Original operating manual

Rotary harrow

KE 2502-150
KE 3002-150
KE 3002-190
KE 3502-190
KE 4002-190
KE 3002-240
KE 4002-240



SmartLearning

MG6878-EN-GB



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-K.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-G.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-E.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-00018782-A.1

The digital operating manual and e-learning can be downloaded from the Download Center 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-00004173-M.1

2.1 Basic safety instructions

CMS-T-00004174-M.1

2.1.1 Safe operating organisation

CMS-T-00002302-F.1

2.1.1.1 Personnel qualification

CMS-T-00002306-C.1

2.1.1.1.1 Requirements for persons working with the implement

CMS-T-00002310-C.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 controlling the machine.
- 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 head 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.

2.1.1.1.2 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".

2.1.1.1.3 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

2.1.1.1.4 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

2.1.1.2 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.

2.1.1.3 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.

2.1.1.4 Operational safety

CMS-T-00002309-E.1

2.1.1.4.1 Perfect technical condition

CMS-T-00002314-E.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 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.

2.1.1.4.2 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.

2.1.1.4.3 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.

2.1.2 Knowing and preventing dangers

CMS-T-00004917-G.1

2.1.2.1 Safety hazards on the implement

CMS-T-00002318-H.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.

Hydraulic accumulator

Hydraulic accumulators contain gas under pressure. There is a risk of explosion if they are not handled properly.

- Do not make any modifications on hydraulic accumulators.
- Have hydraulic accumulators checked and serviced as specified in the operating manual.

Risk of injury on the universal joint shaft and the PTO shaft

Persons can be caught, pulled in and severely injured by the universal joint shaft, the PTO 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.

- Keep the protective device and universal joint shaft guard on the implement functional.
- Maintain sufficient coverage of the profile tube, universal joint shaft guard and PTO shaft protective cap.
- To secure the universal joint shaft guard against rotating:
  Hook on the safety chains.
- Allow the universal joint shaft locks to engage.
- 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.
- To prevent implement damage due to torque peaks:
  Slowly couple the PTO shaft at low tractor engine speed.
- If you do not need the universal joint shaft:
  Switch off the universal joint shaft drive.

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.

2.1.2.2 Danger zones

CMS-T-00004918-C.1

Danger zones on the machine

The following significant hazards are present in the danger zones:

The machine and its work tools move during operation.

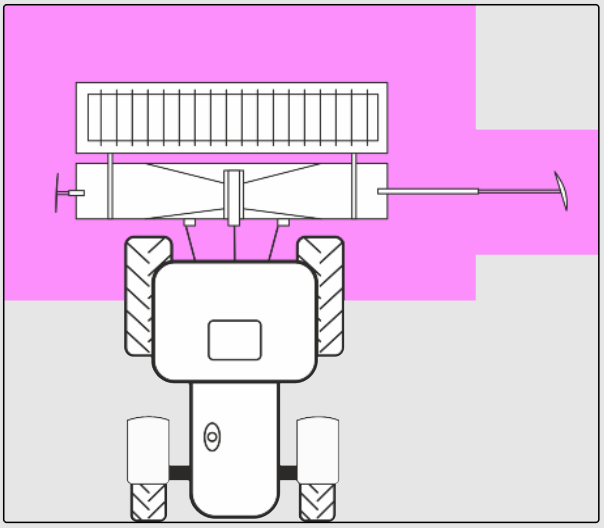
Hydraulically raised machine parts can lower unnoticed and slowly.

The tractor and machine can roll away unintentionally.

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

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

- Keep people out of the danger zone of the machine.
- If people enter the danger zone:
  Switch off the motors and drives immediately.
- Before you work in the danger zone of the machine:
  Secure the tractor and machine. This also applies for quick checking work.



CMS-I-00003509

Overhead power lines

When unfolding and folding or when folding and lifting out or raising the machine or machine parts during operation, the machine can reach the height of overhead power lines. This can cause voltage to jump over to the machine and cause lethal electrical shocks or fires. Large voltage differences develop on the ground surrounding the machine.

- Before operation, carry out a risk assessment at the site by locating the overhead power lines in the area. Consider the risk assessment throughout the entire operation, particularly when controlling moving machine parts.
- When unfolding and folding or when folding and raising or lifting out the machine or machine parts, maintain a sufficient distance from overhead power lines.
- Never fold or unfold the machine parts close to overhead power line pylons and overhead power lines.
- When the machine parts are unfolded, maintain a safe distance from overhead power lines.
- If voltage has jumped over to the machine:
  Stay in the cab.
- Do not touch any metal parts.
- Warn people to stay away from the machine.
- Wait for help from a professional recue team.
- If people must exit the cab despite the voltage flashover, e.g. due to direct lethal danger from fire:
  Jump away from the machine into a stable position.
- Do not touch the machine.
- Move away from the machine with small steps.

2.1.3 Safe operation and handling of the machine

CMS-T-00002304-M.1

2.1.3.1 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.

2.1.3.2 Driving safety

CMS-T-00002321-I.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 capacity. 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.
- Comply with the permissible transport width and transport height of the implement.
- 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 implement 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.
- Use the warning beacon in compliance with the national regulations.
- Switch off the work lights.
- Lock the tractor control units.
- 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.

Do not use the control computer or control terminal during road travel

If the driver is distracted, it can result in accidents and injuries or even death.

- Do not operate the control computer or control terminal during road travel.

2.1.4 Safe maintenance and modification

CMS-T-00002305-O.1

2.1.4.1 Changes on the implement

CMS-T-00002322-C.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 and in consultation with AMAZONE.

2.1.4.2 Work on the machine

CMS-T-00002323-M.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 until hot parts cool down.
- Do not stand on moving parts.

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 by specialist personnel with appropriate training.



CMS-I-00007119

- Have maintenance work that is labelled as "WORKSHOP WORK" performed at a specialist workshop that is adequately equipped in terms of agricultural technology, safety and environmental technology.
- Never perform welding, drilling, sawing, grinding, and cutting work on the frame, running gear or coupling devices of the machine.
- Never modify safety-related components.
- Never drill out existing holes.
- Perform all maintenance work at the prescribed maintenance intervals.

Raised machine parts

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

- Never linger under raised machine parts.
- If you have to work on or under raised machine parts:
  Lower the machine parts or secure the raised machine 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 machine. 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 machine:
  Uncouple the machine from the tractor.
- Do not weld close to a field sprayer that was previously used to spread liquid fertiliser.

2.1.4.3 Operating materials

CMS-T-00002324-C.1

Unsuitable operating materials

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

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

2.1.4.4 Special equipment and spare parts

CMS-T-00002325-B.1

Special equipment, accessories, and spare parts

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

- Only use original parts or parts that meet AMAZONE requirements.
- If you have any questions regarding special equipment, accessories or spare parts,
  contact your dealer or AMAZONE.

2.2 Safety routines

CMS-T-00002300-E.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.

- Before beginning work, check whether the protective devices have been deactivated or manipulated.
- 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-00005043-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 three-point power lift of a tractor that meets the technical requirements.
- The implement is suitable and intended for shallow stubble cultivation or breaking up fallow land, for seedbed preparation and incorporating catch crops or farm manure.
- The soil tillage implement may only be used with the rollers specified in the operating manual.
- When driving on public roads, the implement, depending on the provisions of the applicable road traffic regulations, can be mounted and transported at the rear of a tractor that meets the technical requirements.
- The implement may only be used and maintained by persons who fulfil 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 AMAZONE.
- 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.

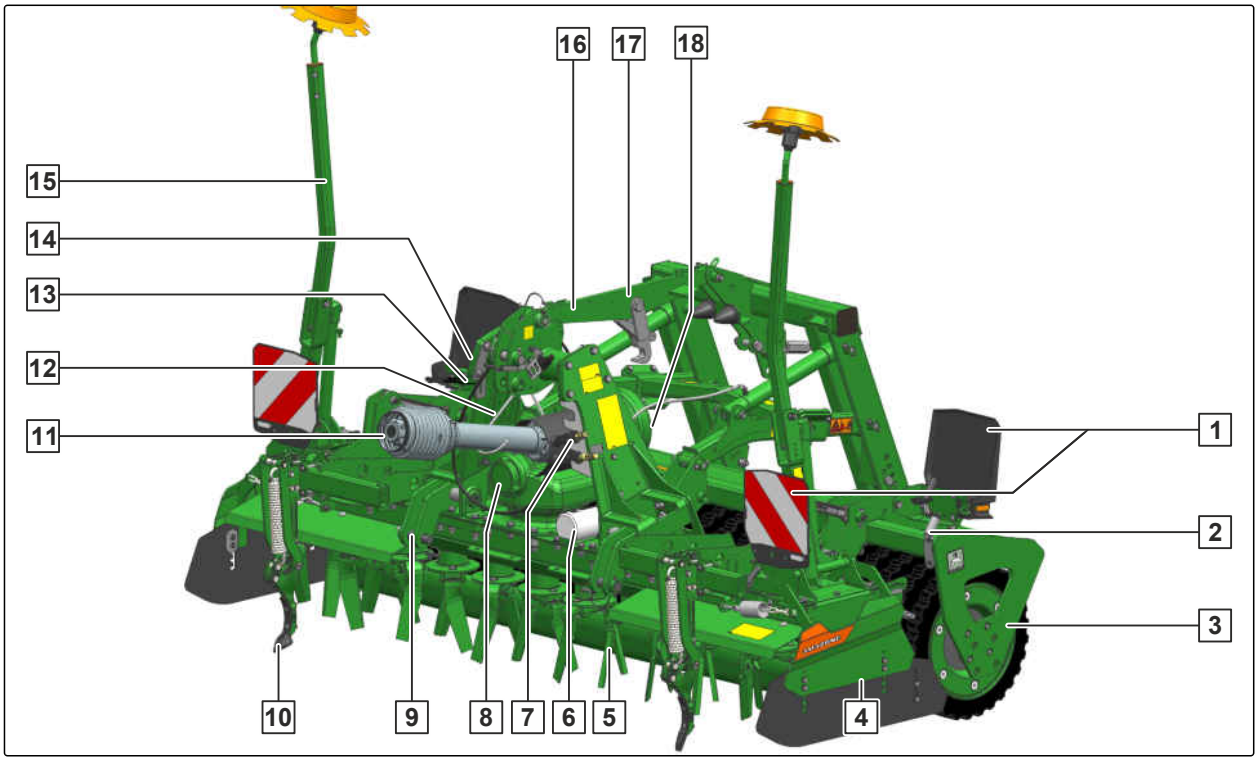
Product description

4

CMS-T-00004636-L.1

4.1 Implement overview

CMS-T-00004639-D.1



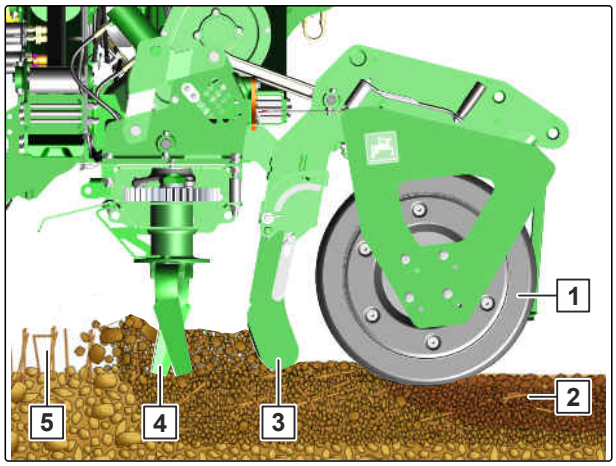
CMS-I-00003477

1	Lighting and identification for road travel	2	Universal operating tool
3	Roller	4	Side guide plate
5	Tines	6	Threaded cartridge
7	Hose cabinet	8	Gearbox
9	Three-point mounting frame	10	Wheel mark eradicator
11	Universal joint shaft	12	Universal joint shaft bracket
13	Rating plate on the implement	14	Implement number
15	Track marker	16	Lift limitation
17	Liftpack system for a mounted seed drill	18	PTO shaft through drive

4.2 Function of the implement

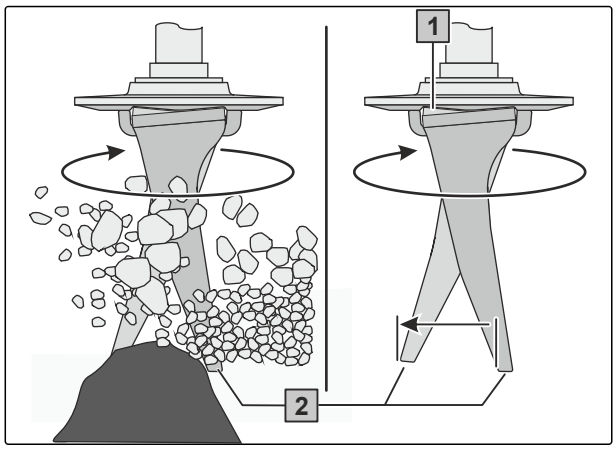
CMS-T-00004656-E.1

The tines 4 break open the soil. Organic residues 5 are intensively incorporated. The levelling board 3 levels the flow of soil between the tool tines and the roller 1. To crush large clods of soil more effectively, the soil clods are held between the tool tines by the levelling board. The roller reconsolidates the soil and produces the finished seedbed 2.



CMS-I-00014405

The tines 2 are fastened to the sockets 1 of the tool carrier. The sockets are shaped in such a way that the tines have a spring action and can deflect on rocks and other obstacles.



CMS-I-00014407

For operation as a seeding combination, the soil tillage implement can be combined with a pack top seed drill.

4.3 Special equipment

CMS-T-00004637-D.1

- Wheel mark eradicator
- Track marker
- Lighting and identification for road travel
- Hydraulic working depth adjustment
- Coupling parts for a pack top seed drill
- Coupling parts for a mounted seed drill
- Liftpack system for a mounted seed drill
- Lateral stabilisation for the liftpack system
- Hydraulic lift limitation for the liftpack system
- Gear wheel change set 31/40 teeth

- GreenDrill pack top seed drill
- PTO shaft through drive

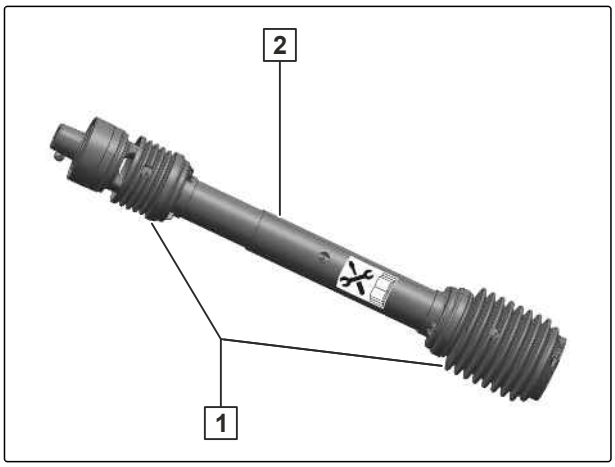
4.4 Protective equipment

CMS-T-00004640-D.1

4.4.1 Universal joint shaft guard

CMS-T-00003992-D.1

As standard, the universal joint shafts are equipped with guard tubes 2 and guard cones 1. Depending on the implement equipment, holding chains or full guard cones fix the guard tubes. This rules out the risk of winding.

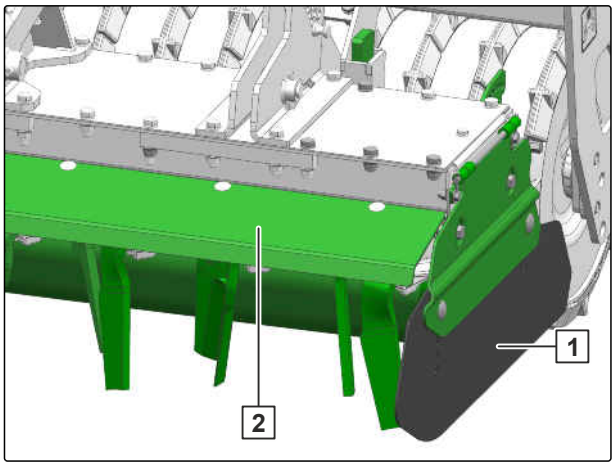


CMS-I-00002930

4.4.2 Tool protection

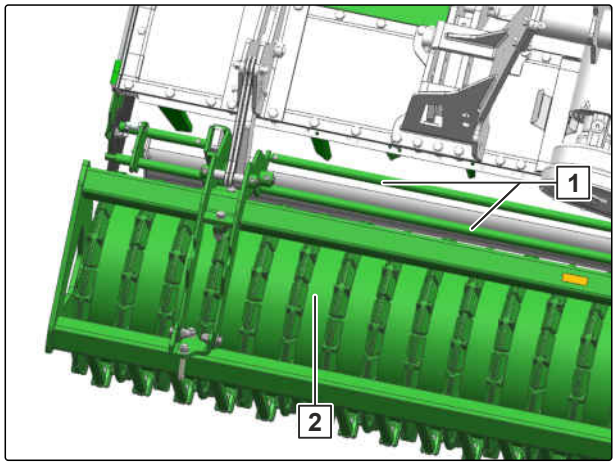
CMS-T-00004641-C.1

The tool guard prevents sand clods or stones from being thrown up and out of the implement. It also prevents accidental touching. The tool guard consists of the side guide plates 1 and the protective panels 2.



CMS-I-00003447

Towards the rear, the tool guard contains a guard tube [1] and trailing roller [2].



CMS-I-00003446

4.5 Warning symbols and instructional images

CMS-T-00004653-I.1

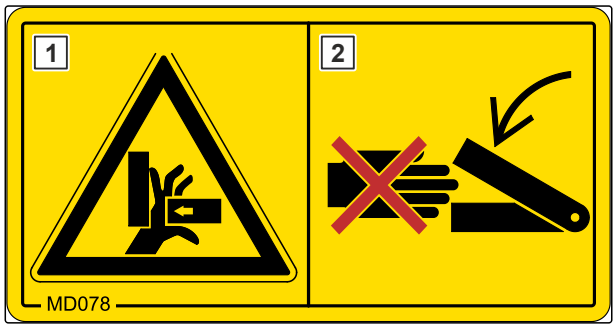
4.5.1 Warning symbols

CMS-T-000141-E.1

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.



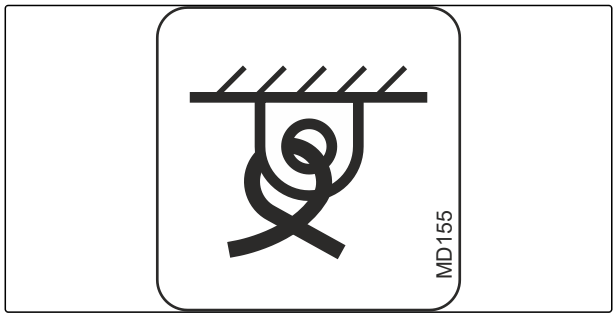
CMS-I-00000416

4.5.2 Instructional images

CMS-T-00021423-A.1

Instructional images provide information on how to proceed.

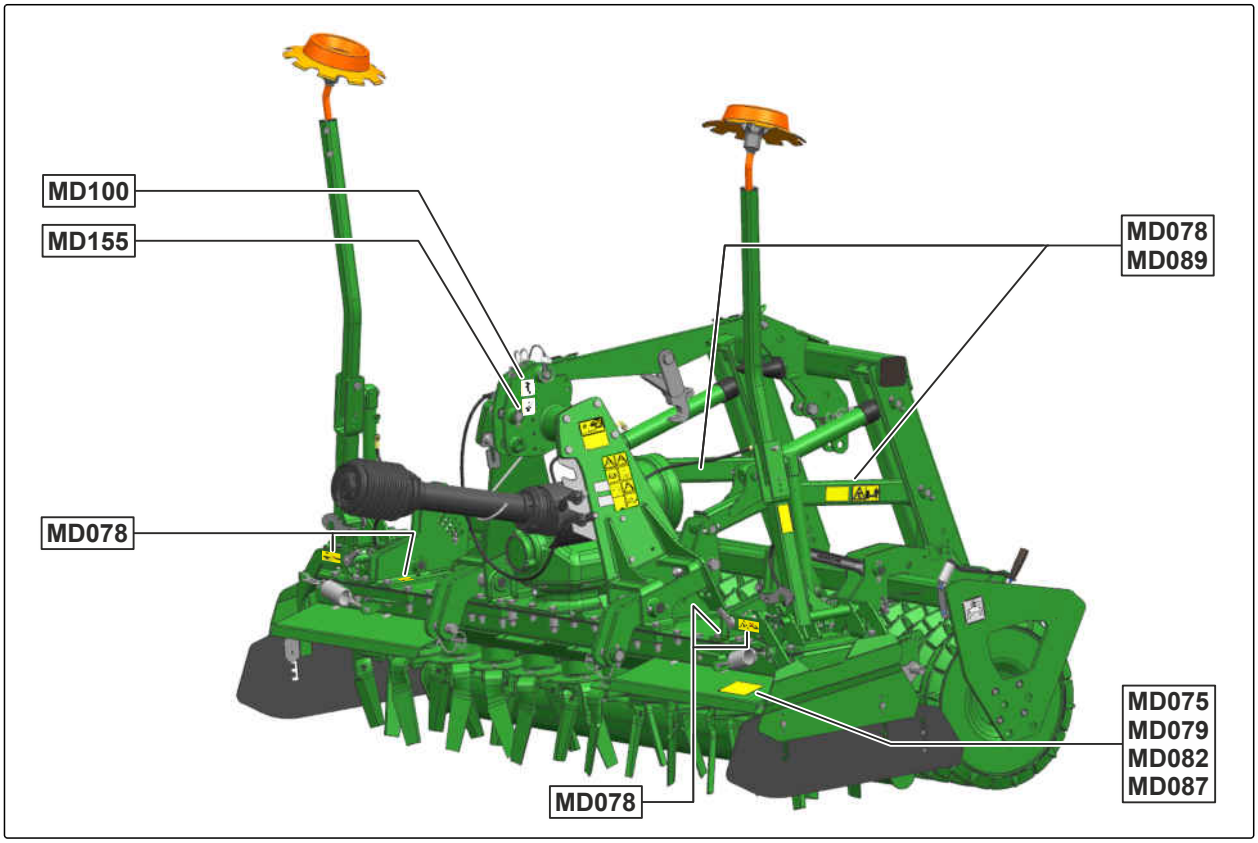
Failure to follow the instructions will result in hazards.



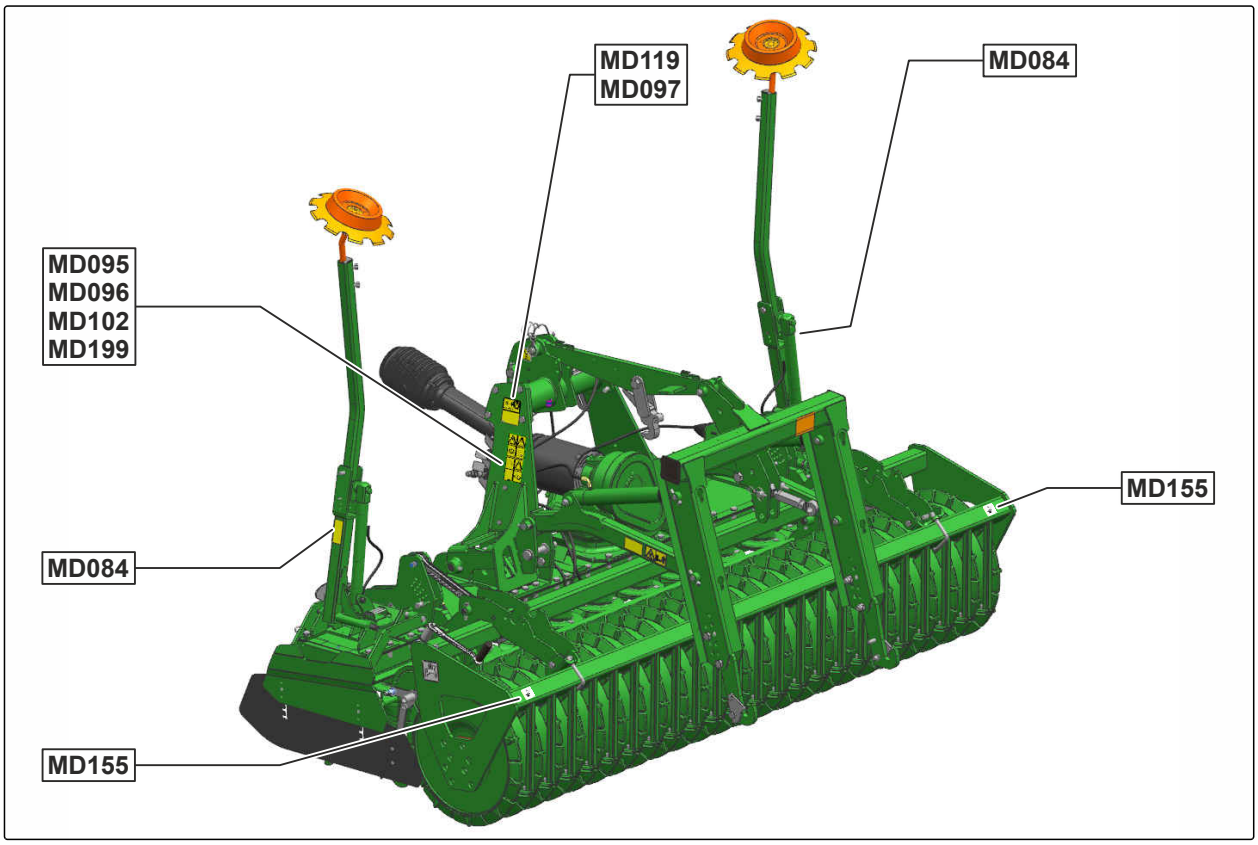
CMS-I-00000450

4.5.3 Positions of the warning symbols and instruction images

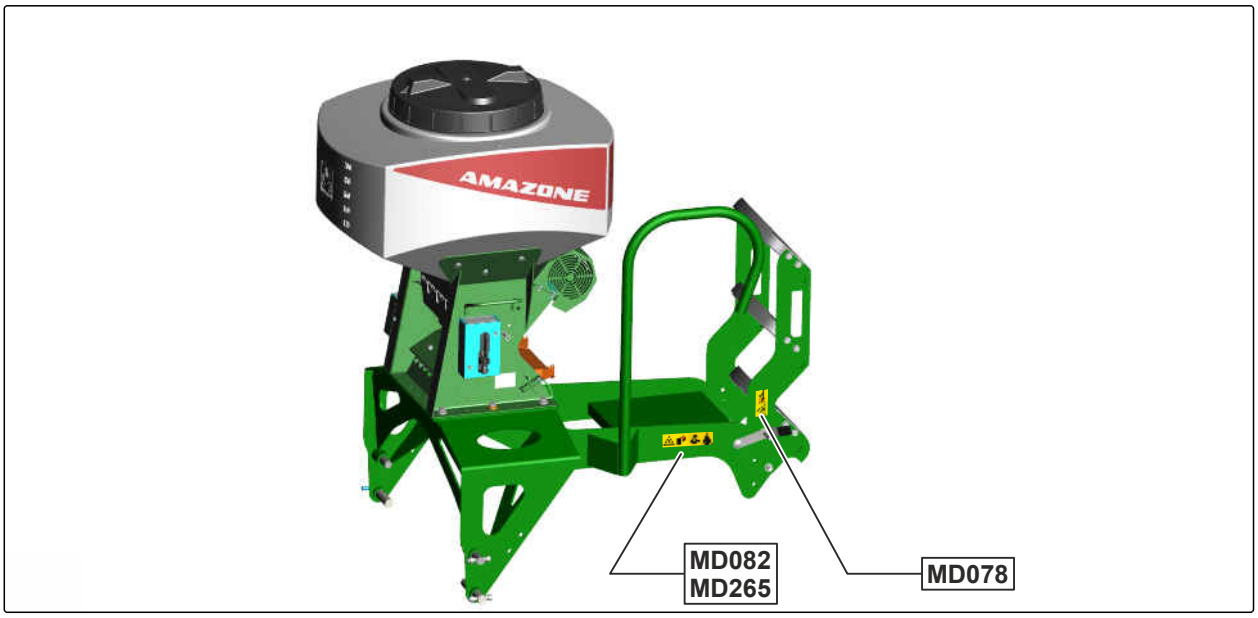
CMS-T-00004654-E.1



CMS-I-00003475



CMS-I-00003663



CMS-I-00011791

4.5.4 Description of warning symbols and instructional images

CMS-T-00004655-I.1

MD 075

Risk of cuts for fingers, hands, and arms

- Disconnect the power supply from the implement before approaching the danger zone.
- Wait until all moving parts are at a standstill before reaching into the danger area.
- Make sure that there is nobody standing in the danger area or close to the moving parts.

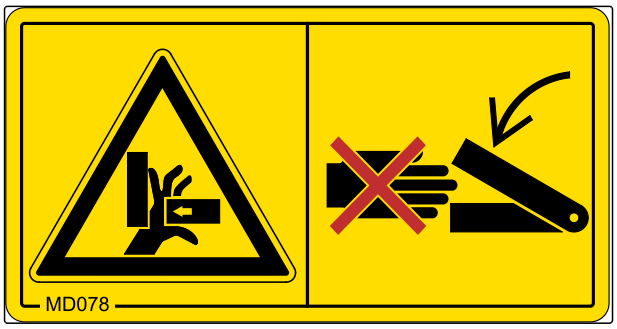


CMS-I-00000418

MD 078

Risk of crushing fingers or hands

- Disconnect the power supply from the implement before approaching the danger zone.
- Wait until all moving parts are at a standstill before reaching into the danger area.
- Make sure that there is nobody standing in the danger area or close to the moving parts.

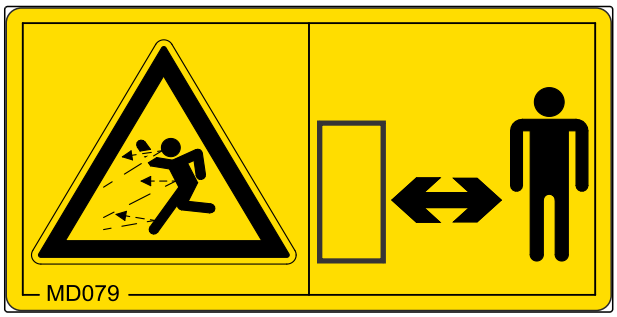


CMS-I-000074

MD 079

Danger due to ejected material

- Make sure that there is nobody standing in the danger area or close to the moving parts.

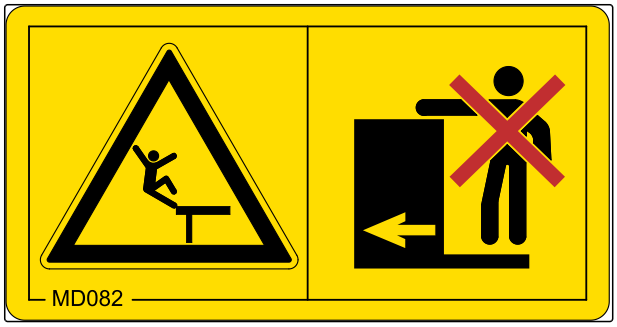


CMS-I-000076

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.

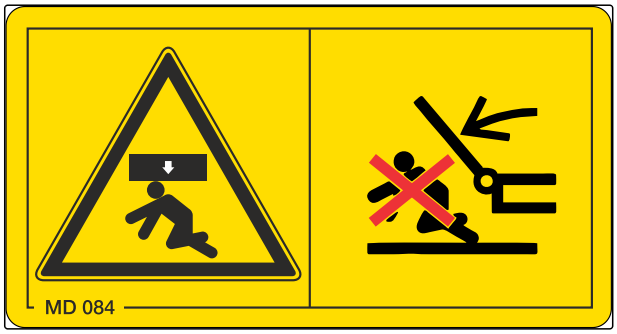


CMS-I-000081

MD 084

Risk of crushing for the whole body from lowering implement parts

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

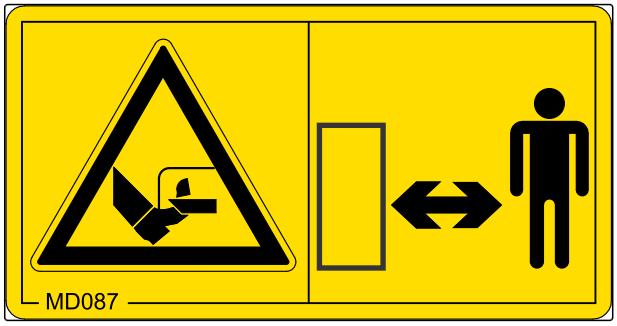


CMS-I-000454

MD 087

Danger due to cutting and moving machine parts

- Disconnect the power supply from the implement before approaching the danger zone.
- Wait until all moving parts are at a standstill before entering the danger area.
- Make sure that there is nobody standing in the danger area or close to the moving parts.

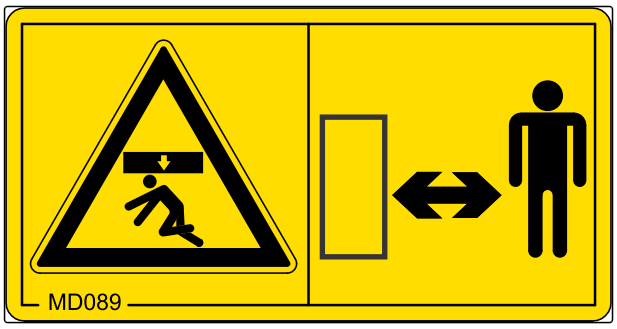


CMS-I-000691

MD089

Risk of crushing from the machine parts unintentionally lowering

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

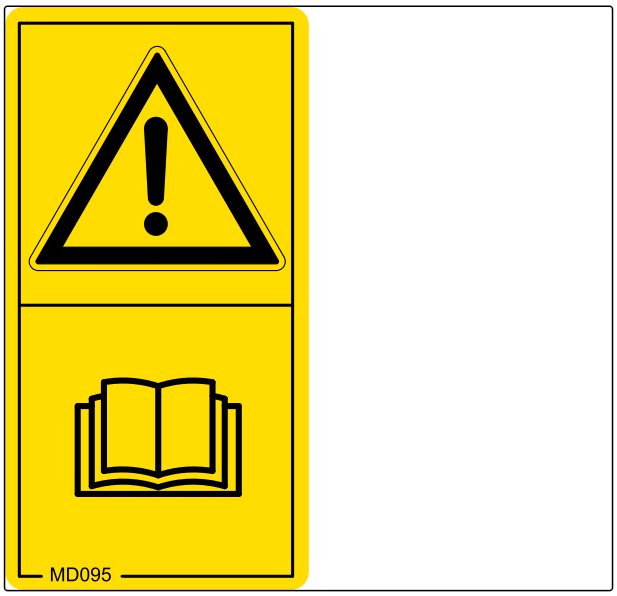


CMS-I-00003027

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.

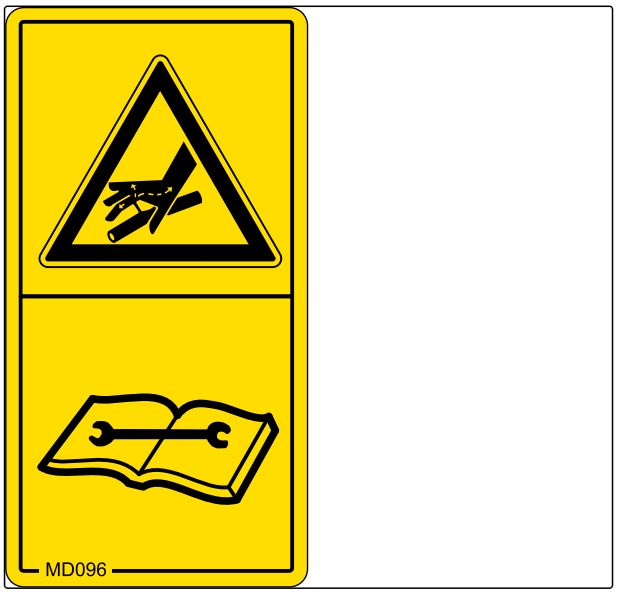


CMS-I-000138

MD 096

Risk of infection from escaping hydraulic fluid under high pressure

- Have the hydraulic system checked and repaired by a qualified specialist workshop only.
- Stay away from leaks in the hydraulic system.
- If you are injured by hydraulic oil:
  Consult a doctor immediately.

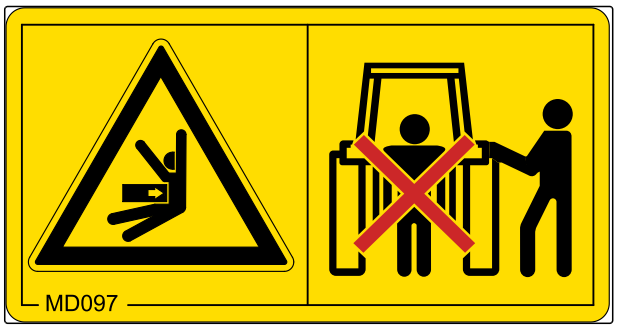


CMS-I-000216

MD 097

Risk of crushing between the tractor and the machine

- Before you actuate the tractor hydraulic system: Instruct persons away from the area between the tractor and the machine.
- Actuate the tractor hydraulic system only from the designated work station.

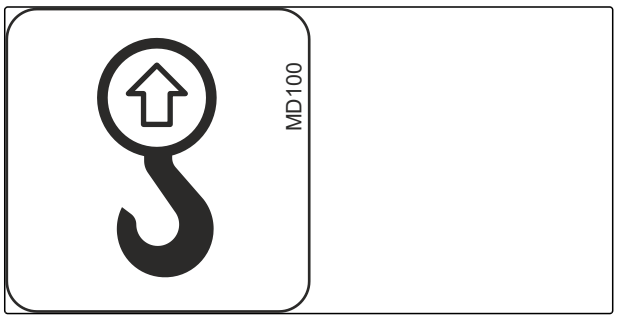


CMS-I-000139

MD 100

Marking of the lashing points

- Attach the slings for lifting only at the marked lashing points.



CMS-I-000089

MD 102

Danger due to unintentional starting as well as unintentional and uncontrolled movements of the implement

- Before all tasks, secure the implement against unintentional starting as well as unintentional and uncontrolled movements.

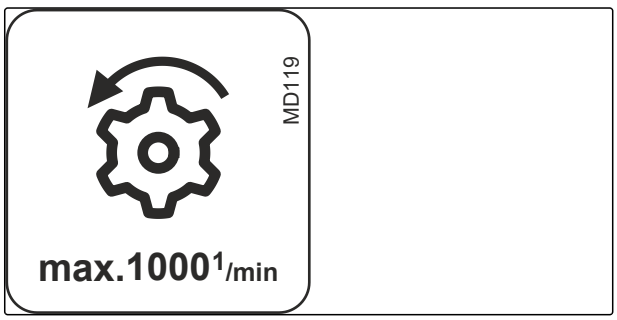


CMS-I-00002253

MD 119

Information on the machine-side drive shaft

- Comply with the maximum drive speed and direction of rotation of the drive shaft on the machine side.

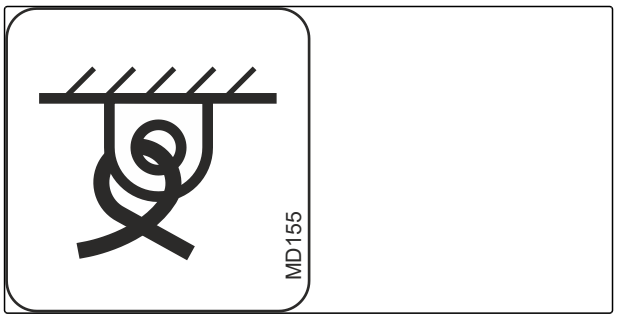


CMS-I-00003656

MD 155

Marking of the lashing points

- Only attach the lashing belts at the marked lashing positions for transporting the machine.

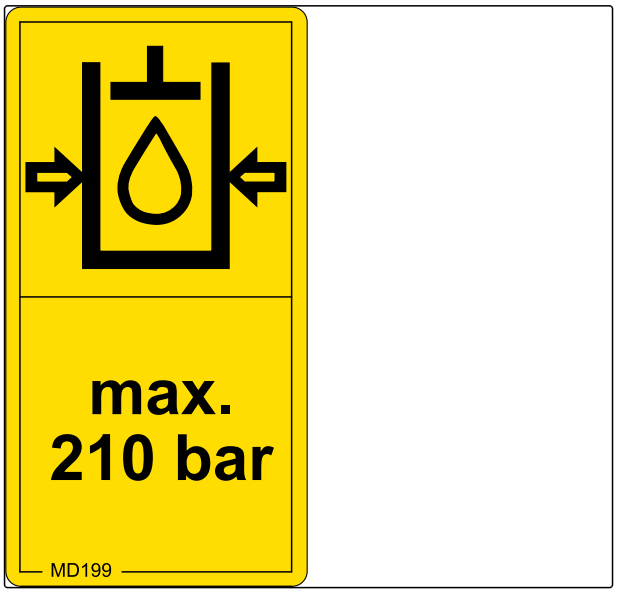


CMS-I-00000450

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.

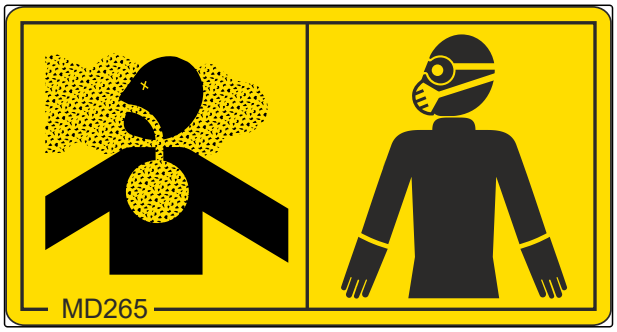


CMS-I-00000486

MD 265

Risk of chemical burns by dressing dust

- Do not breathe in the harmful substance.
- Avoid contact with eyes and skin.
- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.
- Follow the manufacturer's safety instructions for handling harmful substances.



CMS-I-00003659

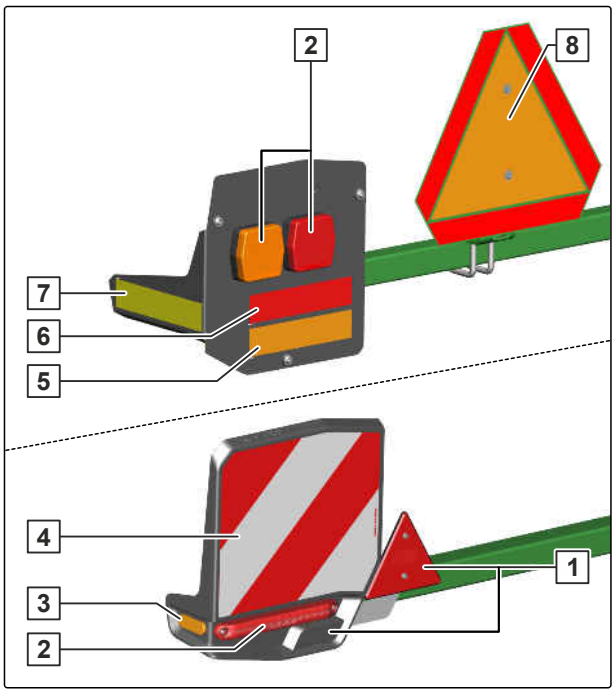
4.6 Lighting and identification for road travel

CMS-T-00006398-D.1

4.6.1 Rear lighting and identification for road travel

CMS-T-00001498-G.1

The equipment can vary depending on the implement type or country-specific regulations.



1 Red reflectors, triangular on trailed implements or non-triangular on mounted implements

2 Rear lights, brake lights, and turn indicators

3 Yellow reflectors

4 Warning sign

5 Orange fluorescent warning sticker for implement width > 3.6 m

6 Red reflecting warning sticker

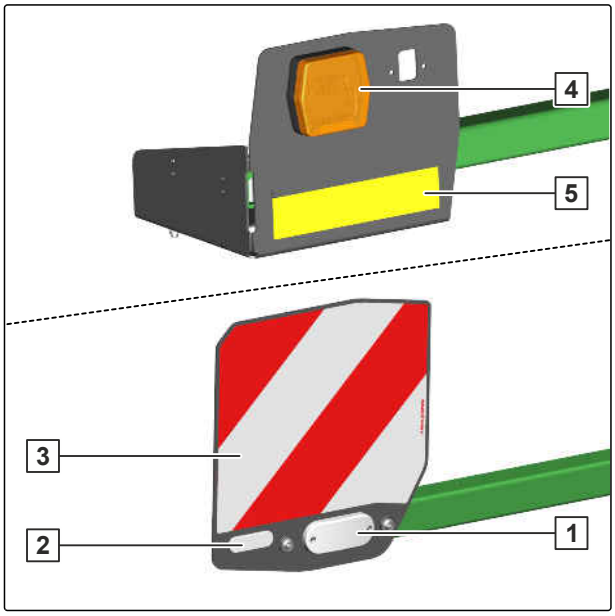
7 Yellow reflecting warning sticker

8 Identification panel for slow-driving vehicles

4.6.2 Front lighting and identification for road travel

CMS-T-00006393-C.1

The equipment can vary depending on the implement type or country-specific regulations.



1 Marker light

2 White reflectors

3 Warning sign

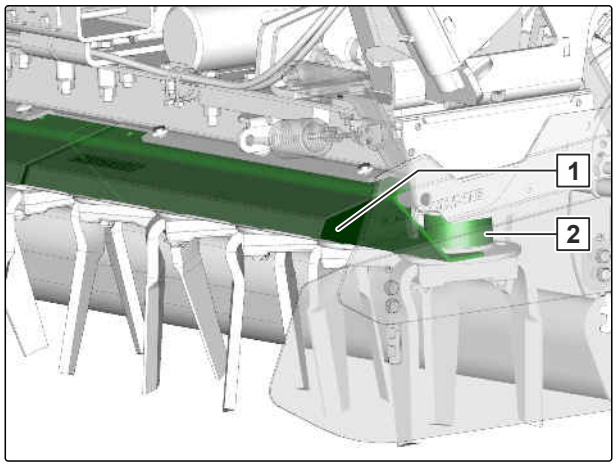
4 Turn indicator for implement width > 3.6 m

5 Yellow reflecting warning sticker

4.7 Stone guard

CMS-T-00018596-A.1

Depending on the implement equipment, the stone guard 1 directs stones from the spur gear trough 2 to the tines.



4.8 Threaded cartridge

CMS-T-00001776-F.1

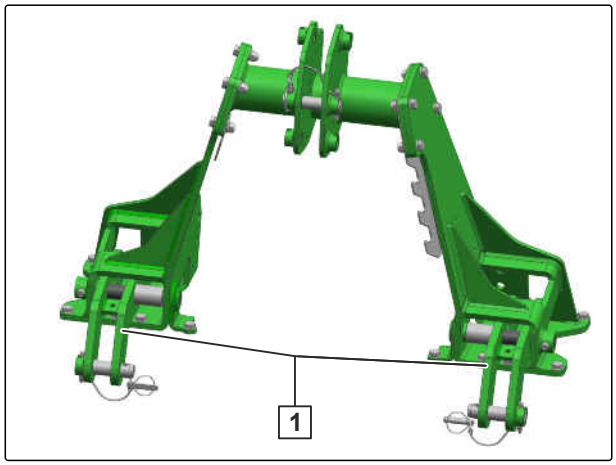
The threaded cartridge contains documents and, depending on the implement equipment, other aids.



4.9 Three-point mounting frame

CMS-T-00004638-C.1

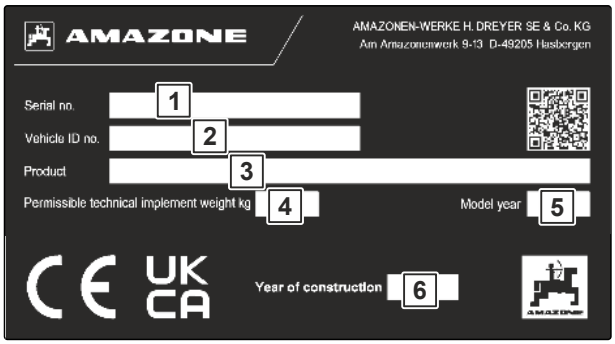
The three-point mounting frame is used to couple the implement onto the tractor. Depending on the implement equipment, the lower link mountings 1 can be adjusted to the three-point power lift.



CMS-I-00003430

4.10 Rating plate on the implement

CMS-T-00004505-L.1



1 Serial number

2 Vehicle ID number

3 Product

4 Permissible technical implement weight

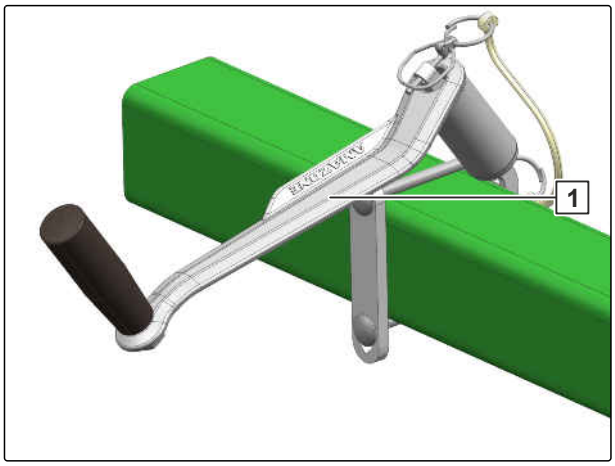
5 Model year

6 Year of manufacture

4.11 Universal operating tool

CMS-T-00001735-C.1

Setting work on the implement is performed with the universal operating tool 1. The universal operating tool is parked in a holder on the implement frame.



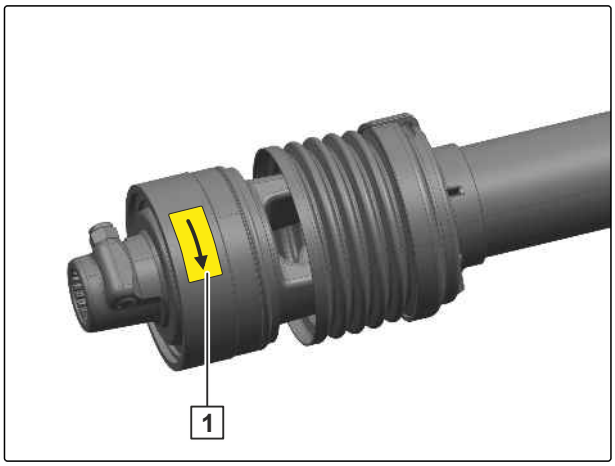
CMS-I-00001082

4.12 Universal joint shaft locking mechanism

CMS-T-00005052-A.1

If the tool carriers encounter an obstacle, the tool carriers can be blocked.

Depending on the implement equipment, the ratchet clutches 1 or shear bolts on the universal joint shafts prevent damage to the gearboxes.



CMS-I-00003044

4.13 Rollers

CMS-T-00004646-D.1

4.13.1 AMAZONE rollers

CMS-T-00008886-C.1

Rollers are used to maintain the working depth, to reconsolidate the soil, and to protect against the rotating tools of the soil tillage machine.

NOTE

For the combination with a seed drill, the soil tillage machine must be equipped with a 2-tube roller frame.

Roller	Working width			
	2.5 m	3 m	3.5 m	4 m
Cage roller	SW 2500-520	SW 3000-520	SW 3500-520	SW 4000-520
Tooth packer roller	PW 2500-500	PW 3000-500	PW 3500-500	PW 4000-500
	PW 2500-600	PW 3000-600	PW 3500-600	PW 4000-600
Wedge ring roller	KW 2500-520	KW 3000-520	/	/
	KW 2500-580	KW 3000-580	KW 3500-580	KW 4000-580
Wedge ring roller with matrix tyres	/	KWM 3000-600	KWM 3500-600	KWM 4000-600
Trapeze ring roller	/	TRW 3000-500	/	/
	TRW 2500-600	TRW 3000-600	/	TRW 4000-600

4.13.2 Packer rollers from other manufacturers

CMS-T-00005061-E.1

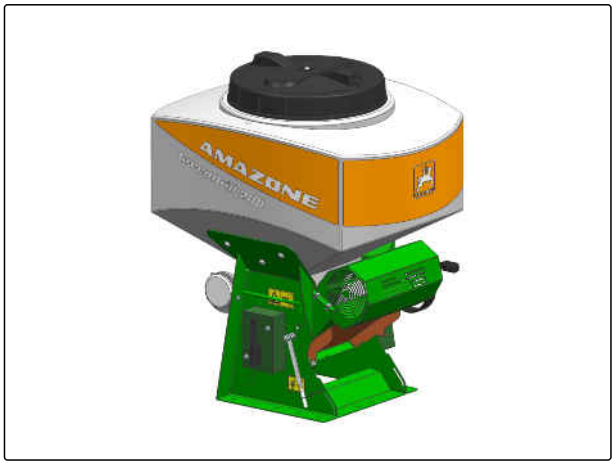
The AMAZONE roller product range is supplemented with rollers from third-party suppliers.

Packer rollers from other manufacturers	Working width		
	3 m	3.5 m	4 m
Güttler Simplex prismatic roller with spheroidal graphite iron rings	3000-SX-45 SG	/	/
Güttler Simplex prismatic roller with synthetic ultra rings	3000-SX-45 SU	/	/
	3000-SX-50 SU	3500-SX-50 SU	4000-SX-50 SU
	3000-SX-56 SU	3500-SX-56 SU	4000-SX-56 SU

4.14 GreenDrill

CMS-T-00005046-B.1

The GreenDrill pack top seed drill enables the seeding of fine seeds and catch crops during soil tillage or the seeding of nurse crops while seeding.



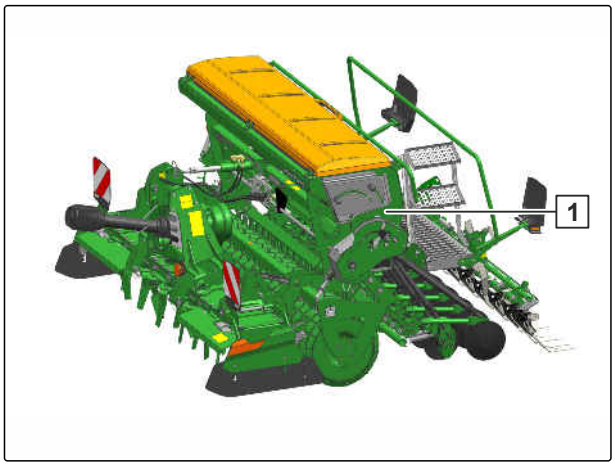
CMS-I-00003609

4.15 QuickLink quick-coupling system

CMS-T-00005079-A.1

Using the quick-coupling system, the soil tillage implement can be combined with a pack top seed drill. The QuickLink quick-coupling system consists of one top coupling point and two lower coupling points on the roller frame.

Soil tillage implement combined with a mechanical pack top seed drill **1**.

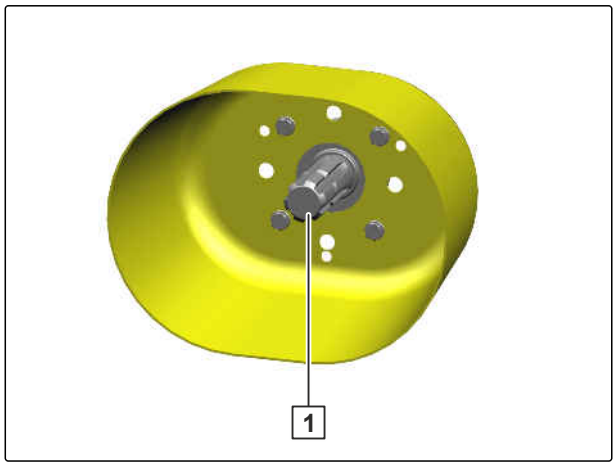


CMS-I-00003602

4.16 PTO shaft through drive

CMS-T-00012206-A.1

The PTO shaft through drive is intended for driving pneumatic seed drills. The speed corresponds to the tractor's PTO shaft speed.



CMS-I-00007863

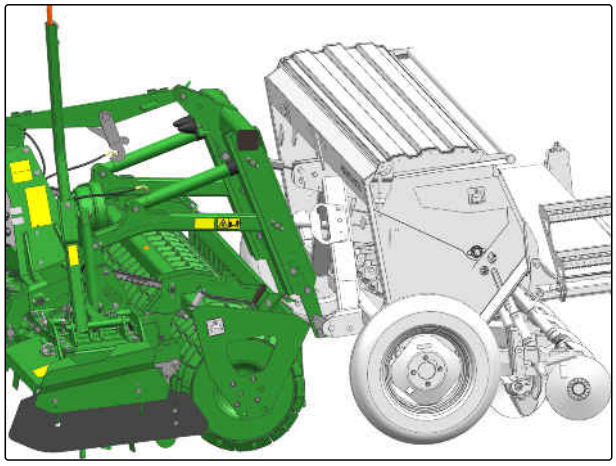
4.17 Liftpack system

CMS-T-00005086-A.1

4.17.1 Lifting frame

CMS-T-00004765-A.1

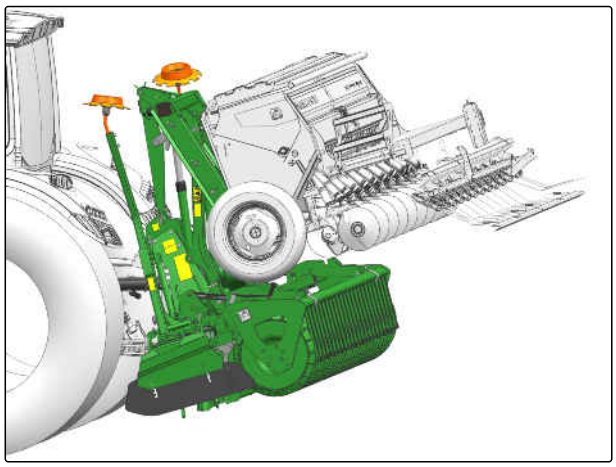
The soil tillage implement can be combined with a mounted seed drill with the aid of the liftpack system.



CMS-I-00003476

The seeding combination is lifted for manoeuvring or for road transport. To reduce the lifting force, the seed drill is first lifted via the roller of the soil tillage implement.

During road transport, the lifting frame is locked.

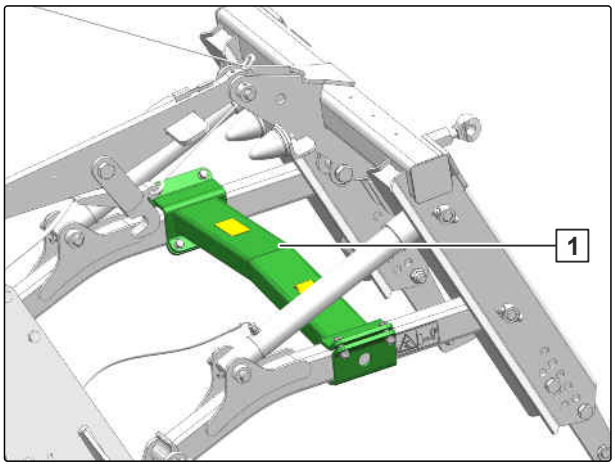


CMS-I-00003478

4.17.2 Lateral stabilisation

CMS-T-00004766-A.1

The lateral stabilisation 1 improves the seed drill's tracking on sloping terrain and reduces the swaying of the raised seed drill during transport. The lateral stabilisation connects the lower links of the lifting frame to each other.

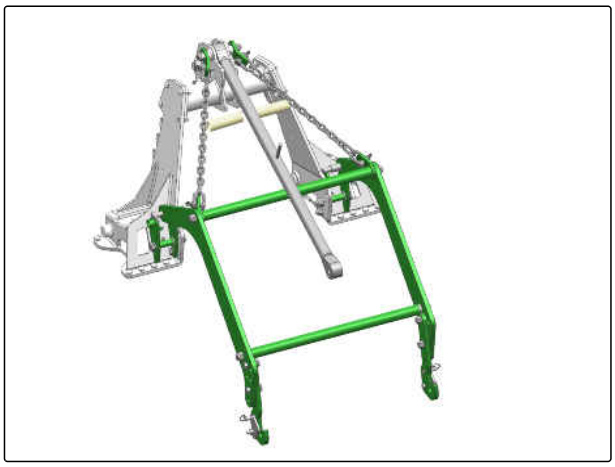


CMS-I-00003364

4.18 Coupling parts

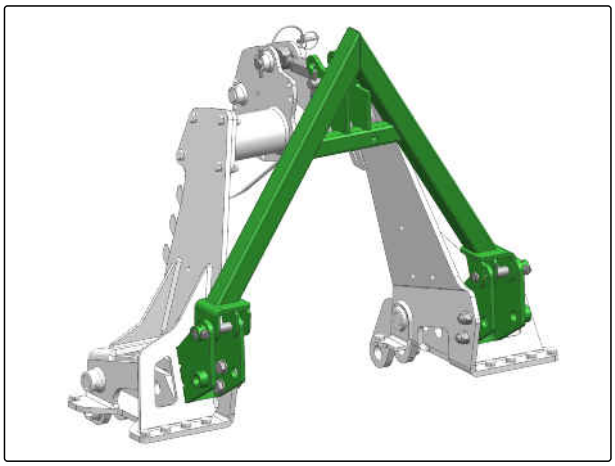
CMS-T-00004769-A.1

The soil tillage implement can be combined with a mounted seed drill with the aid of the coupling parts.



CMS-I-00003368

The soil tillage implement can be combined with a pack top seed drill with the aid of the coupling parts.



CMS-I-00003503

Technical data

5

CMS-T-00004658-K.1

5.1 Dimensions

CMS-T-00004662-D.1

Dimensions	KE 2502	KE 3002	KE 3502	KE 4002
Transport width	2.5 m	3 m	3.5 m	4 m
Transport height	3.6 m	3.6 m	3.6 m	3.6 m
Total length	1.95 m	1.95 m	1.95 m	1.95 m
Total length with coupling parts	2.15 m	2.15 m	2.15 m	2.15 m
Working width	2.49 m to 2.55 m	2.99 m to 3.05 m	3.49 m to 3.55 m	3.99 m to 4.05 m
Centre of gravity distance with roller	65 cm	65 cm	65 cm	65 cm

5.2 Mounting category

CMS-T-00004663-D.1

Type	Seeding combination	Solo operation
KE 2502-150 KE 3002-150/190 KE3502-190 KE 4002-190	Category 3N	Category 3N
KE 3002-240 KE 4002-240	Category 3	Category 3N Category 3

5.3 QuickLink quick-coupling system

CMS-T-00003190-E.1

Working width of the implement	Distance of the QuickLink quick-coupling system
2.5 m	1,529 mm ± 3 mm
3 m	2,029 mm ± 3 mm
3.5 m	2,529 mm ± 3 mm
4 m	3,029 mm ± 3 mm

5.4 Liftpack system

CMS-T-00004767-B.1

Type	Maximum lifting weight	Mounting category
Liftpack system 2.2	1,600 kg	Category 2

5.5 Coupling parts

CMS-T-00004768-B.1

Type	Maximum payload	Mounting category
Coupling parts	1,200 kg	Category 2

5.6 Forward speed

CMS-T-00004665-E.1

Optimal working speed	4-12 km/h

Permissible transport speed	60 km/h

5.7 Working depth

CMS-T-00004661-C.1

Tines	Length of the tines	Maximum working depth
Trailing tines	29.3 cm	20 cm
Trailing tines HD	29.3 cm	20 cm

5.8 Performance characteristics of the tractor

CMS-T-00004664-E.1

Type	Engine power	
KE 4002-240	Starting at 66 kW / 90 hp	Up to 176 kW / 240 hp
KE 4002-190	Starting at 66 kW / 90 hp	Up to 140 kW / 190 hp
KE 3502-190	Starting at 63 kW / 85 hp	Up to 140 kW / 190 hp

Type	Engine power	
KE 3002-240	Starting at 59 kW / 80 hp	Up to 176 kW / 240 hp
KE 3002-190	Starting at 59 kW / 80 hp	Up to 140 kW / 190 hp
KE 3002-150	Starting at 55 kW / 75 hp	Up to 110 kW / 150 hp
KE 2502-150	Starting at 48 kW / 65 hp	Up to 110 kW / 150 hp

Electrical system	
Battery voltage	12 V
Lighting socket	7-pin

Hydraulic system	
Maximum operating pressure	210 bar
Tractor pump output	Depending on the machine equipment 30 l/min at 180 bar
Machine hydraulic oil	HLP68 DIN51524 The hydraulic oil is suitable for the combined hydraulic oil circuits of all standard tractor manufacturers.
Control units	Depending on the machine equipment: 1x double-acting 2x single-acting
Pressureless return	Do not exceed a back pressure of 5 bar.
Universal joint shaft	
Speed	540 1/min / 750 1/min / 1,000 1/min
Direction of rotation	Clockwise

5.9 Noise development data

CMS-T-00004666-A.1

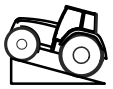
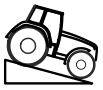
The workplace-related emission sound pressure level is lower than 72 dB(A), measured in operating condition at the ear of the tractor driver with the cab closed.

The emission sound pressure level is primarily dependent on the vehicle used.

5.10 Drivable slope inclination

CMS-T-00002297-E.1

Across the slope		
On left in direction of travel	15 %	
On right in direction of travel	15 %	

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

5.11 Lubricants

CMS-T-00002396-B.1

Manufacturer	Lubricant
ARAL	Aralub HL2
FINA	Marson L2
ESSO	Beacon 2
SHELL	Retinax A

5.12 Oils and filling capacities

CMS-T-00005074-G.1

5.12.1 Interchangeable wheel gear

CMS-T-00004935-G.1

NOTE

Oils with SAE 80W90 – API GL5 specifications can be topped up or replace the existing oil in the interchangeable wheel gear.

Gearbox	Power	Fill quantity	Gear oil
Interchangeable wheel gear	to 240 kW	Without oil cooler: 5.8 l	Factory filling: Mobil ISO VG SAE 80W-90 API GL5
		With oil cooler: –	
	to 190 kW	6.3 l	
	to 150 kW		

5.12.2 Spur gear trough

CMS-T-00005075-E.1

NOTE

Specifications for the spur gear trough:

Oils that comply with the standard CLP/CKC 460 DIN 51517 Part 3 / ISO 12925 can be topped up or used to replace the existing oil in the spur gear trough.

The following table contains several gear oil types that comply with the standard.

Manufacturer	Gear oil
Wintershall	Factory filling: ERSOLAN 460
Agip	Blasia 460
ARAL	Degol BG 460
Autol	Precis GEP 460
Avia	Avilub RSX 460
BP	Energol GR-XP 460
Castrol	Alpha SP 460
DEA	Falcon CLP 460
ESSO	Spartan EP 460
FINA	Giran 460
Fuchs	Renep Compound 110
Mobil	Mobilgear 600 XP 460
Shell	Omala 460
OMV	OMV Gear HST 460

Implement type	Fill quantity
KE 2502	14 litres
KE 3002	16 litres
KE 3502	18 litres
KE 4002	20 litres

5.13 Permissible payload

CMS-T-00011018-E.1

Permissible payload for operation
Permissible payload = G_Z - G_L = _____ kg

- G_Z: Permissible technical implement weight according to the rating plate [kg]
- G_L: Determined tare weight [kg]

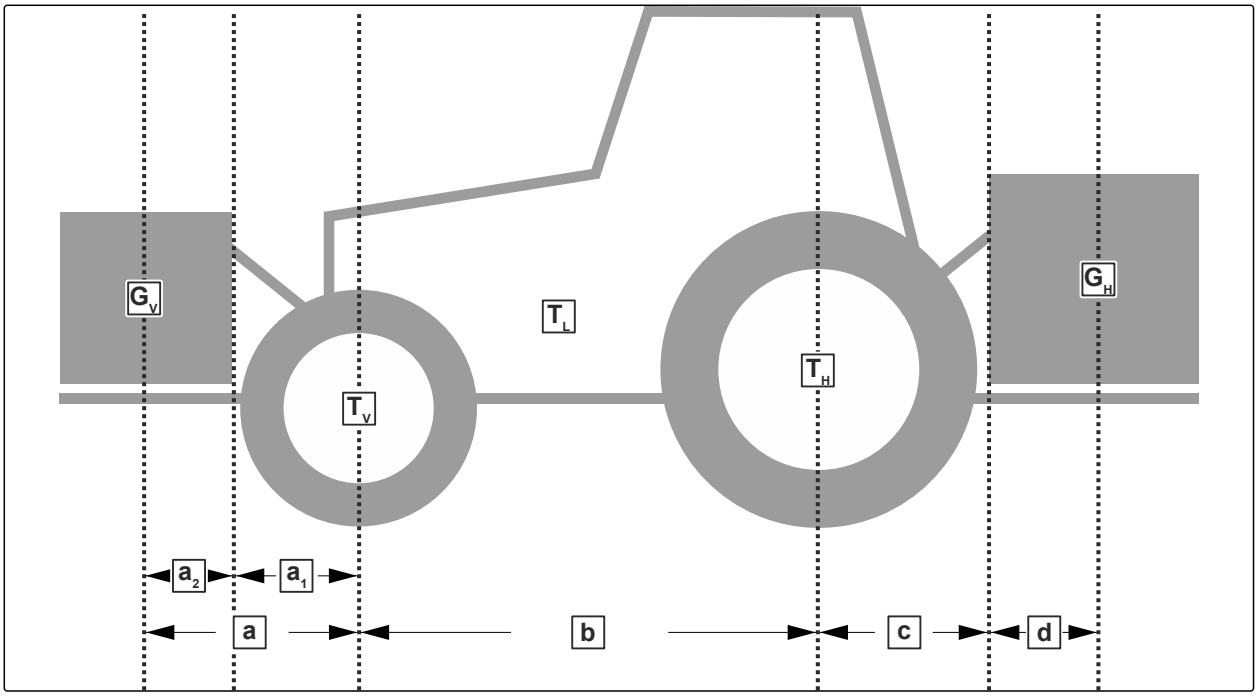
Preparing the machine

6

CMS-T-00004610-L.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	

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} = _____

G_{Vmin} =

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} = _____

T_{Vtat} =

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 Adjusting the three-point mounting frame

CMS-T-00005054-C.1

6.2.1 KE 240 implements

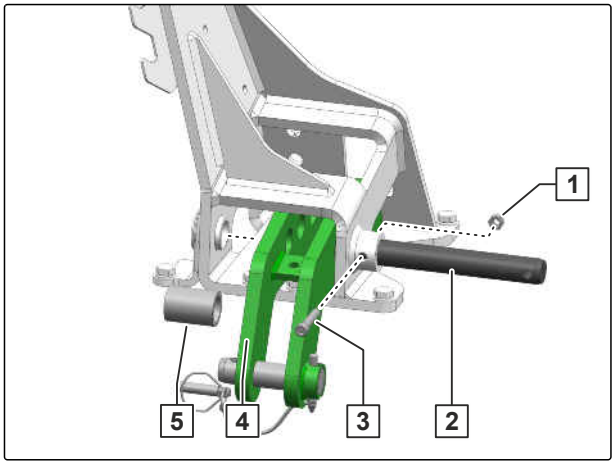
CMS-T-00012975-B.1

6.2.1.1 Adjusting the lower link mounting to the mounting category

CMS-T-00005056-C.1

The lower link mountings can be adjusted to the tractor's mounting category.

1. Loosen and remove the nut **1**.
2. Remove the bolt **3**.
3. Remove the pin **2**.
4. Remove the spacer **5**.
5. Remove the lower link mounting **4**.

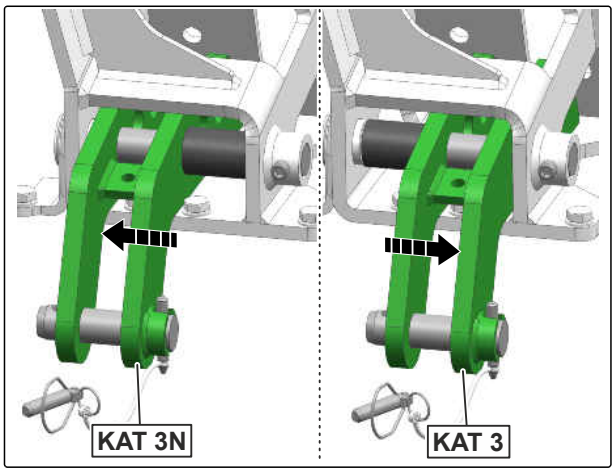


CMS-I-00003459

6. Determine the mounting category of the tractor.
7. To adjust the lower link mountings for mounting category 3N:
   Install the lower link mounting in the inner position

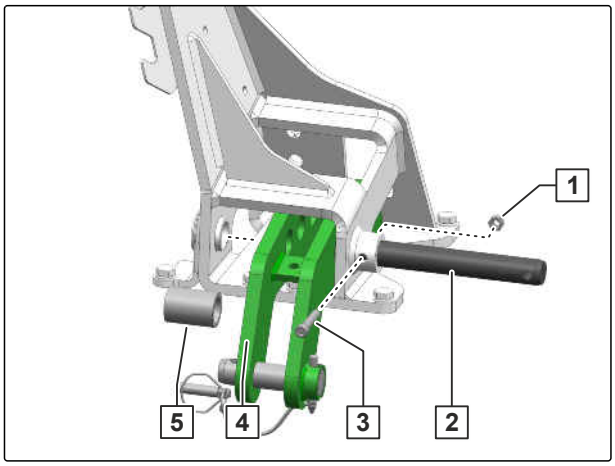
   or

   To adjust the lower link mountings for mounting category 3:
   Install the lower link mounting in the outer the position.



CMS-I-00008245

8. Install the lower link mounting **4** at the desired position.
9. Install the spacer **5** at the desired position.
10. Install the pin **2**.
11. Install the bolt **3**.
12. Install the nut **1** and tighten it.



CMS-I-00003459

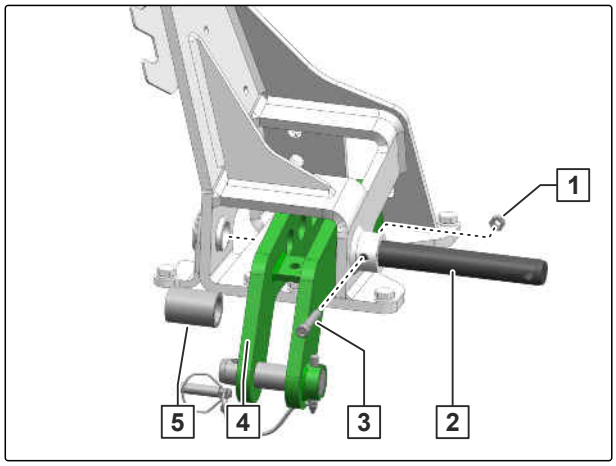
13. Repeat the installation for the opposite lower link mounting.

14. After 5 hours of operation, check the bolt connection for tight fit.

6.2.1.2 Adjusting the length of the three-point mounting frame

CMS-T-00005084-C.1

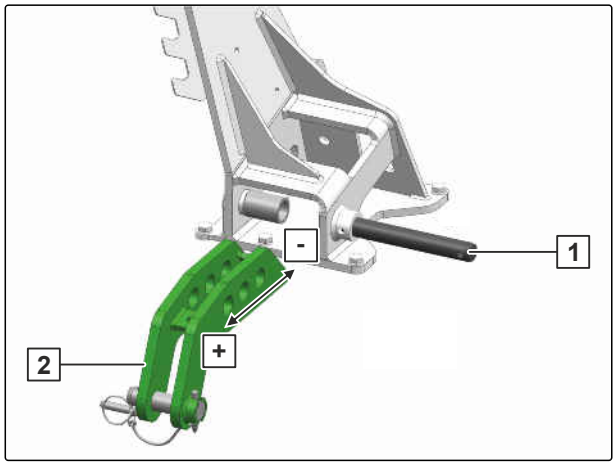
The length of the lower link mountings can be adjusted to the tractor.



CMS-I-00003459

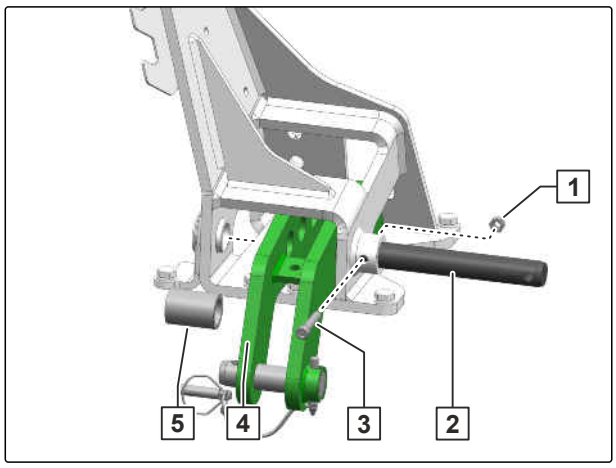
1. Loosen and remove the nut **1**.
2. Remove the bolt **3**.
3. Remove the pin **2**.
4. Remove the spacer **5**.
5. Remove the lower link mounting **4**.

When using the wheel mark eradicators or tractors with short lower links, the lower link mounting may need to be extended under certain circumstances.



CMS-I-00003464

6. To move the lower link mounting to the desired position,
   secure the lower link mounting **2** with the pin **1** in the desired hole.



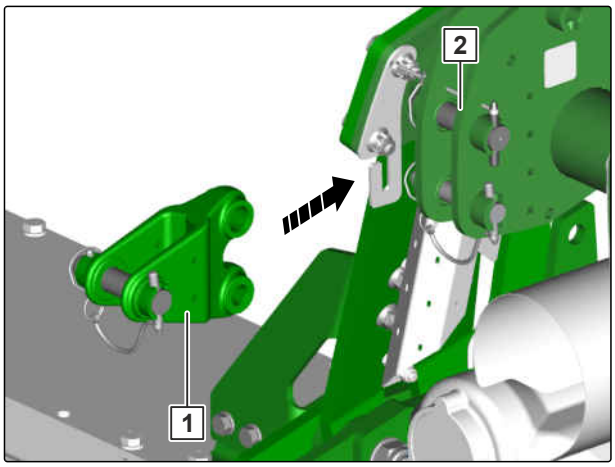
CMS-I-00003459

7. Install the lower link mounting **4**.
8. Install the spacer **5**.
9. Install the pin **2**.
10. Install the bolt **3**.
11. Install the nut **1** and tighten it.

12. Repeat the installation for the opposite lower link mounting.

13. After 5 hours of operation, check the bolt connection for tight fit.

14. Install the top link extension 3 on the implement with the pin 1.



CMS-I-00008246

6.2.2 KE 150/190 implements

CMS-T-00012976-B.1

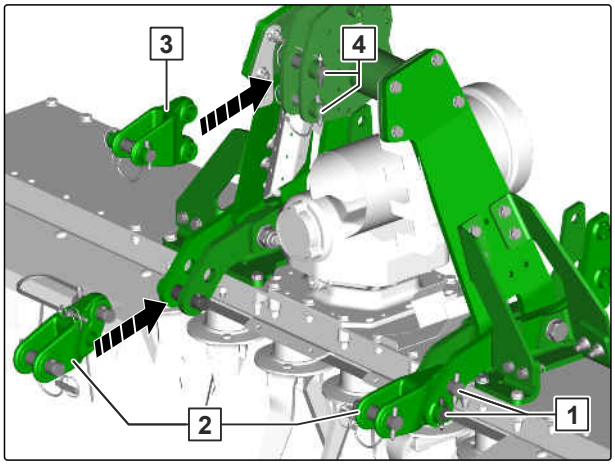
6.2.2.1 Installing the mounting frame extension

CMS-T-00012971-B.1

The mounting frame extension is used to enlarge the distance between the tractor and the implement. The mounting frame extension contains 3 spacer elements. Each spacer element is pegged on the implement using 2 pins and secured using linch pins.

1. Install the lower link extension 2 on the implement with the pin 4.

2. Install the top link extension 3 on the implement with the pin 1.



CMS-I-00008244

6 Preparing the universal joint shaft

CMS-T-00015288-A.1

WORKSHOP WORK

1. Adjust the length of the universal joint shaft.

2. Install the universal joint shaft.

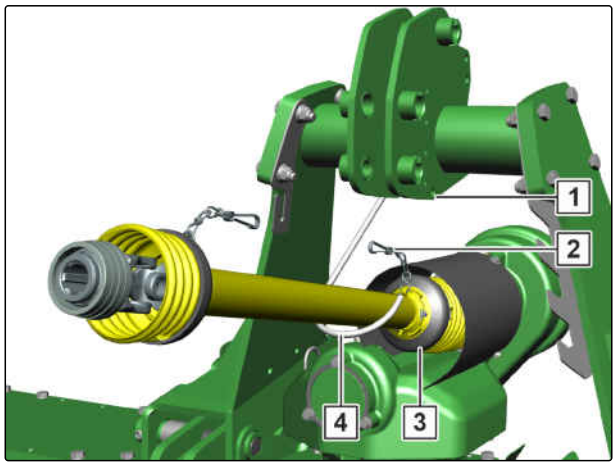
6.3 Installing the universal joint shaft on the implement

CMS-T-00004596-B.1

IMPORTANT

Damage when the universal joint shaft is too long

- ▶ To avoid damage to the implement, check the universal joint shaft length every time the tractor is changed.
- ▶ If the universal joint shaft is too long, have the universal joint shaft corrected by a qualified specialist workshop.



CMS-I-00006234

1. Clean and grease the drive shaft on the implement.
2. Make sure that the universal joint shaft guard is functional.

The tractor symbol on the guard tube identifies the tractor-side of the universal joint shaft. An existing overload clutch or freewheel clutch must be installed on the implement side.

3. Slide the universal joint shaft **3** onto the gearbox output shaft.
4. To secure the universal joint shaft on the gearbox, tighten the locking bolt on the universal joint shaft with the tightening torque prescribed by the universal joint shaft manufacturer.
5. Lift the bracket **4** out of the holder.
6. Swivel the bracket under the universal joint shaft.
7. Put the universal joint shaft in the bracket.
8. Secure the guard tube with the safety chain **2** on the fastening point **1**.

6.4 Coupling the implement

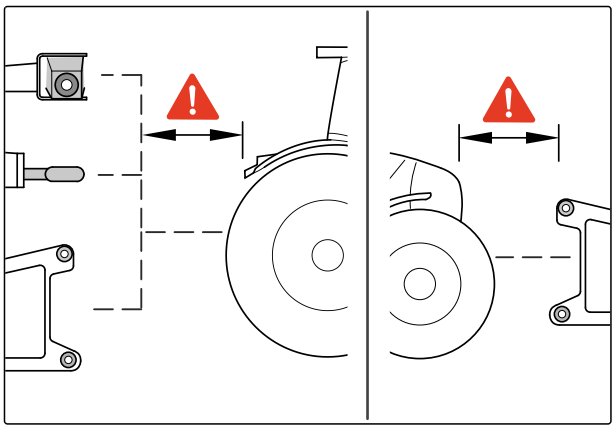
CMS-T-00004613-I.1

6.4.1 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.

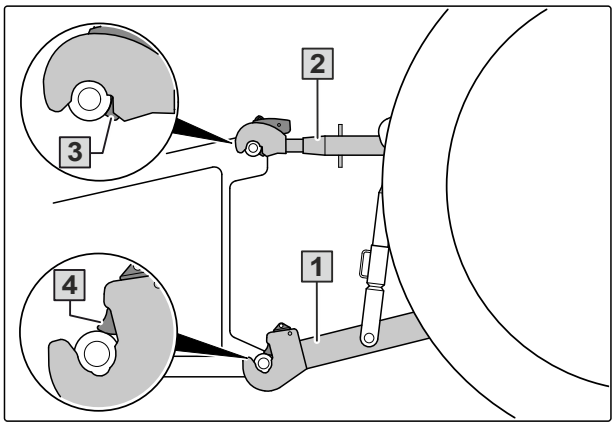


CMS-I-00004045

6.4.2 Coupling the three-point mounting frame

CMS-T-00001400-H.1

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



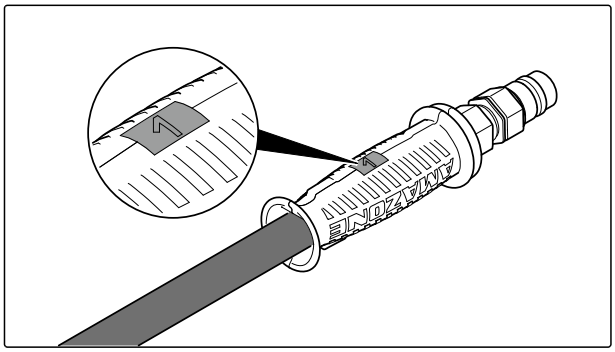
CMS-I-00001225

6.4.3 Coupling the hydraulic hose lines

CMS-T-00006106-G.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

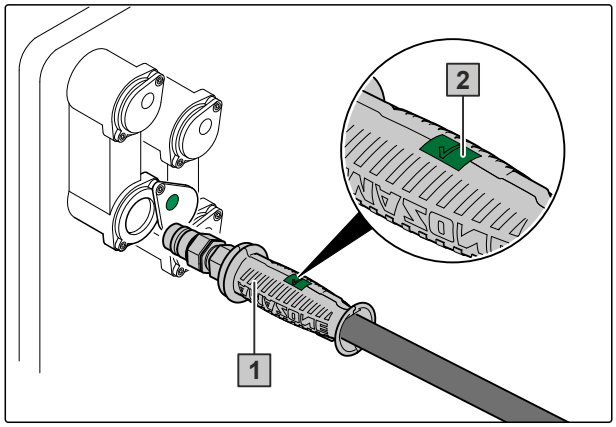
Type of actuation	Function	Symbol
Latching	Permanent oil circulation	
Momentary	Oil circulation until action is executed	
Floating	Free oil flow in the tractor control unit	

Designation		Function			Tractor control unit	
Green	1		Lifting frame	Lifting	Single-acting	
Beige	1		Working depth of the tines	Increase	Double-acting	
	2			Reduce		
Yellow	1		Track marker	Fold	Single-acting	

IMPORTANT

Implement damage due to insufficient hydraulic oil return flow

- On the tractor side, only use lines that correspond to the nominal width of "red T" of the implement or larger for the pressureless hydraulic oil return flow.
- Select short return paths.
- Connect the pressureless hydraulic oil return flow to the intended coupling before all of the other hydraulic connections.
- If the implement has a leakage oil line: couple the leakage oil line in the intended coupling.
- Install the supplied coupling sleeve on the pressureless hydraulic oil return.



CMS-I-00001045

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

2. Clean the hydraulic plugs.

NOTE

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

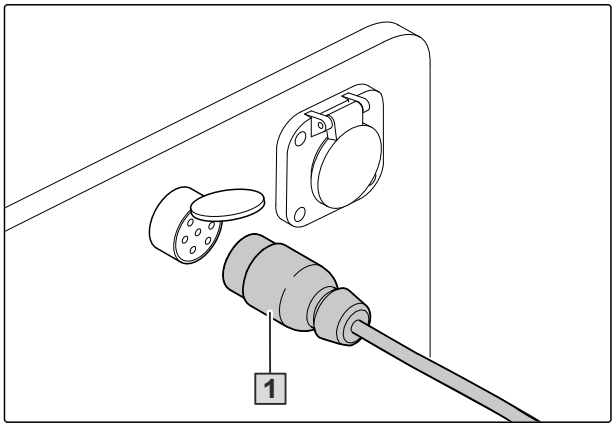
3. Couple the hydraulic hose lines [1] to the hydraulic sockets of the tractor according to the label [2].

➡ The hydraulic plugs lock perceptibly.

4. Route the hydraulic hose lines with sufficient freedom of movement and without chafing points.

6.4.4 Coupling the lighting for road travel

CMS-T-00001399-H.1

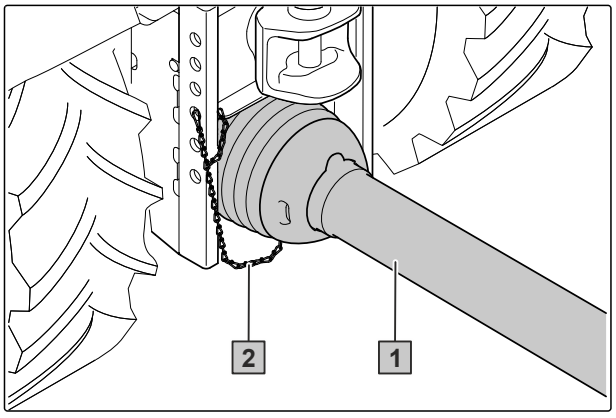


CMS-I-00001048

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

6.4.5 Coupling the universal joint shaft

CMS-T-00012829-C.1



CMS-I-00001069

1. Take the universal joint shaft out of its holder on the implement.
2. Pull back the drawing sleeve [1] on the tractor side.
3. Push the universal joint shaft onto the tractor PTO shaft.

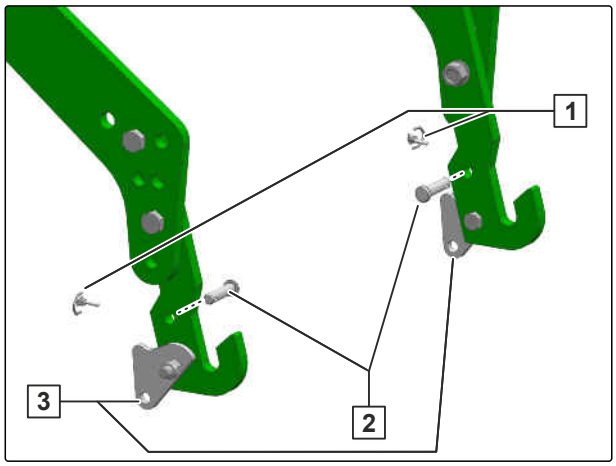
➡ The drawing sleeve engages.

4. To secure the universal joint shaft guard against rotating:
   Fasten the safety chain [2] onto the tractor.
5. Check the guard on the universal joint shaft.

6.4.6 Coupling the seed drill

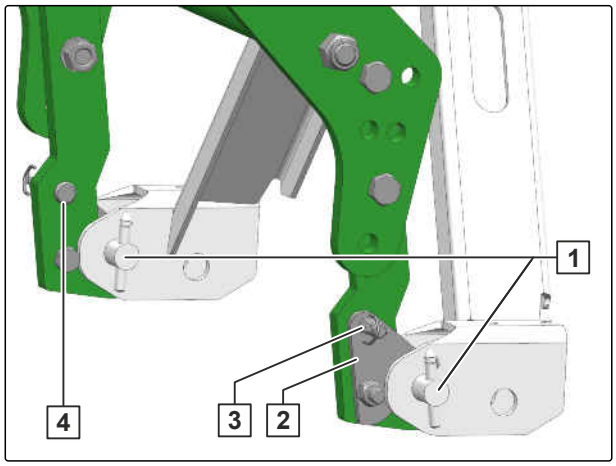
CMS-T-00004779-B.1

1. Remove the linch pin **1**.
2. Remove the pin **2**.
3. Open the locking straps **3**.



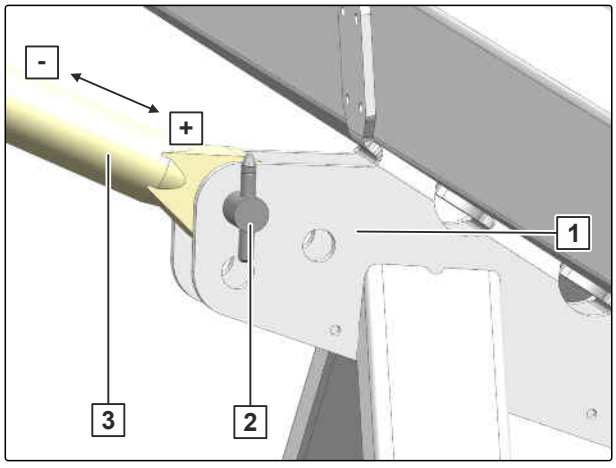
CMS-I-00003377

4. Drive the soil tillage implement up to the seed drill.
5. Pick up the lower coupling points **1** of the seed drill with the catch hooks.
6. Close the locking straps **2**.
7. Install the pin **3**.
8. Install the linch pin.
9. Secure the catch hook **4** on the opposite side.



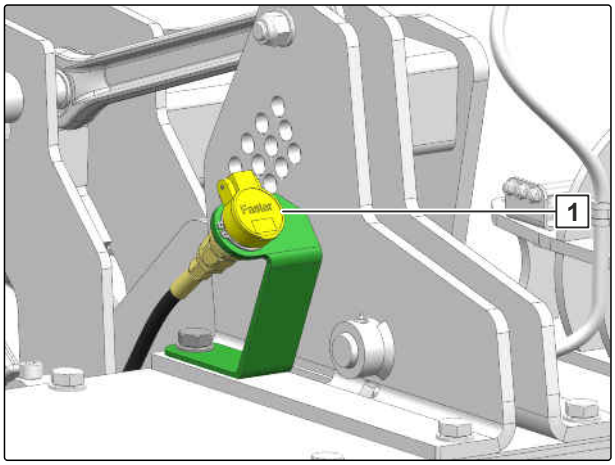
CMS-I-00003378

10. To connect the seed drill ***1*** to the soil tillage implement,
    secure the top link **3** with the pin **2**.
11. Secure the top link with the linch pin.
12. To align the implement horizontally,
    turn the top link to the desired length.



CMS-I-00003379

13. If the seed drill has a tramline marker, connect the tramline marker to the "yellow" control unit 1 of the soil tillage implement.



CMS-I-00003485

6.5 Preparing the implement for operation

CMS-T-00004617-H.1

6.5.1 Manual adjustment of the tine working depth

CMS-T-00004626-D.1

The soil tillage implement 2 is supported by the carrying arms of the trailing roller 1. To adjust the working depth, the depth setting pin 3 is inserted in the desired hole.



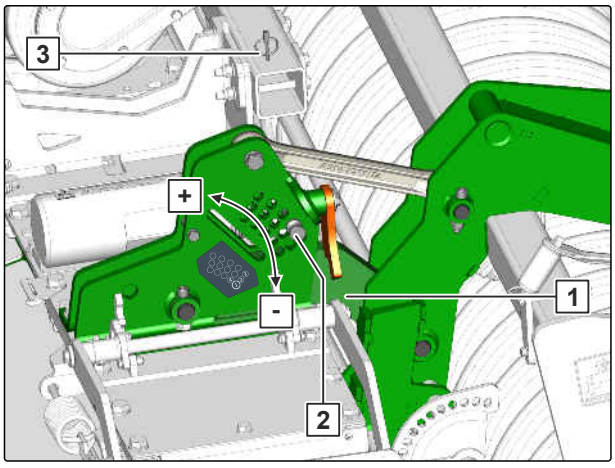
CMS-I-00003428

1. Raise the implement.

➡ The pins 2 are no longer resting on the carrying arms 1.

2. Secure the tractor and implement.

3. Remove the linch pin 3.



CMS-I-00003426

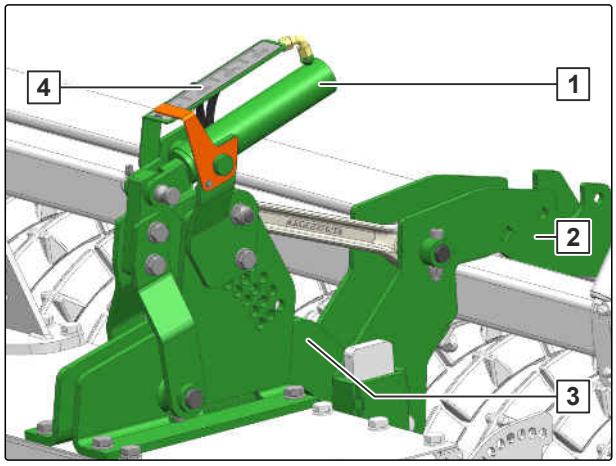
Pegging position	Working depth
Higher +	Deep tillage
Lower -	Shallow tillage

4. Put the pins in the desired position.
5. Secure the pin with the linch pin.
6. Make the same setting for the opposite side of the implement.
7. To check the setting,
   drive for 30 m at working speed and then check the work pattern.

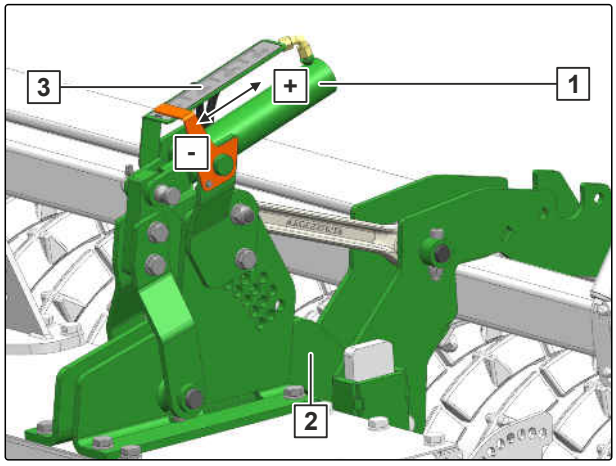
6.5.2 Hydraulic adjustment of the tine working depth

CMS-T-00004625-C.1

The soil tillage implement 3 is supported by the carrying arms of the trailing roller 2. The working depth is adjusted hydraulically 1. The scale 4 shows the set working depth.



CMS-I-00003429



CMS-I-00003427

The working depth is adjusted hydraulically.

Scale	Working depth
Higher +	Deep tillage
Lower -	Shallow tillage

1. For deeper soil tillage,
   actuate the "beige 1" tractor control unit.

   or

   For shallower soil tillage,
   actuate the "beige 2" tractor control unit.

➡ The hydraulic cylinders actuate levers on which the carrying arms **2** are supported.

2. Read the working depth on the scale **3**.

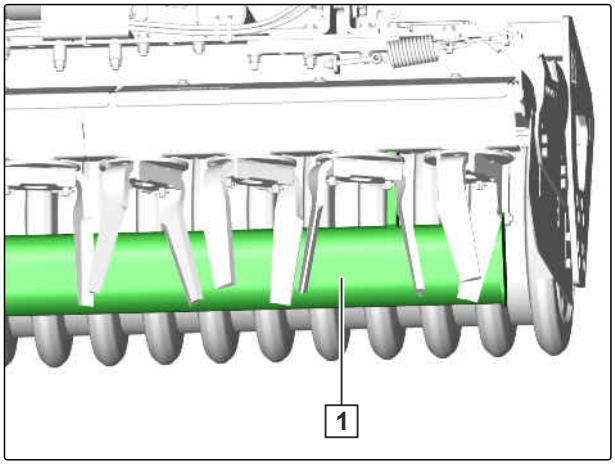
3. Lock the tractor control unit after making the adjustment.

4. To check the setting,
   drive for 30 m at working speed and then check the work pattern.

6.5.3 Adjusting the working height of the levelling board

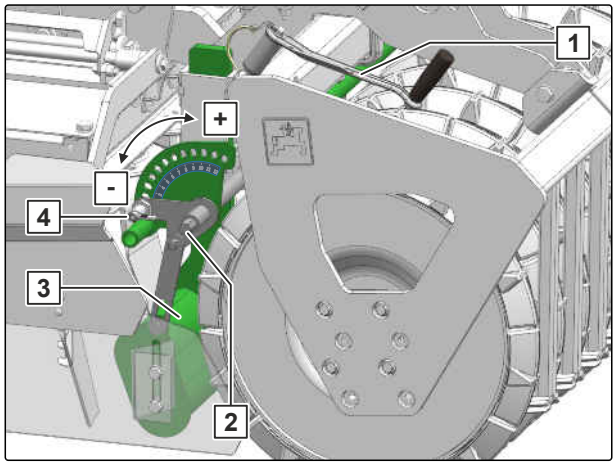
CMS-T-00004620-E.1

The levelling board **1** levels the flow of soil between the tines and the roller. To crush large clods of soil more effectively, the soil clods are held between the tines by the levelling board. The levelling board can deflect upwards thanks to the integrated overload safety. The working height of the levelling board can be adjusted.



CMS-I-00014413

1. Insert the universal operating tool [1] in the adjustment device [2].
2. To relieve the locking mechanism [4]: swivel the adjustment device slightly upwards.
3. Release the locking mechanism. Hold the universal operating tool in position.
4. For conventional seeding: Reduce [-] the working height of the levelling board [3].



CMS-I-00003454

➡ The locking mechanism must engage.

➡ The levelling board is pushing up a small ridge of soil.

5. For mulch seeding: Increase the working height of the levelling board [+].

➡ The locking mechanism must engage.

➡ Crop residues are able to pass under the levelling board.

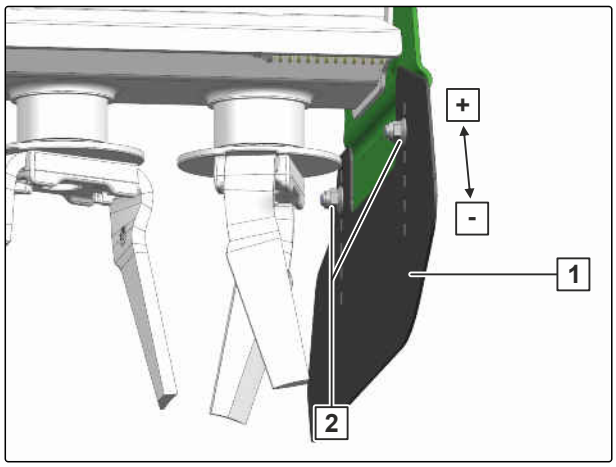
6. Make the same setting for the opposite side of the implement.
7. To check the setting: Drive for 30 m at working speed. Check the work pattern.

6.5.4 Adjusting the working depth of the rigid side guide plates

CMS-T-00004836-C.1

The side guide plate ensures that the tilled soil is not thrown to the side. The working depth of the side guide plate is adjustable.

1. Loosen and remove the nuts [2].



CMS-I-00003449

Work application	Setting
After the plough	Lower [-] The side guide plates glide through the soil at a depth of 1 to 2 cm
For mulch seeding with coarse organic residues	Higher [+] To allow crop residues to pass underneath the side guide plates.

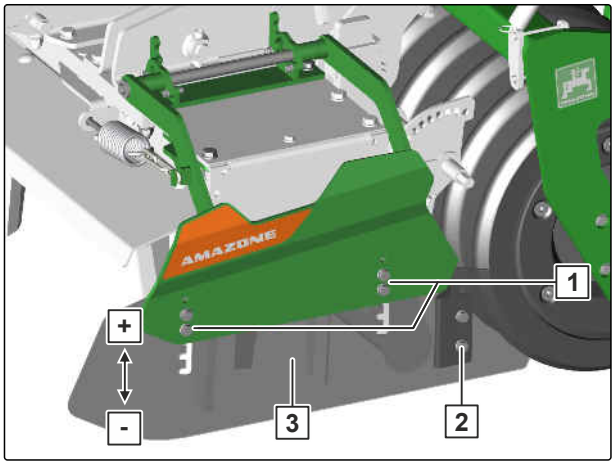
2. Move the side guide plate [1] to the desired position.
3. Install the nuts and tighten them.
4. Make the same setting for the opposite side of the implement.
5. To check the setting,
   drive for 30 m at working speed and then check the work pattern.

6.5.5 Adjusting the working depth of the extendable side guide plates

CMS-T-00004622-C.1

The extendable side guide plate ensures that the tilled soil is not thrown to the side. The working depth can be adjusted. The soil guiding angle bracket additionally prevents free-flowing soil from escaping.

1. Loosen the bolts [1].



CMS-I-00003448

Work application	Setting
After the plough	Lower [-] The side guide plates glide through the soil at a depth of 1 to 2 cm
For mulch seeding with coarse organic residues	Higher [+] To allow crop residues to pass underneath the side guide plates.

2. To release the side guide plate from the grid, push the side guide plate towards the front.

3. Move the side guide plate to the desired position.

4. Push the side guide plate into the grid.

5. Tighten the bolts.

6. Make the same setting for the opposite side of the implement.

7. To check the setting, drive for 30 m at working speed and then check the work pattern.

The soil guiding angle brackets may not work too deep. The soil guiding angle brackets may only level the soil ridge between the side guide plate and the trailing roller.

8. Loosen the bolts.

9. Move the soil guiding angle bracket **2** to the desired position.

10. Tighten the bolts.

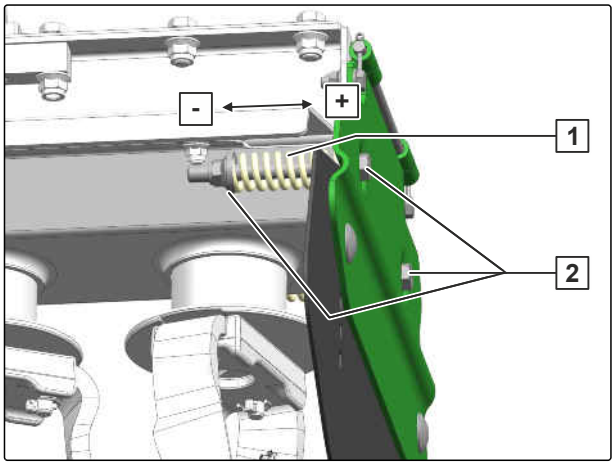
11. Make the same setting for the opposite side of the implement.

12. To check the setting, drive for 30 m at working speed and then check the work pattern.

6.5.6 Adjusting the spring tension of the rigid side guide plates

CMS-T-00004837-C.1

The spring-mounted side panel deflects to the side around obstacles. The pre-tensioning of the coil springs is adjustable **2**.



CMS-I-00003450

The tension of the spring has been adjusted at the factory for light and medium soils.

Work application	Spring tension
After the plough, heavy soils	Increase +
After the plough, light soils	Reduce -
For mulch seeding with coarse organic residues	Reduce - To allow crop residues to pass underneath the side guide plates.

1. To move the spring tension **1** to the desired position, adjust the pre-tension with the bolted connection **2**.

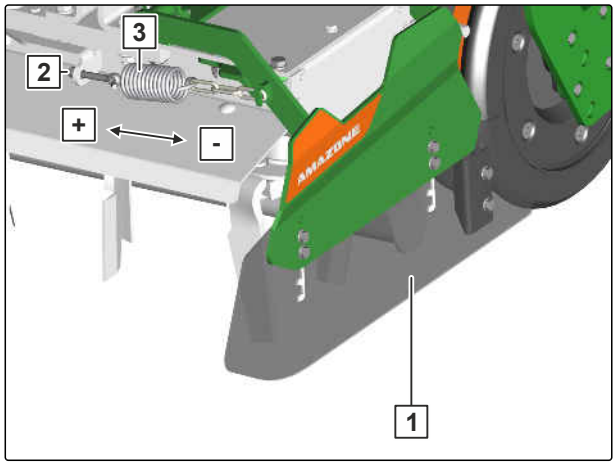
2. Make the same setting for the opposite side of the implement.

3. To check the setting,
drive for 30 m at working speed and then check the work pattern.

6.5.7 Adjusting the spring tension of the extendable side guide plates

CMS-T-00004623-C.1

The swivelling side panel deflects upwards on obstacles. The dead weight of the side panel and a tension spring bring the side panel back into working position. The pre-tensioning of the tension spring is adjustable.



CMS-I-00003451

The tension of the spring for the side guide plates 1 has been adjusted at the factory for light and medium soils.

Work application	Spring tension
After the plough, heavy soils	Increase +
After the plough, light soils	Reduce -
For mulch seeding with coarse organic residues	Reduce - To allow crop residues to pass underneath the side guide plates.

1. To move the spring tension 3 to the desired position, adjust the pre-tension with the nut 2.

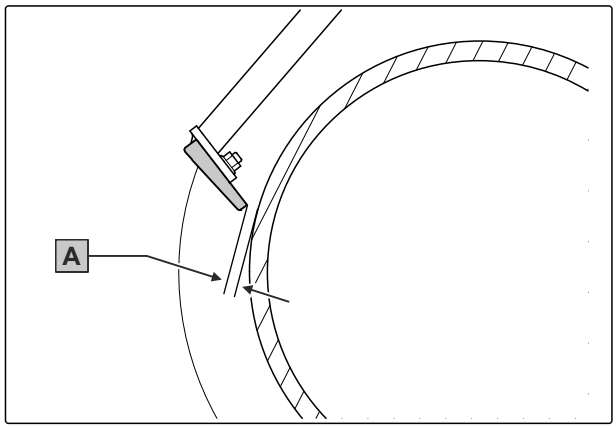
2. Make the same setting for the opposite side of the implement.

3. To check the setting,
drive for 30 m at working speed and then check the work pattern.

6.5.8 Adjusting the scraper on the roller

CMS-T-00000076-I.1

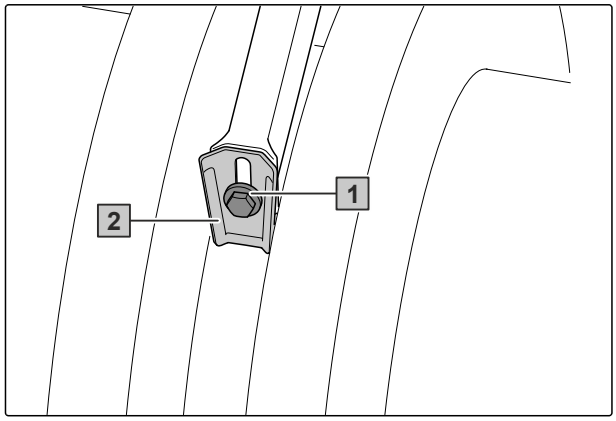
The scrapers are set at the factory. The setting must be adapted to the soil conditions.



CMS-I-00002071

Roller	Possible scraper distance A	Recommended scraper distance A for sticky soils
Wedge ring roller KW / KWM	10 mm to 15 mm	10 mm
Tooth packer roller PW	1 mm to 4 mm	1 mm
Trapeze ring roller TRW	1 mm to 4 mm	1 mm

1. Read the scraper distance A from the table.
2. Loosen the bolt 1 on the scraper 2.
3. Move the scraper in the elongated slot.
4. Tighten the bolt 1.
5. To check the distances when the implement is lowered: Rotate the roller.



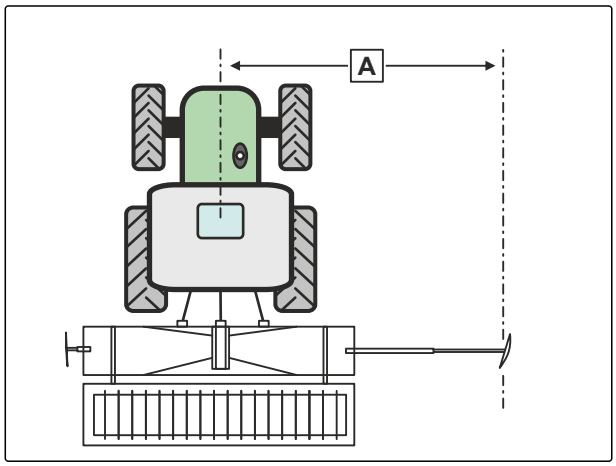
CMS-I-00000521

6.5.9 Preparing the track marker for operation

CMS-T-00001725-H.1

6.5.9.1 Determining the track marker length

CMS-T-00004725-C.1



CMS-I-00003078

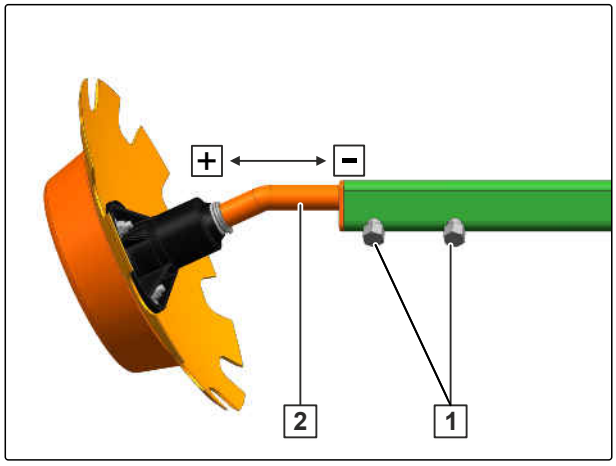
Working width of the implement	Distance A
2.5 m	2.5 m
3 m	3 m
3.5 m	3.5 m
4 m	4 m

▶ Read the distance **A** from the centre of the implement to the track marker disc from the table.

6.5.9.2 Adjusting the track marker length

CMS-T-00001487-E.1

1. Loosen the bolts **1** with the universal operating tool.
2. Pull out the track marker disc **2** until the desired distance is reached.
3. Tighten the bolts with the universal operating tool.
4. Make the same setting for the opposite side of the machine.
5. To check the setting:
   Drive for 30 m at working speed. Check the work pattern.



CMS-I-00001074

6.5.9.3 Adjusting the track marker intensity

CMS-T-00001726-G.1

1. Loosen the bolts 1.

To move the pitch to the desired position, turn the track marker axis 2.

2. On light soils:
   Reduce the pitch -

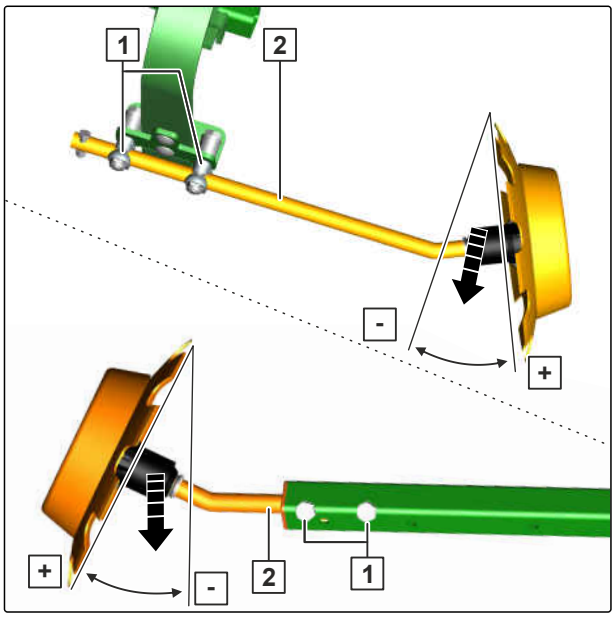
   or

   On heavy soils:
   Increase the pitch +.

3. Tighten the bolts.

4. Make the same setting for the opposite side of the implement.

5. To check the setting:
   Drive for 30 m at working speed. Check the work pattern.



CMS-I-00001077

6.5.10 Preparing the wheel mark eradicator for operation

CMS-T-00004718-G.1

6.5.10.1 Adjusting the working depth of the spring-suspended wheel mark eradicators

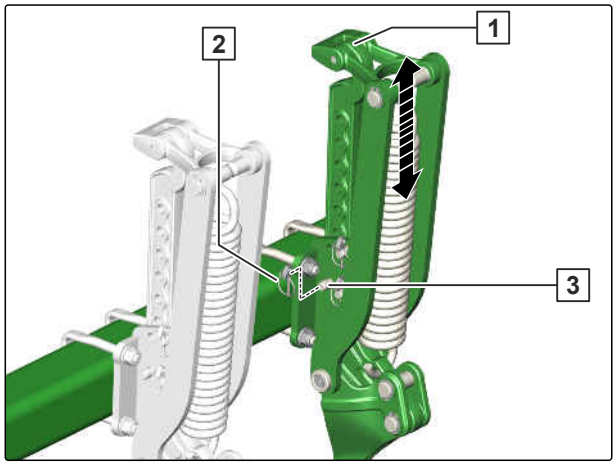
CMS-T-00001486-H.1

IMPORTANT

Increased wear of the wheel mark eradicator bracket

- When the overload safety is triggered at short intervals:
  Reduce the working depth.
- Change to a wheel mark eradicator coulter that is easy to pull.

1. Raise the machine.
2. Release the linch pin **2**.
3. Hold the wheel mark eradicator by the recessed grip **1**.
4. Remove the locking pin **3**.



CMS-I-00000942

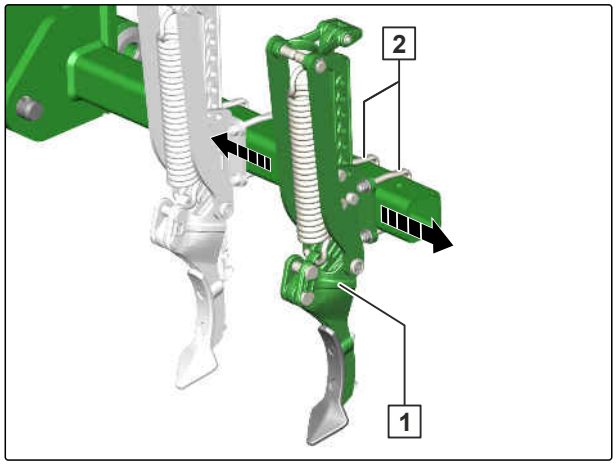
The maximum working depth is 150 mm.

5. Move the wheel mark eradicator to the desired position.
6. Secure the wheel mark eradicator with the locking pin.
7. Secure the locking pin with the linch pin.
8. Make the same setting for all wheel mark eradicators.
9. To check the setting:
   Drive for 30 m at working speed. Check the work pattern.

6.5.10.2 Adjusting the wheel mark eradicator to the track width

CMS-T-00001553-E.1

1. Loosen the nuts for the clamp connection **2**.
2. Move the wheel mark eradicator **1** to the desired position.



CMS-I-00000943

IMPORTANT Risk of machine damage due to tilted clamping bracket

If the nuts are not tightened evenly, the clamping brackets can break.

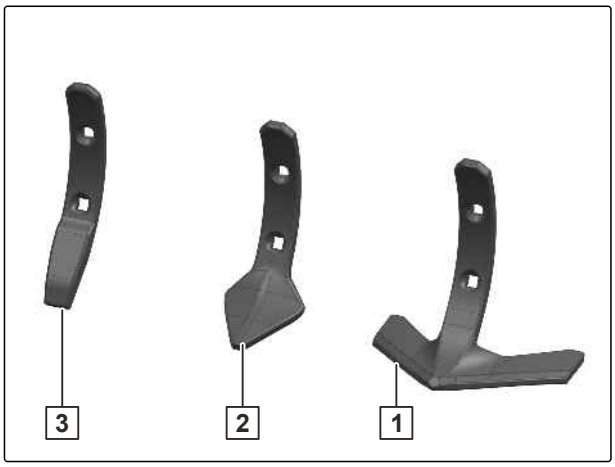
- ▶ To ensure that the clamping brackets rest on the profile tube over the full area:
  Tighten the nuts progressively.
- ▶ When a uniform thread protrusion on the clamping brackets is achieved:
  Tighten the nuts with the torque wrench.

3. To check the setting:
   Drive for 30 m at working speed. Check the work pattern.

6.5.10.3 Changing the wheel mark eradicator coulter

CMS-T-00002425-G.1

Different wheel mark eradicator coulters can be installed on the wheel mark eradicator . The choice of the wheel mark eradicator coulter depends on the operating conditions.



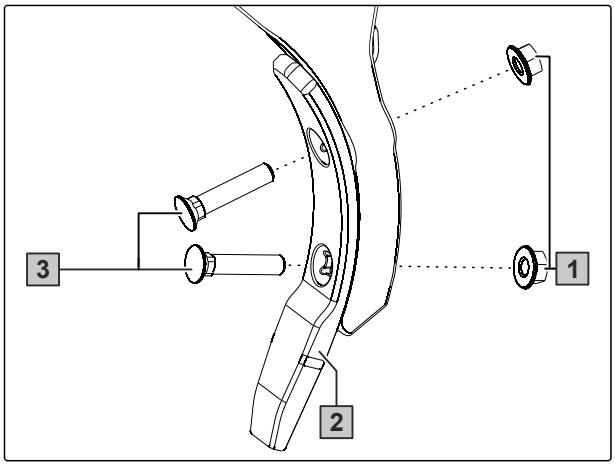
CMS-I-00001967

Number	Wheel mark eradicator coulter	Operating conditions	Pulling force requirement
1	Wing coulter	Shallow loosening and levelling of medium, silty soils	High pulling force requirement
2	Heart-shaped coulter	Medium-depth loosening of various soils	Medium pulling force requirement
3	Narrow coulter	Deep loosening of light soils	Low pulling force requirement

CAUTION

Risk of injury from sharp edges on the coulters and the bolt heads

- ► Wear gloves.
- ► Pay attention to sharp edges.
- ► Do not allow carriage bolts to rotate.



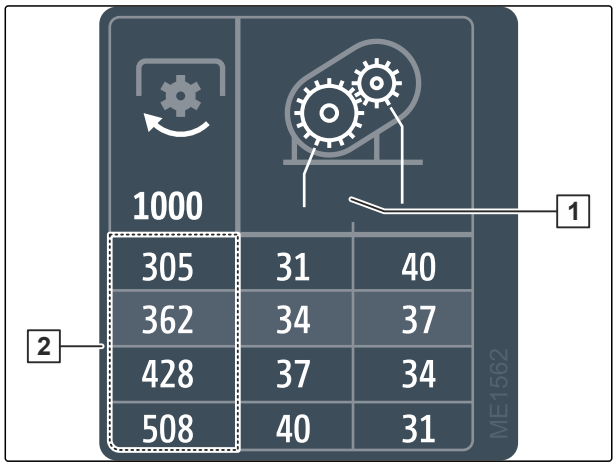
CMS-I-00001080

1. Remove the nuts 1.
2. Remove the bolts 3.
3. Install the desired wheel mark eradicator coulter 2 on the tool carrier.
4. Install the bolts.
5. Install the nuts and tighten them.
6. To check the setting,
   drive for 30 m at working speed and then check the work pattern.

6.5.11 Adjusting the speed of the tines

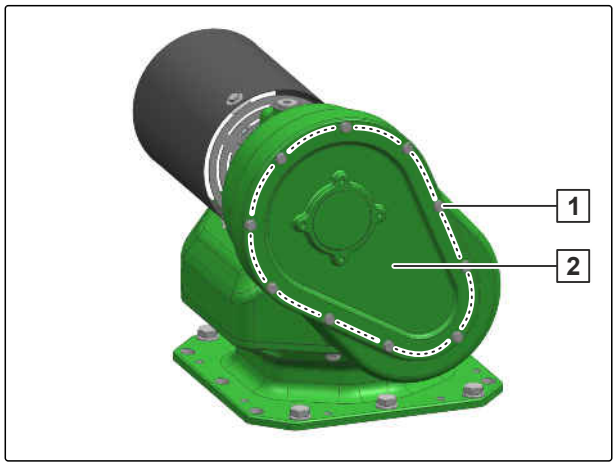
CMS-T-00004619-B.1

1. Depending on the desired tine speed **2**, determine the required gear ratio **1**.



CMS-I-00003483

2. Park the soil tillage implement on a firm surface.
3. To prevent oil from emerging out of the interchangeable wheel gear, slightly tilt the soil tillage implement to the front. Support with suitable aids.
4. Remove the peripheral cover screws **1**.

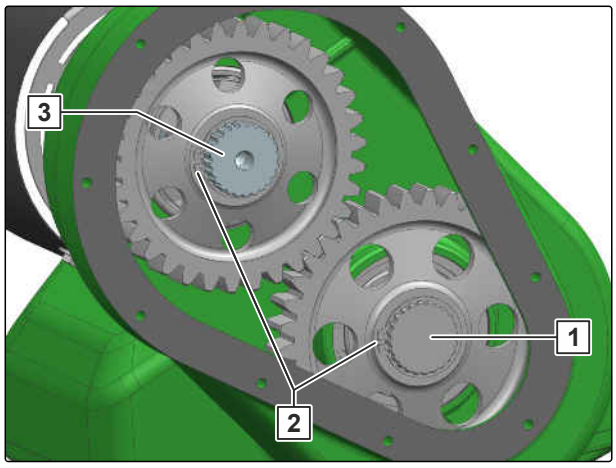


CMS-I-00003397

ENVIRONMENTAL INFORMATION Danger due to escaping oil

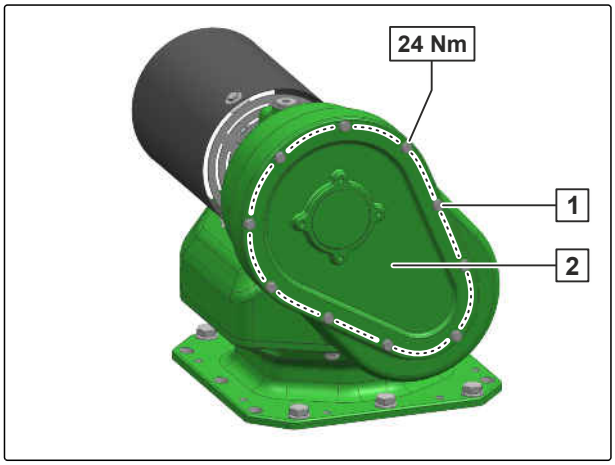
- ▶ Collect any escaping oil.
- ▶ Dispose of cleaning agents for removing oil in an environmentally friendly manner.

5. Remove the gearbox cover **2**.
6. Remove both locking rings **2**.
7. Remove the gear pair.
8. Depending on the desired tine speed, install the gear pair on the drive shaft **3** and the output shaft **1**.
9. Install the two locking rings.
10. Check the seating of the sealing ring on the gearbox cover.



CMS-I-00003398

11. Install the gearbox cover 2 with the sealing ring.
12. Install and tighten the peripheral cover screws 1.
13. After 15 minutes of operation, check the gearbox for leaks.



CMS-I-00003480

6.5.12 Adjusting the lower link catch hook

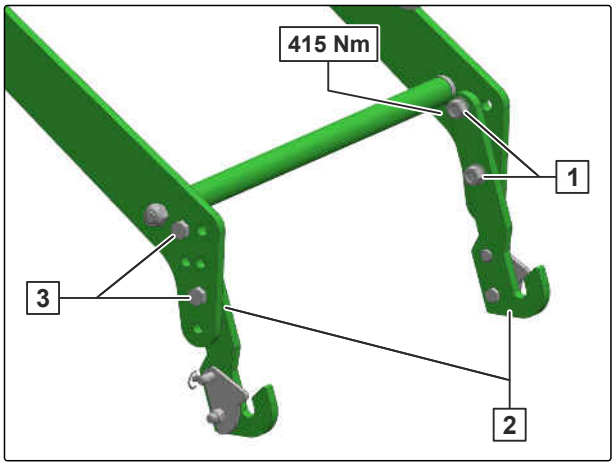
CMS-T-00004774-A.1

1. Loosen the nuts 1 and remove them.
2. Remove the bolts 3.

NOTE

The closer the seed drill is attached behind the roller, the lower the lifting force requirement.

3. Move the lower link catch hooks 2 into the desired position.
4. Install the bolts.
5. Install the nuts and tighten them.
6. After 5 hours of operation, check the bolt connection for tight fit.



CMS-I-00003376

6.5.13 Preparing the liftpack system for operation

CMS-T-00004800-C.1

6.5.13.1 Adjusting the lower link catch hook

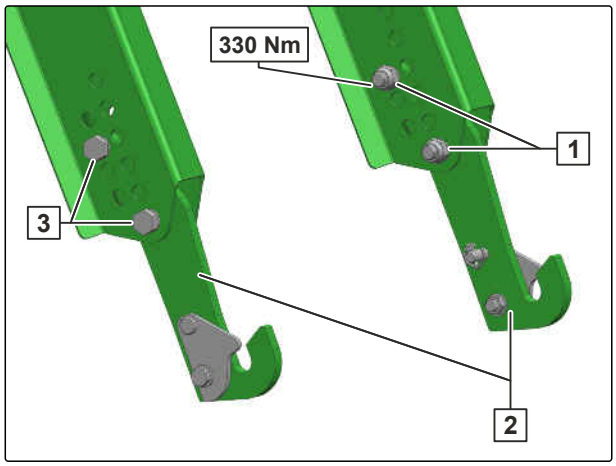
CMS-T-00004775-A.1

1. Loosen the nuts 1 and remove them.
2. Remove the bolts 3.

NOTE

The closer the seed drill is attached behind the roller, the lower the lifting force requirement.

3. Move the lower link catch hooks 2 into the desired position.
4. Install the bolts.
5. Install the nuts and tighten them.
6. After 5 hours of operation, check the bolt connection for tight fit.



CMS-I-00003375

6.5.13.2 Adjusting the lift height limiter

CMS-T-00004784-B.1

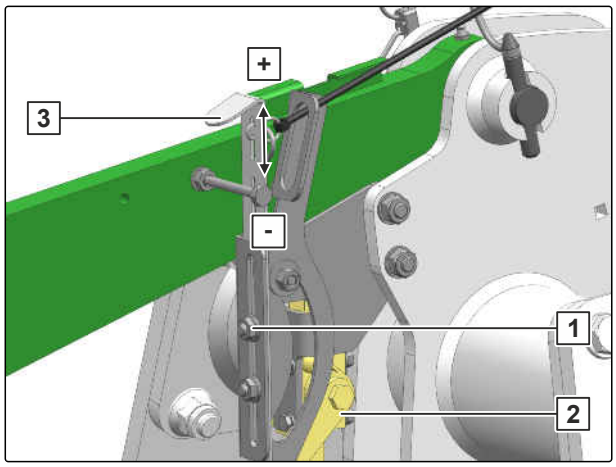
1. Loosen the nuts 1.

The catch hook 3 actuates the hydraulic valve 2 and therefore interrupts the lifting procedure.

IMPORTANT Breaking of the universal joint shaft due to excessive angling down of the driven universal joint shaft

- ▶ Switch off the PTO shaft of the tractor immediately if the implement does not run smoothly when lifted.
- ▶ Observe the permitted angling down of the driven universal joint shaft when lifting the implement.

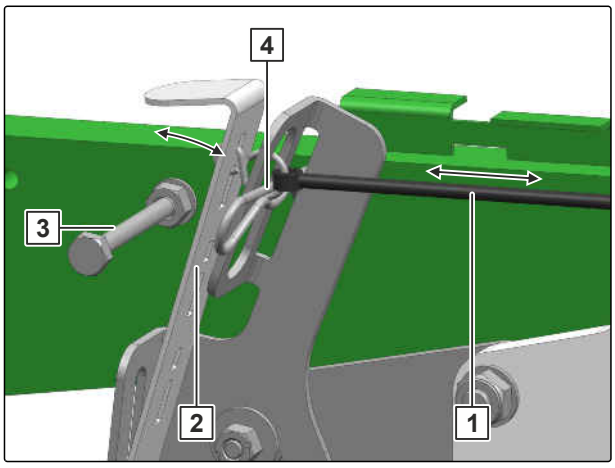
2. Move the catch hooks to the desired position.
3. Tighten the nuts.
4. After 5 hours of operation, check the bolt connection for tight fit.



CMS-I-00003388

6.5.13.3 Deactivating the lift height limiter

CMS-T-00004799-A.1



CMS-I-00003389

1. To deactivate the lift height limiter, pull on the rope from the tractor cab **1** and hold it.

➡ The bolt **3** does not actuate the catch hook **2** and the lifting procedure is not interrupted.

2. Raise the lifting frame.

If an implement without universal joint shaft is mounted on the liftpack system, the lift height limiter can be deactivated.

3. Before coupling the implement onto the liftpack system, the lift height limiter must be permanently deactivated.

4. To permanently deactivate the lift height limiter, pull on the rope **1** on the implement and hold it.

➡ The bolt **3** does not actuate the catch hook **2** and the lifting procedure is not interrupted.

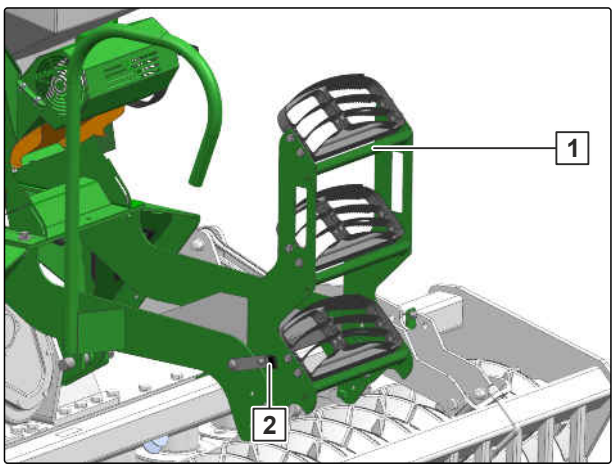
5. Fix the catch hook with the spring cotter pin **4** on the bracket.

6.5.14 Preparing the GreenDrill for operation

CMS-T-00005049-B.1

6.5.14.1 Filling the hopper

CMS-T-00005047-B.1



CMS-I-00003612

1. Couple the implement on the tractor.

2. Switch off the control terminal.

3. Unlock the locking mechanism **2**.

4. Swivel the steps **1** down.

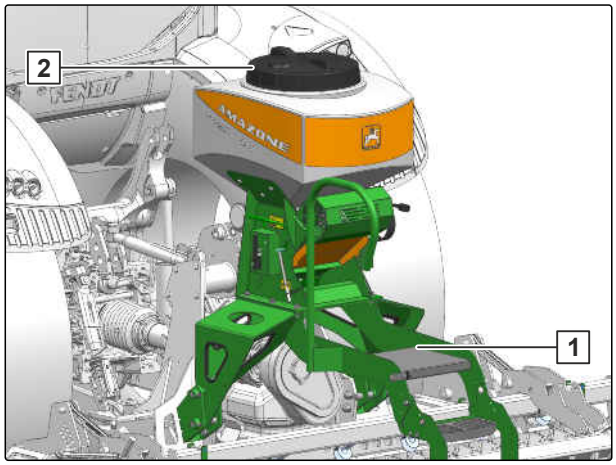
5. Climb onto the loading board **1**.

6. To fill the hopper,
   Open the hopper cover **2**.

7. When the hopper has been filled to the desired fill level, close the hopper cover.

8. Swivel up the steps.

9. Secure the steps.



CMS-I-00003611

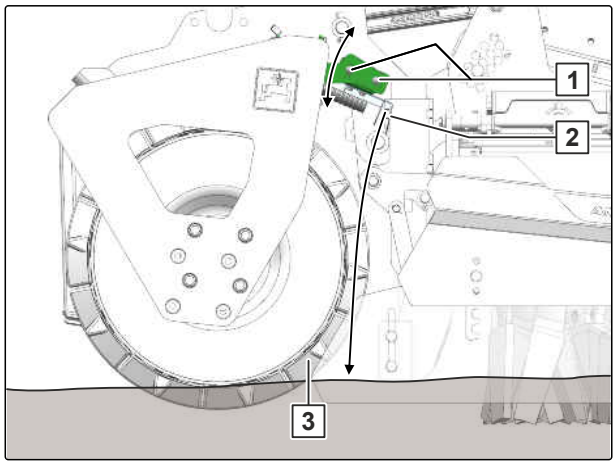
6.5.14.2 Adjusting the seed distributor

CMS-T-00005048-A.1

1. Loosen the bolts **1**.

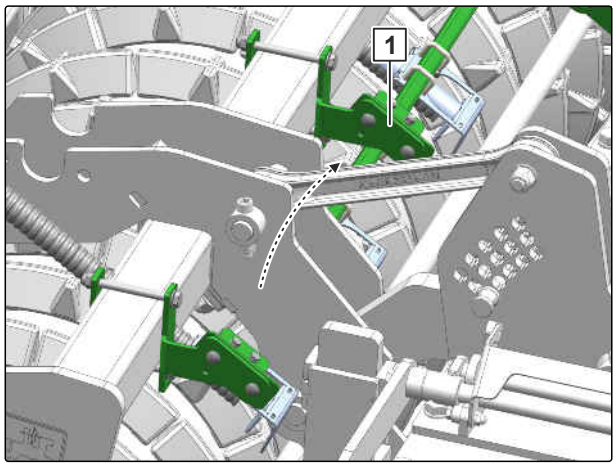
2. To spread the seed directly in front of the roller ***3***, swivel the seed distributor **2** to the desired position.

3. Tighten the bolts.



CMS-I-00003628

4. Make the same setting for the centre seed distributor **1** and the left seed distributor.



CMS-I-00003610

6.6 Preparing the machine for road travel

CMS-T-00004615-E.1

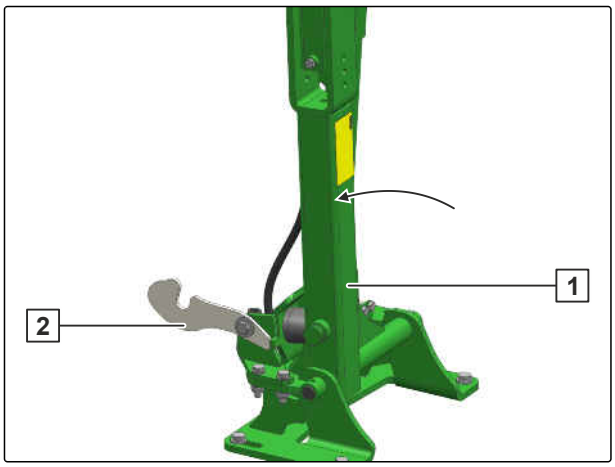
6.6.1 Preparing the track markers for road travel

CMS-T-00001491-E.1

1. Actuate the "yellow" tractor control unit.

➡ Fold the track markers into transport position.

2. Press the track marker 1 against the rubber block.
3. Lock the transport lock 2.
4. Repeat the procedure for the opposite side of the implement.

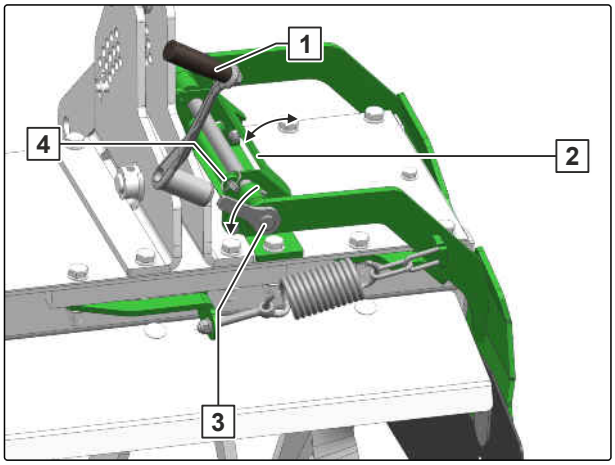


CMS-I-00000952

6.6.2 Moving the extendable side guide plates in transport position

CMS-T-00004840-A.1

1. Insert the universal operating tool 1 on the swivelling lever 3.
2. Remove the linch pin 4.
3. Hold the universal operating tool in position.
4. Open the locking mechanism 3.
5. To move the side guide plate into transport position, move the universal operating tool up.
6. Close the locking mechanism.
7. Secure the locking mechanism with the linch pin.
8. Repeat the procedure for the opposite side of the implement.



CMS-I-00003452

6.6.3 Preparing the liftpack system for road travel

CMS-T-00004804-B.1

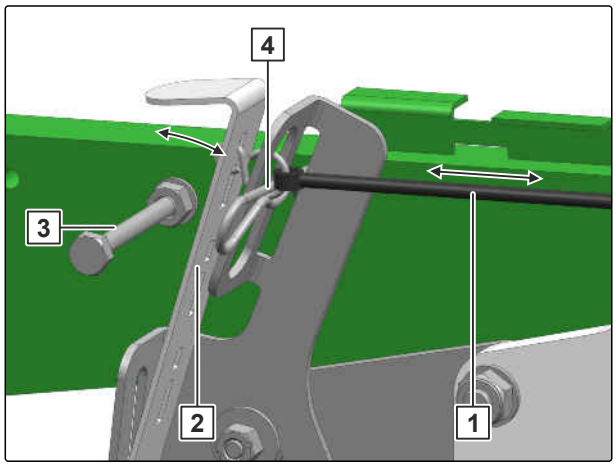
6.6.3.1 Deactivating the lift height limiter

CMS-T-00004799-A.1

1. To deactivate the lift height limiter,
   pull on the rope from the tractor cab **1** and hold it.

➡ The bolt **3** does not actuate the catch hook **2** and the lifting procedure is not interrupted.

2. Raise the lifting frame.



CMS-I-00003389

If an implement without universal joint shaft is mounted on the liftpack system, the lift height limiter can be deactivated.

3. Before coupling the implement onto the liftpack system,
   the lift height limiter must be permanently deactivated.

4. To permanently deactivate the lift height limiter,
   pull on the rope **1** on the implement and hold it.

➡ The bolt **3** does not actuate the catch hook **2** and the lifting procedure is not interrupted.

5. Fix the catch hook with the spring cotter pin **4** on the bracket.

6.6.3.2 Raising the liftpack system

CMS-T-00004841-B.1

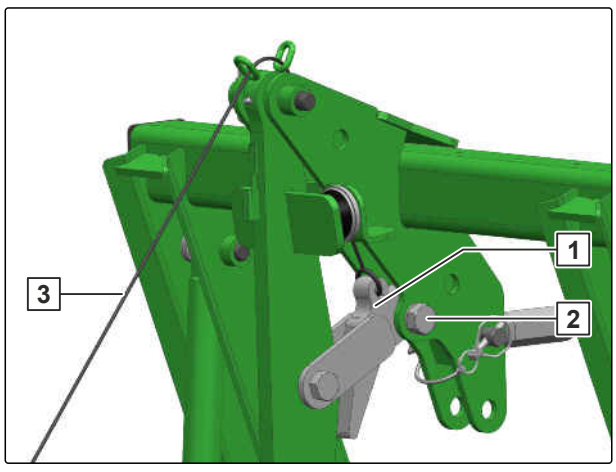
1. Pull on the rope **3** and hold it.

➡ The safety hook is opened.

2. Actuate the "green" tractor control unit,

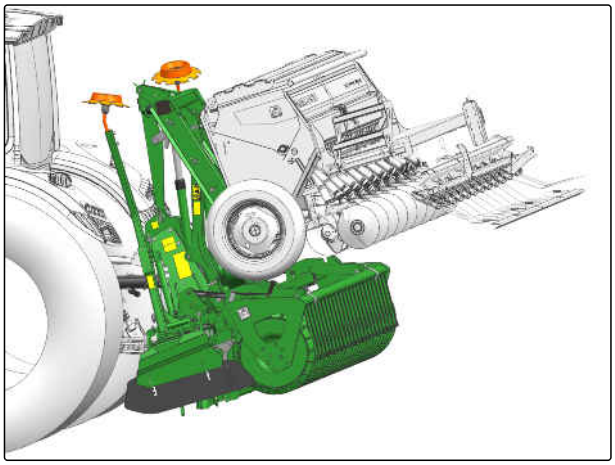
3. When the lifting frame is raised,
   release the rope.

➡ The safety hook **1** fixes the pin **2** and represents the mechanical locking mechanism of the lifting frame.



CMS-I-00003390

4. Lift the soil tillage implement.



CMS-I-00003478

6.6.4 Switching off the work lights

CMS-T-00013341-C.1

▶ To avoid blinding other road users, switch off the work lights according to "ISOBUS" operating manual

or

"control computer" operating manual

or

using the rocker switch.

Using the machine

7

CMS-T-00004634-D.1

7.1 Using the implement

CMS-T-00009290-B.1

1. Lower the implement until it is just above the field.

When working with the implement switched on, it must be ensured that the tines touch the soil.

2. Switch on the tractor PTO shaft.

3. Lower the implement on the field.

4. Move the hydraulic system of the three-point power lift into float position.

7.2 Lowering the liftpack system

CMS-T-00004805-A.1

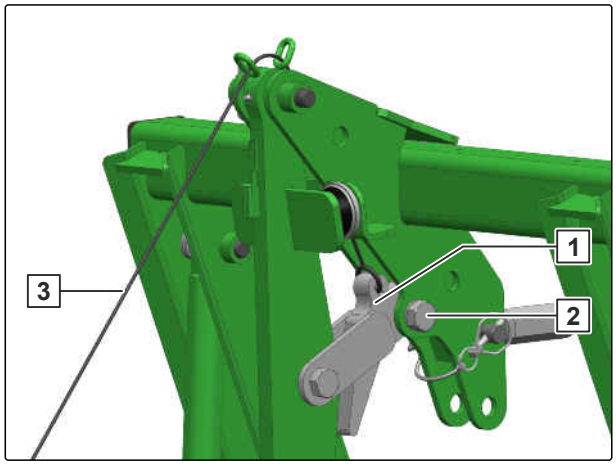
The safety hook 1 fixes the pin 2 and represents the mechanical locking mechanism of the liftpack system.

1. Pull on the rope 3 and hold it.

➡ The safety hook is opened.

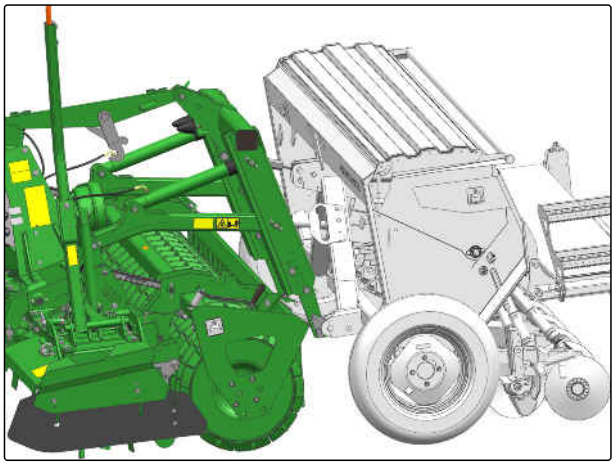
2. Put the "green" tractor control unit into float position,

3. When the liftpack system is lowered, release the rope.



CMS-I-00003390

4. Lower the soil tillage implement.



CMS-I-00003476

7.3 Using the track marker

CMS-T-00004635-A.1

1. Before the track marker encounters an obstacle, lift out the track marker.
2. After passing the obstacle, lower the track marker.

➡ Lifting the track marker causes the tramline counter to be advanced.

3. To correct the position of the tramline counter, actuate the "yellow" tractor control unit several times until the tramline counter detects the correct tramline.

7.4 Checking the set working depth

CMS-T-00004568-A.1

If the set working depth is greater than the tine length, the tool carriers are constantly working in the soil horizon.

IMPORTANT

The tool carriers become worn when constantly working in the soil.

► Replace the tines before they reach the minimum length.

► To prevent wear of the tool carriers, check the set working depth after driving a short distance.

7.5 Turning on the headlands

CMS-T-001728-C.1

1. To prevent lateral loads when driving in curves on the headlands:
   raise the soil tillage tools.

2. When the direction of the implement matches that of the direction of travel:
   lower the soil tillage tools.

7.6 Turning on the headlands with the liftpack system

CMS-T-00004807-B.1

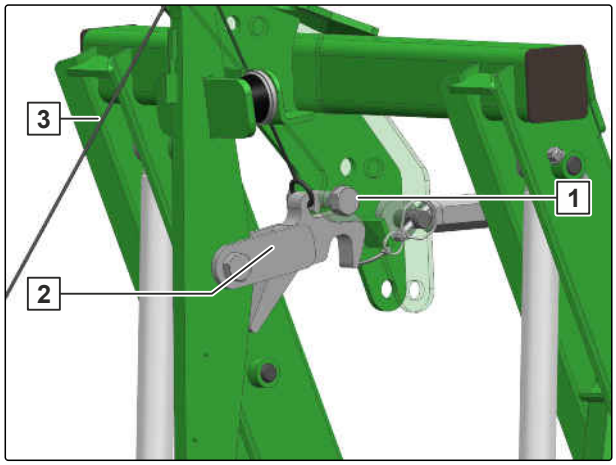
If the lift height limiter is deactivated, the liftpack system does not need to be secured for the turning procedure at the end of the field.

1. Actuate the "green" tractor control unit.

2. Do not pull the rope [3].

➡ The bolt [1] swivels over the safety hook [2].

3. After the turning procedure,
   put the "green" tractor control unit into float position.



CMS-I-00003394

7.7 Moving the extendable side guide plates in working position

CMS-T-00004817-A.1

1. Insert the universal operating tool [1] on the swivelling lever [2].

2. Remove the linch pin [3].

3. Hold the universal operating tool in position.

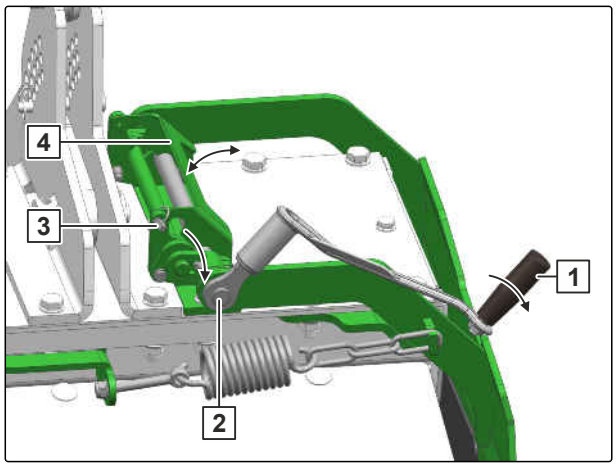
4. Open the locking mechanism [4].

5. To move the side guide plate into working position, move the universal operating tool down.

6. Close the locking mechanism.

7. Secure the locking mechanism with the linch pin.

8. Repeat the procedure for the opposite side of the implement.



CMS-I-00003453

Eliminating faults

8

CMS-T-00004633-F.1

Errors	Cause	Solution
The trailing roller rotates stiffly during initial operation.	Production-related paint residues make it difficult for the roller to rotate.	▶ Pull the roller over firm ground.
Tines stopping during operation	If the tines encounter an obstacle, the tool carriers are blocked.	▶ see page 79
	After the tines have encountered and obstacle, the obstacle is jammed between the tines. The cam-type clutch does not engage automatically.	▶ see page 79
The cam-type clutch is often triggered	Maintenance is required on the cam-type clutch.	▶ see page 79
	Excessive torques on the cam-type clutch.	▶ see page 80
The track marker collision protection is triggered.	The track marker has encountered a solid obstacle. The shear bolt is torn and the track marker folded to the rear.	▶ see page 80
The wheel mark eradicator does not reach the desired working depth.	When the worn tine has been replaced, the working depth of the soil tillage implement must be corrected. The wheel mark eradicator brackets are too high above the soil	▶ see page 81
The wheel mark eradicator tool carriers are constantly working in the soil horizon.	Due to wear on the rotating tines, the working depth of the soil tillage implement must be corrected. The wheel mark eradicator brackets are too close above the soil.	▶ see page 82
The lighting for road travel has a malfunction.	Lamp or lighting supply line is damaged.	▶ Replace the lamp. ▶ Replace the lighting supply line.
It lowers the wrong track marker.	When actuating the tractor control unit, the wrong track marker is lowered.	▶ Switch the control unit several times.
The tension spring of the wheel mark eradicator is broken.		▶ To install and remove the tension springs, contact your dealer.

Tines stopping during operation

CMS-T-00004519-C.1

If the tines encounter an obstacle, the tool carriers are blocked.

The tines encountered an obstacle, the tool carriers are blocked:

1. Raise the implement.
2. Reduce the PTO shaft speed to approx. 300 1/min.

➡ The cam-type clutch engages audibly.

3. Re-establish the original PTO shaft speed.
4. Resume working.

After the tines have encountered and obstacle, the obstacle is jammed between the tines. The cam-type clutch does not engage automatically.

An obstacle is jammed between the tines:

1. Raise the implement.
2. Secure the tractor and implement.
3. Wait until the tool carriers come to a stop.
4. Remove the obstacle between the tines.

The cam-type clutch is often triggered

CMS-T-00004943-B.1

Maintenance is required on the cam-type clutch.

Maintenance is required on the cam-type clutch:

1. If the cam-type clutch is often triggered,
   perform maintenance according to the instructions from the universal joint shaft manufacturer

   or

   Contact AMAZONE Customer Service.
2. Install the universal joint shafts.

Excessive torques on the cam-type clutch.

Excessive torques on the cam-type clutch:

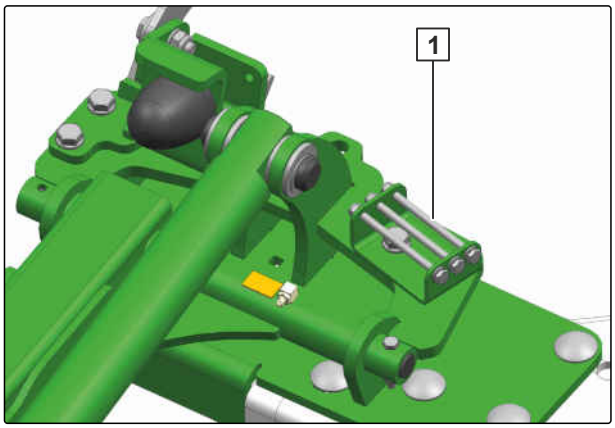
Universal joint shaft speeds lower than 1000 rpm cause high torques on the cam-type clutch.

▶ If the cam-type clutch is often triggered,
set the speed of the universal joint shaft to 1000 rpm.

Track marker collision protection is triggered

CMS-T-00002345-E.1

1. Remove the spare shear bolts [1] from the track marker holder.

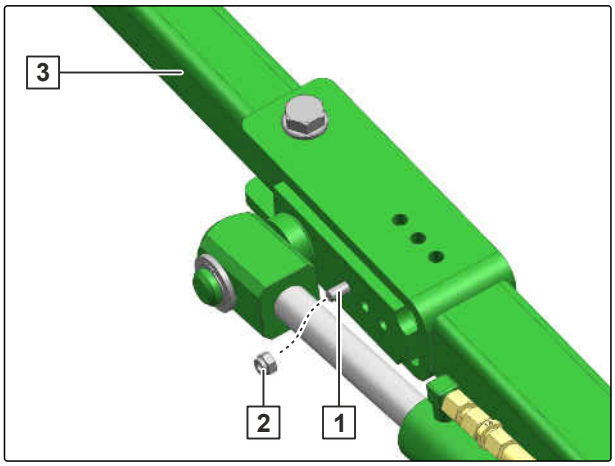


CMS-I-00002081

NOTE

Only use original parts as a replacement.

2. Remove the damaged shear bolt.
3. Fold the track marker section [3] into working position.
4. Insert the replacement shear bolt [1].
5. Install the nut [2] and tighten it.

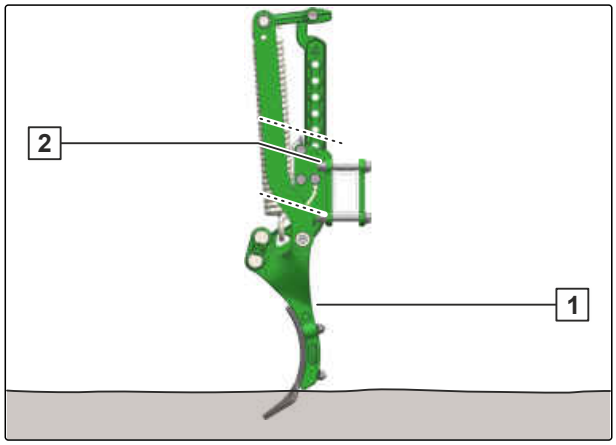


CMS-I-00004385

The wheel mark eradicator does not reach the desired working depth

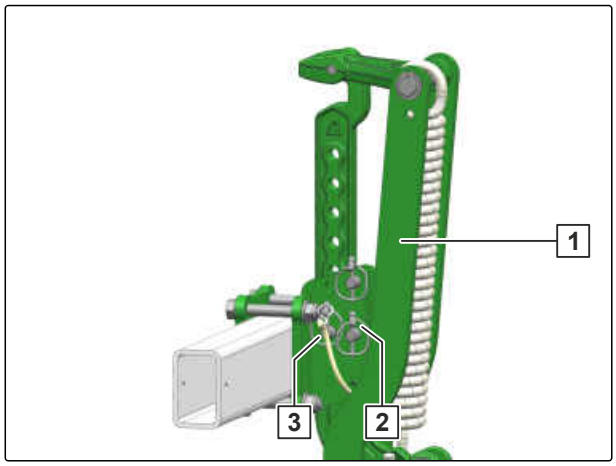
CMS-T-00005076-A.1

1. To allow the wheel mark eradicators **1** to work deeper,
   rotate the wheel mark eradicator bracket **2** by 180 degrees.



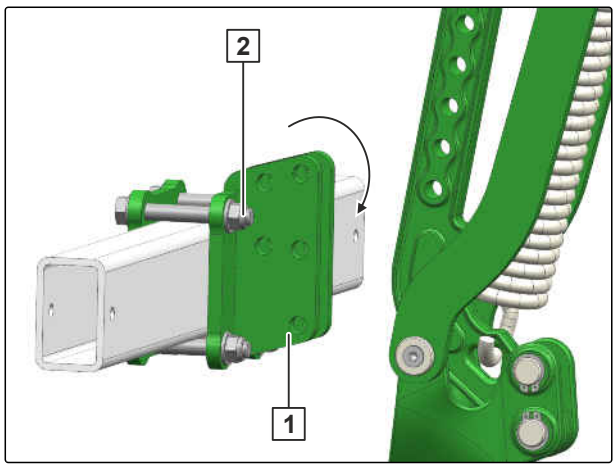
CMS-I-00003357

2. Release both linch pins and locking pins **2**.
3. Release the linch pin **3**.
4. Hold the wheel mark eradicator **1**.
5. Remove the locking pin.
6. Remove the wheel mark eradicator.



CMS-I-00003340

7. Loosen and remove the nuts for the clamp connection **2**.
8. Remove the wheel mark eradicator bracket **1**.

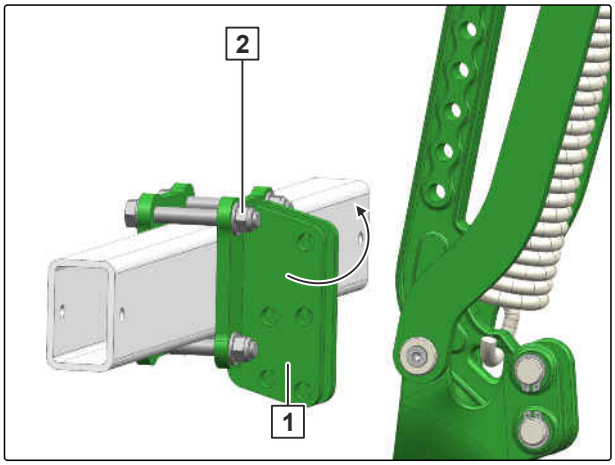


CMS-I-00003338

9. Install the wheel mark eradicator bracket **2** rotated by 180 degrees.

10. Install the nuts for the clamp connection **3**.

11. After 5 hours of operation, check the bolt connection for tight fit.



CMS-I-00003337

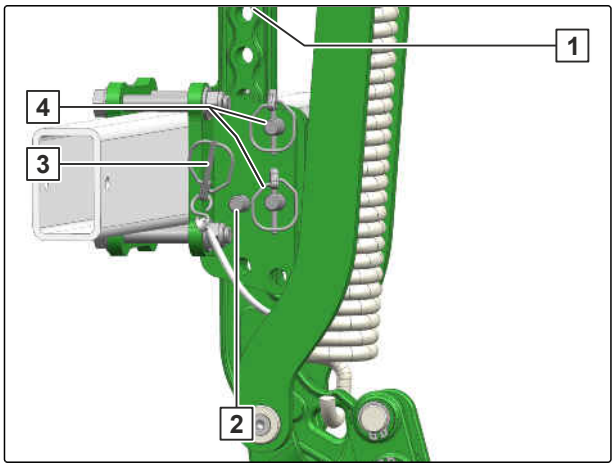
12. Fasten the wheel mark eradicator **1** in the bracket with the locking pins **4**.

13. Secure the locking pins with the linch pins.

14. Move the wheel mark eradicator to the desired position.

15. Secure the wheel mark eradicator with the locking pin **2**.

16. Secure the locking pin with the linch pin **3**.



CMS-I-00003339

Wheel mark eradicator tool carriers constantly working in the soil horizon

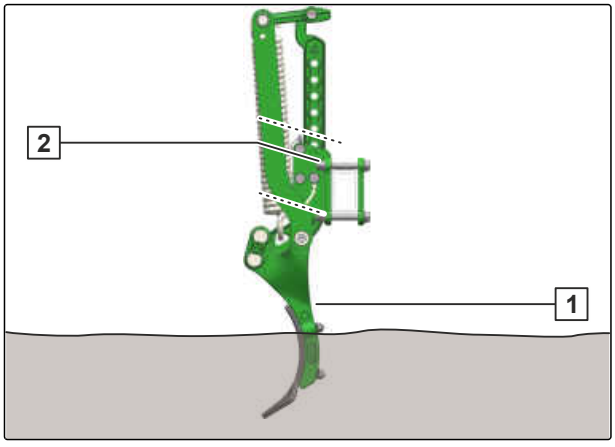
CMS-T-00005077-A.1

IMPORTANT

The tool carriers become worn when constantly working in the soil.

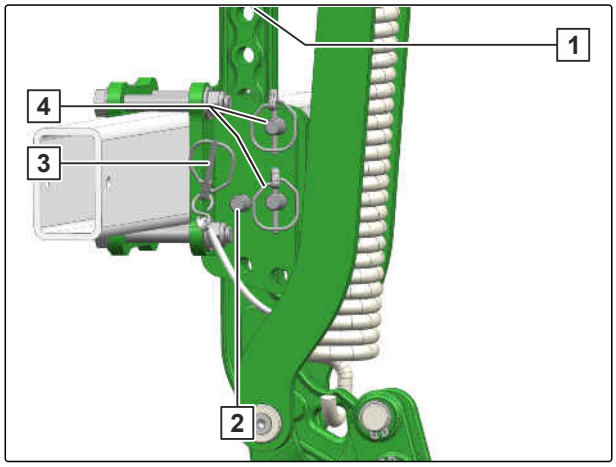
► Install the wheel mark eradicator bracket at a higher position.

1. To prevent the tool carriers ***1*** from constantly working in the soil horizon,
rotate the wheel mark eradicator bracket **2** by 180 degrees.



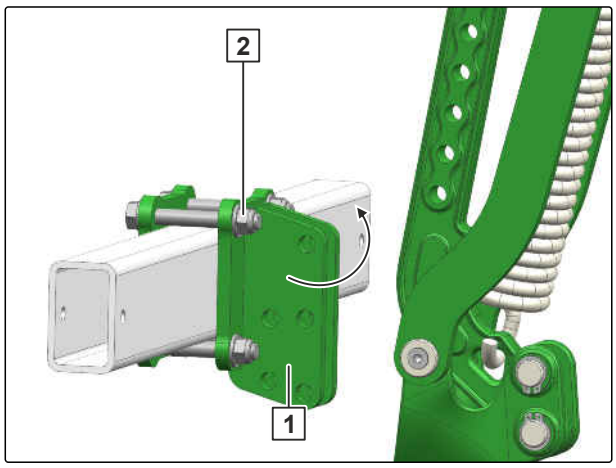
CMS-I-00003334

2. Release the linch pins and locking pins **4**.
3. Release the linch pin **3**.
4. Hold the wheel mark eradicator **1**.
5. Remove the locking pin **2**.
6. Remove the wheel mark eradicator.



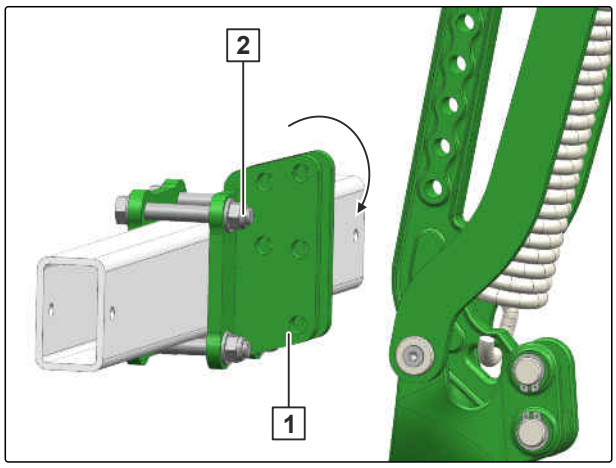
CMS-I-00003339

7. Loosen and remove the nuts for the clamp connection **2**.
8. Remove the wheel mark eradicator bracket **1**.



CMS-I-00003337

9. Install the wheel mark eradicator bracket **1** rotated by 180 degrees.
10. Install the nuts for the clamp connection **2**.
11. After 5 hours of operation, check the bolt connection for tight fit.



CMS-I-00003338

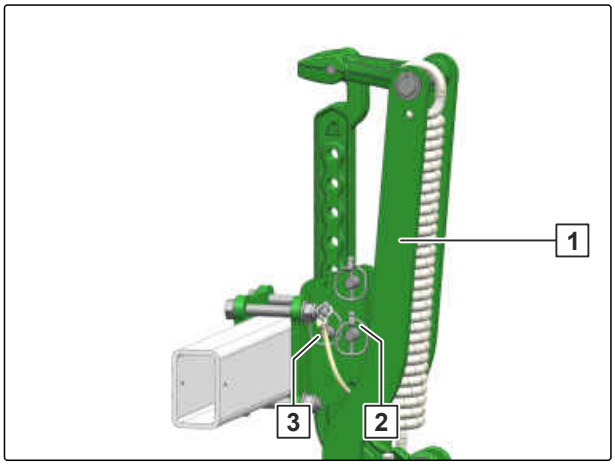
12. Fasten the wheel mark eradicator **1** in the bracket with the locking pins **2**.

13. Secure the locking pins with the linch pins.

14. To prevent the tool carriers from constantly working in the soil horizon,
move the wheel mark eradicator to a higher position.

15. Secure the wheel mark eradicator at the desired position with the locking pin **3**.

16. Secure the locking pin with the linch pin.



CMS-I-00003340

Parking the machine

9

CMS-T-00004657-G.1

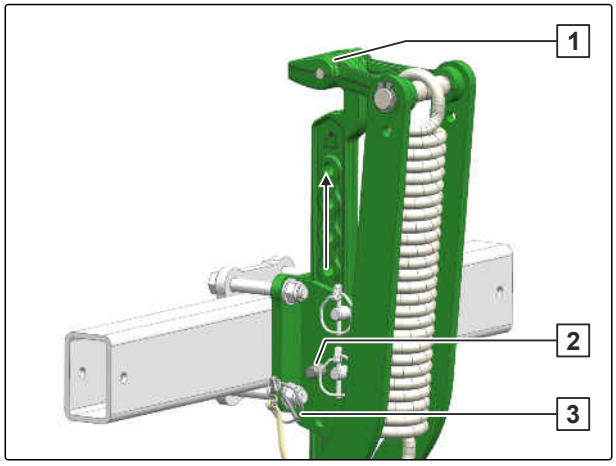
9.1 Moving the wheel mark eradicator into parking position

CMS-T-00001616-B.1

IMPORTANT

Damage to the wheel mark eradicators due to the implement weight

▶ When you park the implement, put the wheel mark eradicators into parking position.



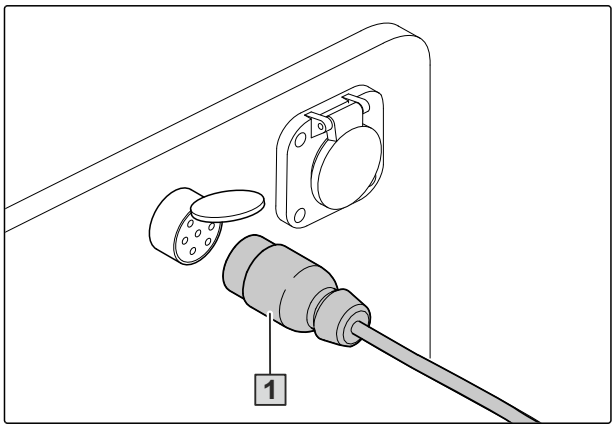
CMS-I-00000992

1. Remove the linch pin 3.
2. Hold the wheel mark eradicator by the recessed grip 1.
3. Remove the locking pin 2.
4. Using the recessed grip, move the wheel mark eradicator into the topmost position.
5. Secure the wheel mark eradicator with the locking pin.
6. Secure the locking pin with the linch pin.

9.2 Uncoupling the lighting for road travel

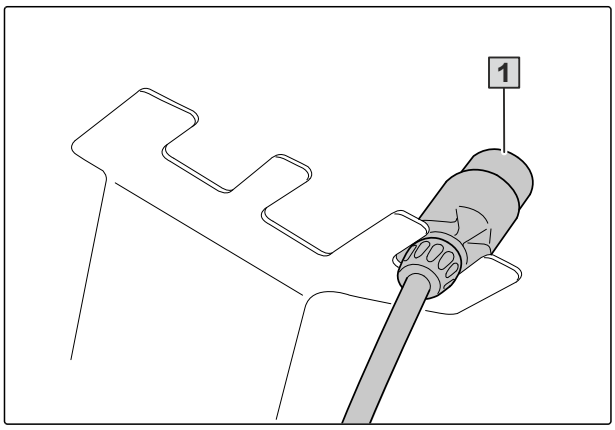
CMS-T-00001402-I.1

1. Unplug the connector **1** for the lighting.



CMS-I-00001048

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

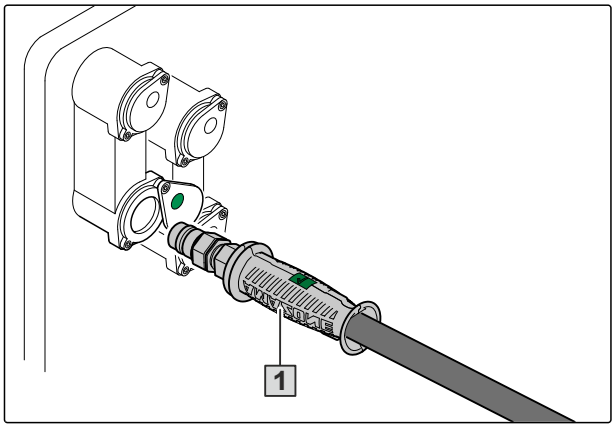


CMS-I-00001248

9.3 Disconnecting the hydraulic hose lines

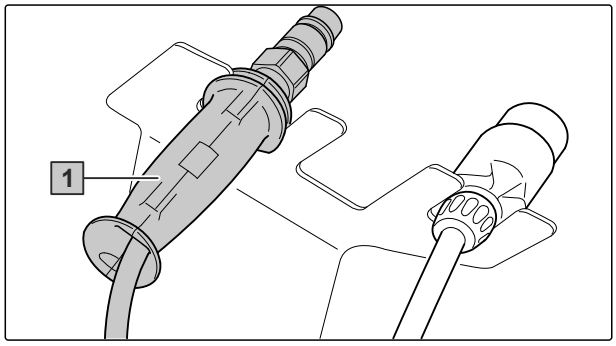
CMS-T-00000277-G.1

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

5. Hang the hydraulic hose lines [1] in the hose cabinet.

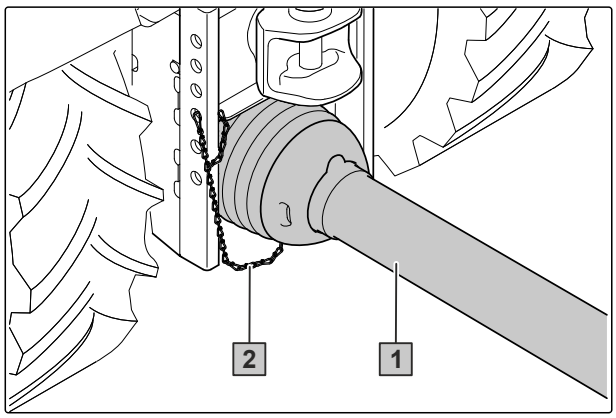


CMS-I-00001250

9.4 Uncoupling the universal joint shaft

CMS-T-00001843-D.1

1. Remove the safety chain [2] from the tractor.
2. Pull on the pull sleeve [1] of the universal joint shaft.
3. Pull off the universal joint shaft from the tractor PTO shaft.
4. Place the universal joint shaft in its holder on the implement.

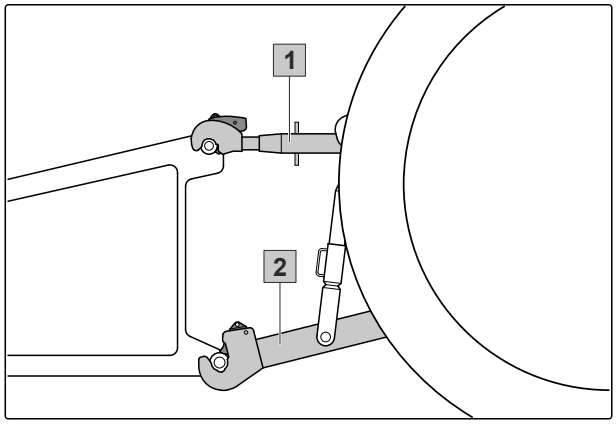


CMS-I-00001069

9.5 Uncoupling the three-point mounting frame

CMS-T-00001401-E.1

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



CMS-I-00001249

9.6 Parking the seed drill

CMS-T-00004843-A.1

9.6.1 Lowering the liftpack system

CMS-T-00004805-A.1

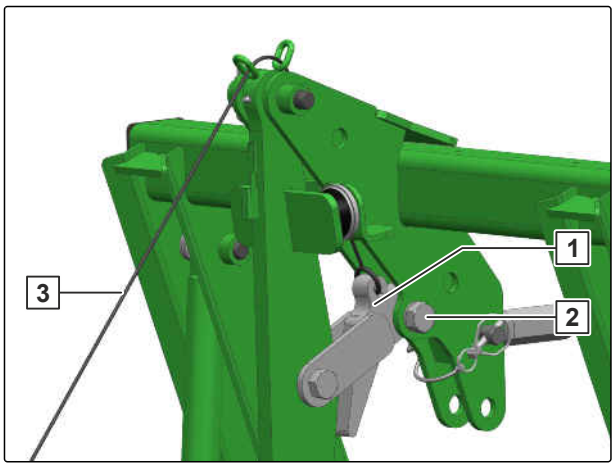
The safety hook **1** fixes the pin **2** and represents the mechanical locking mechanism of the liftpack system.

1. Pull on the rope **3** and hold it.

➡ The safety hook is opened.

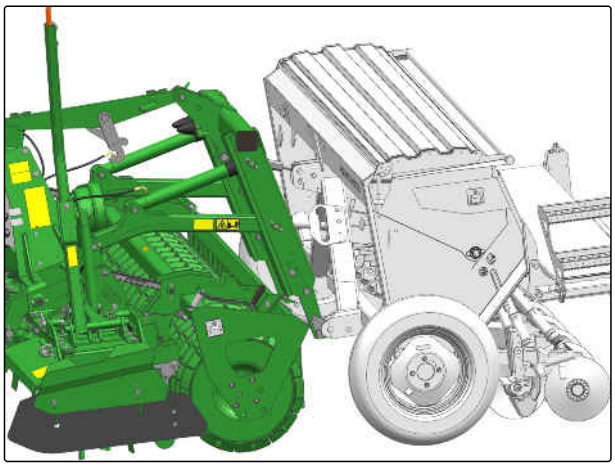
2. Put the "green" tractor control unit into float position,

3. When the liftpack system is lowered, release the rope.



CMS-I-00003390

4. Lower the soil tillage implement.

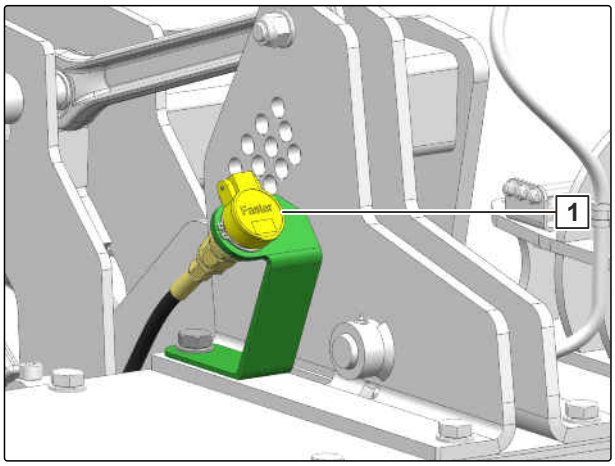


CMS-I-00003476

9.6.2 Uncoupling the seed drill

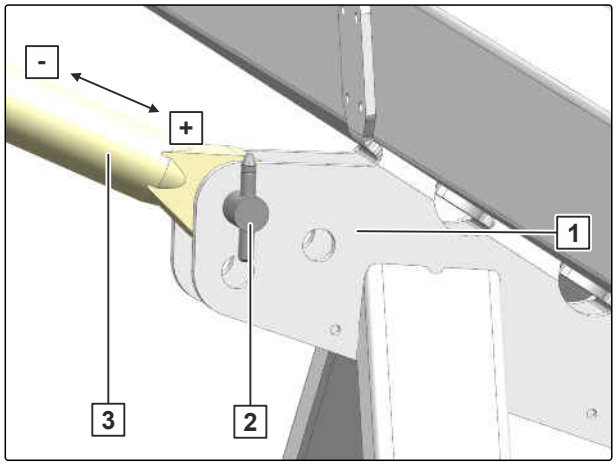
CMS-T-00004844-A.1

1. If the seed drill has a tramline marker, disconnect the tramline marker from the "yellow" control unit **1** of the soil tillage implement.



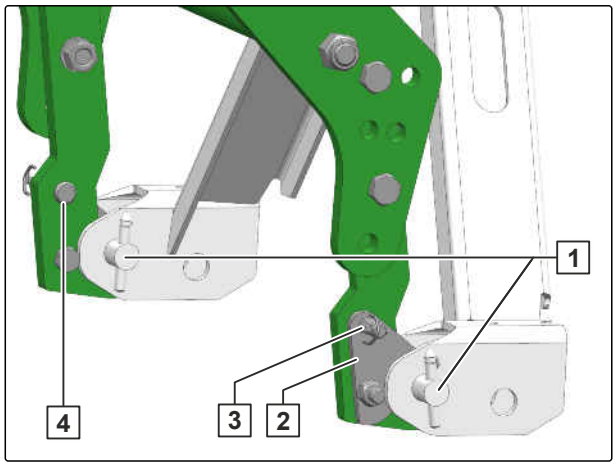
CMS-I-00003485

2. To relieve the top link **3**, turn the top link to the desired length.
3. Remove the linch pin from the pin.
4. Remove the pin **2** from the seed drill **1**.



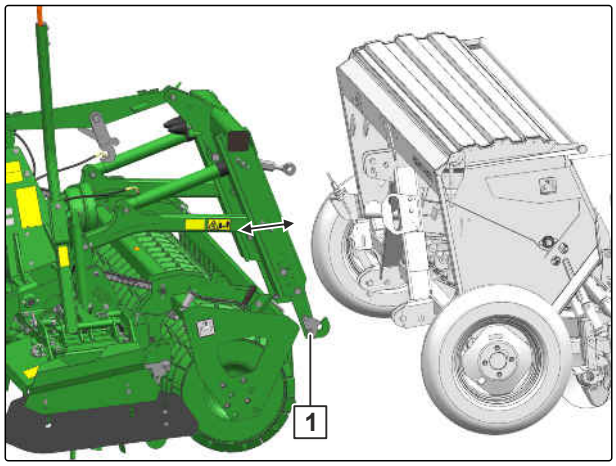
CMS-I-00003379

5. Remove the linch pin **3**.
6. Remove the pin.
7. Open the locking straps **2**.
8. Open the catch hook **4** on the opposite side.
9. Release the lower coupling points **1** of the seed drill from the catch hooks.



CMS-I-00003378

10. Slowly drive forwards with the mounted soil tillage implement **1**.



CMS-I-00003486

Repairing the machine 10

CMS-T-00004627-L.1

10.1 Maintaining the machine

CMS-T-00004630-K.1

10.1.1 Maintenance schedule

After initial operation	
Checking the hydraulic hose lines	see page 91
Checking and adjusting the scraper on the roller	see page 93
Checking the oil level in the interchangeable wheel gear	see page 95
Checking the oil level in the spur gear trough	see page 96

After the first 50 operating hours	
Replacing the oil in the interchangeable wheel gear	see page 97

As required	
Universal joint shaft maintenance	see page 98

Daily	
Checking the lower link pins and top link pins	see page 91

Every 6 months	
Ratchet clutch maintenance	see page 97

Every 50 operating hours	
Checking and replacing the tines	see page 92

Every 100 operating hours	
Checking and adjusting the scraper on the roller	see page 93

Every 500 operating hours	
Replacing the oil in the interchangeable wheel gear	see page 97

Every 50 operating hours / Weekly	
Checking the hydraulic hose lines	see page 91
Checking the oil level in the interchangeable wheel gear	see page 95
Checking the oil level in the spur gear trough	see page 96

Every 50 operating hours / Every 3 months	
Checking the wheel mark eradicator coulter	see page 94

10.1.2 Checking the lower link pins and top link pins

CMS-T-00002330-K.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.

10.1.3 Checking the hydraulic hose lines

CMS-T-00002331-G.1

INTERVAL

- After initial operation
- Every 50 operating hours

  or

  Weekly

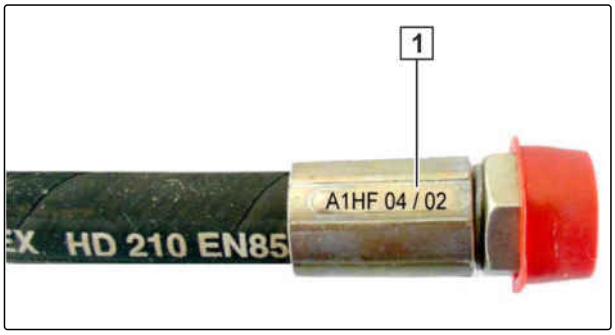
1. Check the hydraulic hose lines for damage, such as chafing point, cuts, tears and deformation.

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.

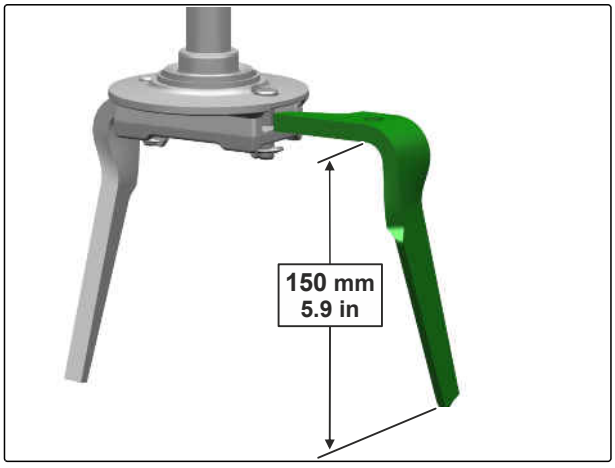
10.1.4 Checking and replacing the tines

CMS-T-00019943-A.1

INTERVAL

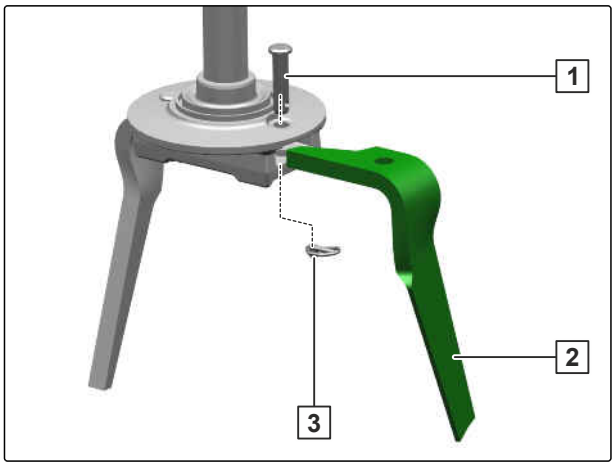
- Every 50 operating hours

1. Determine the length of the tines.
2. If the minimum length of the tines is undercut: replace the tines.



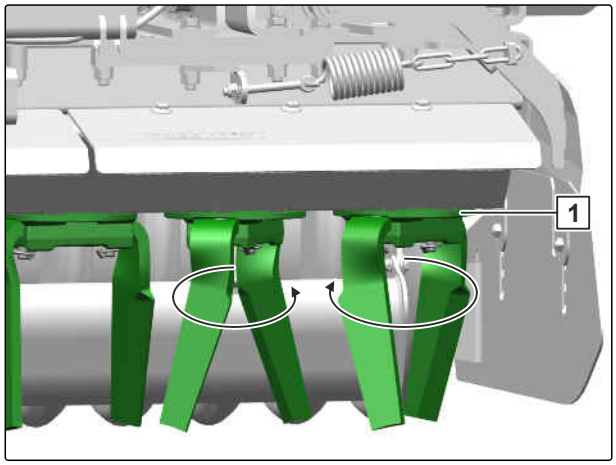
CMS-I-00014461

3. Remove the linch pin **3**.
4. Remove the pin **1** from the tool carrier.
5. Remove the tine **2**.



CMS-I-00014462

The outer tool carriers 1 always rotate towards the centre of the implement.



CMS-I-00014466

6. Pay attention to the alignment of the tine.
7. Install the new tine.
8. Fasten the tine with the pin.
9. Secure the tine with the linch pin.

10.1.5 Checking and adjusting the scraper on the roller

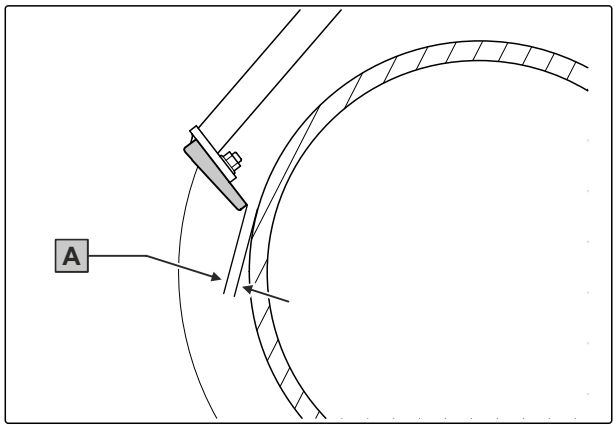
CMS-T-00018820-D.1

INTERVAL

- After initial operation
- Every 100 operating hours

The scrapers are subject to wear. The scrapers can be readjusted.

Roller	Scraper distance A
Wedge ring roller KW / KWM	10 mm to 15 mm
Tooth packer roller PW	1 mm to 4 mm
Trapeze ring roller TRW	1 mm to 4 mm

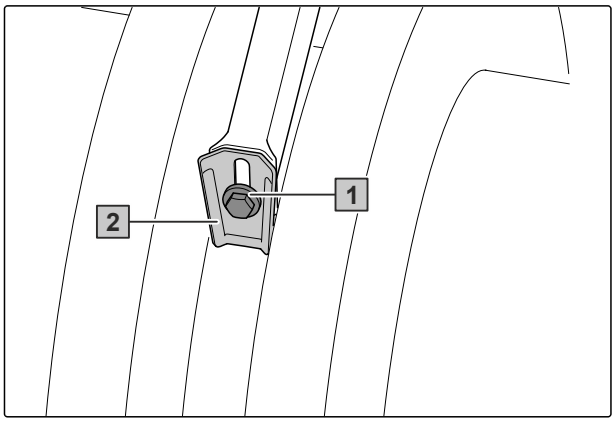


CMS-I-00002071

1. Read the scraper distance **A** from the table.
2. Loosen the bolt **1** on the scraper **2**.
3. Move the scraper in the elongated slot

   or

   If the scraper cannot be readjusted any more:
   Replace and adjust the scraper.
4. Tighten the bolt **1**.
5. To check the distances when the implement is lowered:
   Rotate the roller.



CMS-I-00000521

10.1.6 Checking the wheel mark eradicator coulter

CMS-T-00002497-G.1

INTERVAL

- Every 50 operating hours

  or

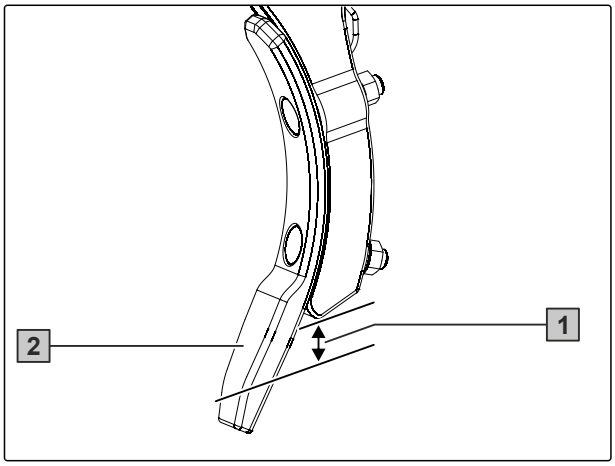
  Every 3 months

IMPORTANT

The tool carriers become worn when constantly working in the soil.

▶ When the wear limit of the wheel mark eradicator coulter has been exceeded, the tool carriers constantly work in the soil horizon. Replace the coulter when the wear limit has been reached.

1. If the distance ***1*** between the coulter tip and the tool carrier is less than 15 mm,
   replace the wheel mark eradicator coulter **2**.
2. To replace the wheel mark eradicator coulter,
   see page 66.



CMS-I-00001081

10.1.7 Checking the oil level in the interchangeable wheel gear

CMS-T-00004632-C.1

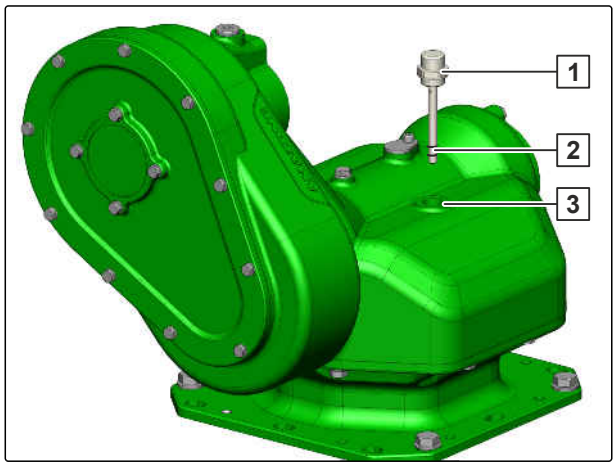
INTERVAL

- After initial operation
- Every 50 operating hours

  or

  Weekly

1. Park the implement on a horizontal surface.
2. Remove the oil dipstick **1**.
3. Check the oil level.



CMS-I-00003466

NOTE

If oil types are mixed, warranty claims cannot be accepted.

- Do not mix oils.
- Fill with new and clean gear oil.

4. If the oil level is not visible between the markings **2**: Refill the oil.
5. When the oil level is visible between the markings: install the oil dipstick with a new sealing ring. Hand-tighten the oil dipstick.

10.1.8 Checking the oil level in the spur gear trough

CMS-T-00004838-B.1

INTERVAL

- After initial operation
- Every 50 operating hours

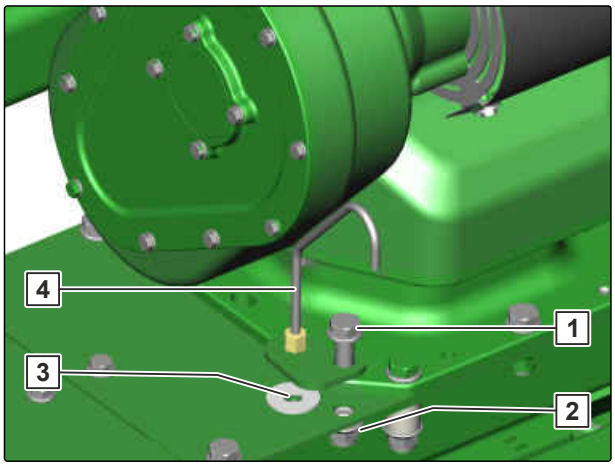
  or

  Weekly

IMPORTANT

Damage due to impurities in the spur gear trough

► Clean the implement before performing maintenance.



CMS-I-00003467

1. Park the implement on a horizontal surface.
2. Loosen and remove the nut **2**.
3. Remove the cover bolt **1**.
4. Remove the cover with ventilation pipe **4**.

NOTE

If oil types are mixed, warranty claims cannot be accepted.

- Do not mix oils.
- Fill with new and clean gear oil.

5. If the spur gears are not halfway covered with gear oil in the spur gear trough,
   refill oil according to the technical data.
6. Check the fit of the gasket **3**.
7. Install the cover with the ventilation pipe.
8. Install the cover bolt.
9. Install the nut and tighten it.

NOTE

There is no need to change the oil in the spur gear trough.

10.1.9 Replacing the oil in the interchangeable wheel gear

CMS-T-00020243-B.1

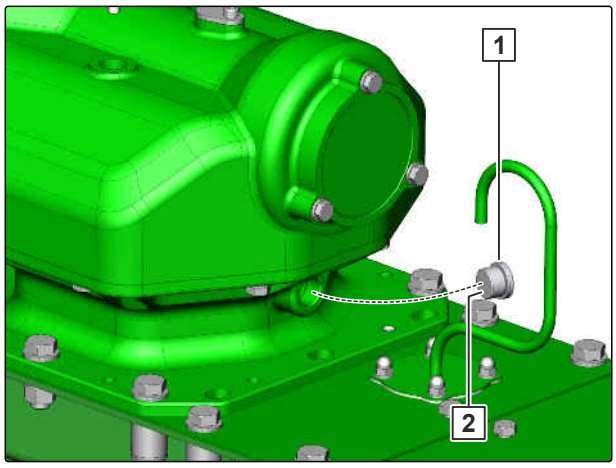
INTERVAL

- After the first 50 operating hours
- Every 500 operating hours

1. Place a suitable collection bucket under the oil drain opening.
2. Remove the oil dipstick 1.
3. Remove the oil drain plug 2.

ENVIRONMENTAL INFORMATION Danger due to escaping oil

- ▶ Collect any escaping oil.
- ▶ Dispose of cleaning agents for removing oil in an environmentally friendly manner.



CMS-I-00003465

4. Install the oil drain plug with a new sealing ring.
5. Refill the oil.
6. install the oil dipstick with a new sealing ring.

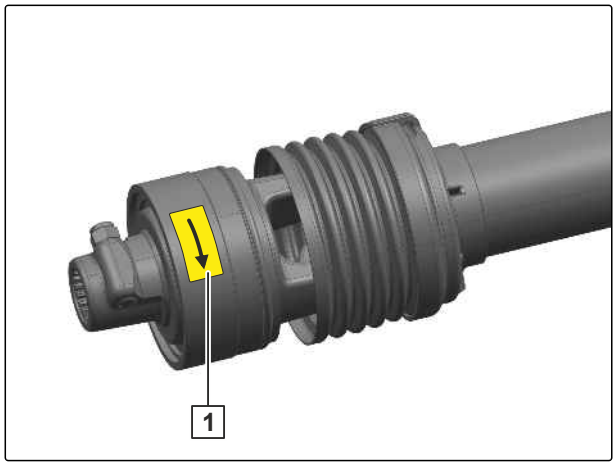
10.1.10 Ratchet clutch maintenance

CMS-T-00004584-A.1

INTERVAL

- Every 6 months

- ▶ Perform maintenance on the ratchet clutches 1 according to the instructions from the universal joint shaft manufacturer



CMS-I-00003044

10.1.11 Universal joint shaft maintenance

CMS-T-00004585-C.1

INTERVAL

- As required

▶ Perform maintenance on the universal joint shaft according to the instructions from the universal joint shaft manufacturer.

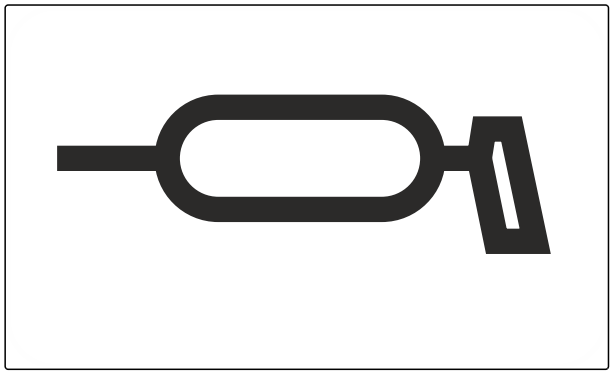
10.2 Lubricating the implement

CMS-T-00004628-D.1

IMPORTANT

Implement damage due to improper lubrication

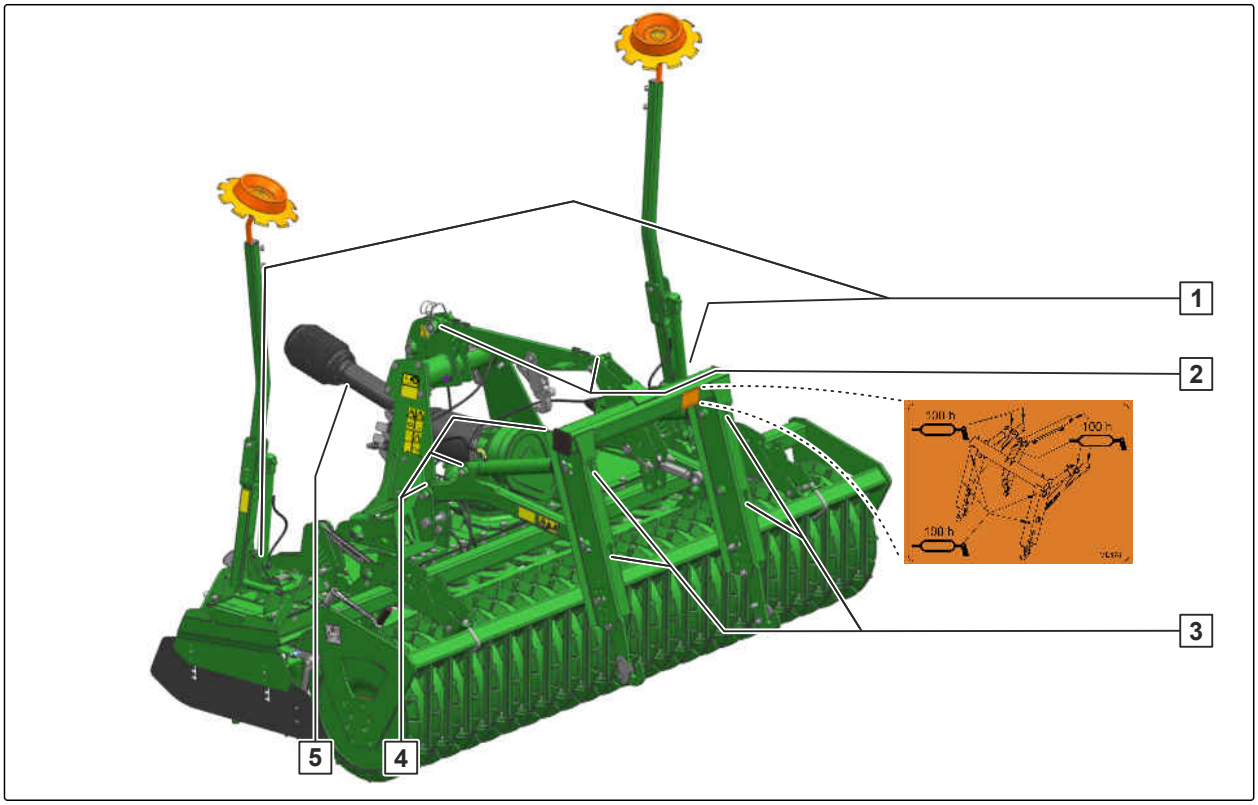
- Grease the implement at the marked lubrication points according to the lubrication schedule.
- To ensure that dirt is not pressed into the lubrication points,
  thoroughly clean the grease nipples and the grease gun.
- Only grease the implement with the lubricants listed in the technical data.
- Press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



CMS-I-00002270

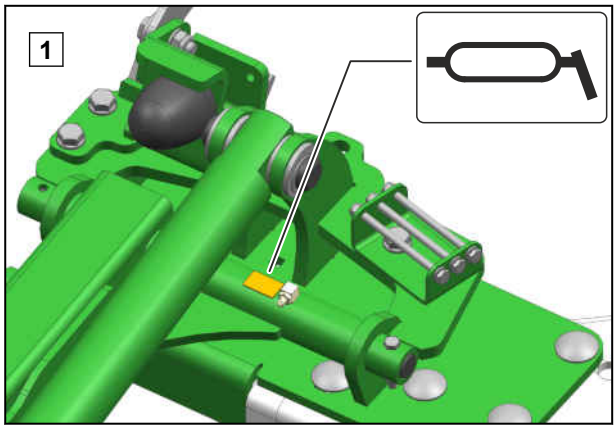
10.2.1 Overview of lubrication points

CMS-T-00004629-B.1

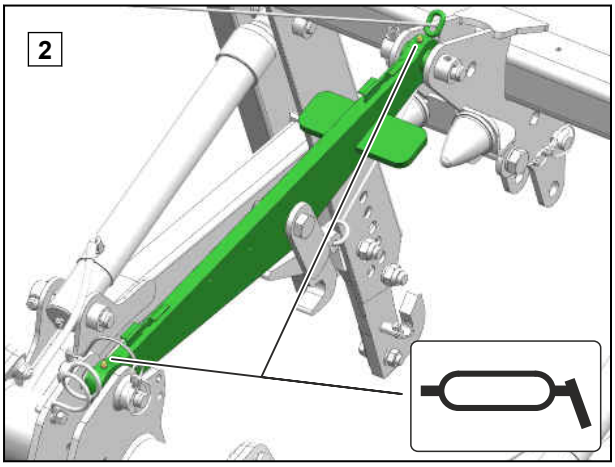


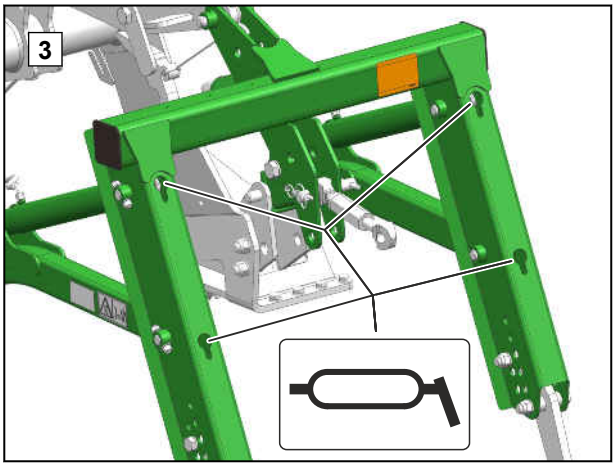
CMS-I-00003471

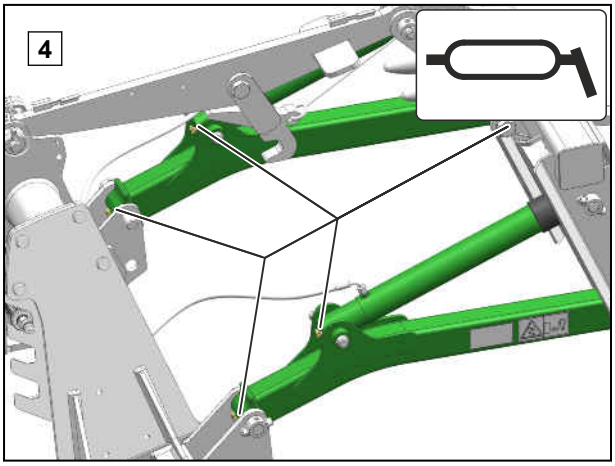
Every 20 operating hours / Every 6 months

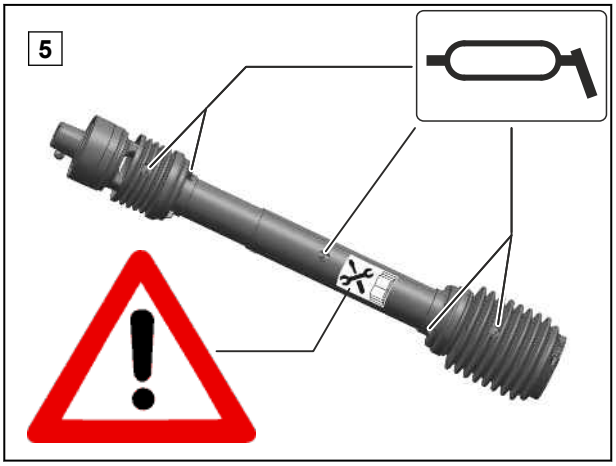


Every 50 operating hours / Every 6 months









10.3 Cleaning the implement

CMS-T-00000593-G.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

- Clean the implement with a high-pressure cleaner or a hot water high-pressure cleaner.

10.4 Storing the implement

CMS-T-00005282-A.1

IMPORTANT

Implement damage due to corrosion

Dirt attracts moisture and leads to corrosion.

- Store the implement only in a clean state and protected from the weather.

1. Clean the machine.
2. Protect unpainted components from corrosion using a suitable corrosion inhibitor.
3. Grease all lubrication points. Remove excess grease.
4. Park the implement in a sheltered place.

Loading the machine

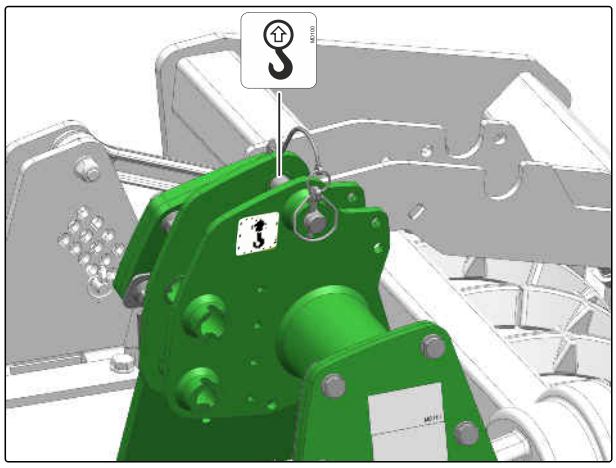
11

CMS-T-00004608-E.1

11.1 Loading the machine with a crane

CMS-T-00004609-E.1

The machine has a lashing point for slings for lifting.



CMS-I-00003481

WARNING

Risk of accidents due to improperly attached slings for lifting

If the slings are not attached at the marked lashing points, the implement can be damaged during lifting and endanger safety.

- ▶ Only attach the slings for lifting at the marked lashing points.

1. Attach the slings for lifting on the intended lifting points.

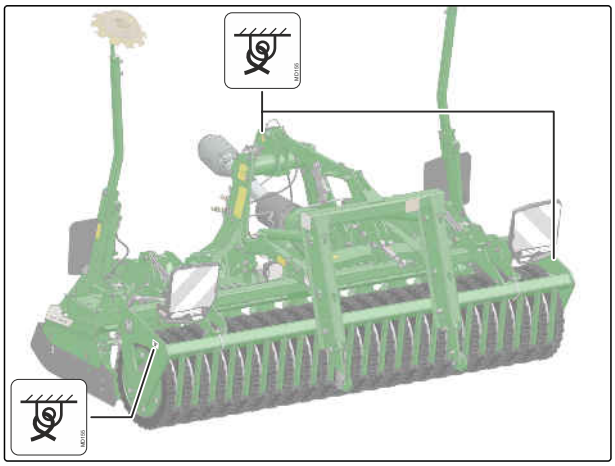
➡ When the roller is mounted, the implement hangs slightly inclined.

2. Slowly lift the machine.

11.2 Lashing the machine

CMS-T-00006657-C.1

The machine has 3 lashing points for the lashing straps.



CMS-I-00004746

WARNING

Risk of accidents due to improperly attached lashing straps

If the lashing straps are not attached at the marked lashing points, the implement can be damaged during lashing and endanger safety.

- ▶ Attach the lashing straps only at the marked lashing points.

1. Put the machine on the transport vehicle.
2. Attach the lashing straps at the marked lashing points.
3. Lash down the machine in compliance with the national regulations for load securing.

Disposing of the implement 12

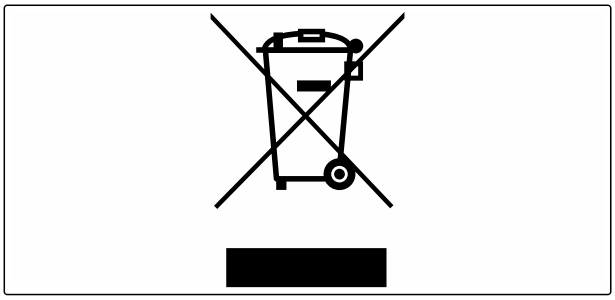
CMS-T-00010906-B.1

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.

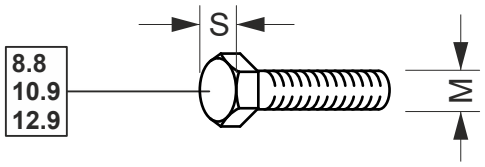
Appendix

13

CMS-T-00004152-D.1

13.1 Bolt tightening torques

CMS-T-00000373-G.1



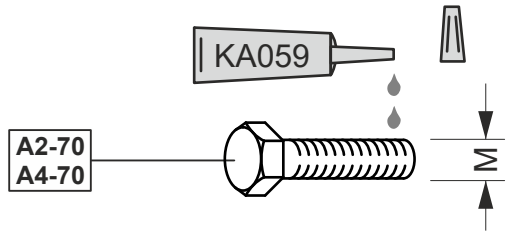
CMS-I-000260

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 (15,17) 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 (21) 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



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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-00004153-A.1

- Tractor operating manual
- Universal joint shaft operating manual

Directories

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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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