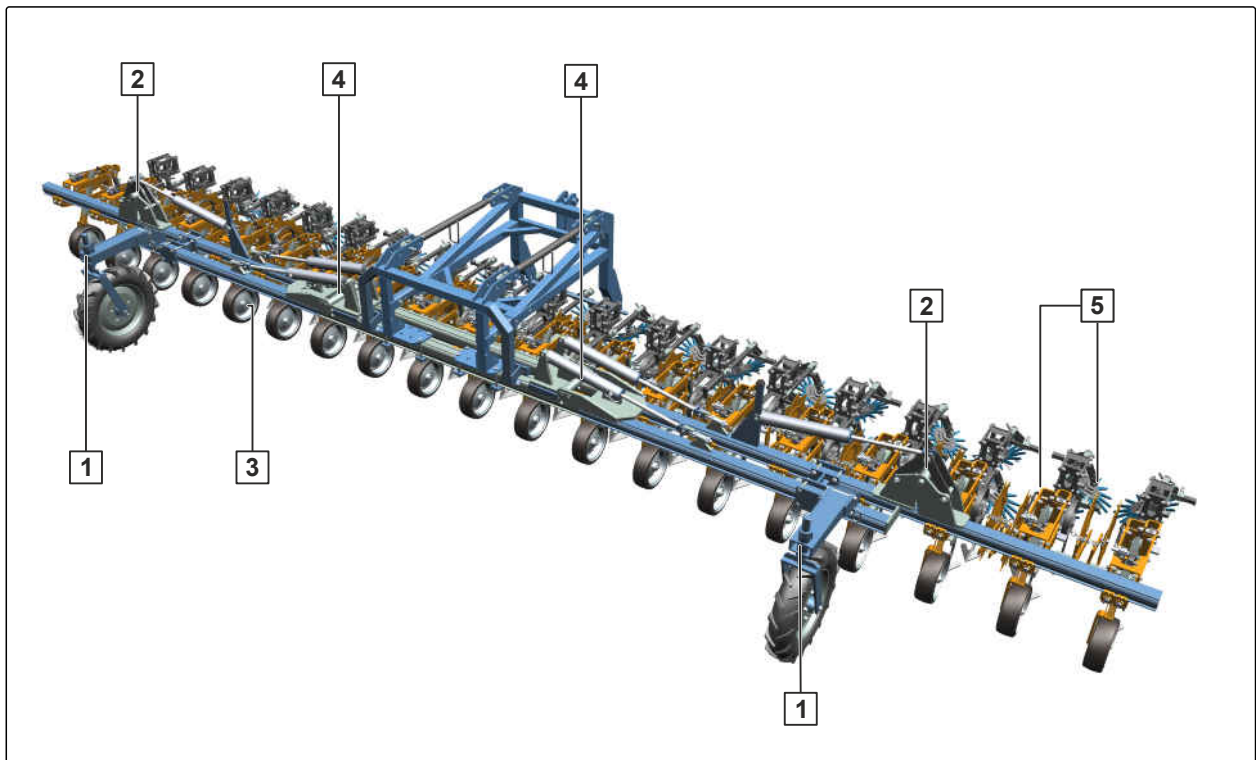
- ▶ Grease the implement at the marked lubrication points according to the lubrication schedule.
- ▶ *To ensure that dirt is not pressed into the lubrication points,* thoroughly clean the grease nipples and the grease gun.
- ▶ Only grease the implement with the lubricants listed in the technical data.
- ▶ Press the dirty grease completely out of the bearings.



CMS-I-00002270

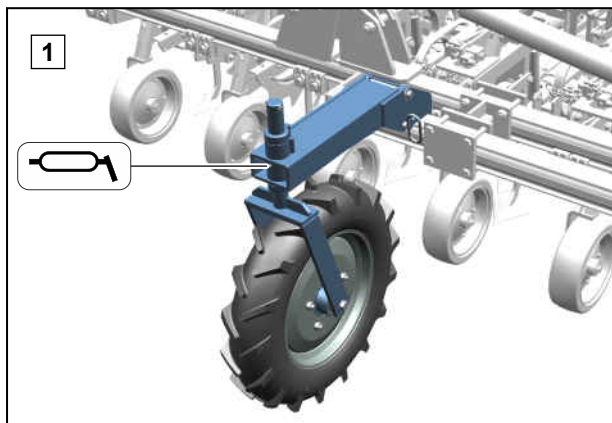
10.2.1 Overview of lubrication points

CMS-T-00010665-A.1

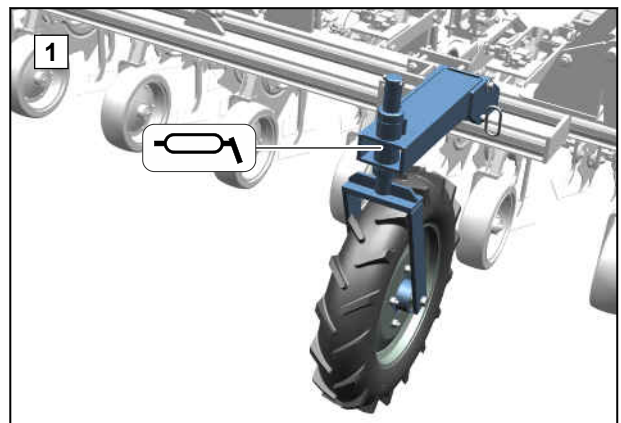


CMS-I-00007638

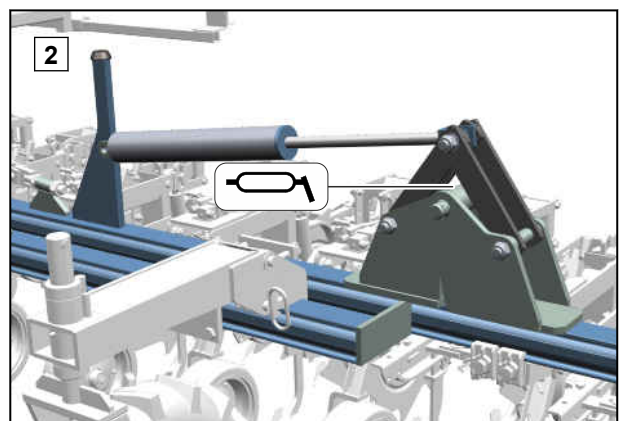
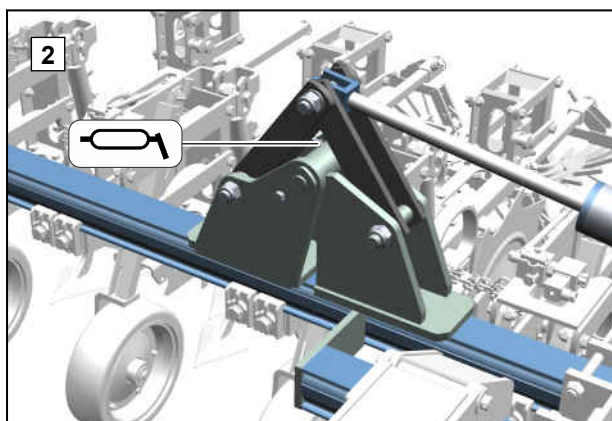
Every 20 operating hours



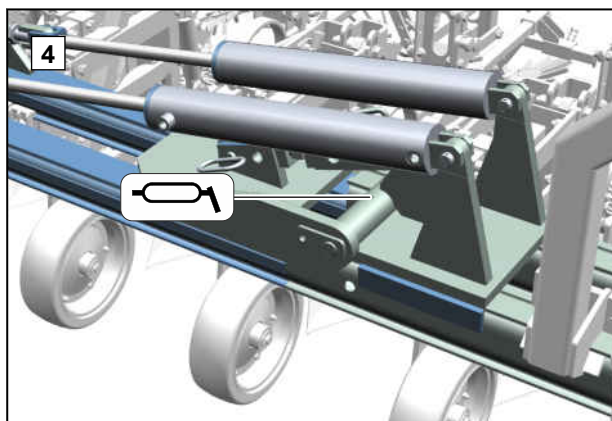
CMS-I-00007182



CMS-I-00007181

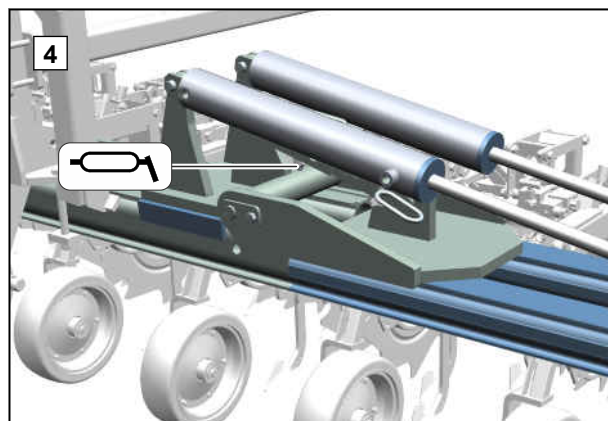


CMS-I-00007184

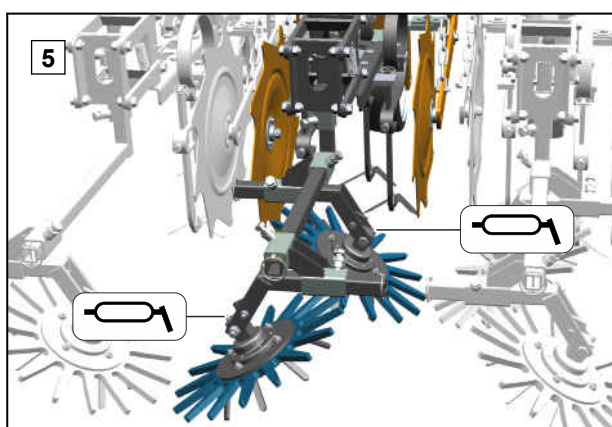


CMS-I-00007186

CMS-I-00007183

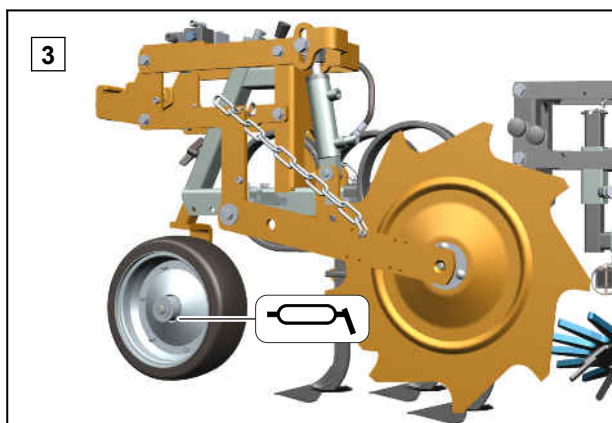


CMS-I-00007187



CMS-I-00007188

Every 50 operating hours



CMS-I-00007185

10.3 Cleaning the implement

CMS-T-00006591-B.1



IMPORTANT

Risk of machine damage due to cleaning jet of the high-pressure nozzle

- ▶ Never direct the cleaning jet of the high-pressure cleaner or hot water high-pressure cleaner onto the marked components.
- ▶ Never aim the cleaning jet of high-pressure cleaners or hot water high-pressure cleaners on electrical or electronic components.
- ▶ Never aim the cleaning jet of the high pressure cleaner directly on lubrication points, bearings, rating plates, warning signs, and stickers.
- ▶ Always maintain a minimum distance of 30 cm between the high-pressure nozzle and the implement.
- ▶ Do not exceed a water pressure of 120 bar.



CMS-I-00002692

1. Only blow off the implement with compressed air.
2. Remove heavy soiling on the tools with a high-pressure cleaner or a hot water high-pressure cleaner.

Preparing the implement for transport

11

CMS-T-00007061-B.1

11.1 Loading and securing the implement

CMS-T-00010638-B.1



WARNING

Risk of accident due to improper loading and securing

► Follow the instructions below exactly.

1. Fold the folding implement, see page 53.
2. Attach the parking supports, see page 133.
3. Couple the implement onto a suitable lifting vehicle with the three-point mounting frame.
4. Lift the implement onto the transport vehicle with the lifting vehicle and put it down on the loading platform.
5. Uncouple the implement from the lifting vehicle.
6. Secure the implement with lashing material in the parking support area onto the transport vehicle.

Disposing of the implement

12

CMS-T-00010906-B.1

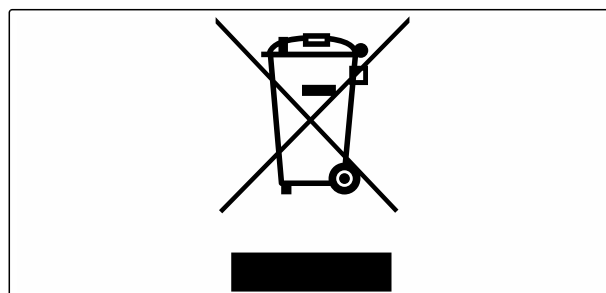


ENVIRONMENTAL INFORMATION

Environmental damage due to improper disposal

- ▶ Observe the regulations of the local authorities.
- ▶ Observe the symbols on the implement regarding disposal.
- ▶ Observe the following instructions.

1. Components with this symbol should not be disposed of with household waste.



CMS-I-00007999

2. Return batteries to the distributor

or

Dispose of batteries at a collection point.

3. Put recyclable materials in the recycling.
4. Treat operating materials like hazardous waste.



WORKSHOP WORK

5. Dispose of the coolant.

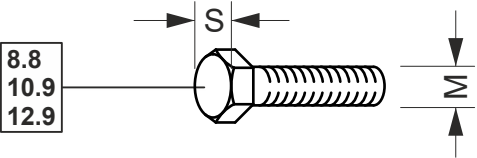
Appendix

13

CMS-T-00010659-B.1

13.1 Bolt tightening torques

CMS-T-00000373-E.1



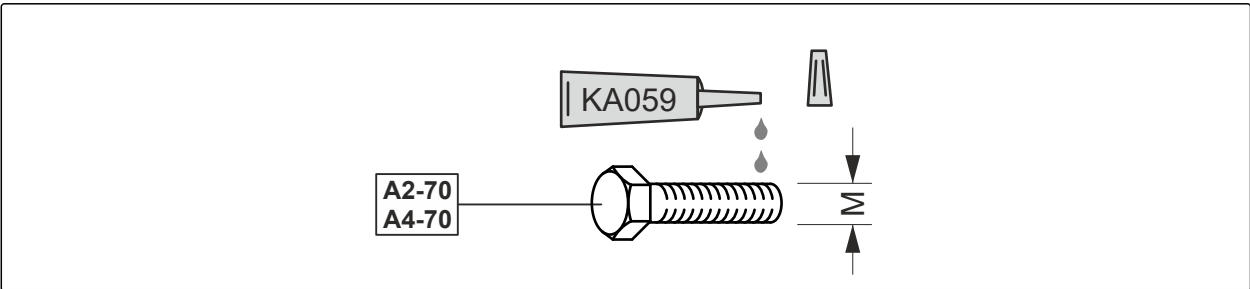
CMS-I-000260

NOTE

Unless specified otherwise, the bolt tightening torques listed in the table apply.

M	S	Strength classes		
		8.8	10.9	12.9
M8	13 mm	25 Nm	35 Nm	41 Nm
M8x1		27 Nm	38 Nm	41 Nm
M10	16(17) mm	49 Nm	69 Nm	83 Nm
M10x1		52 Nm	73 Nm	88 Nm
M12	18(19) mm	86 Nm	120 Nm	145 Nm
M12x1.5		90 Nm	125 Nm	150 Nm
M14	22 mm	135 Nm	190 Nm	230 Nm
M 14x1.5		150 Nm	210 Nm	250 Nm
M16	24 mm	210 Nm	300 Nm	355 Nm
M16x1.5		225 Nm	315 Nm	380 Nm
M18	27 mm	290 Nm	405 Nm	485 Nm
M18x1.5		325 Nm	460 Nm	550 Nm
M20	30 mm	410 Nm	580 Nm	690 Nm
M20x1.5		460 Nm	640 Nm	770 Nm

M	S	Strength classes		
		8.8	10.9	12.9
M22	32 mm	550 Nm	780 Nm	930 Nm
M22x1.5		610 Nm	860 Nm	1,050 Nm
M24	36 mm	710 Nm	1,000 Nm	1,200 Nm
M24x2		780 Nm	1,100 Nm	1,300 Nm
M27	41 mm	1,050 Nm	1,500 Nm	1,800 Nm
M27x2		1,150 Nm	1,600 Nm	1,950 Nm
M30	46 mm	1,450 Nm	2,000 Nm	2,400 Nm
M30x2		1,600 Nm	2,250 Nm	2,700 Nm



CMS-I-00000065

M	Tightening torque	M	Tightening torque
M4	2.4 Nm	M14	112 Nm
M5	4.9 Nm	M16	174 Nm
M6	8.4 Nm	M18	242 Nm
M8	20.4 Nm	M20	342 Nm
M10	40.7 Nm	M22	470 Nm
M12	70.5 Nm	M24	589 Nm

13.2 Other applicable documents

CMS-T-00010660-B.1

- Tractor operating manual
- Operating manual for the ISOBUS control terminal
- Operating manual for the ISOBUS hoeing machine software

Directories

14

14.1 Glossary

CMS-T-00000513-B.1

M

Machine

Mounted implements are accessory parts of the tractor. However, mounted implements are always referred to as the implement in this operating manual.

O

Operating materials

Operating materials serve to ensure operational readiness. Operating materials include e.g. cleaning agents and lubricants such as lubricating oil, greases or cleaners.

T

Tractor

In this operating manual, the designation tractor is always used, even for other agricultural tractor units. Implements are mounted on the tractor or towed by the tractor.

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