



Original operating manual

Mounted precision airplanter

Precea 4500-2

Precea 4500-2CC

Precea 4500-2FCC



SmartLearning



AMAZONE
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About this operating manual

1

CMS-T-00000081-I.1

1.1 Copyright

CMS-T-00012308-A.1

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1.2 Diagrams

CMS-T-005676-F.1

1.2.1 Warnings and signal words

CMS-T-00002415-A.1

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



DANGER

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



WARNING

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



CAUTION

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

1.2.2 Further instructions

CMS-T-00002416-A.1



IMPORTANT

- Indicates a risk for damage to the implement.



ENVIRONMENTAL INFORMATION

- Indicates a risk for environmental damage.



NOTE

Indicates application tips and instructions for optimal use.

1.2.3 Instructions

CMS-T-00000473-D.1

1.2.3.1 Numbered instructions

CMS-T-005217-B.1

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

Example:

1. Instruction 1
2. Instruction 2

1.2.3.2 Instructions and responses

CMS-T-005678-B.1

Reactions to instructions are marked with an arrow.

Example:

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

1.2.3.3 Alternative instructions

CMS-T-00000110-B.1

Alternative instructions are introduced with the word "or".

Example:

1. Instruction 1

or

Alternative instruction

2. Instruction 2

1.2.3.4 Instructions with only one action

CMS-T-005211-C.1

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

Example:

► Instruction

1.2.3.5 Instructions without sequence

CMS-T-005214-C.1

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

Example:

► Instruction

► Instruction

► Instruction

1.2.3.6 Workshop work

CMS-T-00013932-B.1



WORKSHOP WORK

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

1.2.4 Lists

CMS-T-000024-A.1

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

Example:

- Point 1
- Point 2

1.2.5 Item numbers in figures

CMS-T-000023-B.1

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

1.2.6 Direction information

CMS-T-00012309-A.1

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

1.3 Other applicable documents

CMS-T-00000616-B.1

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

1.4 Digital operating manual

CMS-T-00002024-B.1

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

1.5 Your opinion is important

CMS-T-000059-D.1

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

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CMS-I-00000638

Safety and responsibility

2

CMS-T-00007640-C.1

2.1 Basic safety instructions

CMS-T-00007641-C.1

2.1.1 Meaning of the operating manual

CMS-T-00006180-A.1

Observe the operating manual

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

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

2.1.2 Safe operating organisation

CMS-T-00002302-D.1

2.1.2.1 Personnel qualification

CMS-T-00002306-B.1

2.1.2.1.1 Requirements for persons working with the implement

CMS-T-00002310-B.1

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

the implement must meet the following minimum requirements:

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

2.1.2.1.2 Qualification levels

CMS-T-00002311-A.1

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

- Farmer
- Agricultural helper

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

2.1.2.1.3 Farmer

CMS-T-00002312-A.1

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

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

Farmers can be e.g.:

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

Activity example:

- Safety training for agricultural helpers

2.1.2.1.4 Agricultural helpers

CMS-T-00002313-A.1

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

Agricultural helpers can be e.g.:

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

Activity examples:

- Driving the machine
- Adjusting the working depth

2.1.2.2 Workplaces and passengers

CMS-T-00002307-B.1

Passengers

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

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

2.1.2.3 Danger for children

CMS-T-00002308-A.1

Danger for children

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

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

2.1.2.4 Operational safety

CMS-T-00002309-D.1

2.1.2.4.1 Perfect technical condition

CMS-T-00002314-D.1

Only use properly prepared machines

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

- ▶ Prepare the machine according to this operating manual.

Danger due to damage to the machine

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

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

Observe the technical limit values

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

- ▶ Comply with the technical limit values.

2.1.2.4.2 Personal protective equipment

CMS-T-00002316-B.1

Personal protective equipment

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

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

Wear suitable clothing

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

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

2.1.2.4.3 Warning symbols

CMS-T-00002317-B.1

Keep warning symbols legible

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

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

2.1.3 Knowing and preventing dangers

CMS-T-00007642-B.1

2.1.3.1 Safety hazards on the implement

CMS-T-00002318-F.1

Liquids under pressure

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

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

Risk of injury on the universal joint shaft

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

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

Risk of injury on the PTO shaft

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

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

Danger due to machine parts still running

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

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

2.1.3.2 Danger areas

CMS-T-00007643-A.1

Dangers areas on the implement

The following basic dangers are encountered in the danger areas:

The implement and its work tools move during operation.

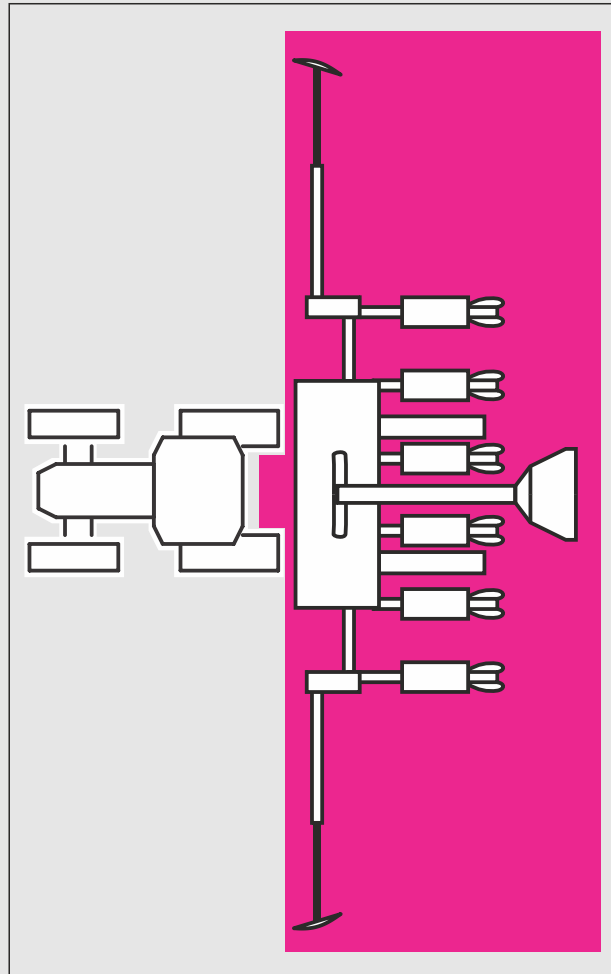
Hydraulically raised implement parts can descend unnoticed and slowly.

The tractor and implement can roll away unintentionally.

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

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

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



CMS-I-00005448

2.1.4 Safe operation and handling of the machine

CMS-T-00002304-I.1

2.1.4.1 Coupling implements

CMS-T-00002320-D.1

Coupling the implement on the tractor

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

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

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

2.1.4.2 Driving safety

CMS-T-00002321-E.1

Risk when driving on roads and fields

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

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

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

- ▶ Lock the tractor lower links for road travel.

Preparing the machine for road travel

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

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

Parking the implement

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

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

Unsupervised parking

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

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

2.1.5 Safe maintenance and modification

CMS-T-00002305-H.1

2.1.5.1 Changes on the implement

CMS-T-00002322-B.1

Only authorised design changes

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

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

2.1.5.2 Work on the machine

CMS-T-00002323-G.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.

- ▶ Before performing any work on the machine, shutdown and secure the machine.
- ▶ *To immobilise the machine,*
perform the following tasks.
- ▶ If necessary, secure the machine against rolling away with wheel chocks.
- ▶ Lower lifted loads down to the ground.
- ▶ Relieve the pressure in the hydraulic hose lines.
- ▶ *If you have to work on or under raised loads,*
lower the loads or secure raised machine parts 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.
- ▶ Remove the key from the battery circuit breaker.
- ▶ Wait until all parts that are still running come to a stop and that hot parts cool down.

Maintenance work

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

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

Raised implement parts

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

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

Danger due to welding work

Improper welding work, particularly on or close to safety-related components, endangers the operational safety of the implement. This can result in accidents and serious personal injury or even death. Safety-related components include, for example, hydraulic components and electronic components, frames, springs, coupling devices to the tractor such as the 3-point mounting frame, drawbar, trailer support, trailer coupling or tensioned crosspiece as well as axles and axle suspensions, lines and tanks containing flammable substances.

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

2.1.5.3 Operating materials

CMS-T-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.

2.1.5.4 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-C.1

Securing the tractor and implement

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

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

Securing the machine

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

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

Make sure that the protective equipment is functional

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

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

Climbing on and off

Negligent behaviour while climbing on and off can cause people to fall off the ladder. People who climb onto the machine without using the intended access steps can slip, fall, and suffer severe injury.

- ▶ Use only the intended access steps
- ▶ *Dirt as well operating materials can impede walking safety and stability.*
Always keep steps and platforms clean and in proper condition, so that safe stepping and standing is ensured.
- ▶ Never climb onto the machine when it is in motion.
- ▶ Climb up and down facing the machine.
- ▶ When climbing up and down, maintain 3-point contact with the access steps and handrails: always keep two hands and one foot or two feet and one hand on the machine.
- ▶ When climbing up and down, never hold onto the control elements. Accidental actuation of control elements can unintentionally activate potentially dangerous functions.
- ▶ When climbing down, never jump off of the machine.

Intended use

3

CMS-T-00002353-A.1

- The implement is designed solely for professional use for the precise spreading of seed according to Good Agricultural Practices.
- The implement is suitable and intended for the precise spreading of various seeds. The seed is singled and deposited in the soil at the desired depth and spacing.
- The implement is an agricultural implement to be mounted on the 3-point power lift of a tractor that meets the technical requirements.
- 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.

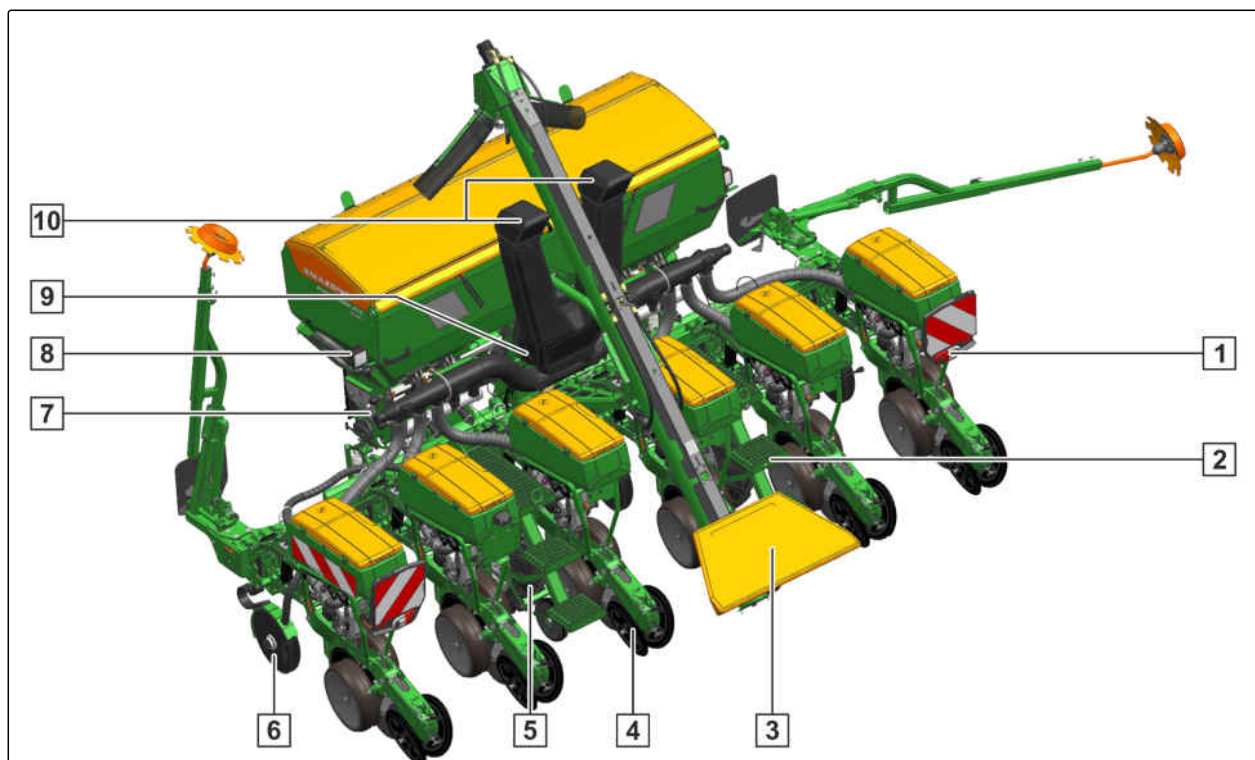
Product description

4

CMS-T-00001757-I.1

4.1 Implement overview

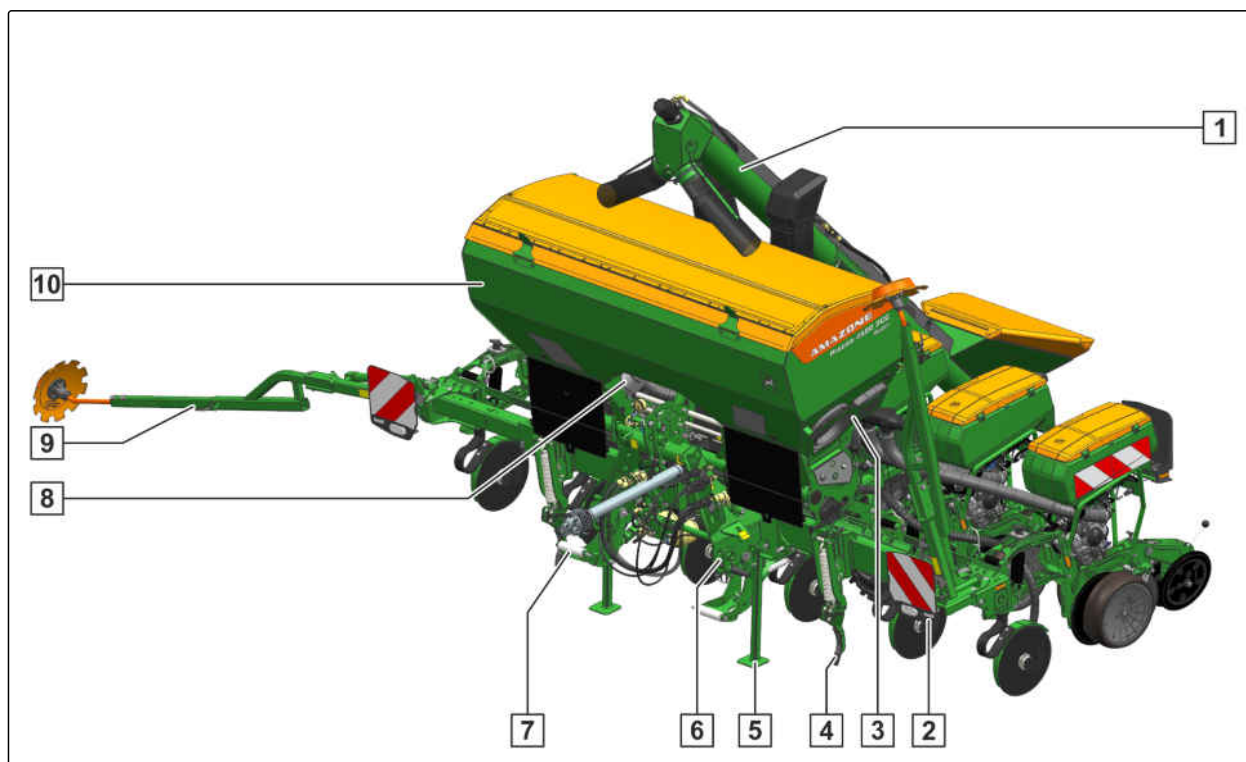
CMS-T-00001763-D.1



CMS-I-00001992

Implement with rear hopper

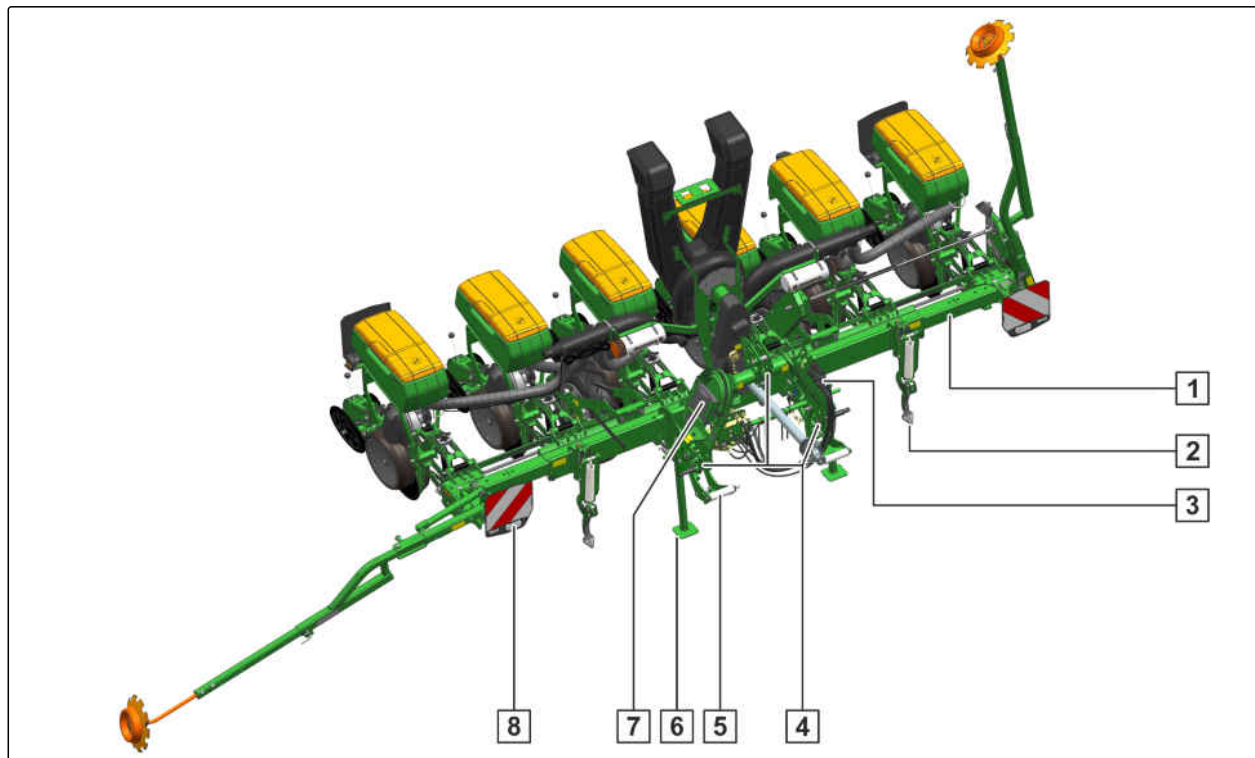
- | | |
|--|---|
| 1 Lighting and identification for road travel | 2 Loading board |
| 3 Filling auger | 4 Seeding unit |
| 5 Running gear | 6 Fertiliser coulter |
| 7 SmartCenter | 8 Shelf compartment for the collapsible bucket and scale |
| 9 Compressed air fan | 10 Suction baskets |



CMS-I-00002088

Implement with rear hopper

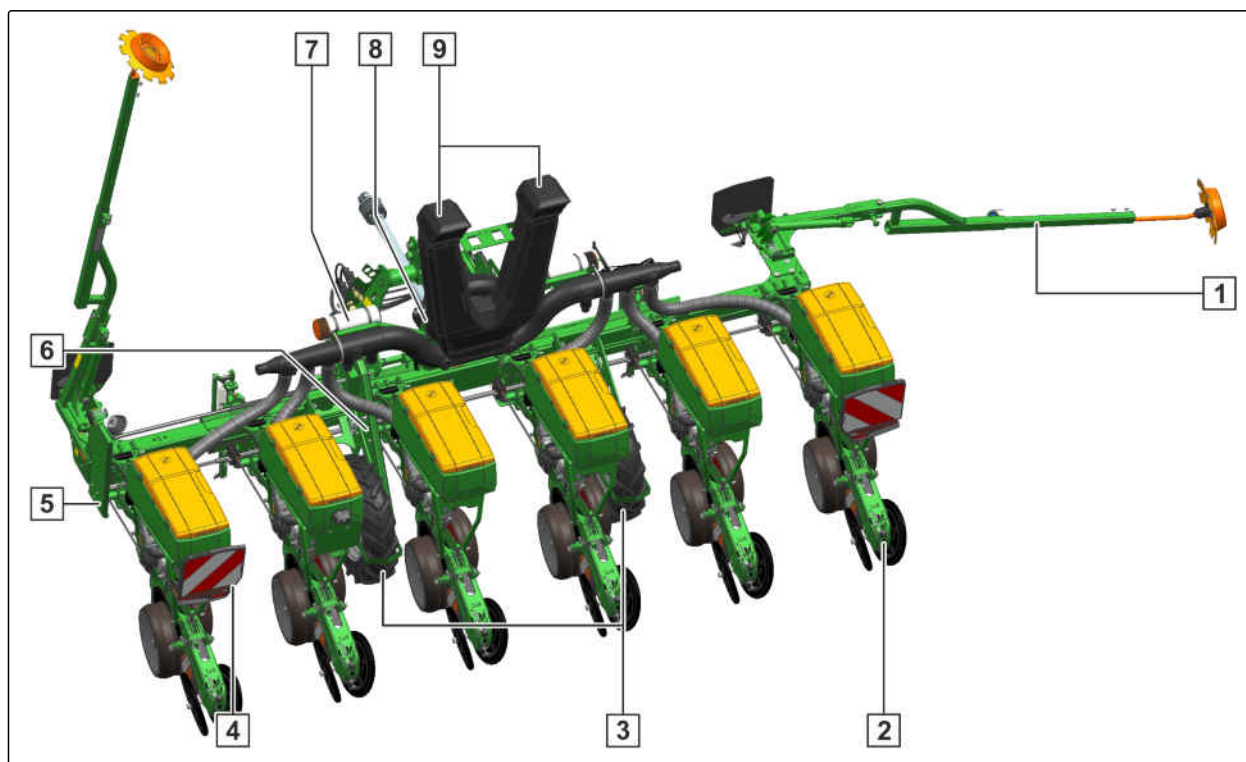
- | | |
|---|--|
| 1 Fertiliser filling auger | 2 Lighting and identification for road travel |
| 3 Shelf compartment for the collapsible bucket and scale | 4 Wheel mark eradicator |
| 5 Parking supports | 6 3-point mounting frame |
| 7 Frame ballasting | 8 Container for implement documents and other tools |
| 9 Track marker | 10 Fertiliser hopper |



CMS-I-00003903

Implement without fertiliser equipment

- | | |
|---|--|
| 1 Frame profile | 2 Wheel mark eradicator |
| 3 Hose cabinet | 4 3-point mounting frame |
| 5 Frame ballasting | 6 Parking supports |
| 7 Shelf compartment for the collapsible bucket and scale | 8 Lighting and identification for road travel |



CMS-I-00003902

Implement without fertiliser equipment

- | | |
|---|--|
| 1 Track marker | 2 Seeding unit |
| 3 Running gear | 4 Lighting and identification for road travel |
| 5 Interchangeable wheel gear | 6 Wheel drive |
| 7 Hopper for implement documents | 8 Compressed air fan |
| 9 Suction baskets | |

4.2 Function of the implement

CMS-T-00005719-B.1

The basic version of the implement consists of a frame with its own running gear, a compressed air fan, and seeding units. On each row, there is a seeding unit consisting of a seeding coulter with a grain singling unit and seed hopper. The compressed air fan produces the overpressure for the grain singling.

Depending on the requirements, the implement can be fitted with special equipment. Alternatively, the fertiliser can also be carried in a front-mounted hopper. A hose package connects the front-mounted hopper to the rear-mounted implement.

4.3 Special equipment

CMS-T-00002252-E.1

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

- Clod/star clearer
- Wheel mark eradicator
- Disc closer
- Star closer
- Rigid cutting disc
- Mono press roller
- Integrated fertiliser system
- FertiSpot
- Filling auger
- Track marker
- Electronic monitoring and operation
- Frame ballasting
- Light
- Micropellet spreader
- Multi-placement tester
- Running gear in front of or between the seed rows
- Hydraulic shifted tramline
- Hydraulic coulter pressure system
- Contact force regulation
- Calibration kit

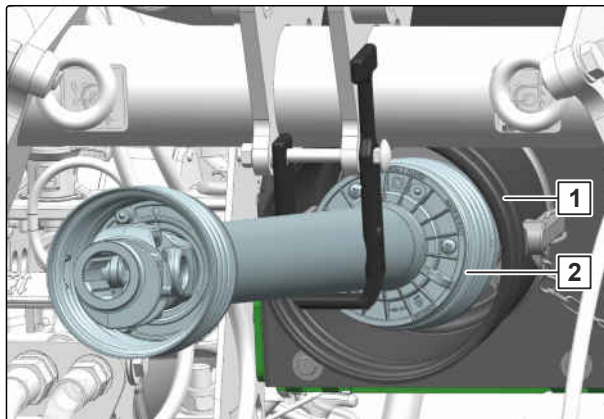
4.4 Protective equipment

CMS-T-00001764-B.1

4.4.1 Universal joint shaft guard

CMS-T-00002011-A.1

- 1 Universal joint shaft guard cone
- 2 Universal joint shaft guard



CMS-I-00001936

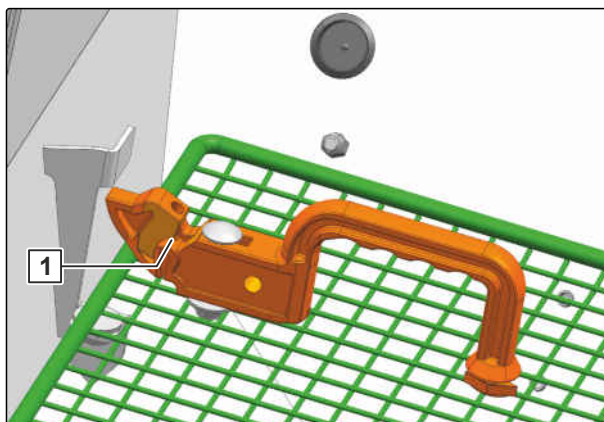
4.4.2 Fertiliser metering drive

CMS-T-00002012-A.1

4.4.2.1 Guard screen locking mechanism

CMS-T-00002016-A.1

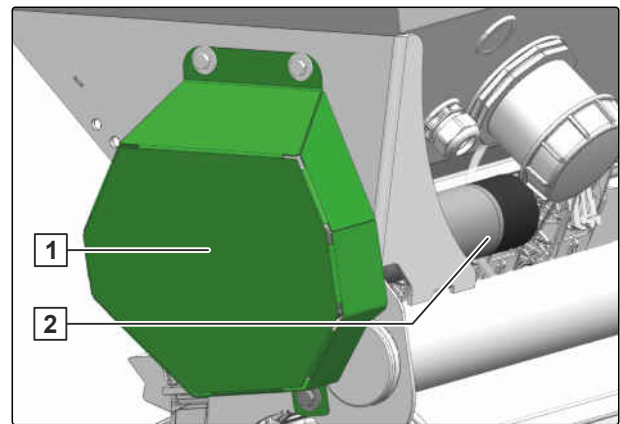
To protect against injuries, the guard screens are equipped with locking mechanisms 1.



CMS-I-00001937

4.4.2.2 Electric metering drive

- 1 Drive guard
- 2 Electric metering drive

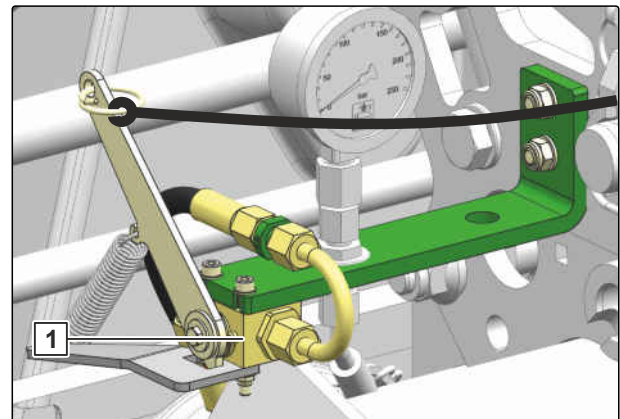


CMS-T-00002014-A.1

CMS-I-00001938

4.4.3 Transport lock

The transport lock 1 prevents the hydraulic telescopic frame parts from extending unintentionally.



CMS-T-00002015-A.1

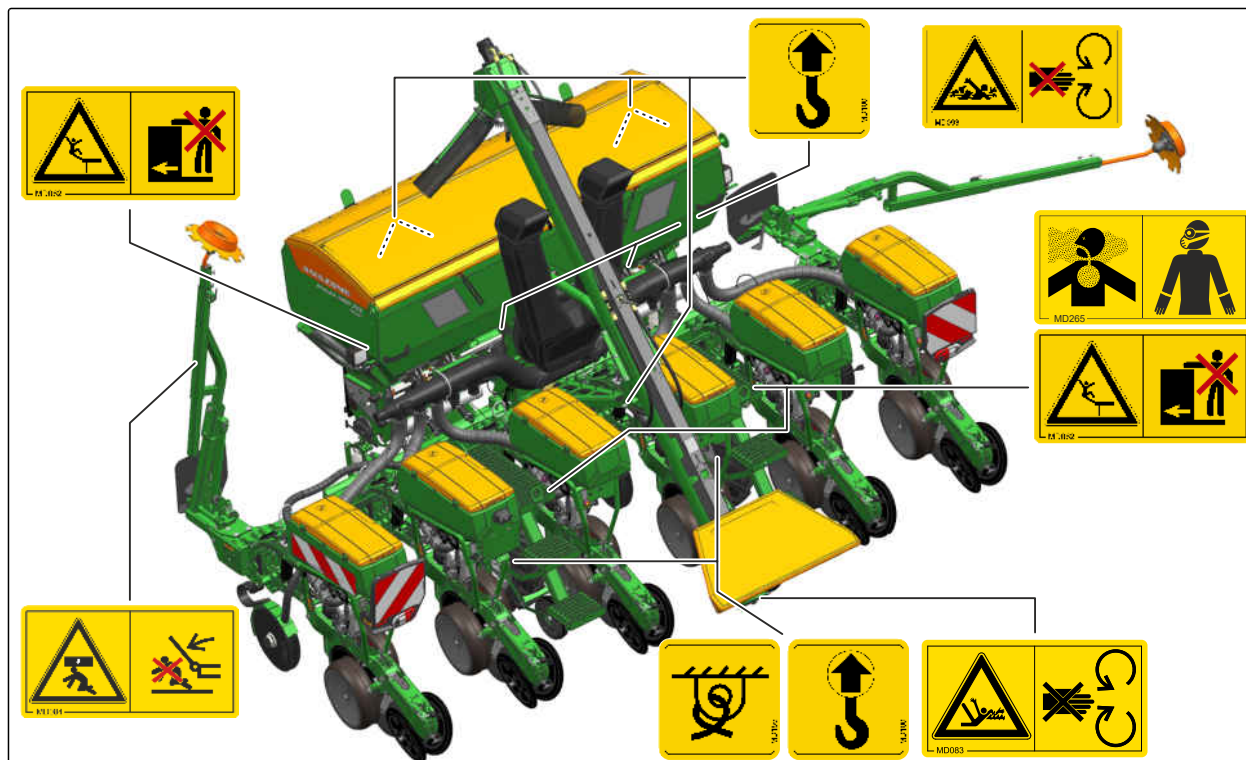
CMS-I-00001939

4.5 Warning symbols

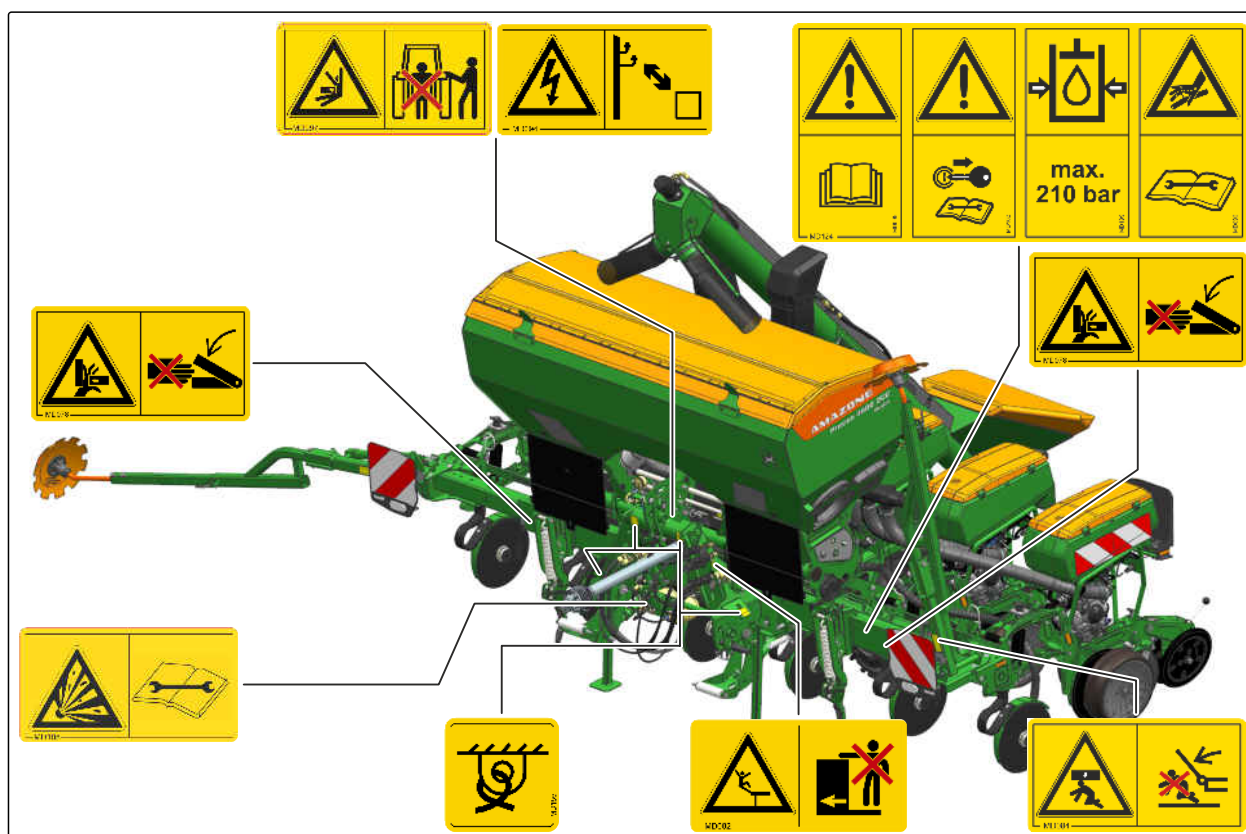
CMS-T-00001765-F.1

4.5.1 Position of the warning symbols

CMS-T-00001766-D.1



CMS-I-00002031



CMS-I-00002255

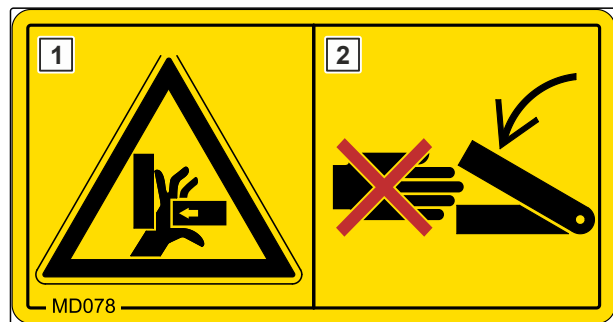


4.5.2 Layout of the warning symbols

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

A warning symbol consists of two fields:

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



4.5.3 Description of the warning symbols

MD 076

Risk of being drawn in or caught

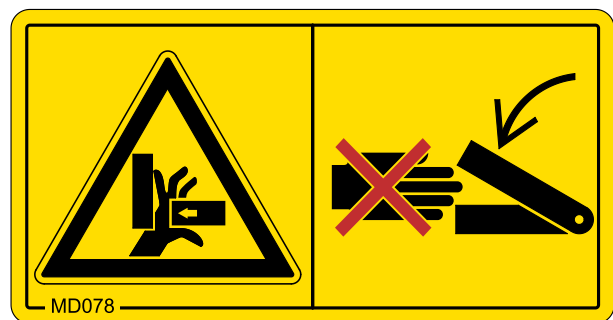
- *As long as engine of the tractor or machine is running,*
stay away from the danger area.
- *As long as engine of the tractor or machine is running,*
do not remove any protective equipment.
- Make sure that there is nobody standing in the danger area.



MD 078

Risk of crushing fingers or hands

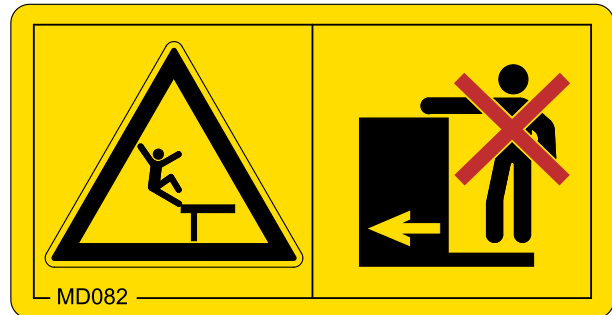
- *As long as the tractor engine or implement motor is running,*
stay away from the danger area.
- *If you have to move marked parts with your hands,*
pay attention to the crushing areas.
- Make sure that there is nobody standing in the danger area.



MD 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.

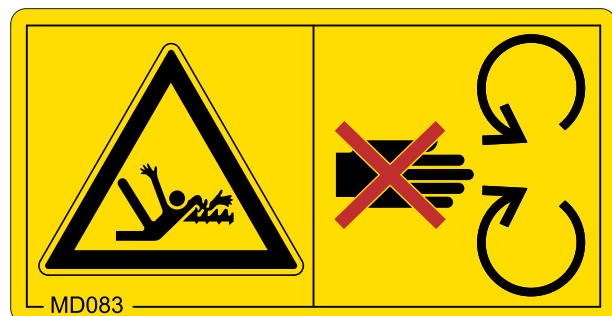


CMS-I-000081

MD 083

Risk due to being drawn in and caught

- ▶ Ensure that the energy supply to the implement is interrupted before you remove the protective devices.
- ▶ 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-00003694

MD 093

Risk due to being drawn in and caught

- ▶ Ensure that the energy supply to the implement is interrupted before you remove the protective devices.
- ▶ 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-00000426

MD 084

Risk of crushing for the whole body from lowering implement parts

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

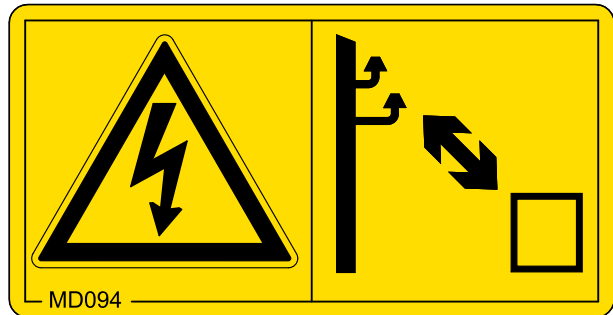


CMS-I-000454

MD094

Danger due to transmission lines

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



CMS-I-000692

MD095

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

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



CMS-I-000138

MD 096

Risk of infection from escaping hydraulic fluid under high pressure

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

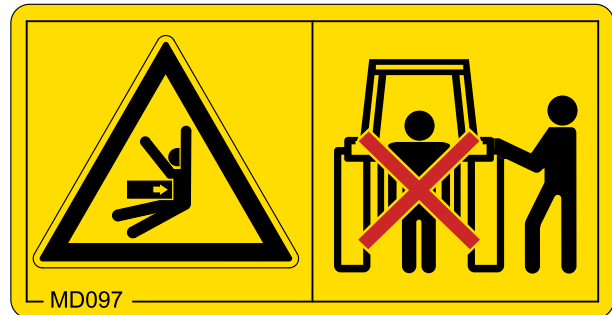


CMS-I-000216

MD 097

Risk of crushing between the tractor and the implement

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

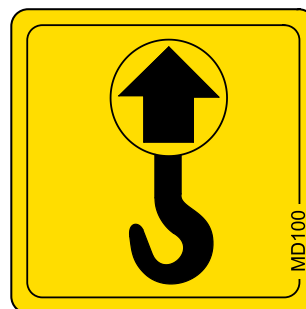


CMS-I-000139

MD 100

Risk of accidents due to improperly attached lifting gear

- ▶ Only attach the lifting gear at the marked positions.



CMS-I-000089

MD 102

Risk due to unintentional starting and rolling away of the machine

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

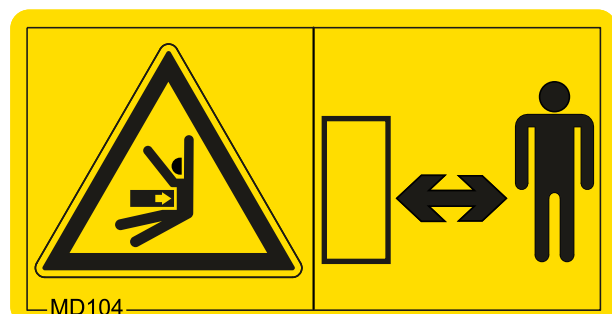


CMS-I-00002253

MD104

Risk of crushing due to swivelling parts of the implement

- ▶ As long as the tractor engine is running, maintain an adequate safety distance from swivelling implement parts.
- ▶ Make sure that there is nobody standing close to swivelling parts.



CMS-I-00003312

MD 108

Severe injuries due to incorrect handling of the hydraulic accumulator when it is under pressure

- Have the pressurised hydraulic accumulator checked and repaired only by a qualified specialist workshop.



CMS-I-00004027

MD 118

Risk of implement damage due to excessively high drive speeds and incorrect direction of rotation of the drive shaft

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

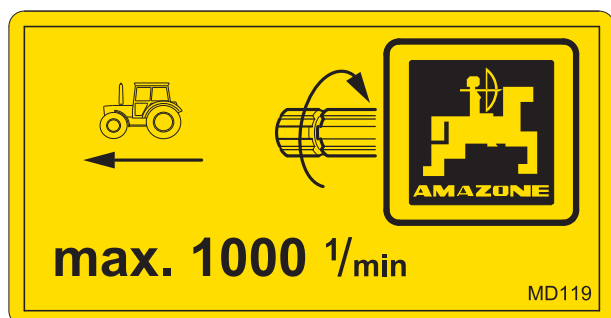


CMS-I-00000433

MD119

Risk of implement damage due to excessively high drive speeds and incorrect direction of rotation of the drive shaft

- Comply with the maximum drive speed and direction of rotation of the drive shaft on the implement side, as shown on the pictogram.



CMS-I-00003656

MD 121

Risk of implement damage due to excessively high drive speeds and incorrect direction of rotation of the drive shaft

- Comply with the maximum drive speed and direction of rotation of the drive shaft on the implement side, as shown on the pictogram.

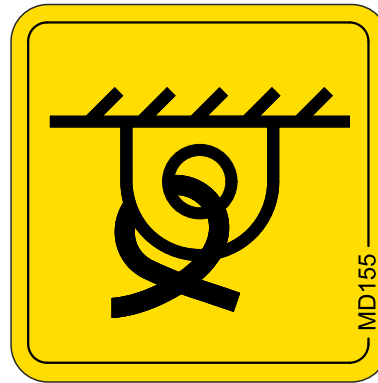


CMS-I-00000434

MD 155

Risk of accident and machine damage during transport due to improperly secured machine

- ▶ 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.

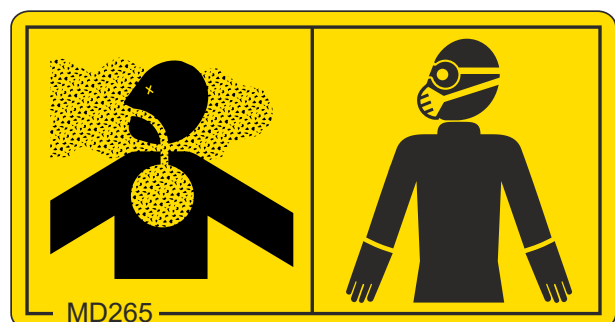


CMS-I-00000486

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 Rating plate on the implement

CMS-T-00004505-G.1

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



CMS-I-00004294

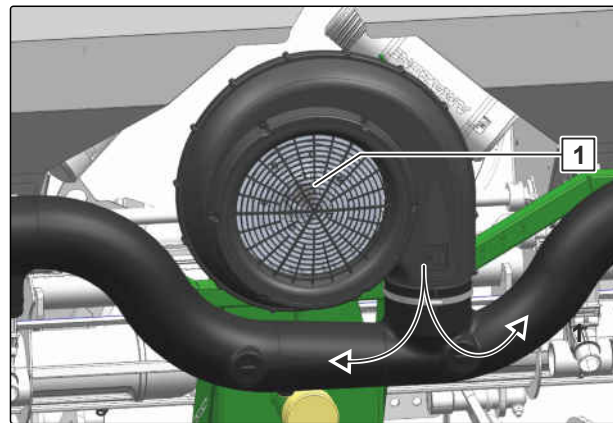
4.7 Compressed air fan

CMS-T-00001782-B.1

NOTE

When the fan is operated with the tractor PTO shaft, excess grease can emerge from the drive bearings during the initial operating hours. A light film of oil is formed after the initial warm-up. After that, grease or oil may no longer emerge.

The compressed air fan **1** produces overpressure, which causes the seed grains to adhere to the singling discs. Depending on the equipment, the fan is driven by the tractor PTO shaft or a hydraulic motor. The overpressure is set through the fan speed. Depending on the implement equipment, the overpressure is displayed by a pressure gauge or the control terminal.

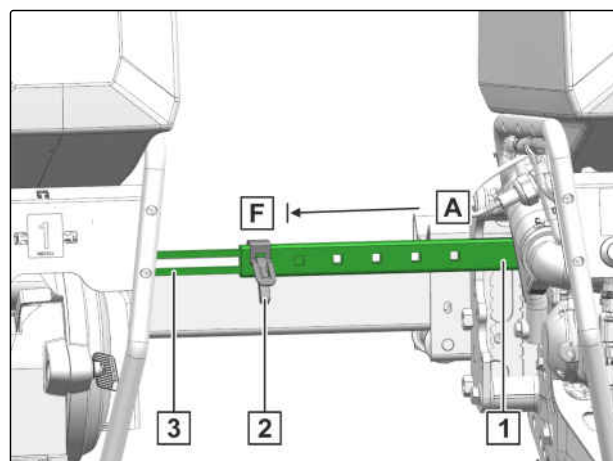


CMS-I-00001943

4.8 Variable telescoping

CMS-T-00003716-A.1

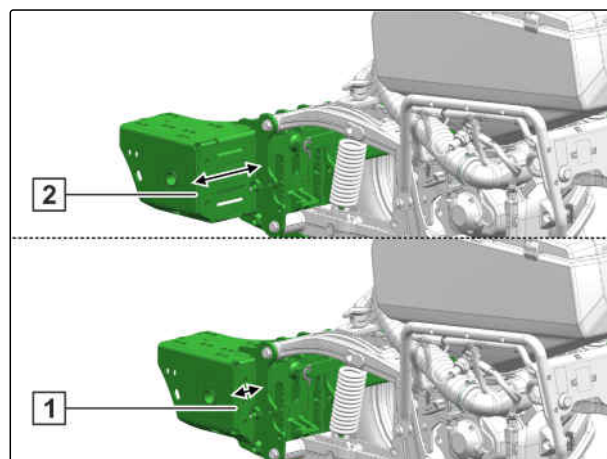
The individual seeding coulters are connected with braces **1** and **3**. The row spacing is adjusted with the linch pin **2**. For the smallest row spacing, the implement is fully telescoped in. Positions **A** to **F** increase the row spacing in steps of 5 cm.



CMS-I-00002709

Implements with the section **1** can be telescoped in steps from 50 - 80 cm.

Implements with the section **2** can be telescoped in steps from 45 - 75 cm.



CMS-I-00002710

4.9 Grain singling unit

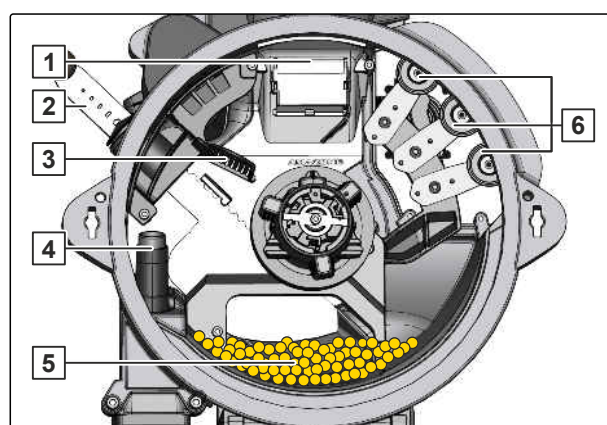
CMS-T-00001990-G.1

4.9.1 Layout and function of the grain singling unit

CMS-T-00001773-E.1

The grain singling unit singles the seed with air overpressure. The spread rate determines the required grain spacing. The type of singling disc and the singling disc speed determine the spread rate. Depending on the implement equipment, the speed of the singling discs is set in the mechanical setting gearbox or on the control terminal. Each grain singling unit has its own seed hopper. The seed flows through the inlet opening in the grain singling unit.

- 1** Seed hopper inlet
- 2** Sliding shutter
- 3** Air guiding element
- 4** Opto-sensor
- 5** Supply area
- 6** Scraper

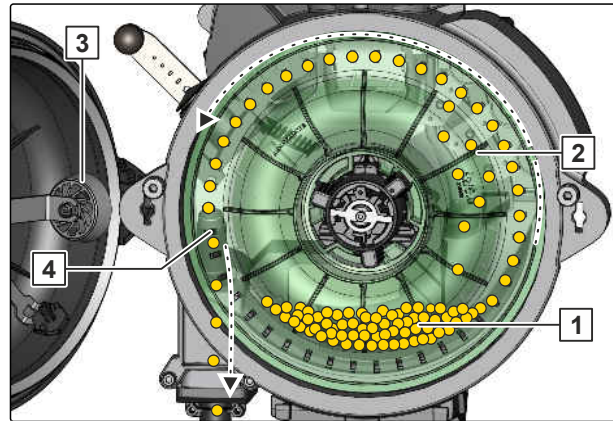


CMS-I-00002295

4 | Product description

PreTeC mulch seeding coulters

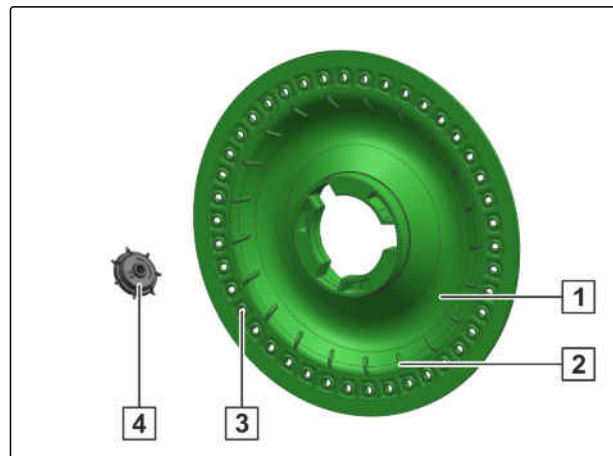
The compressed air fan produces the overpressure in the grain singling unit. The grains from the supply area **1** adhere to the holes of the singling disc due to the overpressure. The rotating singling disc guides the singled seed past the scrapers. The scrapers remove excess seed grains **2**. The excess seed grains fall back into the supply area. On the opto-sensor, the holes of the singling disc are closed by the hole covering roller **3**. The seed is transferred to the feed channel by the air current at the opto-sensor **4**. The opto-sensor monitors the grain singling unit.



CMS-I-00001946

4.9.2 Singling disc

The singling discs **1** are exchangeable and can be adjusted for the operating conditions as well as the seed characteristics. The blades **2** stir the seed. The marking on the singling discs provides information on the number of holes **3** and the hole diameter of the singling disc. The ejection wheel **4** releases jammed seed and ensures that the singling discs are clean.



CMS-I-00001947

4.10 PreTeC mulch seeding coulters

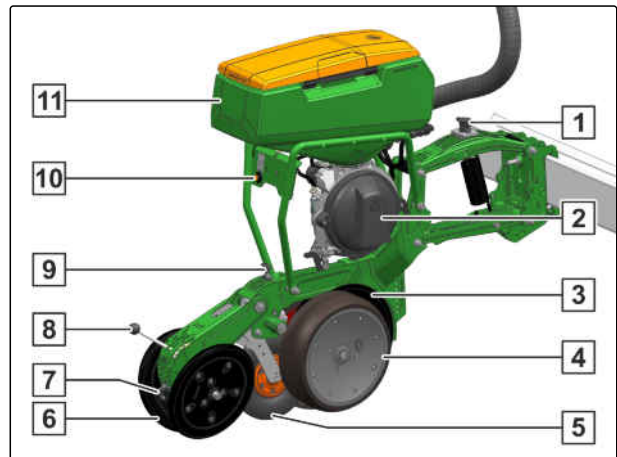
CMS-T-00005814-E.1

4.10.1 Seeding unit

CMS-T-00001771-F.1

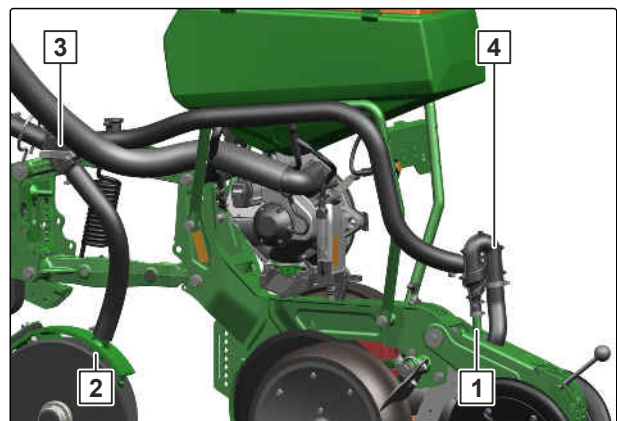
The seeding unit is used on ploughed or mulched soils. The seeding unit includes the grain singling unit, the seed hopper and the seeding coulters. The seed placement depth and the seeding coulters pressure can be adjusted. The seeding coulters are guided over the soil with the depth control wheel. The cutting discs clear plant residues out of the seed furrow area. Together with the furrow former, the cutting discs shape the seed furrow. The singled seed grains are caught by the catch roller and pressed into the bottom of the furrow for good soil contact. Depending on the implement equipment, the seed furrow will either be closed by a press roller or the V press rollers.

- 1** Coulter pressure adjustment, mechanical or hydraulic
- 2** Grain singling unit
- 3** Cutting discs
- 4** Depth control wheels
- 5** Catch roller
- 6** V press rollers
- 7** V press roller pitch adjustment
- 8** V press roller pressure adjustment
- 9** Seed placement depth adjustment
- 10** Calibration button
- 11** Seed hopper



CMS-I-00002089

Depending on implement equipment, the fertiliser application point can be changed over with a switch **3**. The fertiliser can therefore be applied in the fertiliser furrow **2** or in the seed belt **1**. The exhaust air **4** is discharged near the ground.

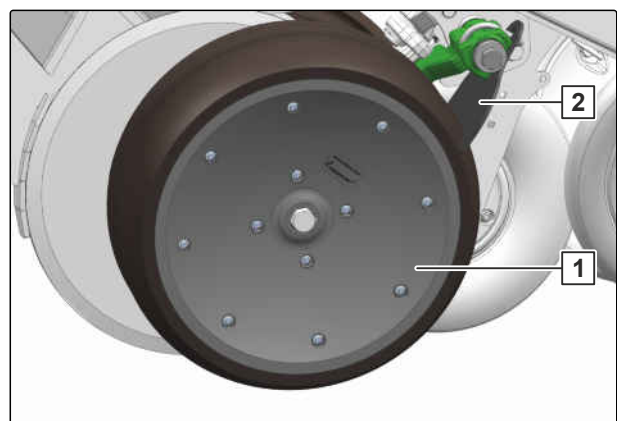


CMS-I-00007255

4.10.2 Depth control wheels

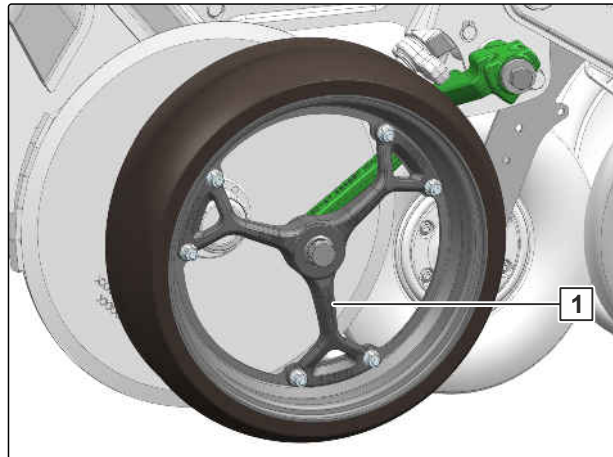
The depth control wheels guide the seeding coulters over the soil.

Depth control wheels with closed rim **1** have advantages with high amounts of organic residues. The scrapers **2** prevent soil from sticking and ensure that the seeding coulters run smoothly.



CMS-I-00001954

Depth control wheels with open rim **1** have advantages on very heavy soils.

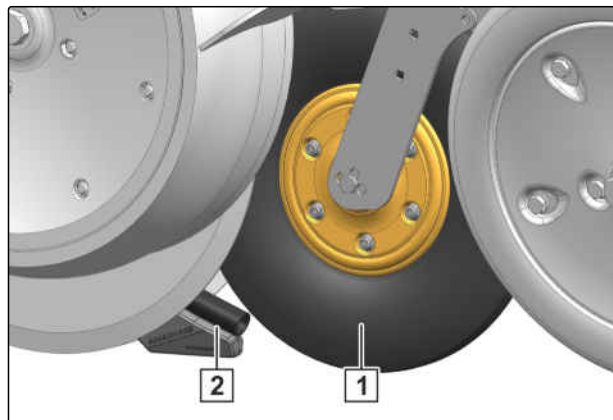


CMS-I-00005367

4.10.3 Furrow former and catch roller

Together with the catch roller **1**, the furrow former **2** represents a central functional unit in the coulter. The furrow former shapes the seed furrow. The shot channel guides the seed grain into the seed furrow. For better soil contact, the catch roller presses the seed grain into the bottom of the furrow.

The furrow former and the catch roller must be adapted to the operating conditions.



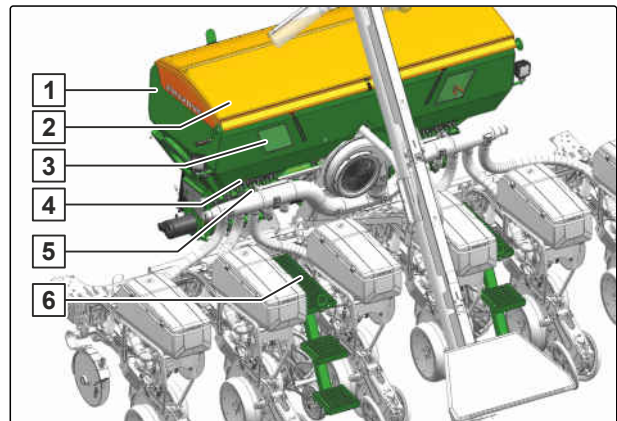
CMS-I-00001955

4.11 Fertiliser hopper

Depending on the implement or configuration, the fertiliser hopper contains 950 or 1250 litres. The fertiliser metering unit is operated with a mechanical ground wheel drive or an electric drive. The fertiliser hopper has large inspection windows at the front and rear to check the fill level. The rear fertiliser hopper can be safely reached via the loading board.

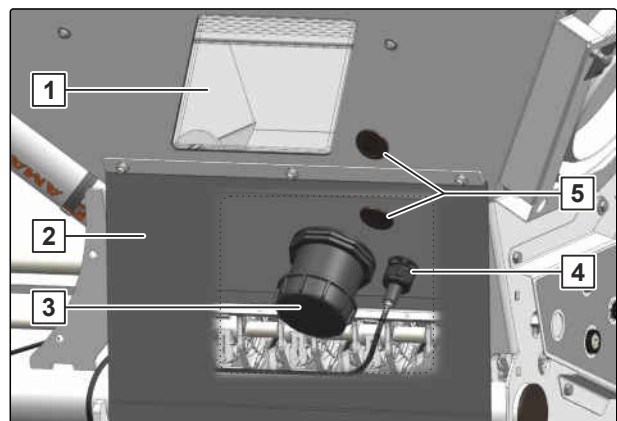
CMS-T-00001985-C.1

- 1** Fertiliser hopper
- 2** Cover tarpaulin
- 3** Inspection window
- 4** Unlocking tool
- 5** Fertiliser metering unit
- 6** Loading board



CMS-I-00002257

- 1** Inspection window
- 2** Spray protection
- 3** Residual quantity removal
- 4** Low level sensor
- 5** Mounting positions for the low level sensor



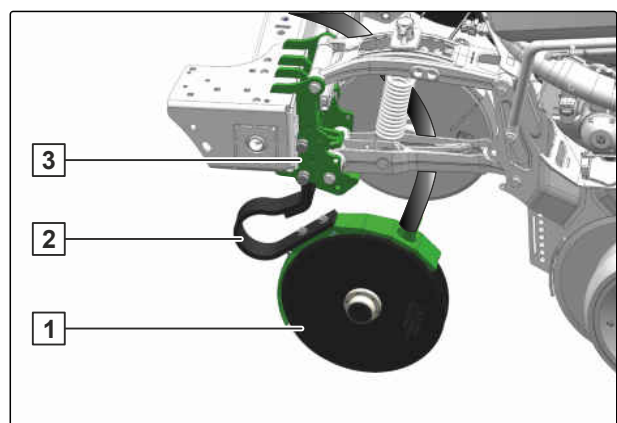
CMS-I-00001966

4.12 FerTeC Twin coulters

CMS-T-00005566-C.1

The FerTeC Twin coulters are used on ploughed soils or for mulch seeding. The fertiliser placement depth is adjustable. The distance from the seeding coulters is determined by the coulters mount. The distance is of 60 mm.

- 1** Cutting discs
- 2** Fertiliser coulters compression spring
- 3** Coulters mount



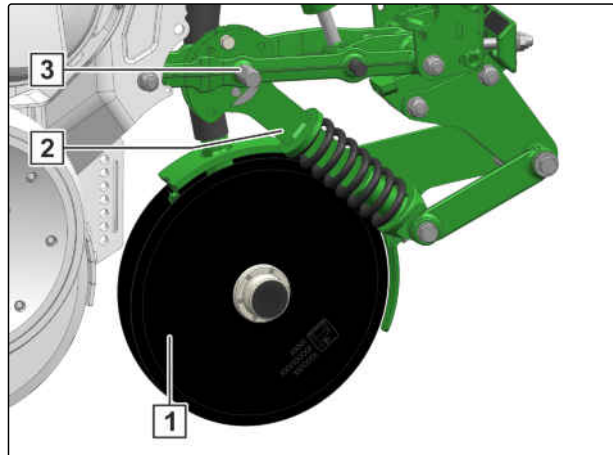
CMS-I-00001963

4 | Product description

FertiSpot

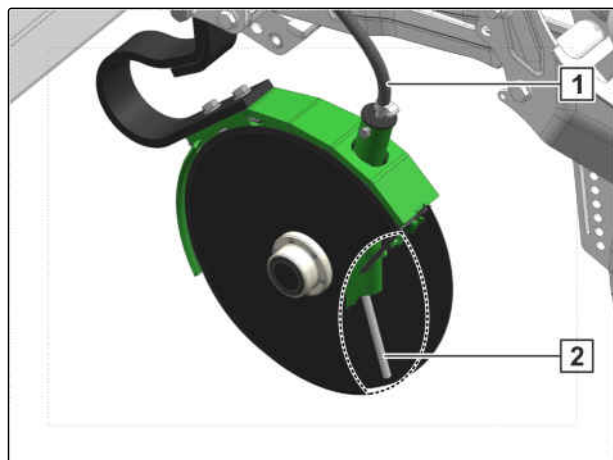
The coupled fertiliser coulters are guided via the PreTeC mulch seeding coulters. The placement depth is adjusted with an eccentric.

- 1 Cutting discs
- 2 Coupling rod, spring-suspended
- 3 Adjustment device



CMS-I-00003934

- 1 Liquid fertiliser connection
- 2 Liquid fertiliser outlet



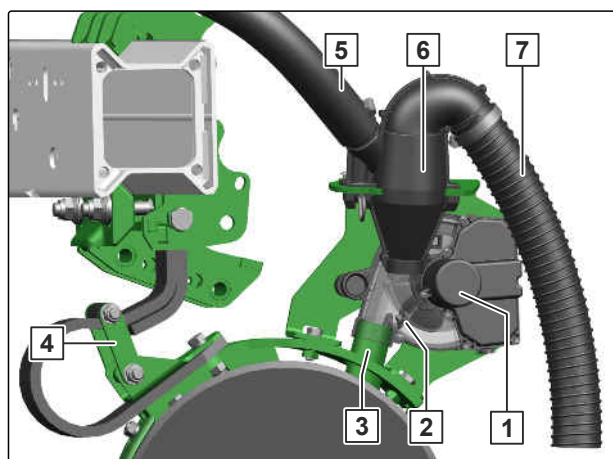
CMS-I-00002728

4.13 FertiSpot

CMS-T-00014355-A.1

The FertiSpot metering unit enables spot application of pre-metered fertiliser. The pre-metered fertiliser is conveyed via the hose (5) into the air separator (6). In FertiSpot mode, the fertiliser portion is applied at the same time as the seed. In MultiSpot mode, a maximum number of fertiliser portions can be applied.

The exhaust air is discharged close to the ground via the hose (7). The fertiliser is collected in the metering unit housing (1) and is conveyed in portions into the FerTeC coulters (3) by means of the rotor (2). The leaf spring is pre-tensioned with the spring tensioner (4) to reduce vibrations of the FertiSpot metering unit.



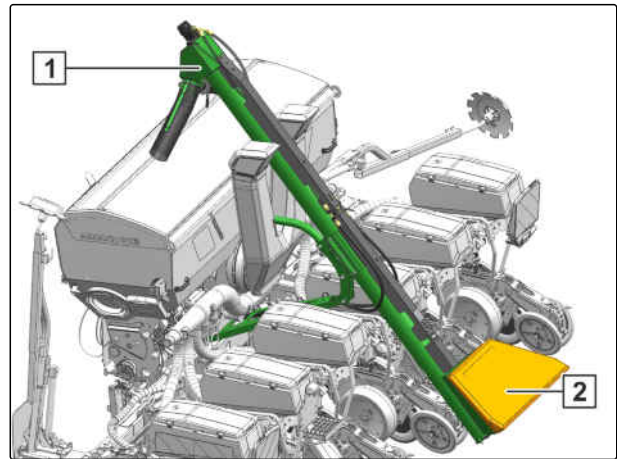
CMS-I-00009102

4.14 Filling auger

CMS-T-00001986-B.1

The filling auger facilitates the filling procedure for the fertiliser hopper. The filling auger is driven by the tractor's hydraulic system.

- 1 Filling auger
- 2 Filling funnel



CMS-I-00001964

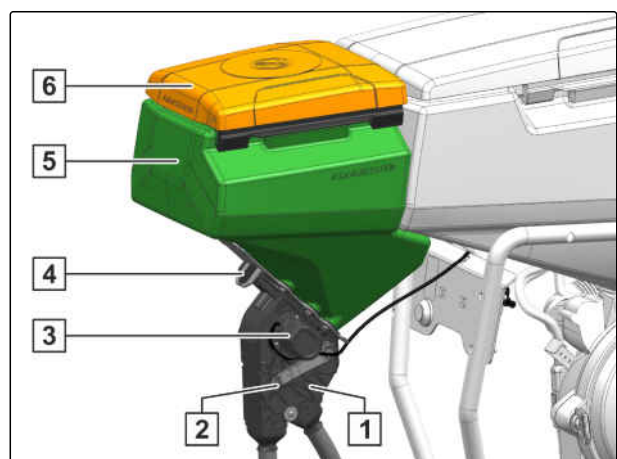
4.15 Micropellet spreader

CMS-T-00003594-C.1

Depending on the application, the micropellet spreader is used to spread insecticides, slug pellets or micro-fertilisers. Depending on the active substance, the spreading material is applied in the seed furrow, in the closing seed furrow or on the closed seed furrow.

Micropellet spreader

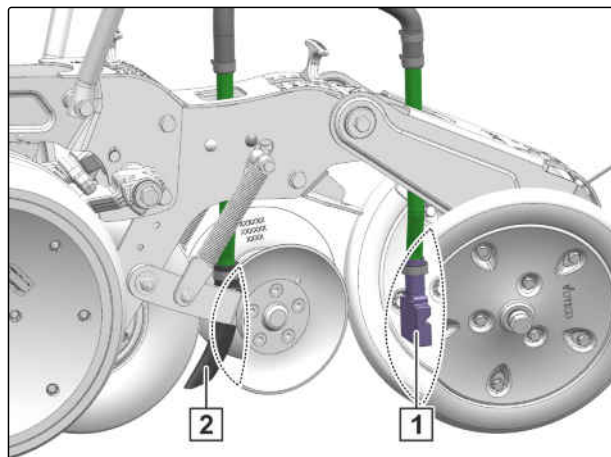
- 1 Micropellet metering unit
- 2 Bottom flap
- 3 Drive
- 4 Sliding shutter
- 5 Micropellet hopper
- 6 Hopper cover



CMS-I-00002590

PreTeC coulter with closer

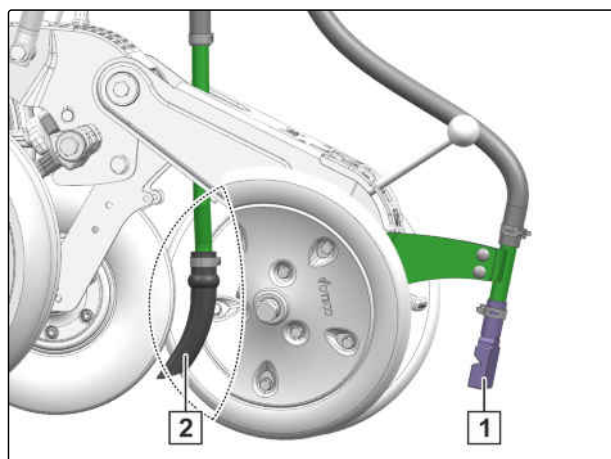
- 1** Application in the closing seed furrow, for slug pellet applications.
- 2** Application in the seed furrow, for insecticide and micro-fertiliser applications.



CMS-I-00003850

PreTeC coulter without closer

- 1** Application on the soil surface, for slug pellet or herbicide applications.
- 2** Application in the seed furrow, for insecticide and micro-fertiliser applications.



CMS-I-00003849

4.16 Lighting

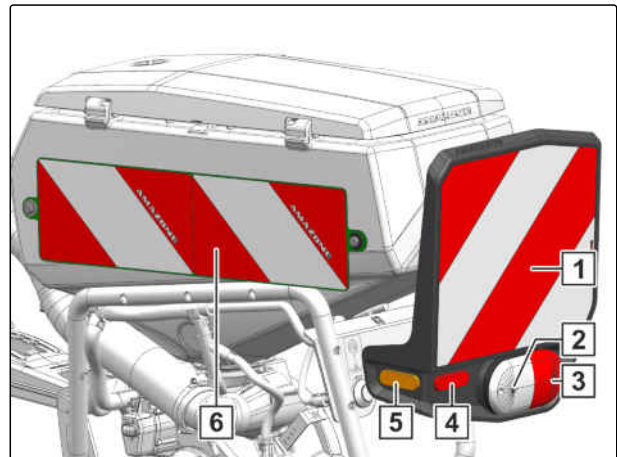
CMS-T-00001988-D.1

4.16.1 Lighting and identification for road travel

CMS-T-00001768-B.1

Lighting to the rear

- 1 Warning signs
- 2 Turn indicators
- 3 Rear lights and brake lights
- 3 Red reflectors
- 5 Yellow reflector
- 6 Lateral warning signs



CMS-I-00001977

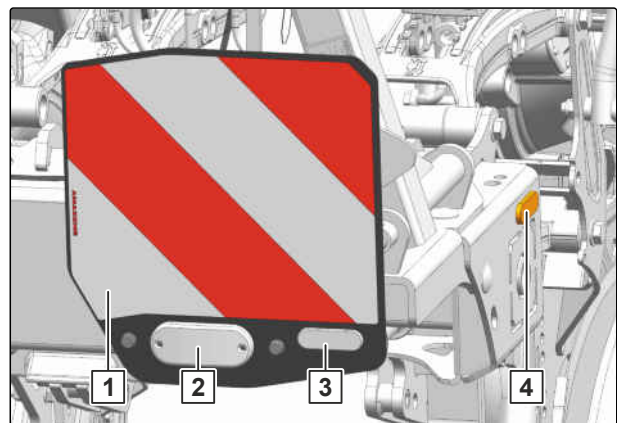


NOTE

Depending on the national regulations.

Lighting to the front

- 1 Warning signs
- 2 Side marker lights
- 3 White reflector
- 4 Yellow reflector



CMS-I-00001979

4.16.2 Work lights

CMS-T-00001779-E.1

The work lights are used to improve the illumination of the work area.

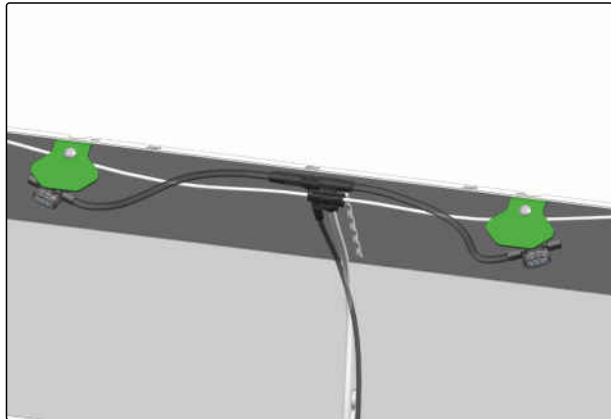


CMS-I-00002218

4.16.3 Hopper interior lighting

CMS-T-00001987-B.1

The hopper interior lighting serves for better viewing inside the hopper and makes it easier to check the fill level. The hopper interior lighting is switched on via the lighting for road travel.



CMS-I-00002219

4.17 Electronic monitoring

CMS-T-00001777-D.1

4.17.1 Radar sensor

CMS-T-00001778-C.1

On electric drives, the radar sensor records the working speed. The working speed is used to determine the worked area and the required speed for the metering drives.



CMS-I-00002221

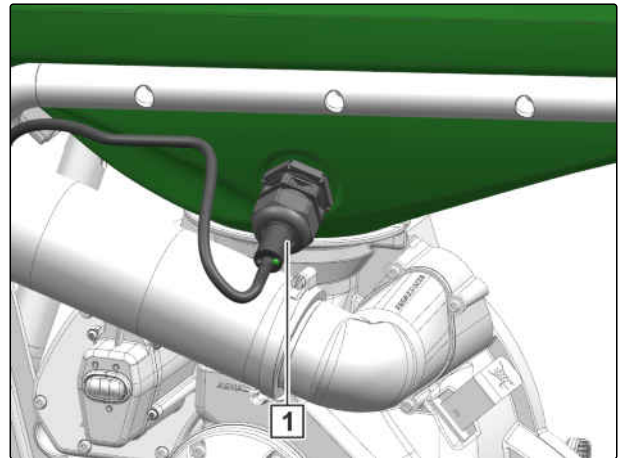
4.17.2 Low level sensors

CMS-T-00001979-B.1

4.17.2.1 Seed

CMS-T-00001981-B.1

The low level sensor **1** triggers an alarm as soon as the low level sensor is no longer covered with seed.

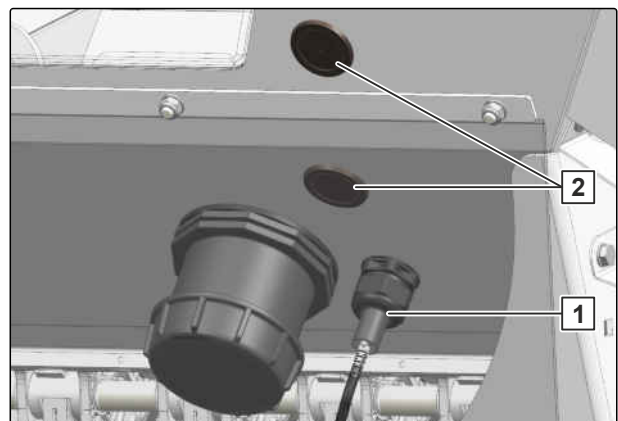


CMS-I-00001986

4.17.2.2 Fertiliser

CMS-T-00001983-A.1

The low level sensor **1** triggers an alarm as soon as the low level sensor is no longer covered with fertiliser. The low level sensor can be installed at different positions **2**. As a result, the triggering point can be adapted to the spread rate.



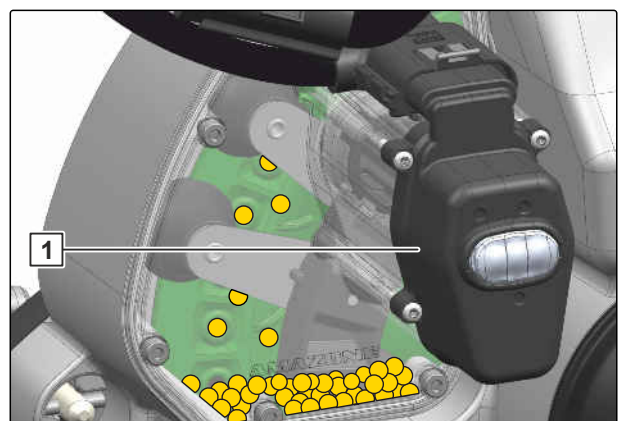
CMS-I-00001987

4.17.3 Electronic remote scraper bar adjustment

CMS-T-00001984-B.1

With the electronic remote scraper bar adjustment **1**, the scrapers are conveniently adjusted on the control terminal.

In conjunction with SmartControl, the scrapers are controlled automatically. By means of the opto-sensor monitoring, gaps or doubles are detected and the scraper bar position is adjusted. This automatically reduces gaps and doubles.



CMS-I-00001917

4.18 Threaded cartridge

CMS-T-00001776-E.1

The threaded cartridge contains the following items:

- Documents
- Aids



CMS-I-00002306

4.19 Calibration kit

CMS-T-00007520-A.1

The calibration kit contains the following items:

- Collapsible bucket
- Tension scale



CMS-I-00005274

4.20 TwinTerminal

CMS-T-00004156-D.1

With the TwinTerminal, the following functions are possible:

- Calibrate the spread rate
- Emptying the implement
- Communication with the control terminal
 - Enter the calibration parameters
 - Enter the collected spread rate



CMS-I-00003079

Technical data

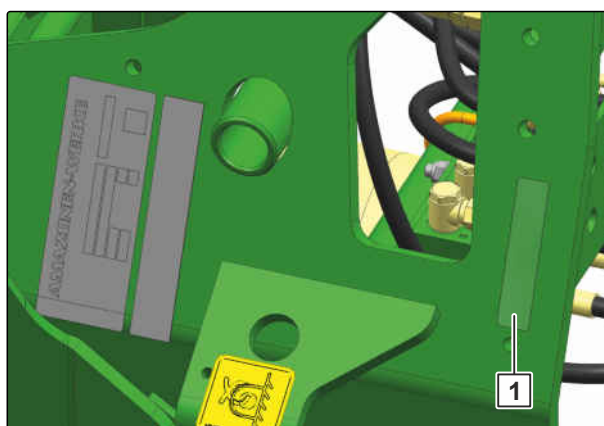
5

CMS-T-00002341-H.1

5.1 Serial number

CMS-T-00002399-A.1

The serial number **1** of the implement is stamped onto the mounting frame for identification.



CMS-I-00002008

5.2 Dimensions

CMS-T-00002356-E.1

	Equipment feature	Precea 4500-2 / -2CC	Precea 4500-2CC with fertiliser auger
Transport width	1-stage telescoping	3.3 m	3.3 m
	2-stage or variably telescoping	3 m	3 m
Transport height		< 4 m	< 4 m
Total length	Short mounting frame	2.22 m	2.91 m
	Long mounting frame	2.38 m	3.07 m
Working width, depending on the row spacing	1-stage telescoping	3600 – 4800	4500 – 4800
	2-stage telescoping	4.2 m to 4.8 m	4.2 m to 4.8 m
	Variable telescoping	2.7 m to 4.8 m	2.7 m to 4.8 m
Centre of gravity distance, depending on the equipment	Short mounting frame	80 cm	80 cm
	Long mounting frame	1.08 m	1.08 m

5.3 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]

5.4 Seed metering unit

CMS-T-00005919-C.1

The target spacing depends on the spreading material. On implements with electric metering drives, the target spacing can be adjusted via the forward speed.

The minimum target spacing is based on the maximum working speed, the maximum singling unit speed, and the largest singling disc.

The maximum target spacing is based on the minimum working speed, the minimum singling unit speed, and the smallest singling disc.

Target spacing
3.1 cm to 86.9 cm

Precea	Seed volume		
	Decentralised seed hopper	Central seed hopper	Additional hopper – Central Seed Supply
3000/4500/6000	55 l or 70 l	/	/
4500-2/6000-2			
3000-AFCC	55 l	/	/
6000-2AFCC			
6000-TCC	55 l or 70 l	1,200 l	8 l
9000-TCC	/	2,200 l	2x 8 l

5.5 Fertiliser metering unit

CMS-T-00002362-F.1

The maximum spread rate depends on the spreading material. On implements with electric metering drives,

the spread rate can be adjusted via the forward speed.

The maximum spread rate is based on a working speed of 15 km/h.

Application	Application point	Maximum spread rate
Under-root fertilising	Fertiliser coulter	50 kg/ha to 250 kg/ha
		Precea 6000-2CC with 9 rows and FertiSpot: 50 kg/ha to 220 kg/ha
	Seed belt	50 kg/ha to 75 kg/ha
Micro-fertiliser	Seed belt	35 kg/ha

Precea	Fertiliser hopper
3000/4500/6000	950 l or 1,250 l
4500-2/6000-2	
3000-AFCC	950 l
6000-2AFCC	FTender with 1,600 l or 2,200 l
6000-TCC	3,000 l
9000-TCC	6,000 l

5.6 Micropellet metering unit

CMS-T-00005413-C.1

The maximum spread rate depends on the spreading material.

The maximum spread rate is based on a working speed of 15 km/h.

Application	Application point	Maximum spread rate
Micro-fertiliser	Seed belt	35 kg/ha

Micropellet hopper
17 l

5.7 PreTeC mulch seeding coulter

CMS-T-00005570-D.1

The maximum placement depth serves as a reference value. The actual value can only be determined during field operation.

Position	Load	Coulter pressure	Tare weight	Placement depth
Beside the track	Spring	1 kg to 100 kg	120 kg	0 cm to 10 cm
In the track		1 kg to 115 kg	120 kg	0 cm to 10 cm
Beside the track	Hydraulic system	1 kg to 180 kg	120 kg	0 cm to 10 cm
In the track		1 kg to 230 kg	120 kg	0 cm to 10 cm

5.8 FerTeC Twin couler

CMS-T-00005569-D.1

The maximum placement depth serves as a reference value. The actual value can only be determined during field operation.

Coulter	Disc diameter	Coulter pressure	Overload safety	Placement depth
FerTeC Twin double-disc couler	380 mm	80 kg	/	3 cm to 12 cm
FerTeC Twin HD double-disc couler	400 mm	/	200 kg	3 cm to 12 cm

5.9 Row spacings

CMS-T-00002366-F.1



NOTE

It is possible to subsequently convert the number of rows. For more information, contact your specialist workshop.

Frame	Number of rows	Seeding coulter spacing	Working width
1-stage telescoping	6	80 cm	4.8 m
		75 cm	4.5 m
		70 cm	4.2 m
		65 cm	3.9 m
	7	60 cm	4.2 m
	8	45 cm	3.6 m
2-stage telescoping	6	80 cm	4.8 m
		75 cm	4.5 m
		70 cm	4.2 m
	7	60 cm	4.2 m

Frame	Number of rows	Seeding coulter spacing	Working width
Variable telescoping	6	80 cm	4.8 m
		75 cm	4.5 m
		70 cm	4.2 m
		65 cm	3.9 m
		60 cm	3.6 m
		50 cm	3 m
		45 cm	2.7 m
	7 Only 6 rows in operation	80 cm	4.8 m
		75 cm	4.5 m
		70 cm	4.2 m
	7 All rows in operation	60 cm	4.2 m
		50 cm	3.5 m

5.10 Mounting category

CMS-T-00002368-A.1

3-point mounting frame	Category 2 and Category 3N
------------------------	----------------------------

5.11 Forward speed

CMS-T-00002367-E.1



NOTE

High spread rates can prevent the maximum working speed from being reached.

Optimal working speed for implements with SpeedShaft	2 km/h to 12 km/h
Optimal working speed for implements with ElectricDrive	2 km/h to 15 km/h

Permissible transport speed	60 km/h
-----------------------------	---------

5.12 Performance characteristics of the tractor

CMS-T-00002369-C.1

Engine rating	
Precea 4500-2 / -2CC	Starting at 75 kW / 100 hp

Electrical system	
Battery voltage	12 V
Basic tractor equipment for ISOBUS	25 A
Lighting socket	7-pin

Hydraulic system	
Maximum operating pressure	210 bar
Tractor pump output	Implement with mechanical fan drive, at least 20 l/min at 150 bar
	Implement with hydraulic fan drive, at least 50 l/min at 150 bar
Implement 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 implement equipment
Pressure-free return flow	Do not exceed a back pressure of 5 bar.

5.13 Noise development data



CMS-T-00002296-D.1

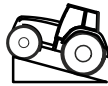

The workplace-related emission sound pressure level is lower than 70 dB(A), measured in operating condition at the ear of the tractor driver with the cab closed.

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

5.14 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 %	

5.15 Lubricants

CMS-T-00002396-B.1

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

5.16 Gear oil

CMS-T-00003834-B.1

Manufacturer	Gear oil
WINTERSHALL	Wintal UG22 WTL-HM, ex-factory
FUCHS	Renolin MR5 VG22

5.17 Chain oil

CMS-T-00005469-B.1

Chain oil
Non-saponifiable mineral-based chain oil according to ISO VG 68

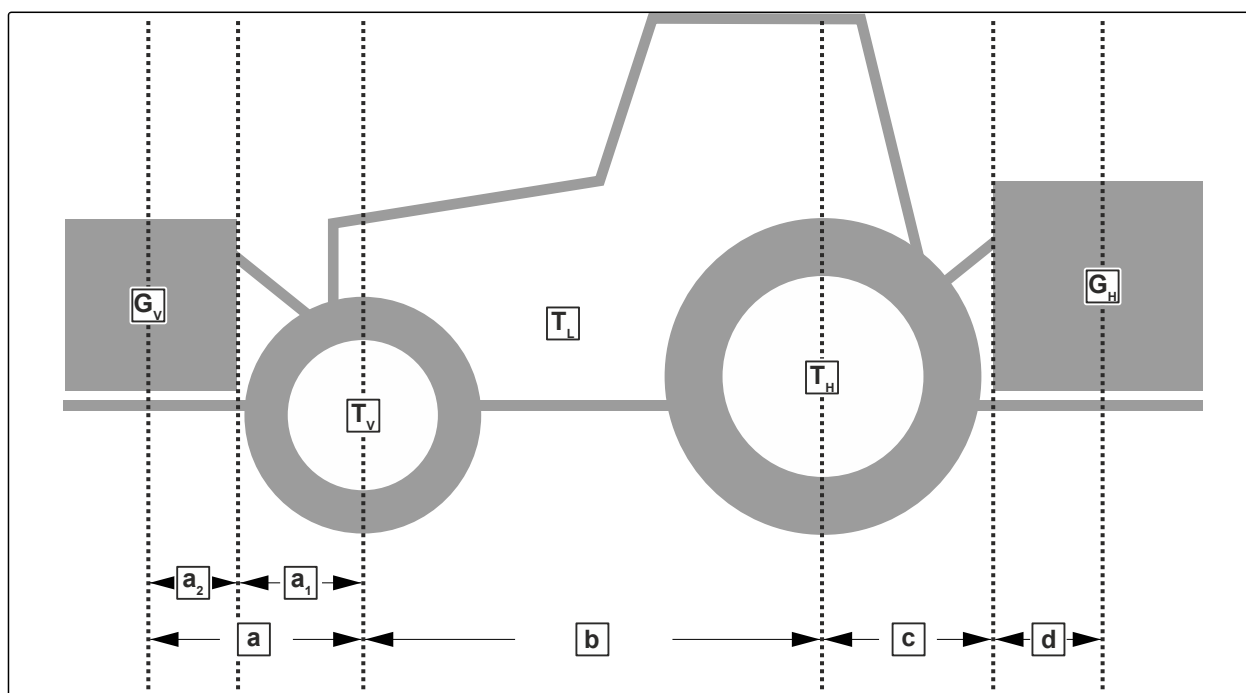
Preparing the machine

6

CMS-T-00001759-I.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.

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

$$G_{\min} = \underline{\hspace{100pt}}$$

$$G_{\min} = \underline{\hspace{100pt}}$$

CMS-I-00000513

2. Calculate the actual front axle load.

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

$$T_{Vtat} = \underline{\hspace{100pt}}$$

$$T_{Vtat} = \underline{\hspace{100pt}}$$

CMS-I-00000516

6 | Preparing the machine

Calculating the required tractor characteristics

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

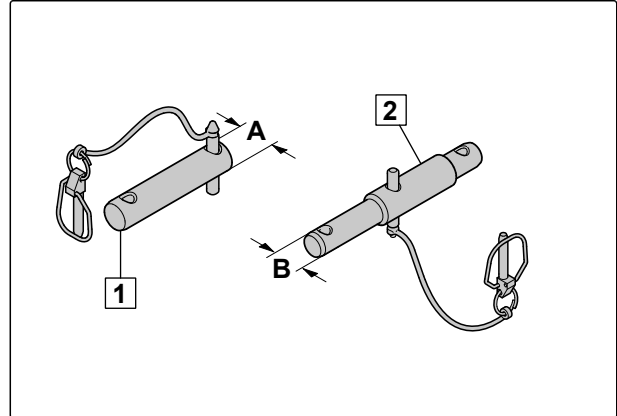
6.2 Adjusting the 3-point mounting frame

CMS-T-00002075-B.1

6.2.1 Adjusting the 3-point mounting frame for mounting category 2

CMS-T-00002076-B.1

Mounting category 2 measurements	Diameter
A	25 mm
B	28 mm



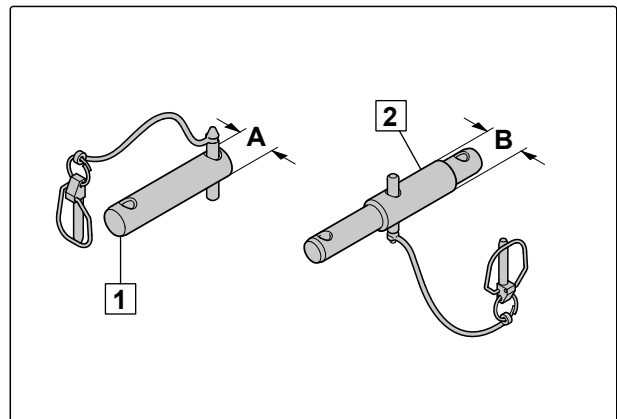
CMS-I-00001816

- Install the top link pin **1** and lower link step pin **2** of mounting category 2.

6.2.2 Adjusting the 3-point mounting frame for mounting category 3

CMS-T-00002077-B.1

Mounting category 3 measurements	Diameter
A	31.7 mm
B	36.6 mm



CMS-I-00001817

- Install the top link pin **1** and lower link step pin **2** of mounting category 3.

6.3 Preparing the universal joint shaft

CMS-T-00005128-B.1

1. Have the length of the universal joint shaft adjusted by a specialist workshop.
2. Have the universal joint shaft installed by a specialist workshop.

6.4 Coupling the implement

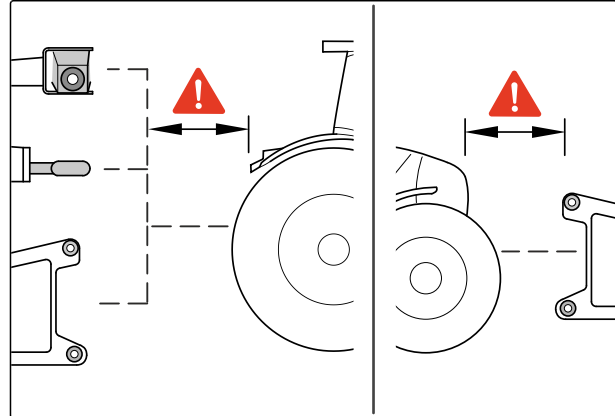
CMS-T-00001828-F.1

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.

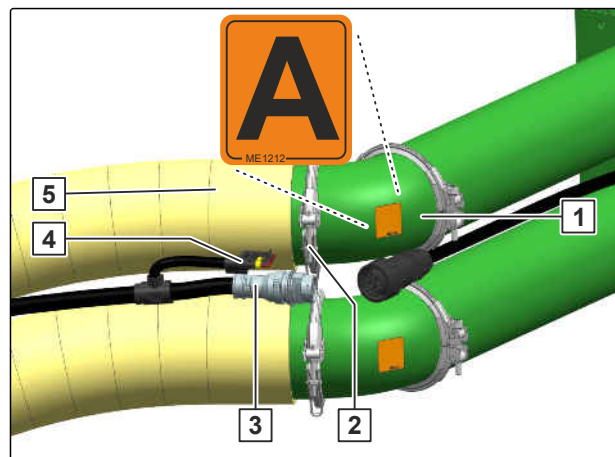


CMS-I-00004045

6.4.2 Coupling the supply lines to the front-mounted hopper

CMS-T-00004439-C.1

1. To connect the conveyor hose **5** to the front-mounted hopper **1**, couple the connecting piece with the bracket **2**.
2. Depending on the implement equipment, connect the second conveyor hose to the hose package. Pay attention to the markings on the conveyor hoses.
3. Depending on the implement equipment, connect the front hopper supply **3** to the hose package.
4. Depending on the implement equipment, connect the metering unit shutoff **4** to the hose package.

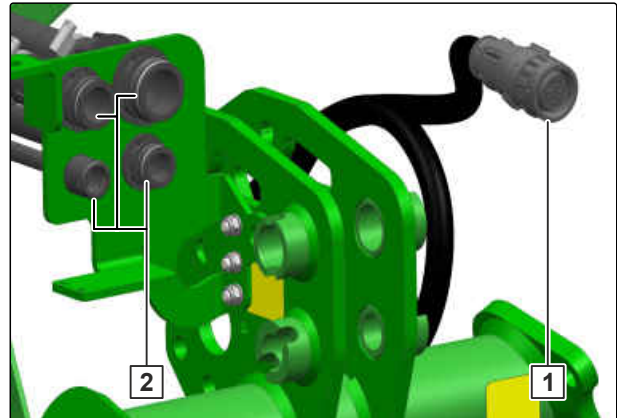


CMS-I-00003124

6.4.3 Coupling the supply lines to the front hopper

CMS-T-00010803-A.1

1. Connect the plug for the ISOBUS line **1** to the front hopper.
2. Connect the supply lines **2** to the conveyor hoses of the front hopper.



CMS-I-00007399

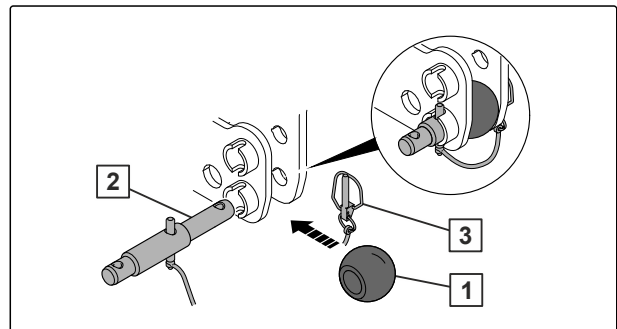
6.4.4 Attaching the lower link ball sleeves

CMS-T-00002085-A.1

6.4.4.1 Attaching the lower link ball sleeves for mounting category 2

CMS-T-00002089-A.1

1. Insert the lower link step pin **2** into the mount from the outside.
2. Equip the lower link step pins with ball sleeves **1**.
3. Secure the lower link step pin **2** with a linch pin.

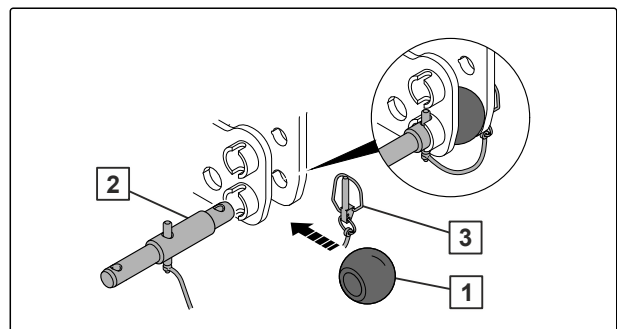


CMS-I-00001885

6.4.4.2 Attaching the lower link ball sleeves for mounting category 3

CMS-T-00002084-A.1

1. Insert the lower link step pin **2** into the mount from the outside.
2. Equip the lower link step pins with ball sleeves **1**.
3. Secure the lower link step pin with a linch pin **3**.



CMS-I-00001884

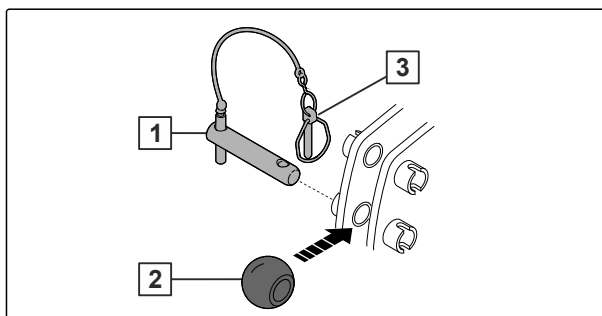
6.4.5 Attaching the top link ball sleeves

CMS-T-00002087-A.1

6.4.5.1 Attaching the top link ball sleeve for mounting category 2

CMS-T-00002086-A.1

1. Insert the top link pin **1** together with the ball sleeve **2** in the bottom holes.
2. Secure the top link pin **1** with a linch pin **3**.

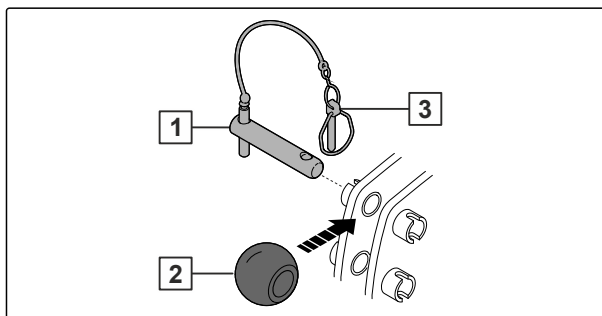


CMS-I-00001871

6.4.5.2 Attaching the top link ball sleeve for mounting category 3

CMS-T-00002088-A.1

1. Insert the top link pin **1** together with the ball sleeve **2** in the top holes.
2. Secure the top link pin **1** with a linch pin **3**.



CMS-I-00001870

6.4.6 Coupling the universal joint shaft

CMS-T-00005462-A.1

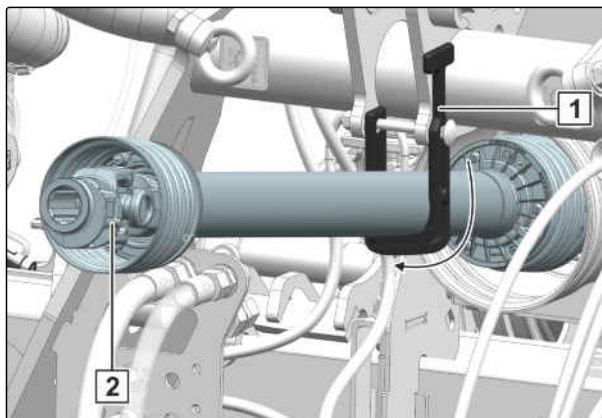


REQUIREMENTS

- ✓ The universal joint shaft was installed according to the manufacturer specifications

1. Open the holder **1**.
2. Pull back the drawing sleeve **2** on the tractor side.
3. Push the universal joint shaft onto the tractor PTO shaft.

➔ The drawing sleeve engages.



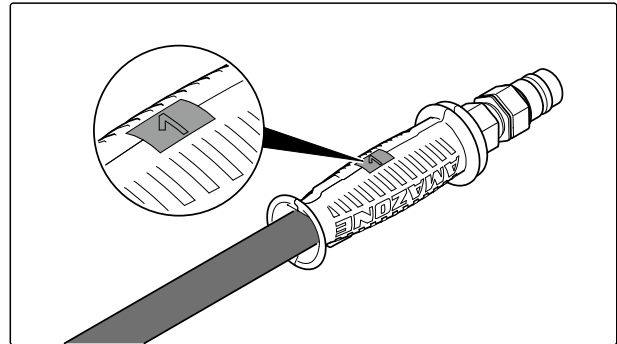
CMS-I-00003956

6.4.7 Coupling the hydraulic hose lines

CMS-T-00007884-C.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.
















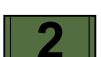



The tractor control unit is used with different types of actuation, depending on the hydraulic function:



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	
Red		Pressure-free return flow. The pressure-free return flow must always be coupled!			Maximum line pressure less than 5 bar
			Fan hydraulic motor	Switching on	Single-acting
			Coulter pressure	Increase Reduce	
Green			Section	Extend	Double-acting
				Retract	
Yellow			Track marker	Lifting	Single-acting
Blue			Frame ballasting	Increase	Double-acting
				Reduce	
Beige			Filling auger	Switching on	Single-acting

Designation		Function			Tractor control unit	
		Pressure-free return flow. The pressure-free return flow must always be coupled!			Maximum line pressure less than 5 bar	
			Fan hydraulic motor	Switching on	Single-acting	
			Coulters pressure	Increase Reduce		
Green			Section	Extend	Double-acting	
				Retract		
			Track marker	Lifting	Single-acting	
			Frame ballasting	Increase	Double-acting	
				Reduce		
Beige			Filling auger	Switching on	Single-acting	



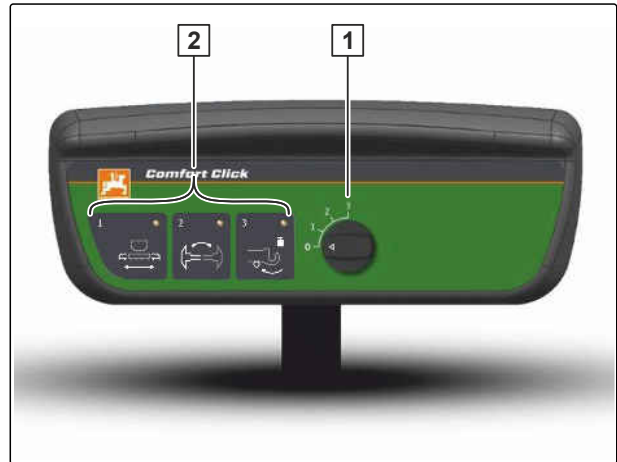
WARNING

Risk of injury or even death

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

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

If there are not enough tractor control units available, multiple implement functions **2** can be assigned to one tractor control unit with the Comfort hydraulic system. The function is actuated either via the implement software or via ComfortClick **1**.



CMS-I-00001699

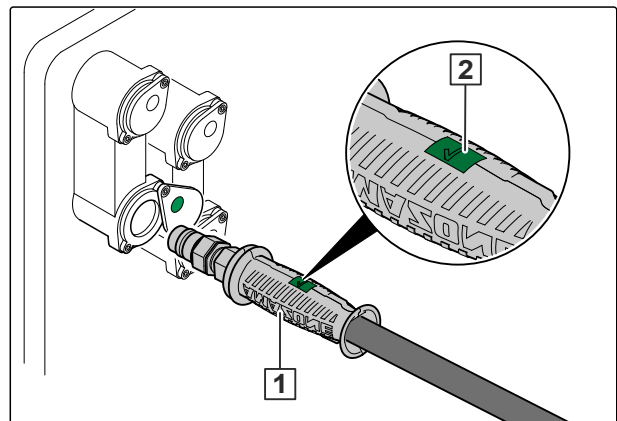
1. Depressurise the hydraulic system between the tractor and the implement using the tractor control unit.
2. Clean the hydraulic plugs.



IMPORTANT

Implement damage due to insufficient hydraulic oil return flow

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



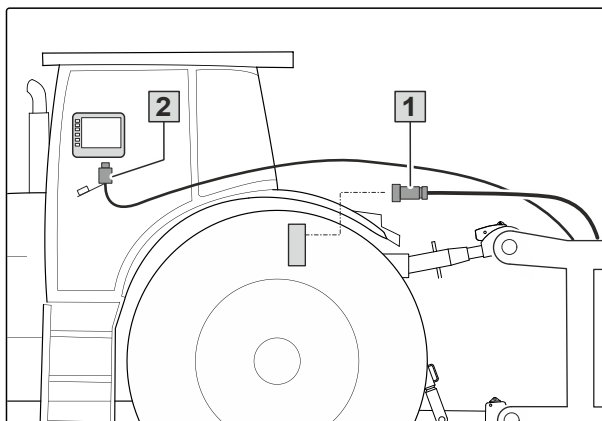
CMS-I-00001045

3. First couple the "red T" hydraulic hose line with the corresponding hydraulic socket on the tractor.
 4. Couple the "red 1" hydraulic hose line with the corresponding hydraulic socket on the tractor.
 5. Couple the remaining hydraulic hose lines **1** to the hydraulic sockets on the tractor according to the marking **2**.
- ➔ The hydraulic plugs lock perceptibly.
6. Route the hydraulic hose lines with sufficient freedom of movement and without chafing points.

6.4.8 Coupling the ISOBUS or control computer

CMS-T-00003611-F.1

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

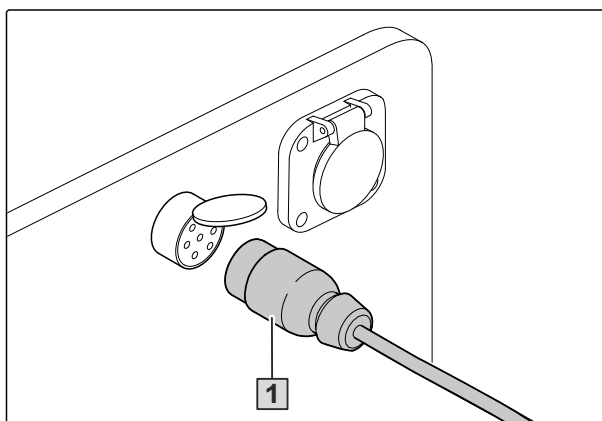


CMS-I-00006891

6.4.9 Coupling the power supply

CMS-T-00001399-G.1

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



CMS-I-00001048

6.4.10 Coupling the 3-point mounting frame

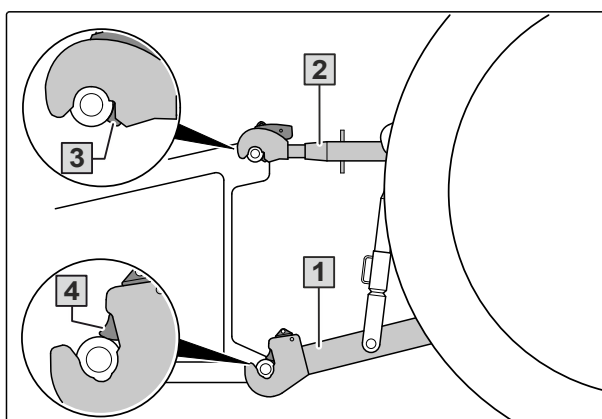
CMS-T-00007518-C.1

1. Set the tractor lower links **1** to the same height.
2. Couple the lower links **1** from the tractor seat.



IMPORTANT Collision of the frame ballasting with the tractor tyres

- During operation, make sure that the frame ballasting always has enough distance from the tractor tyres.



CMS-I-00001225



NOTE

For the optimal effect of frame ballasting, the top link must be mounted on the highest top link point on the tractor side.

3. Couple the top link **2**.
4. Check whether the top link catch hooks **3** and lower link catch hooks **4** are correctly locked.



WARNING

An unexpected hydraulic function is activated

- Before you actuate the tractor control unit, check the selected hydraulic function of the Comfort hydraulic system.

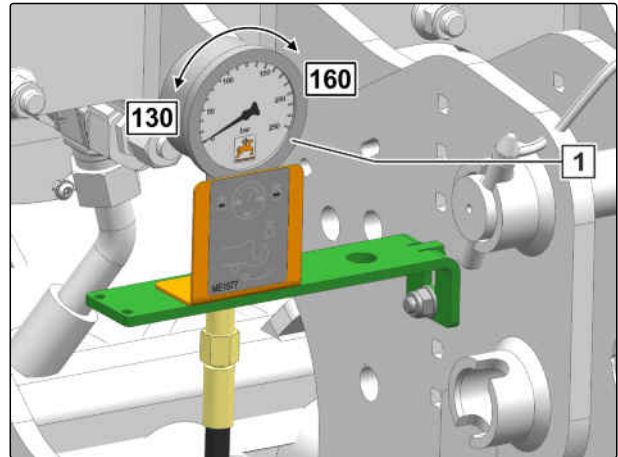
5. Lower the implement onto the ground.
6. *To increase the frame ballast:*
Actuate the "green 1" tractor control unit and set 160 bar.

- ➔ The pressure gauge **1** shows the set coultur pressure.

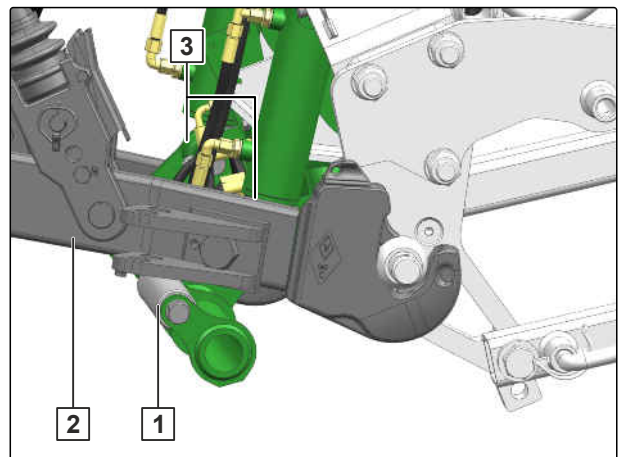
The frame ballasting **1** is resting on the lower links **2**.

7. Slowly lift the implement and move it into working position.

- ➔ The piston rods **3** must not reach the end position in any operating state.



CMS-I-00004101

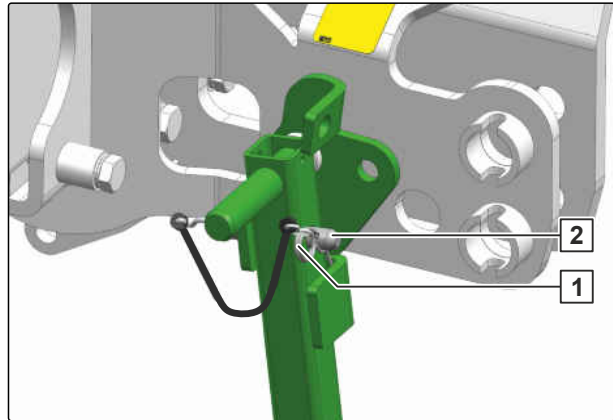


CMS-I-00009250

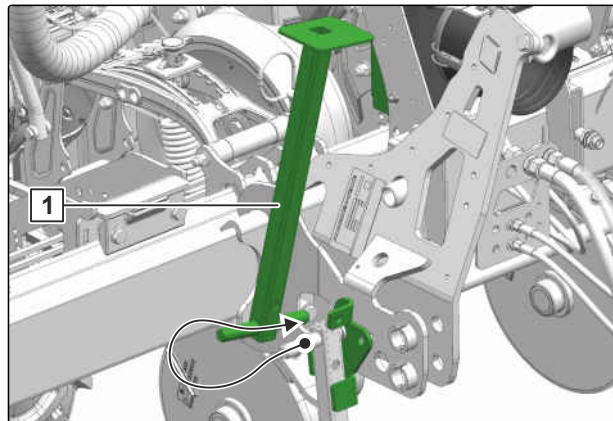
6.4.11 Raising the jacks

1. *To relieve the jacks,*
raise the implement.
2. Pull out the spring cotter pin **1**.
3. Hold the jack firmly.
4. Remove the pin **2**.
5. Move the jack **1** out of the support position.
6. Move the jack to the parking position.
7. Secure the jack with a pin **2**.
8. Secure the pin with a spring cotter pin **1**.
9. Repeat the procedure for the second jack.

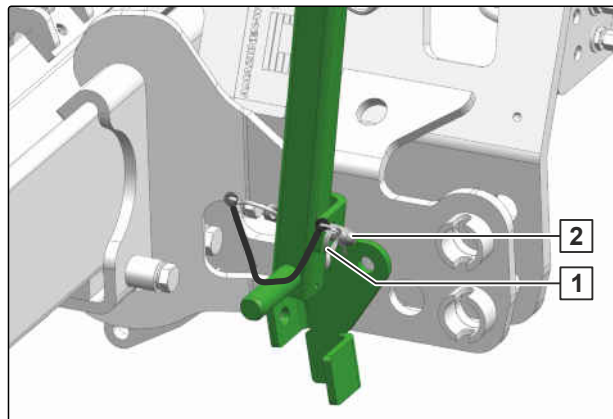
CMS-T-00001838-A.1



CMS-I-00002003



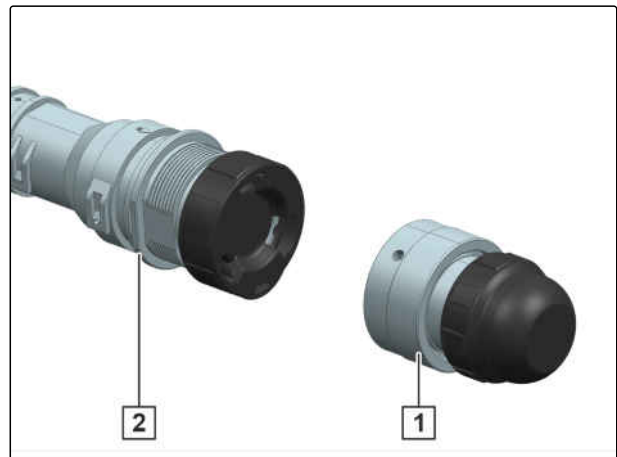
CMS-I-00002001



CMS-I-00002002

6.4.12 Operation without front hopper

- *If the implement should be used without the front hopper,*
install the terminating resistor **1** on the signal cable **2** for the front hopper.



CMS-T-00008281-A.1

CMS-I-00005657

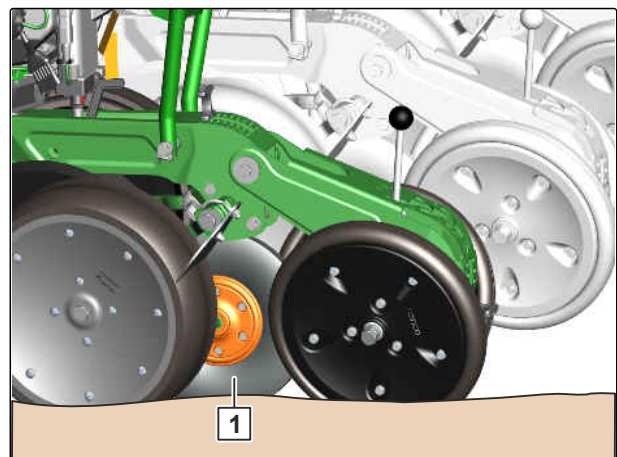
6.5 Preparing the implement for operation

CMS-T-00001841-I.1

6.5.1 Aligning the implement horizontally

For precise seed placement, the implement must be aligned horizontally. The catch roller **1** can still be turned by hand in the formed furrow, but does not bend to the side.

- Set the top link to the desired length.



CMS-T-00014683-A.1

CMS-I-00007970

6.5.2 Telescoping the implement sections

CMS-T-00001909-B.1



CAUTION

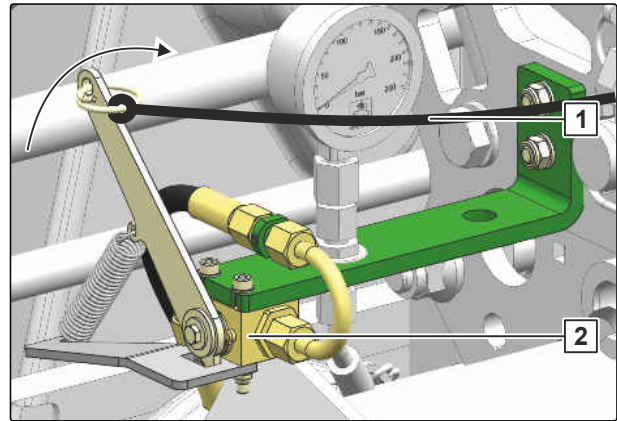
There are crushing and shear points between the implement sections and the implement.

- *When folding or unfolding the implement sections,*
never reach into the crushing area.

6 | Preparing the machine

Preparing the implement for operation

1. Raise the implement.
 2. Pull on the pull rope **1**.
- ➔ The hydraulic valve is opened **2**.
3. *Until the implement sections have reached the end position,*
Actuate the pull rope and actuate the "green" tractor control unit.
- ➔ When the implement sections have reached their end position, the conveyor hoses to the fertiliser coulters may not sag.
4. *If the conveyor hoses are sagging,*
fasten the fertiliser hoses.
 5. *When the implement sections have reached the end position,*
release the pull rope and move the "green" tractor control unit to the neutral position.

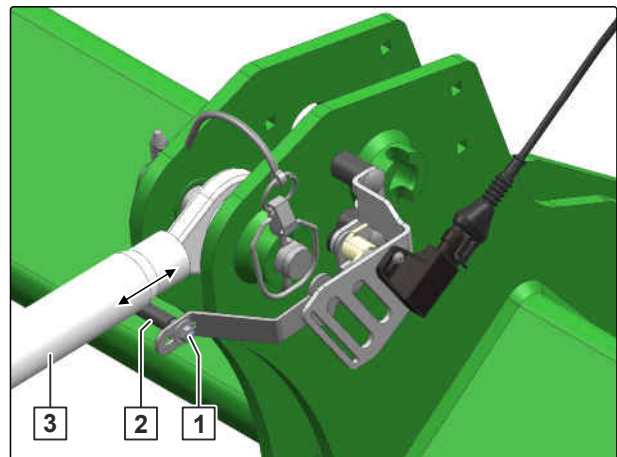


CMS-I-00001897

6.5.3 Adjusting the working position sensor

The working position sensor monitors the implement position in the three-point hydraulic system and switches the metering drives. The lever length is adjustable.

1. loosen the nut **1**.
2. Place the lever **2** on an level contact surface on the top link **3**.
3. Tighten the nut.
4. *To ensure that the working position sensor is resting on a level surface,*
completely lift and lower the implement.
5. *To configure the working position sensor,*
refer to the ISOBUS software operating manual,
"Configuring the working position sensor"



CMS-I-00002608

or

see "control computer" operating manual.

6.5.4 Filling the seed hopper

CMS-T-00001914-D.1



REQUIREMENTS

- ☑ The implement is coupled to the tractor
- ☑ The tractor and implement are secured
- ☑ The seed and seed hopper are free of foreign objects
- ☑ The seed is dry and does not stick

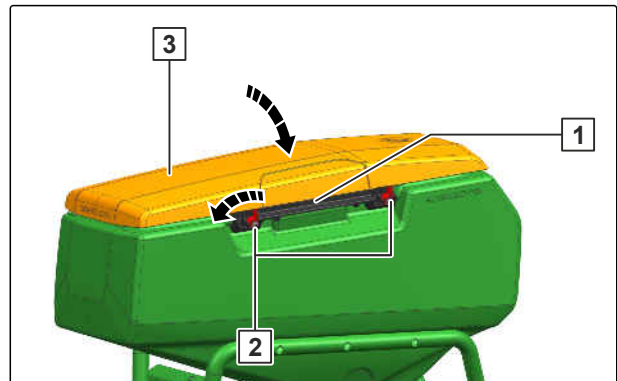


IMPORTANT

Hopper cover damage caused by people walking on it

If the hopper cover is damaged, the hopper is not sealed. Metering will be faulty.

- ▶ Do not step on the hopper cover.



CMS-I-00001886

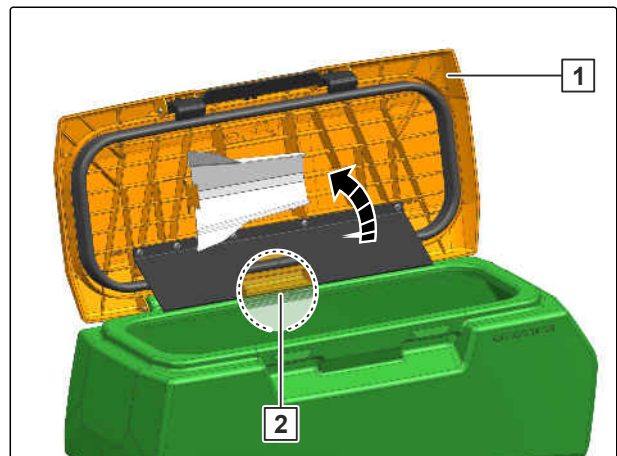
1. Open the fastener **2**.
 2. *To relieve the fastener:*
Press the hopper cover **3** down.
 3. Unlock the **1** fastener.
 4. Open the hopper cover **1** completely.
- ➔ The cover fastener **2** latches.



WARNING Risk of chemical burns by dressing dust

- ▶ Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.

5. Fill the seed hopper.

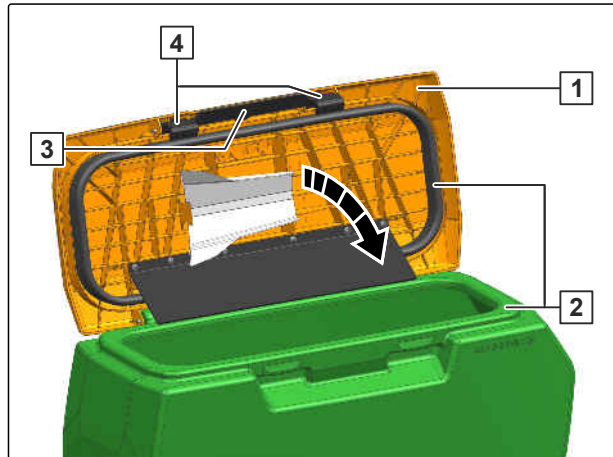


CMS-I-00001887

6 | Preparing the machine

Preparing the implement for operation

6. Clean the cover seal and sealing surface **2**.
7. Close the hopper cover **1**.
- ➔ The fastener **3** is locked.
8. Close the lock **4**.



CMS-I-00001889

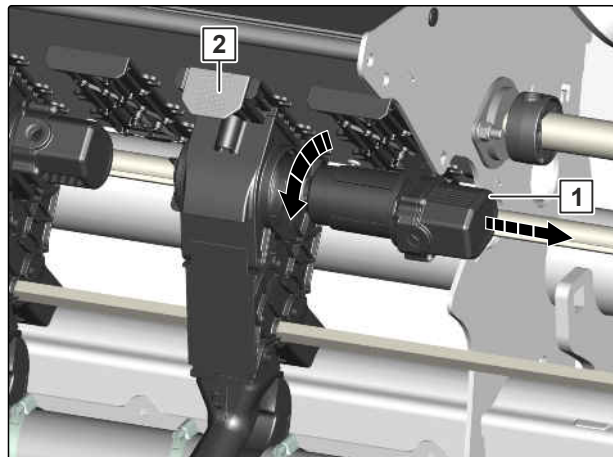
6.5.5 Preparing the fertiliser hopper for operation

CMS-T-00011011-B.1

6.5.5.1 Changing the metering wheel

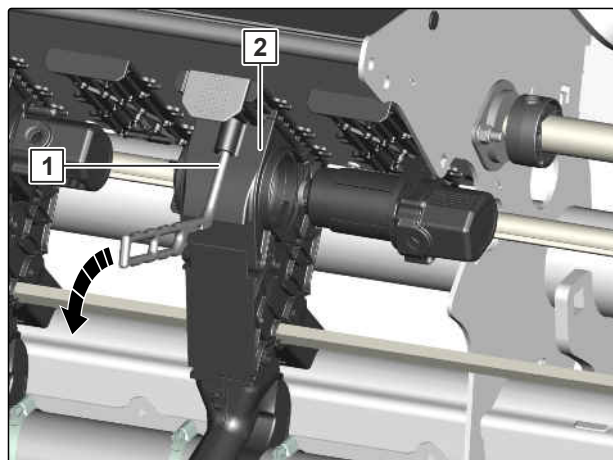
CMS-T-00014322-A.1

1. Set the sliding shutter **2** to the bottom position.
2. Turn the drive unit **1** counterclockwise.
3. Pull the drive unit out of the metering housing.



CMS-I-00009080

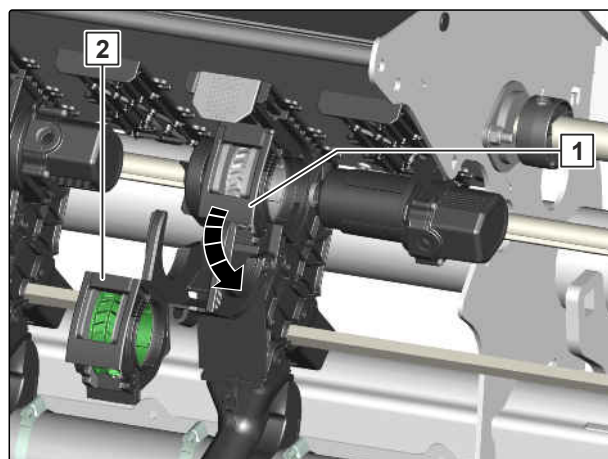
4. Insert the unlocking tool **1** into the metering unit cover **2**.
5. Unlock the metering unit cover.
6. Open the metering unit cover.



CMS-I-00009079

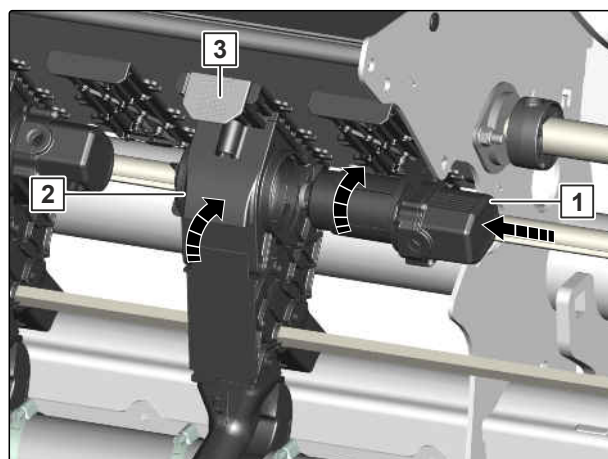
7. Take the roller cage **1** along with the metering roller out of the metering housing.

Metering wheel	Colour	Applications	Spread rate
Metering wheel 4 cm ³	Orange	Insecticide	5 kg/ha to 20 kg/ha
Metering wheel 3 cm ³	Silver grey	Slug pellets	2 kg/ha to 10 kg/ha
Metering wheel 12 cm ³	Green	Micro-fertiliser	10 kg/ha to 35 kg/ha
Metering wheel 100 cm ³	Green	Fertiliser	50 kg/ha to 250 kg/ha



CMS-I-00009078

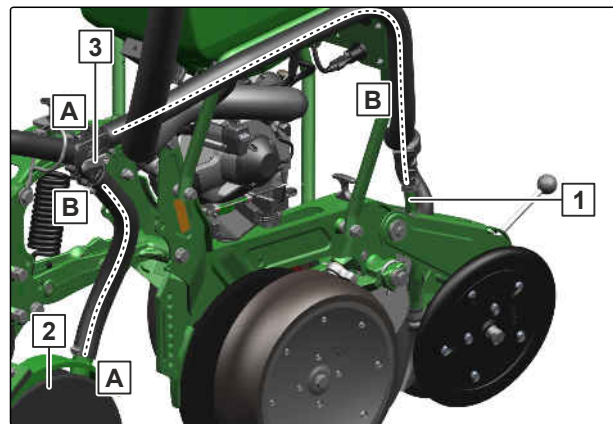
8. Insert the desired metering roller **2** in the metering unit housing.
9. Close the metering unit cover **2**.
- ➔ The locking mechanism engages.
10. Insert the drive unit **1** into the metering roller.
11. Rotate the drive unit clockwise.
12. Set the sliding shutter **3** to the top position.



CMS-I-00009077

6.5.5.2 Adjusting the fertiliser application point

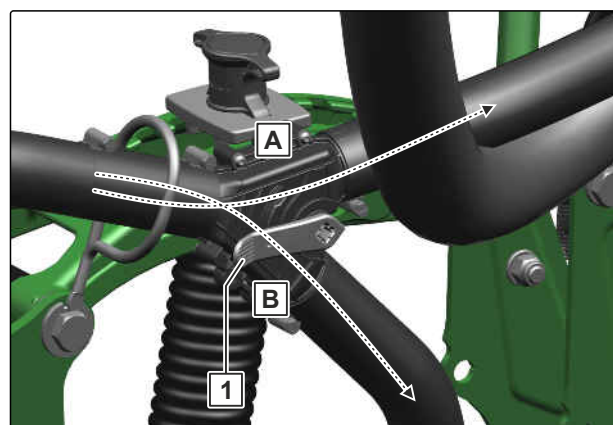
Depending on implement equipment, the fertiliser application point can be switched over. Use the switch **3** to change between the fertiliser coulter **2** or seedbed placement **1**.



CMS-I-00007256

- *To select the fertiliser application point:*
Set the lever **1** to the desired position.

➔ The lever engages perceptibly.



CMS-T-00001911-E.1

6.5.5.3 Filling the fertiliser hopper via the loading board

CMS-T-00001911-E.1



NOTE

The guard screen and function screen in the fertiliser hopper are closed. Only a closed guard screen and function screen can prevent fertiliser clumps and/or foreign objects from entering the fertiliser hopper and clogging the metering unit.

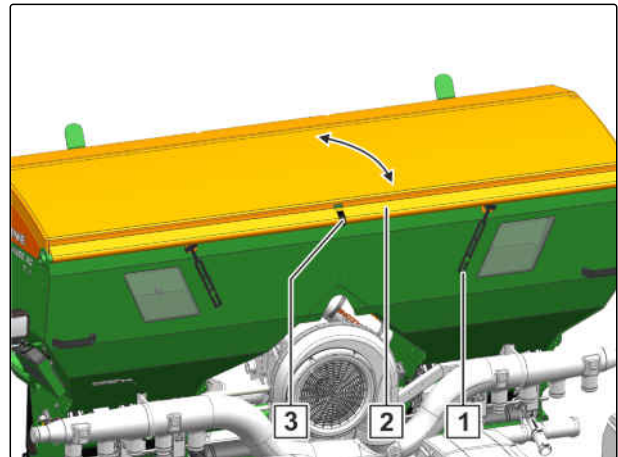


REQUIREMENTS

- ☑ The implement is coupled to the tractor
 - ☑ The tractor and implement are secured
 - ☑ The transport vehicle carrying the fertiliser is standing on a level surface
1. When working at night, switch on the interior lighting of the fertiliser hopper.
 2. *Depending on the implement equipment:*
Climb onto the loading board using the steps

or

Unfold the ladder and climb onto the loading board using the steps.
 3. Open the rubber straps **1**.
 4. Open the fertiliser hopper tarpaulin **2**.
 5. Remove residues or foreign objects from the fertiliser hopper.
 6. Fill the fertiliser hopper.
 7. Close the fertiliser hopper tarpaulin with the pull rope **3**.
 8. Secure the fertiliser hopper tarpaulin with rubber straps.
 9. Fold in the ladder.



CMS-I-00001892

6.5.5.4 Filling the fertiliser hopper with the folding filling auger

CMS-T-00011012-B.1



NOTE

The guard screen and function screen in the fertiliser hopper are closed. Only a closed guard screen and function screen can prevent fertiliser clumps and/or foreign objects from entering the fertiliser hopper and clogging the metering unit.



REQUIREMENTS

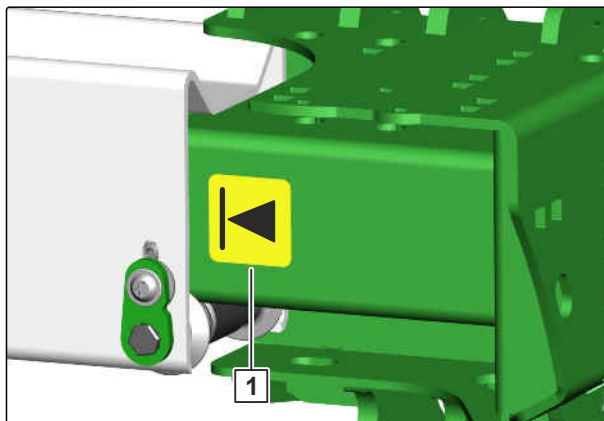
- ✓ The implement is coupled to the tractor
- ✓ The tractor and implement are secured
- ✓ The transport vehicle carrying the fertiliser is standing on a level surface

1. *If the variably telescoping implement is set to a row spacing greater than 50 cm:*
Telescope the implement in

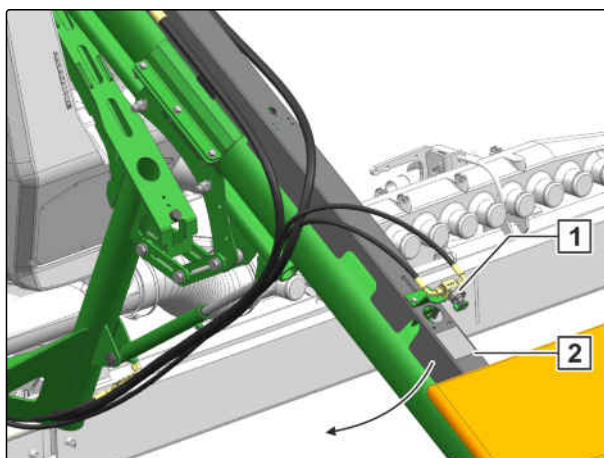
or

If the variably telescoping implement is set to a row spacing greater than 45 cm:
Telescope the implement out. Telescope in up to the mark **1**.

2. When working at night, switch on the interior lighting of the fertiliser hopper.
 3. Actuate and hold the control lever **1**.
 4. Push the filling auger **2** into the desired position.
 5. Release the control lever.
- ➔ The filling auger is locked in the desired position.

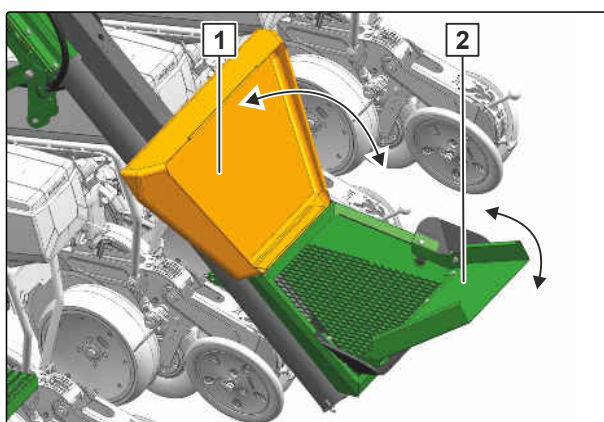


CMS-I-00007471



CMS-I-00003949

6. Open the cover tarpaulin **1** of the filling funnel.
7. Swivel out the filling chute **2**.
8. Remove residues or foreign objects from the filling funnel.
9. *To activate the oil supply for the feed auger:*
Switch on the "beige 1" tractor control unit at 32 l/min.



CMS-I-00001894

10. Slowly switch on the filling auger's drive on the stop tap **1**.

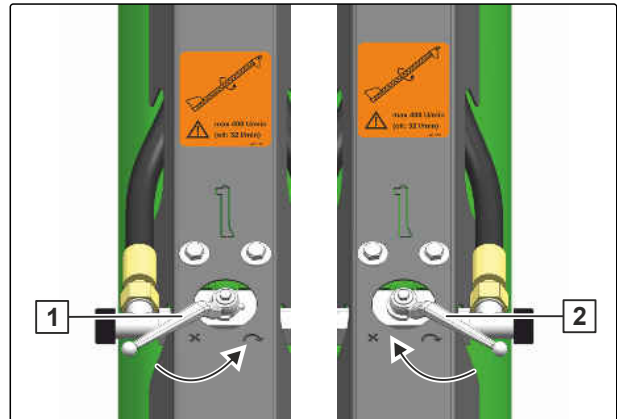
11. Fill the filling funnel of the filling auger with the spreading material.

➔ The fill level in the fertiliser hopper rises.



NOTE

The maximum filling capacity is reached when a material cone is formed over the feed auger. If possible, let the fertiliser run directly into the filling funnel.



CMS-I-00001895

12. Monitor the fill level through the inspection window.

13. *When the fill level rises beyond the edge of the inspection window:*

Reduce the filling of the filling funnel and the filling auger speed with the ball valve **2**.

14. *When the fertiliser hopper is full:*
stop filling the filling funnel.

15. Leave the feed auger running until it is empty.

16. Slowly switch off the filling auger drive with the stop tap.

17. Switch off the tractor control unit.

18. Swivel in the filling chute.

19. Close the cover tarpaulin of the filling funnel.

20. *To swivel the filling auger back into the parking position:*

actuate the "green 1" tractor control unit until the filling auger has reached its end position.

6.5.5.5 Filling the fertiliser hopper with the filling auger

CMS-T-00001912-D.1



NOTE

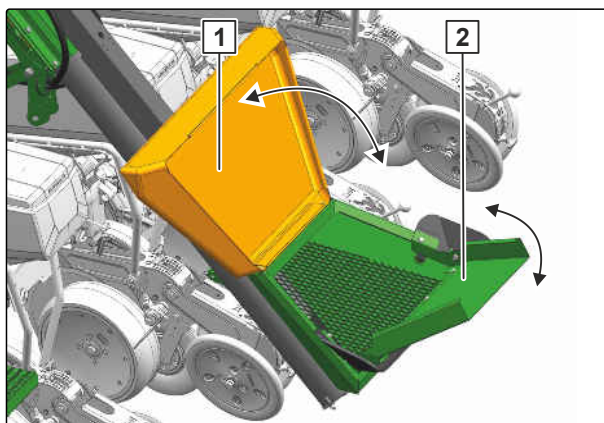
The guard screen and function screen in the fertiliser hopper are closed. Only a closed guard screen and function screen can prevent fertiliser clumps and/or foreign objects from entering the fertiliser hopper and clogging the metering unit.



REQUIREMENTS

- ✓ The implement is coupled to the tractor
- ✓ The tractor and implement are secured
- ✓ The transport vehicle carrying the fertiliser is standing on a level surface

1. When working at night, switch on the interior lighting of the fertiliser hopper.
 2. Open the cover tarpaulin **1** of the filling funnel.
 3. Swivel out the filling chute **2**.
 4. Remove residues or foreign objects from the filling funnel.
 5. *To activate the oil supply for the feed auger:*
Switch on the "beige" tractor control unit at 32 l/min.
 6. Slowly switch on the filling auger's drive on the stop tap **1**.
 7. Fill the filling funnel of the filling auger with the spreading material.
- ➔ The fill level in the fertiliser hopper rises.



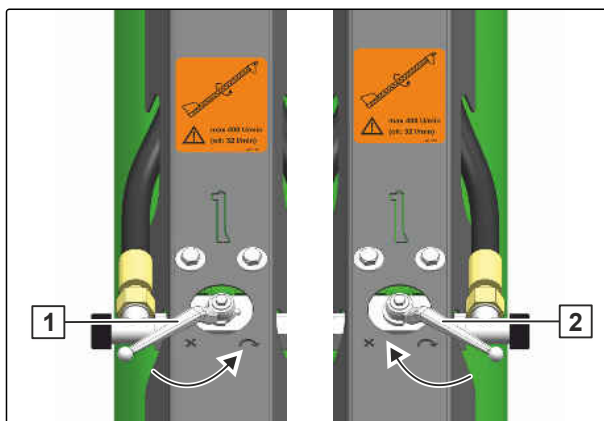
CMS-I-00001894



NOTE

The maximum filling capacity is reached when a material cone is formed over the feed auger. If possible, let the fertiliser run directly into the filling funnel.

8. Monitor the fill level through the inspection window.
9. *When the fill level rises beyond the edge of the inspection window:*
Reduce the filling of the filling funnel and the filling auger speed with the ball valve **2**.
10. *When the fertiliser hopper is full:*
stop filling the filling funnel.
11. Leave the feed auger running until it is empty.
12. Slowly switch off the filling auger drive with the stop tap.



CMS-I-00001895

13. Switch off the tractor control unit.
14. Swivel in the filling chute.
15. Close the cover tarpaulin of the filling funnel.

6.5.5.6 Adjusting the filling auger

CMS-T-00002217-D.1



REQUIREMENTS

- ☑ The implement is not coupled to the tractor
- ☑ The implement is properly parked



CAUTION

Risk of tripping due to difficult access

- For safe access,
use a platform ladder.

1. Fertiliser hopper is filled unevenly in the direction of travel.

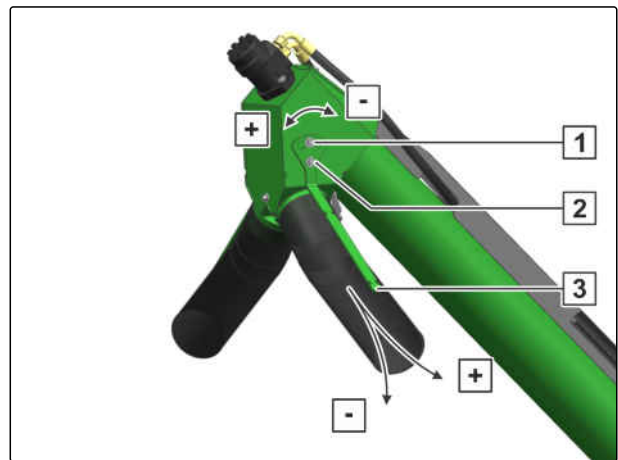
Loosen the bolt **2**.

2. Loosen the bolt **1** and remove it.

3. Move the outlet to the desired position.

4. Insert the bolt **1** and tighten it.

5. Tighten the bolt **2**.



CMS-I-00002029



CAUTION

Risk of tripping due to difficult access

- For safe access,
use a platform ladder.

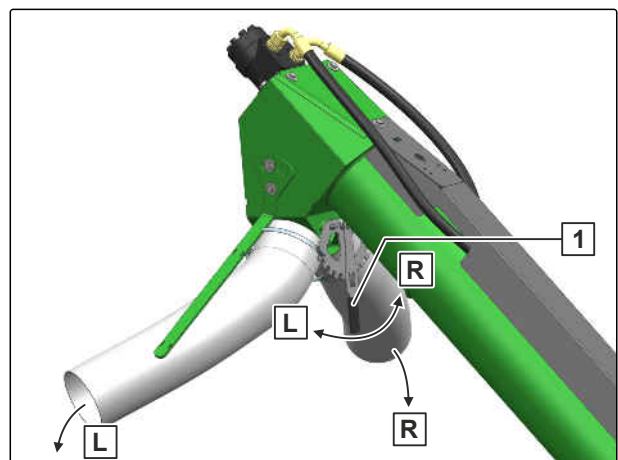
6. Fertiliser hopper is filled unevenly transverse to the direction of travel.

Unlock the setting lever **1**.

7. Move the setting lever to the desired position.

➔ In the end position, the outlet is closed.

8. The setting lever must lock in the setting grid.



CMS-I-00002030

6.5.6 Preparing FertiSpot for operation

CMS-T-00014356-A.1

6.5.6.1 Changing the rotor

CMS-T-00014360-A.1

Depending on the desired forward speed, the single rotor, double rotor or the strip placement unit is required.

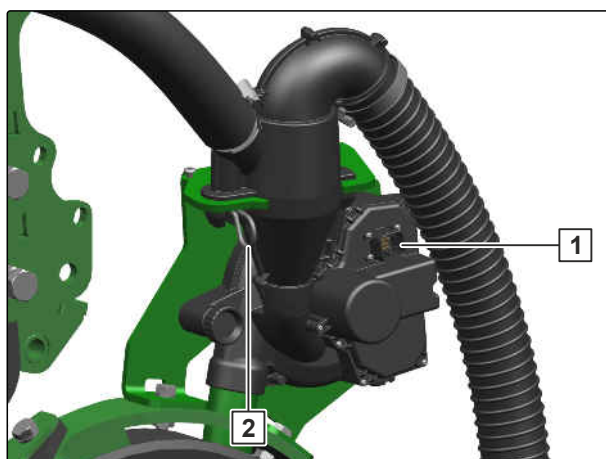
Single rotor						
Spread rate	Row width					
	45 cm	50 cm	60 cm	70 cm	75 cm	80 cm
60,000 Körner/ha to 100,000 Körner/ha	to 15 km/h	to 15 km/h	to 15 km/h	to 15 km/h	to 15 km/h	to 14 km/h
> 100000 Körner/ha to 120,000 Körner/ha	to 15 km/h	to 15 km/h	to 15 km/h	to 13 km/h	to 13 km/h	to 11 km/h
> 120000 Körner/ha to 150,000 Körner/ha	to 15 km/h	to 15 km/h	to 12 km/h	to 12 km/h	to 10 km/h	up to 9 km/h
> 150000 Körner/ha	Conversion to double rotor necessary.					

Double rotor						
Spread rate	Row width					
	45 cm	50 cm	60 cm	70 cm	75 cm	80 cm
60,000 Körner/ha to 100,000 Körner/ha	10 km/h to 15 km/h	9 km/h to 15 km/h	8 km/h to 15 km/h	7 km/h to 15 km/h	7 km/h to 15 km/h	6 km/h to 15 km/h
> 100000 Körner/ha to 120,000 Körner/ha	7 km/h to 15 km/h	6 km/h to 15 km/h	5 km/h to 15 km/h	5 km/h to 15 km/h	to 15 km/h	to 15 km/h
> 120000 Körner/ha to 150,000 Körner/ha	to 15 km/h	to 15 km/h	to 15 km/h	to 15 km/h	to 15 km/h	to 15 km/h
> 150000 Körner/ha to 300,000 Körner/ha	to 15 km/h	to 15 km/h	to 12 km/h	to 10 km/h	to 10 km/h	to 9 km/h
> 300000 Körner/ha to 380,000 Körner/ha	to 13 km/h	to 12 km/h	to 10 km/h	to 8 km/h	to 8 km/h	to 7 km/h
> 380000 Körner/ha to 500,000 Körner/ha	to 10 km/h	to 9 km/h	to 7 km/h	up to 6 km/h	Conversion to strip placement necessary.	



WORKSHOP WORK

1. Disconnect the energy supply from the metering unit housing **1**.
2. Remove the cotter pin **2**.

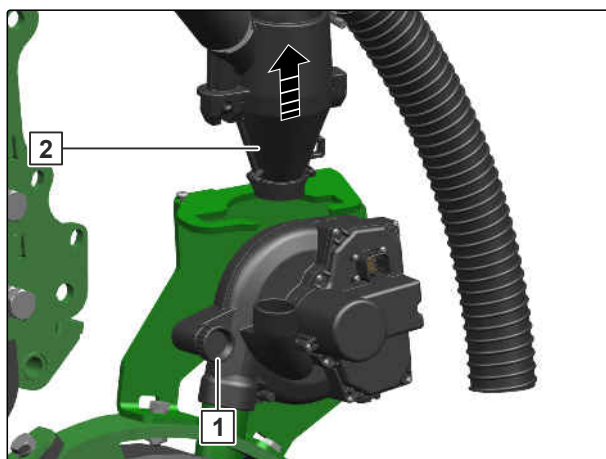


CMS-I-00009105



WORKSHOP WORK

3. Remove the air separator **2**.
4. Loosen the knurled nut **1**.

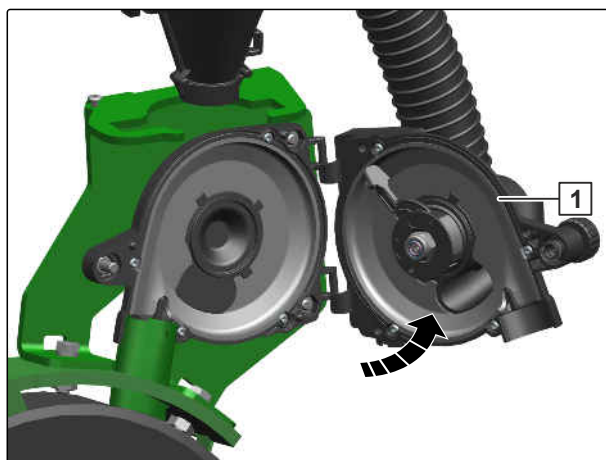


CMS-I-00009104



WORKSHOP WORK

5. Open the cover **1** of the metering unit housing.



CMS-I-00009103



WORKSHOP WORK

6. Remove the nut **3**.



NOTE

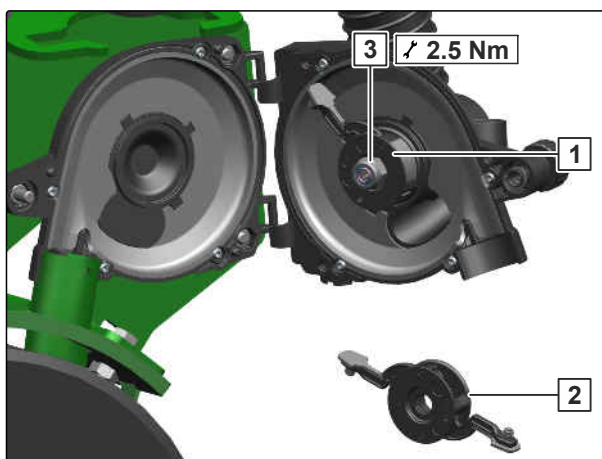
Pay attention to the rotor direction of rotation.

7. Install the desired rotor

or

*To switch to strip placement:
see page 82.*

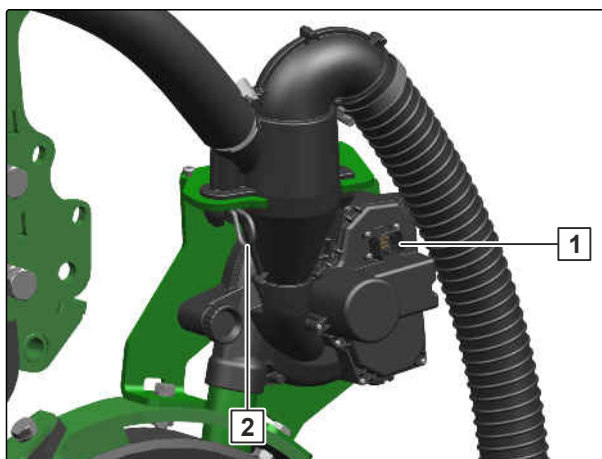
8. Put on the nut.



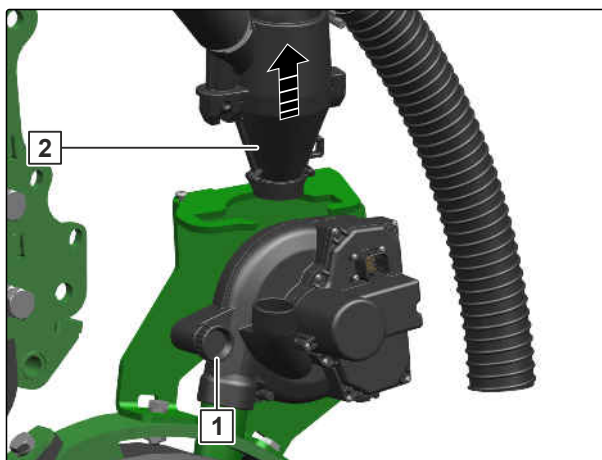
6.5.6.2 Converting FertiSpot to strip placement

CMS-T-00014361-A.1

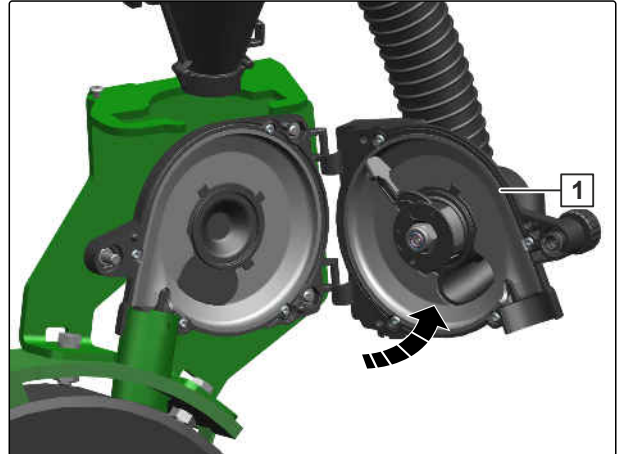
1. Disconnect the energy supply from the metering unit housing **1**.
2. Remove the cotter pin **2**.



3. Remove the air separator **2**.
4. Loosen the knurled nut **1**.

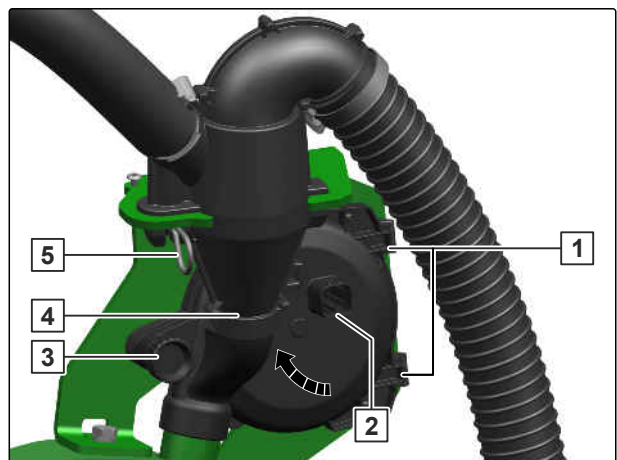


5. Open the cover **1** of the metering unit housing.



CMS-I-00009103

6. Install the cover **1** for strip placement.
7. Install the knurled nut **3**.
8. Install the air separator **4**.
9. Install the cotter pin **5**.
10. *To protect the energy supply from moisture:*
Install the plug on the cover for strip placement **2**.



CMS-I-00009314

6.5.7 Preparing the micropellet spreader for operation

CMS-T-00003596-H.1

6.5.7.1 Filling the micropellet hopper

CMS-T-00003595-E.1



REQUIREMENTS

- ✓ The micropellets are free of foreign objects
- ✓ The micropellets are dry and do not stick



IMPORTANT

Hopper cover damage caused by people walking on it

If the hopper cover is damaged, the hopper is not sealed. Metering will be faulty.

- Do not step on the hopper cover.

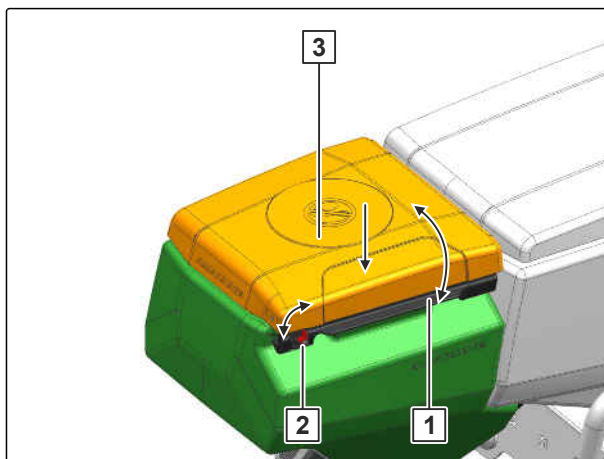
1. Open the fastener **2**.
2. Press the hopper cover **3** down.
3. Unlock the **1** fastener.
4. Open the hopper cover **1**.



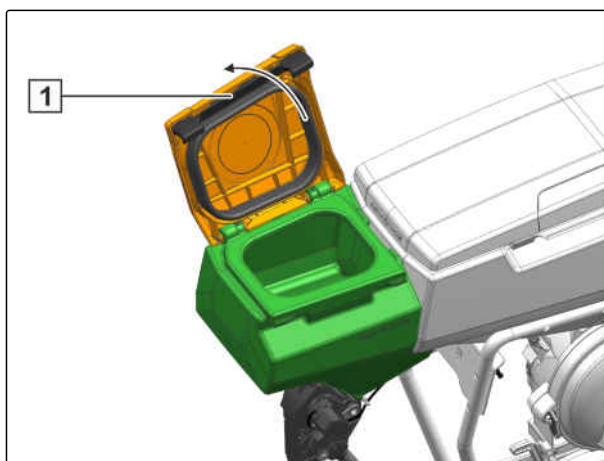
WARNING Risk of chemical burns by dressing dust

- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.

5. Fill the micropellet hopper.

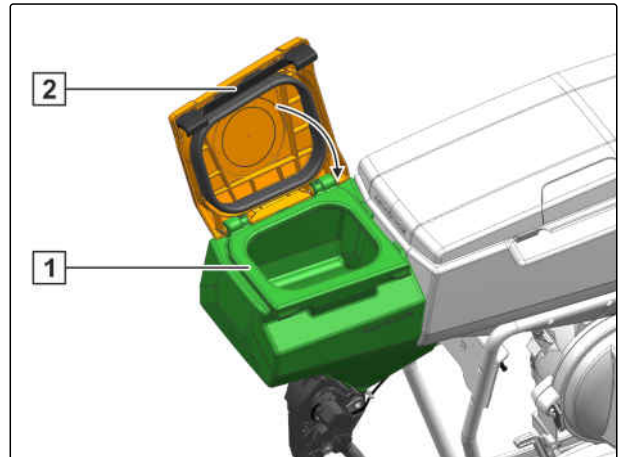


CMS-I-00002595



CMS-I-00002598

6. Clean the cover seal and sealing surface **1**.
7. Close the hopper cover.
- ➔ The fastener **2** is locked.
8. Close the fastener.



CMS-I-00002596

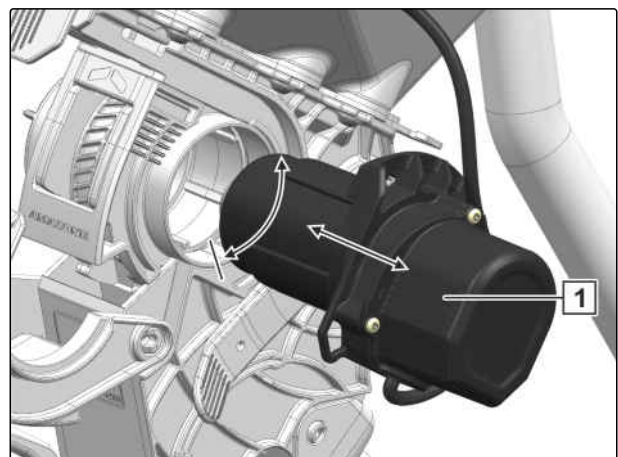
6.5.7.2 Changing the metering wheel

1. Set the sliding shutter **1** to the bottom position.



CMS-I-00002586

2. Turn the drive unit **1** counterclockwise.
3. Pull the drive unit out of the metering housing.



CMS-I-00002585

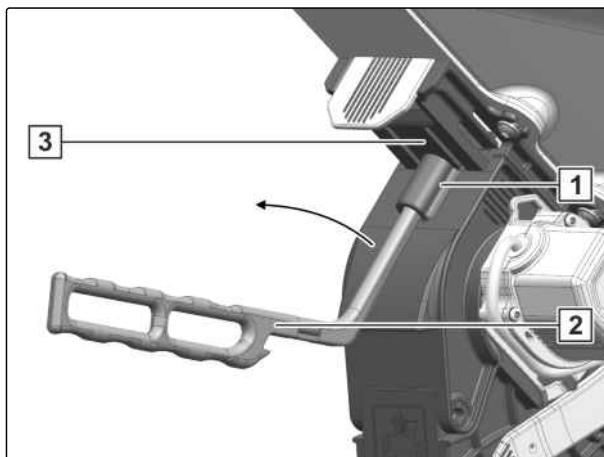
6 | Preparing the machine

Preparing the implement for operation

4. Insert the unlocking tool **2** into the metering unit cover **1**.
5. Unlock the metering unit cover on the metering housing **3**.

⚠ WARNING Risk of chemical burns by dressing dust

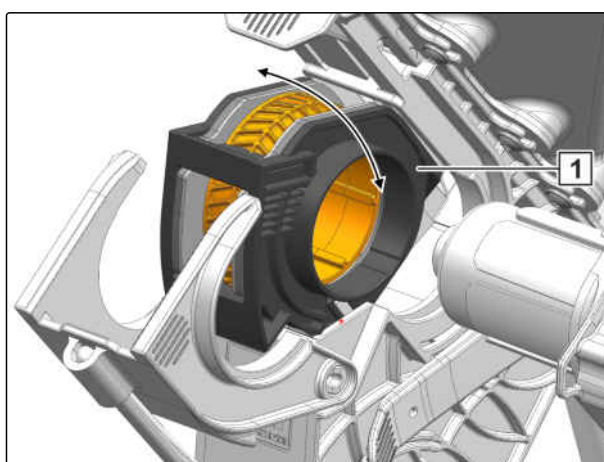
- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.



CMS-I-00002582

6. Open the metering unit cover.
7. Take the metering roller **1** out of the metering unit housing.

Metering wheel	Colour	Applications	Spread rate
Metering wheel 4 cm ³	Orange	Insecticide	5 kg/ha to 20 kg/ha
Metering wheel 3 cm ³	Silver grey	Slug pellets	2 kg/ha to 10 kg/ha
Metering wheel 12 cm ³	Green	Micro-fertiliser	10 kg/ha to 35 kg/ha



CMS-I-00002584

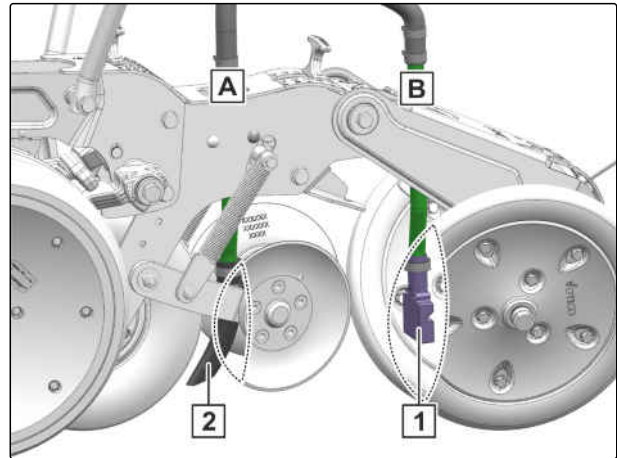
8. Insert the desired metering roller in the metering unit housing.
9. Close the metering unit cover.
- ➔ The locking mechanism engages.
10. Set the sliding shutter to the top position.
11. Insert the drive unit **1** into the metering roller.
12. Rotate the drive unit clockwise.

6.5.7.3 Changing the application point

CMS-T-00003633-D.1

PreTeC mulch seeding coulters with closer

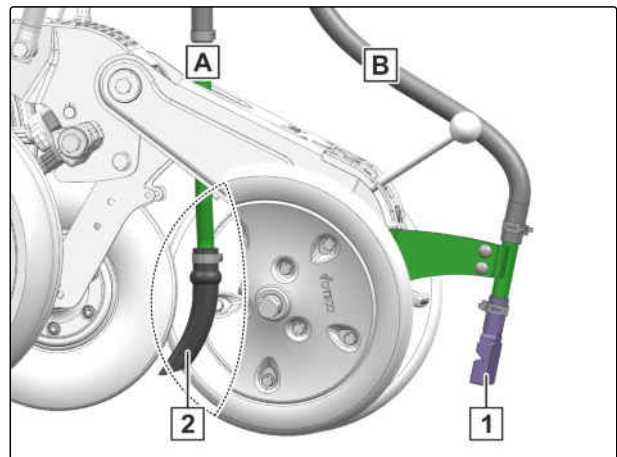
- 1 Application in the closing seed furrow, optionally with targeted outlet or diffuser.
- 2 Application in the seed furrow, optionally with targeted outlet or diffuser.



CMS-I-00002579

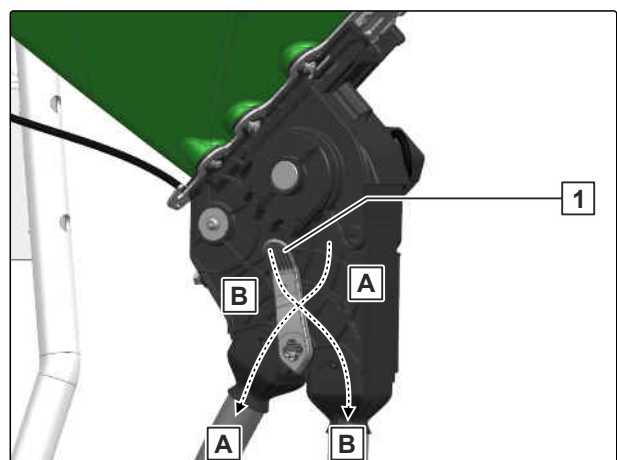
PreTeC mulch seeding coulter without closer

- 1 Application on the closed seed furrow with the diffuser.
- 2 Application in the seed furrow, optionally with targeted outlet or diffuser.



CMS-I-00002578

- To activate the outlet that is suitable for the application, move the switchover flap **1** to the desired position.



CMS-I-00002580

6.5.7.4 Adjusting the diffuser angle

CMS-T-00003884-C.1

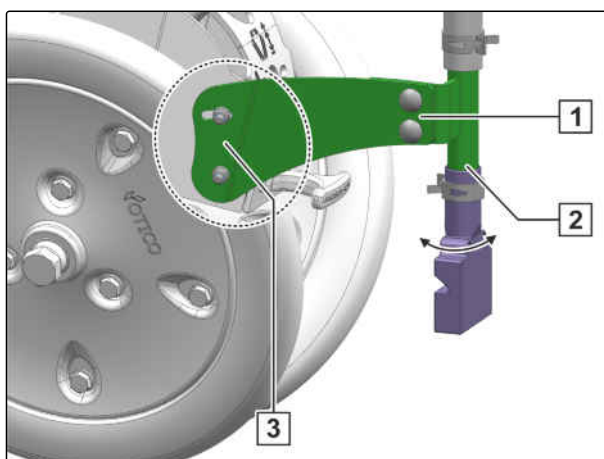
1. Loosen the bolts **1**.
2. Move the diffuser **2** to the desired position.

or

If the desired position cannot be set,

Loosen the bolts **3**.

3. Move the diffuser to the desired position.
4. Tighten the bolts.



CMS-I-00002837

6.5.8 Determining the seed settings

CMS-T-00007715-D.1

Seed		Seed singling unit							PreTeC mulch seeding coulter		
Variety	Thousand grain weight	Holes	Hole Ø	Colour	Sliding shutter	Air pressure	Filling block	Opto-sensor Ø	Feed channel Ø	Diameter of the furrow former	Seed press roller
Rapeseed	Maximum working speed 10 km/h.										
	< 4.5 g	120	1 mm	Light grey	B/C	35 mbar ± 5 mbar	Orange	16 mm	16 mm	12 mm	20 mm
	4.5 g to 7 g	120	1.3 mm	Anthracite grey	B/C			16 mm	16 mm	12 mm	20 mm
	> 7 g	120	1.6 mm	Black	B/C			16 mm	16 mm	12 mm	20 mm
Sorghum	25 g to 45 g	80	2.5 mm	Bordeaux red	B/C	35 mbar ± 5 mbar	Orange	16 mm	16 mm	16 mm	16 mm

Seed		Seed singling unit						PreTeC mulch seeding coulter			
Variety	Thousand grain weight	Holes	Hole Ø	Colour	Sliding shutter	Air pressure	Filling block	Opto-sensor Ø	Feed channel Ø	Diameter of the furrow former	Seed press roller
Soybean	<ul style="list-style-type: none">Silver-grey singling disc: maximum working speed 8 km/h.Violet singling disc: maximum working speed 12 km/h. Deviations can occur in the distribution along the row.45 cm or 50 cm row width with max. 50 Körner/m².Depending on the seed, the actual spread rate can deviate strongly from the target rate.										
	120 g to 265 g	80	4 mm	Silver grey	D/E	45 mbar ± 5 mbar	Green	16 mm	16 mm	16 mm	16 mm
	120 g to 265 g	120	4 mm	Purple	D/E			20 mm	20 mm to 16 mm	16 mm	16 mm
	Field bean		55	6 mm	Red	G/H	45 mbar ± 5 mbar	Green	20 mm	20 mm	16 mm
Maize	< 220 g	42	4.5 mm	Beige	E/F/G	45 mbar ± 5 mbar	Green	16 mm	16 mm	16 mm	16 mm
	220 g to 300 g	42	5 mm	Green	E/F/G			16 mm	16 mm	16 mm	16 mm
	> 300 g	42	5.5 mm	Purple	E/F/G			16 mm	16 mm	16 mm	16 mm
Sugar beet		34	2.2 mm	Blue	B/C	35 mbar ± 5 mbar	Orange	16 mm	16 mm	12 mm	20 mm

Seed		Seed singling unit							PreTeC mulch seeding coulter		
Variety	Thousand grain weight	Holes	Hole Ø	Colour	Sliding shutter	Air pressure	Filling block	Opto-sensor Ø	Feed channel Ø	Diameter of the furrow former	Seed press roller
Sunflower	For seeds larger than 15 mm: use an opto-sensor, feed channel, and furrow former with a diameter of 20 mm and preferably the pink singling disc.										
	70 g to 85 g	34	3 mm	Orange	E/F/G	35 mbar ± 5 mbar	Green	16 mm	16 mm	16 mm	16 mm
	85 g to 95 g	34	3.5 mm	Brown	E/F/G			16 mm	16 mm	16 mm	16 mm
	<95 g	34	4 mm	Pink	E/F/G			16 mm	16 mm	16 mm	16 mm
Squash		10	4 mm	Opal green	F/G	45 mbar ± 5 mbar	Green	20 mm	20 mm	20 mm	16 mm



NOTE

Operating conditions such as the grain shape, dressing or the addition of talcum affect the correct selection of the singling discs. The selection of the singling discs width must be adapted to the respective operating conditions and can only be determined during field operation.

The sliding shutter position and fan pressures are reference values.

1. The seed settings can be found in the table.
2. Adjust the fan speed.
3. Adjust the seed singling unit.
4. Adjust the PreTeC mulch seeding coulter.

6.5.9 Adjusting the grain singling unit

CMS-T-00001887-D.1

6.5.9.1 Changing the singling disc

CMS-T-00001889-D.1

REQUIREMENTS

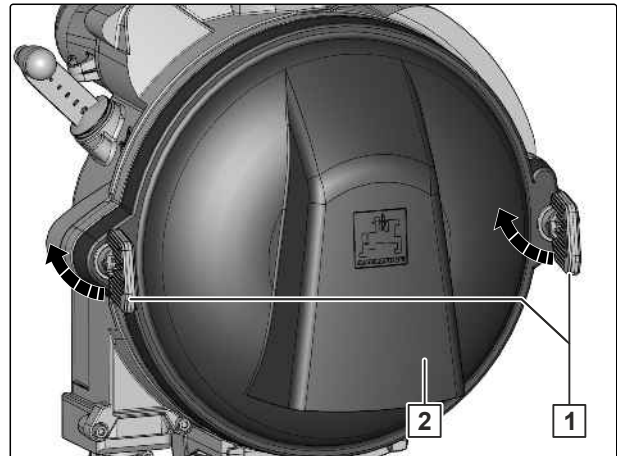
- ☑ The ideal hole diameter is known

1. Secure the tractor and implement.
2. Open the locks **1**.

WARNING Risk of chemical burns by dressing dust

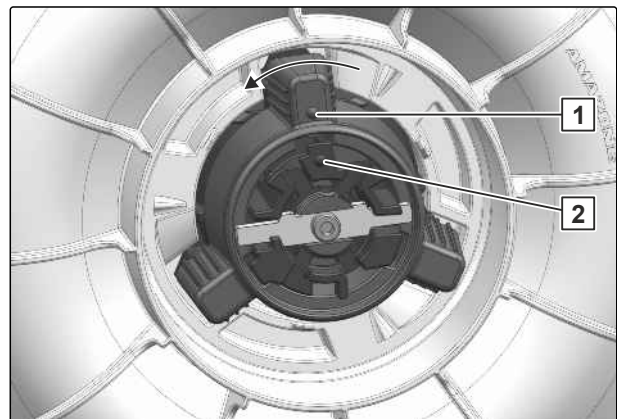
► Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.

3. Remove the cover **2**.



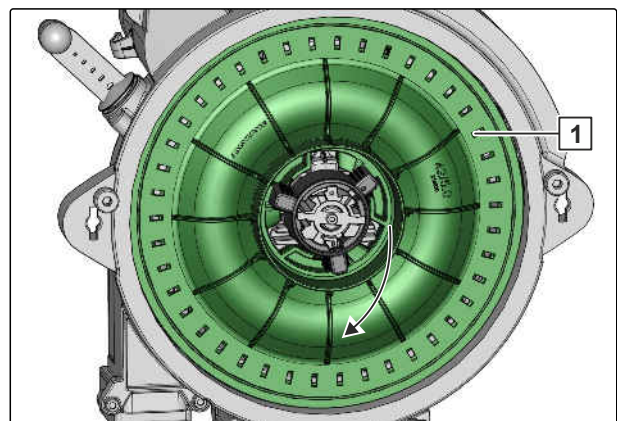
CMS-I-00007543

4. Release the lock until the points **1** and **2** are aligned.



CMS-I-00001910

5. remove the singling disc **1** from the drive hub.



CMS-I-00001912

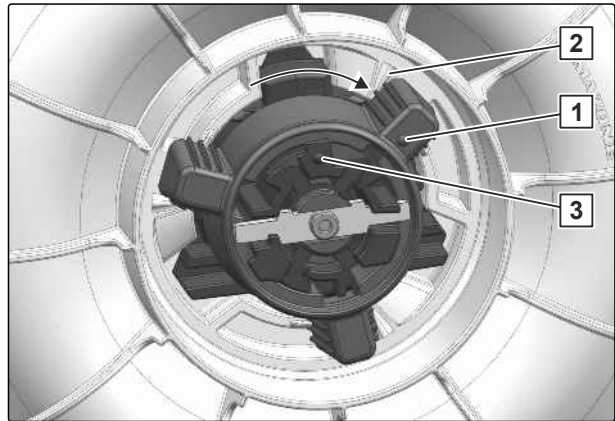
6 | Preparing the machine

Preparing the implement for operation

6. *To select the singling disc:*
See "Determining the seed settings".
7. *The studs point towards the seeding housing and stir the seed to ensure optimal filling of the disc.*
Install the desired singling disc.

8. Turn the lock beyond the notch **2**.

➔ The points **1** and **3** are no longer aligned.



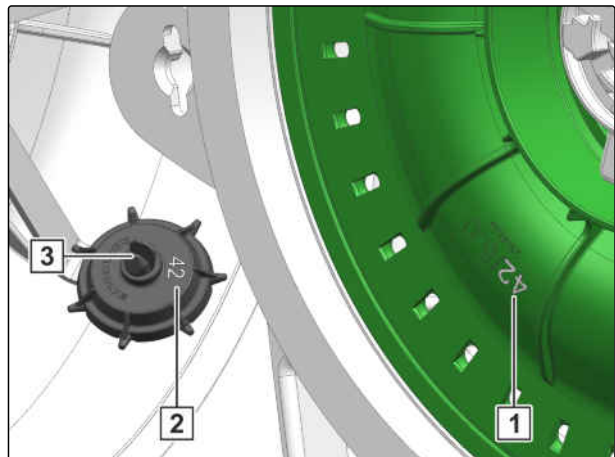
CMS-I-00001911

9. Press the ejector holder **3** together.

10. Pull off the ejection wheel **2**.

The number on the ejection wheel must be the same as the number of holes on the singling disc **1**. Deviating from this, the singling disc for squash requires an ejection wheel for the singling disc with 42 holes.

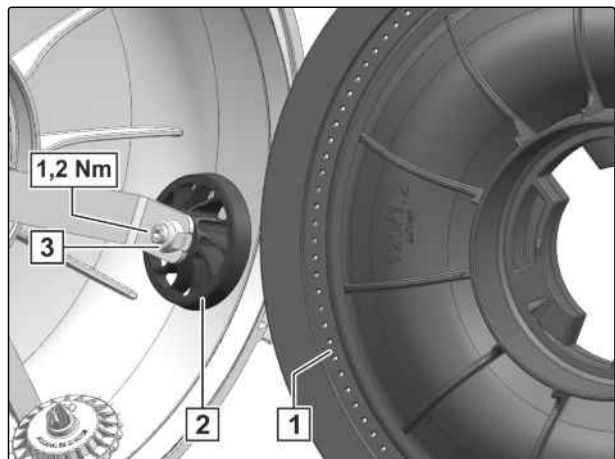
11. Install the desired ejection wheel.



CMS-I-00002072

For singling discs **1** with 1 mm, 1.3 mm and 1.6 mm holes, a narrow hole covering roller **2** is required.

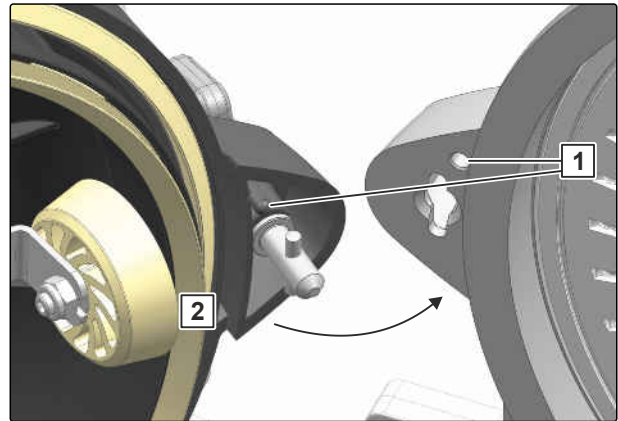
12. Remove the nut **3**.
13. Remove the wide hole covering roller.
14. Install the narrow hole covering roller **2**.
15. Put on the nut.
16. *If the singling unit is converted to fine seed:*
see page 251.



CMS-I-00003868

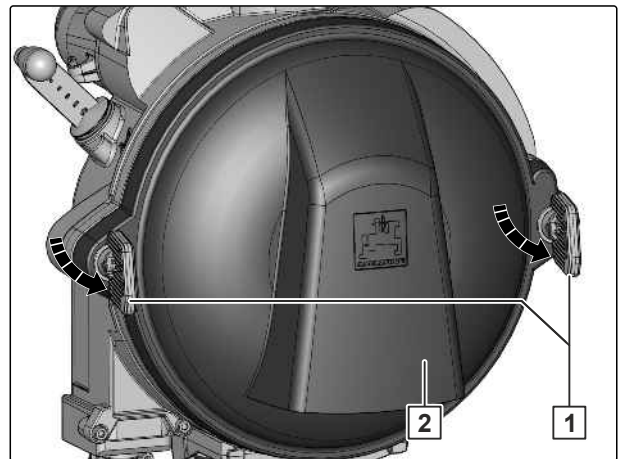
17. Align the guide pin **1**.

18. Close the cover **2**.



CMS-I-00001913

19. Close the locks **1**.



CMS-I-00007542

6.5.9.2 Adjusting the sliding shutter

CMS-T-00001901-F.1

i NOTE

The adjustment of the sliding shutter must be adapted to the respective operating conditions. The optimum adjustment can only be determined during field operation.

If a filling block is installed in the singling unit, more time elapses until the fill level is reached.

i NOTE

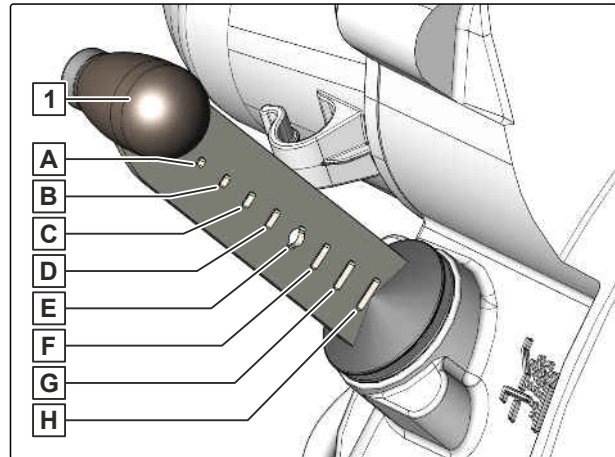
The factory setting of the sliding shutter is marked with a circular cut-out.

Seed	Rapeseed	Sorghum	Soybean	Field bean	Maize	Sugar beet	Sunflower	Squash
Position	B/C	B/C	D/E	G/H	E/F/G	B/C	E/F/G	F/G

6 | Preparing the machine

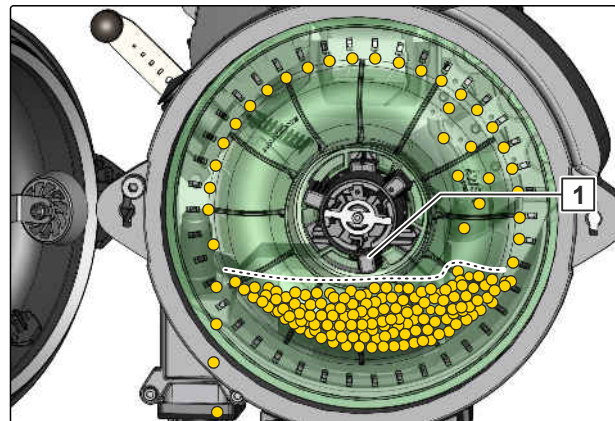
Preparing the implement for operation

1. Move the sliding shutter **1** to the desired position.
2. Check the fill level.



CMS-I-00001915

➔ The fill level must be just under the drive hub.



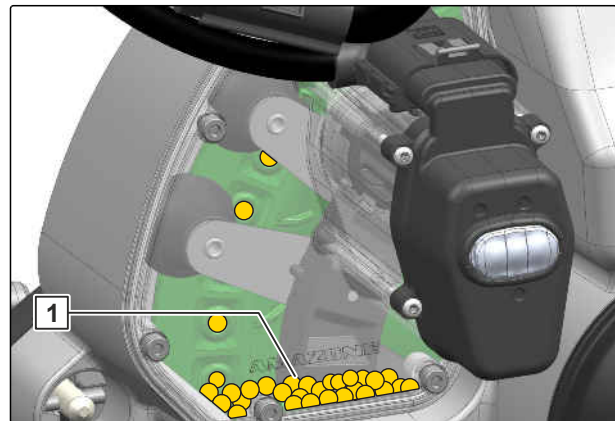
CMS-I-00008639

3. When the fill level **1** rises above the drive hub:
Gradually close the sliding shutter

or

If empty spaces occur:
Gradually open the sliding shutter.

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



CMS-I-00001916

6.5.9.3 Changing the opto-sensor and shot channel

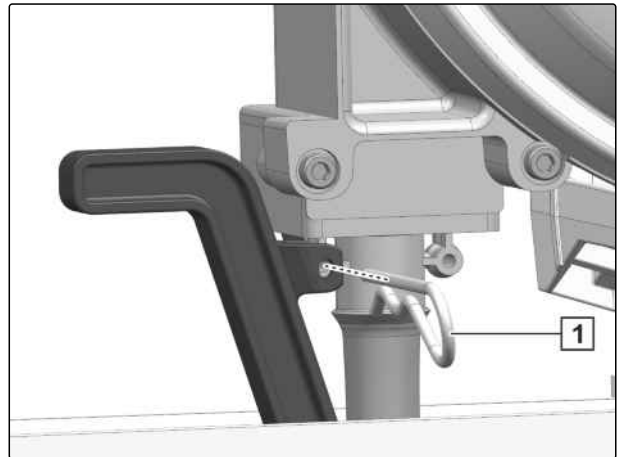
CMS-T-00005387-C.1



NOTE

The opto-sensor must be adapted to the respective operating conditions.

1. Uncouple the ISOBUS line.
2. Remove the spring cotter pin **1**.



CMS-I-00003814

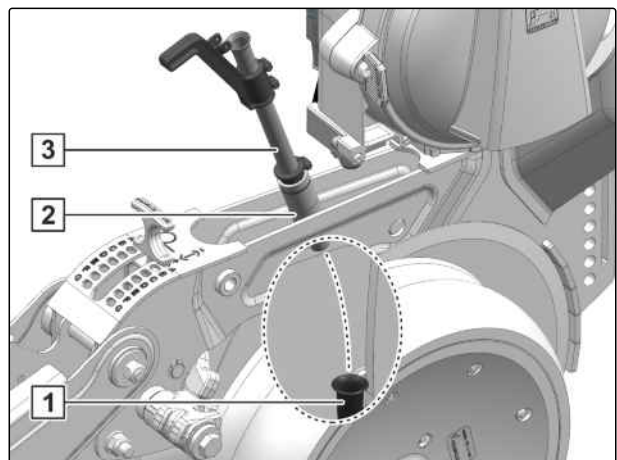


WARNING

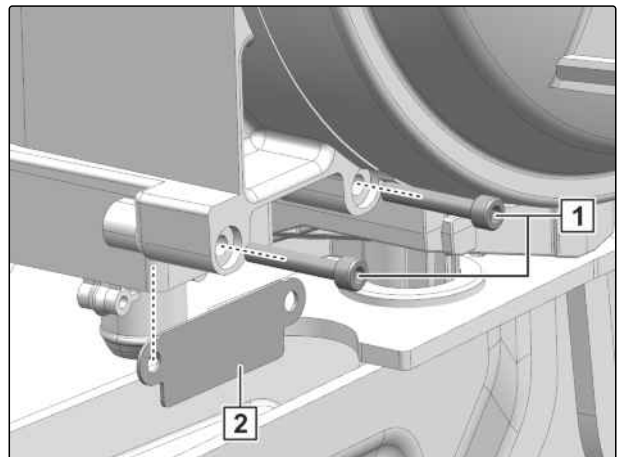
Risk of chemical burns by dressing dust

- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.

3. Press the shot channel **3** against the gasket **2** in the funnel **1**.
4. Swivel the shot channel away from the opto-sensor and pull it up.
5. Remove the bolts **1**.
6. Remove the spacer plate **2**.



CMS-I-00003815

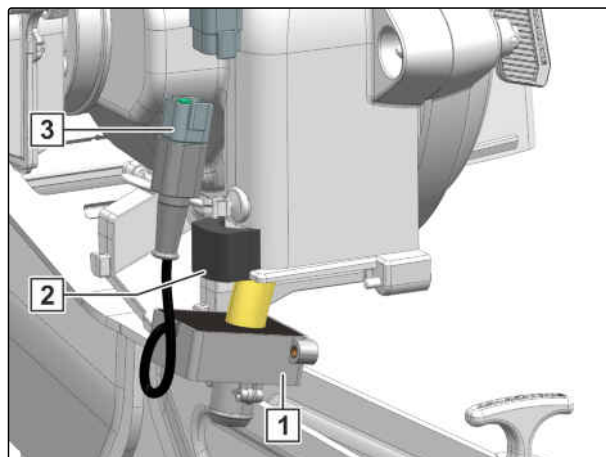


CMS-I-00003816

6 | Preparing the machine

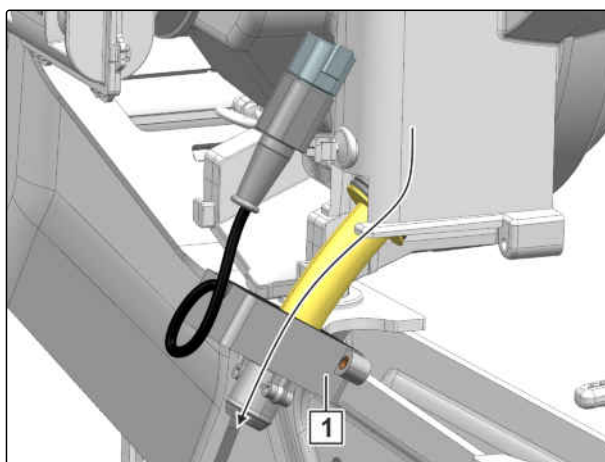
Preparing the implement for operation

7. Disconnect the plug connection **3**.
8. Move the opto-sensor **1** down.
9. Remove the gasket **2**.



CMS-I-00003817

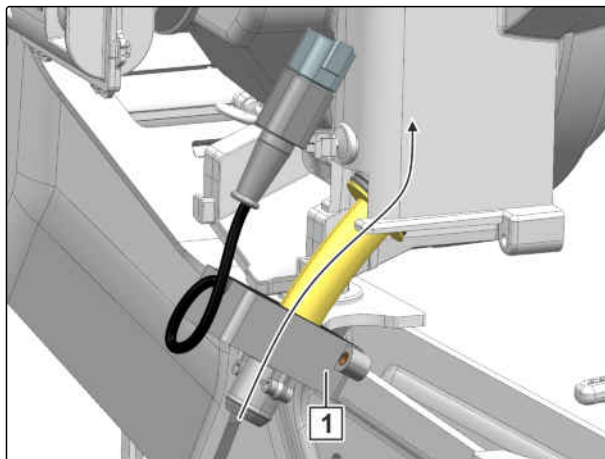
10. Remove the opto-sensor **1**.



CMS-I-00002827

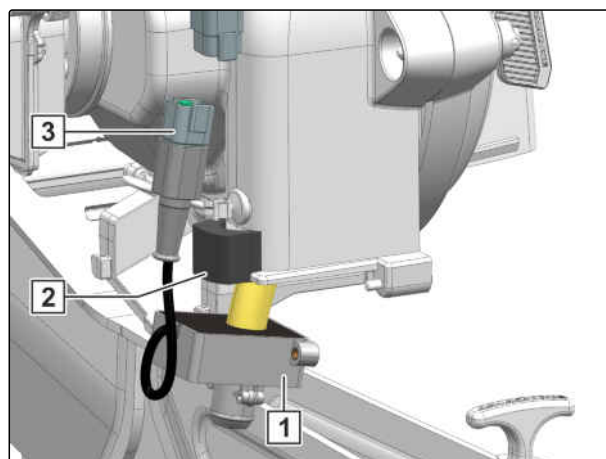
11. *To select the opto-sensor:*
See "Determining the seed settings".

12. Install the desired opto-sensor **1**.



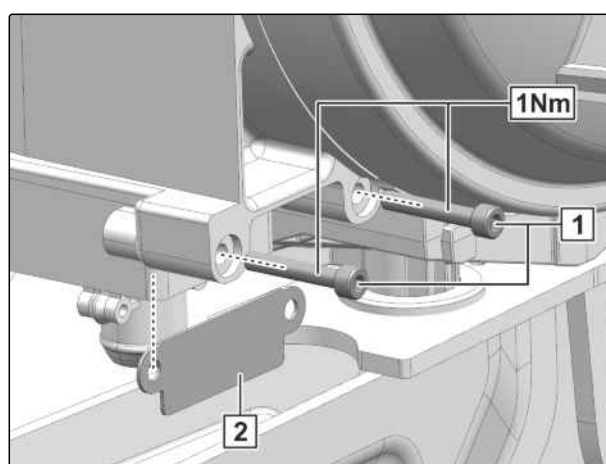
CMS-I-00002826

13. Move the opto-sensor **1** up.
14. Put on the gasket **2**.
15. Establish the plug connection **3**.



CMS-I-00003817

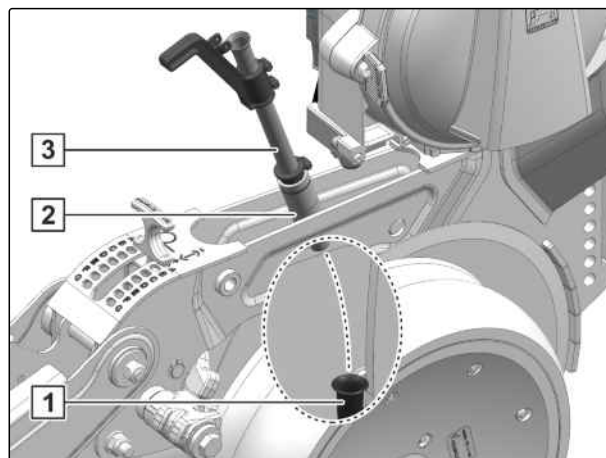
16. Install the spacer plate **2**.
17. Install the bolts **1**.



CMS-I-00003818

The shot channel **3** must be changed to fit the seed.

18. *To select the feed channel:*
See "Determining the seed settings".
19. Press the shot channel against the gasket **2** in the funnel **1**.
20. Swivel the shot channel under the opto-sensor.

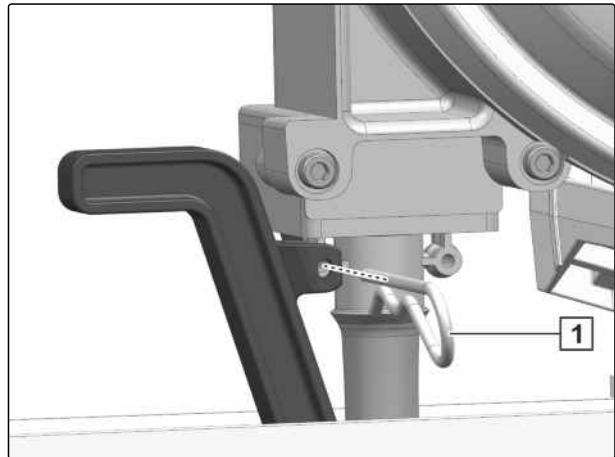


CMS-I-00003815

6 | Preparing the machine

Preparing the implement for operation

21. Install the shot channel with the spring cotter pin **1**.
22. Couple the ISOBUS line.
23. Restart the implement.



CMS-I-00003814

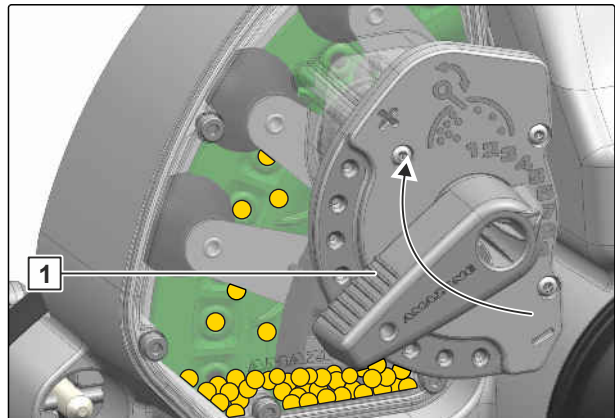
6.5.9.4 Adjusting the scraper mechanically

CMS-T-00001896-C.1

NOTE

The adjustment of the scraper must be adapted to the respective operating conditions. The optimum adjustment can only be determined during field operation.

1. *If the control terminal detects doubles,* increase the setting value on the scraper **1**.
2. *If the control terminal detects gaps,* reduce the setting value on the scraper **1**.
3. Check the adjustment of the scraper on the field after driving a short distance.



CMS-I-00001918

6.5.9.5 Adjusting the scraper electrically

CMS-T-00001897-D.1

NOTE

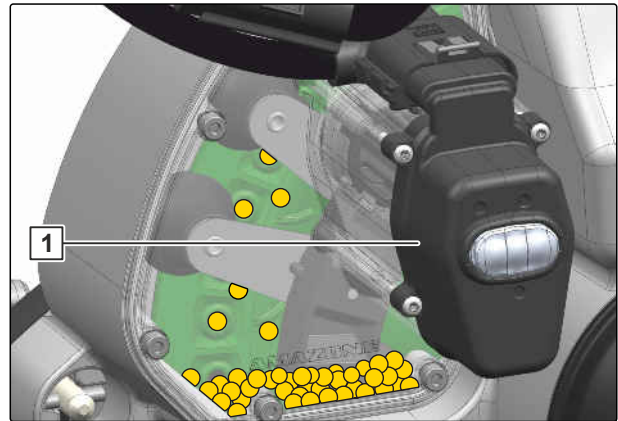
The adjustment of the scraper must be adapted to the respective operating conditions. The optimum adjustment can only be determined during field operation.

The control terminal detects doubles and gaps.

Depending on the implement equipment, the scrapers

1 are adjusted automatically.

1. *If the control terminal detects doubles:*
Increase the effect on the scraper.
2. *If the control terminal detects gaps:*
Reduce the effect on the scraper.
3. *To move the scraper to the desired position:*
See "Adjusting the scraper manually" in the ISOBUS operating manual.
4. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.



CMS-I-00001917

6.5.10 Changing the seed spread rate

CMS-T-00001884-I.1

6.5.10.1 Manually calculating the grain spacing

CMS-T-00003838-D.1

Formula symbol	Designation
G	Grains
G/ha	Spread rate per hectare
R _w	Row width m
K _{AB}	Grain spacing cm

$$\frac{K}{m^2} = \frac{K}{ha} \times \frac{1 ha}{10.000m^2}$$

$$\frac{K}{m^2} = \frac{\boxed{}}{ha} \times \frac{1 ha}{10.000m^2} = \boxed{}$$

$$K_{Ab} = \frac{1}{\frac{K}{m^2} \times R_w} \times \frac{100cm}{1m}$$

$$K_{Ab} = \frac{1}{\frac{\boxed{}}{m^2} \times \boxed{}} \times \frac{100cm}{1m} = \boxed{}$$

CMS-I-00002047



NOTE

For grain spacing ≤ 4 cm, there can be multiples or gaps in the holes of the singling disc. Reduce the working speed to obtain consistent high placement accuracy.

- Determine the grain spacing using the equation.

6.5.10.2 Adjusting the electrically driven grain singling unit

CMS-T-00002038-H.1

6.5.10.2.1 Adjusting the spread rate

CMS-T-00001886-D.1



NOTE

For grain spacing ≤ 4 cm, there can be multiples or gaps in the holes of the singling disc. Reduce the working speed to obtain consistent high placement accuracy.

- See "Changing the seed spread rate" in the ISOBUS operator manual

6.5.10.2.2 Determining the working speed

CMS-T-00002251-G.1



NOTE

The specified values are reference values. They are based on a constant power supply of at least 12 volt.

Singling disc with 10 holes					
Spread rate	Row width				
	0.45 m	0.6 m	0.75 m	0.8 m	0.9 m
1 Körner/m ²	3.9 km/h to 15 km/h	3 km/h to 15 km/h	2.4 km/h to 15 km/h	2.2 km/h to 15 km/h	2 km/h to 15 km/h
1.2 Körner/m ²	3.3 km/h to 15 km/h	2.5 km/h to 15 km/h	2 km/h to 15 km/h	1.9 km/h to 15 km/h	1.7 km/h to 15 km/h
1.4 Körner/m ²	2.8 km/h to 15 km/h	2.1 km/h to 15 km/h	1.7 km/h to 15 km/h	1.6 km/h to 15 km/h	1.4 km/h to 15 km/h
1.6 Körner/m ²	2.5 km/h to 15 km/h	1.9 km/h to 15 km/h	1.5 km/h to 15 km/h	1.4 km/h to 15 km/h	1.3 km/h to 14.6 km/h
1.8 Körner/m ²	2.2 km/h to 15 km/h	1.7 km/h to 15 km/h	1.4 km/h to 15 km/h	1.3 km/h to 15 km/h	-
2 Körner/m ²	2 km/h to 15 km/h	1.5 km/h to 15 km/h	1.2 km/h to 14 km/h	1.1 km/h to 13.1 km/h	-

Singling disc with 34 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
≤ 9 Körner/m ²	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
10 Körner/m ²	15 km/h	15 km/h	15 km/h	13.5 km/h	12.6 km/h
11 Körner/m ²	15 km/h	15 km/h	15 km/h	12.2 km/h	11.5 km/h

Singling disc with 34 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
12 Körner/m ²	15 km/h	15 km/h	15 km/h	11.2 km/h	10.5 km/h
13 Körner/m ²	15 km/h	15 km/h	12.9 km/h	10.4 km/h	9.7 km/h
14 Körner/m ²	15 km/h	14.4 km/h	12 km/h	9.6 km/h	9 km/h
15 Körner/m ²	15 km/h	13.5 km/h	11.2 km/h	9 km/h	8.4 km/h
16 Körner/m ²	14 km/h	12.6 km/h	10.5 km/h	8.4 km/h	7.9 km/h
17 Körner/m ²	13.2 km/h	11.9 km/h	9.9 km/h	7.9 km/h	7.4 km/h
18 Körner/m ²	12.5 km/h	11.2 km/h	9.4 km/h	7.5 km/h	7 km/h

Singling disc with 42 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
≤10 Körner/m ²	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
11 Körner/m ²	15 km/h	15 km/h	15 km/h	15 km/h	14.2 km/h
12 Körner/m ²	15 km/h	15 km/h	15 km/h	13.9 km/h	13 km/h
13 Körner/m ²	15 km/h	15 km/h	15 km/h	12.8 km/h	12 km/h
14 Körner/m ²	15 km/h	15 km/h	14.9 km/h	11.9 km/h	11.1 km/h
15 Körner/m ²	15 km/h	15 km/h	13.9 km/h	11.1 km/h	10.4 km/h
16 Körner/m ²	15 km/h	15 km/h	13 km/h	10.4 km/h	9.7 km/h
17 Körner/m ²	15 km/h	14.7 km/h	12.2 km/h	9.8 km/h	9.2 km/h
18 Körner/m ²	15 km/h	13.9 km/h	11.6 km/h	9.2 km/h	8.7 km/h

Singling disc with 55 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
20 Körner/m ²	15 km/h	15 km/h	13.6 km/h	10.9 km/h	10.2 km/h
24	15 km/h	13.6 km/h	11.3 km/h	9.1 km/h	8.5 km/h
28 Körner/m ²	13 km/h	11.7 km/h	9.7 km/h	7.8 km/h	7.3 km/h
32 Körner/m ²	11.3 km/h	10.2 km/h	8.5 km/h	6.8 km/h	6.4 km/h
36 Körner/m ²	10.1 km/h	9.1 km/h	7.6 km/h	6.1 km/h	5.7 km/h
40 Körner/m ²	9.1 km/h	8.2 km/h	6.8 km/h	5.4 km/h	5.1 km/h
44 Körner/m ²	8.3 km/h	7.4 km/h	6.2 km/h	5 km/h	4.6 km/h
48 Körner/m ²	7.6 km/h	6.8 km/h	5.7 km/h	4.5 km/h	4.3 km/h
52 Körner/m ²	7 km/h	6.3 km/h	5.2 km/h	4.2 km/h	3.9 km/h
56 Körner/m ²	6.5 km/h	5.8 km/h	4.9 km/h	3.9 km/h	3.6 km/h

Singling disc with 55 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
60 Körner/m ²	6.1 km/h	5.4 km/h	4.5 km/h	3.6 km/h	3.4 km/h

Singling disc with 80 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
32 Körner/m ²	15 km/h	14.9 km/h	12.4 km/h	9.9 km/h	9.3 km/h
36 Körner/m ²	14.7 km/h	13.2 km/h	11 km/h	8.8 km/h	8.3 km/h
40 Körner/m ²	13.2 km/h	11.9 km/h	9.9 km/h	7.9 km/h	7.4 km/h
44 Körner/m ²	12 km/h	10.8 km/h	9 km/h	7.2 km/h	6.8 km/h
48 Körner/m ²	11 km/h	9.9 km/h	8.3 km/h	6.6 km/h	6.2 km/h
52 Körner/m ²	10.2 km/h	9.1 km/h	7.6 km/h	6.1 km/h	5.7 km/h
56 Körner/m ²	9.4 km/h	8.5 km/h	7.1 km/h	5.7 km/h	5.3 km/h
60 Körner/m ²	8.8 km/h	7.9 km/h	6.6 km/h	5.3 km/h	5 km/h
64 Körner/m ²	8.3 km/h	7.4 km/h	6.2 km/h	5 km/h	4.6 km/h
68 Körner/m ²	7.8 km/h	7 km/h	5.8 km/h	4.7 km/h	4.4 km/h
72 Körner/m ²	7.3 km/h	6.6 km/h	5.5 km/h	4.4 km/h	4.1 km/h
76 Körner/m ²	6.9 km/h	6.3 km/h	5.2 km/h	4.2 km/h	3.9 km/h
80 Körner/m ²	6.6 km/h	5.9 km/h	5 km/h	4 km/h	3.7 km/h

Singling disc with 120 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
≤28 Körner/m ²	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
32 Körner/m ²	15 km/h	15 km/h	15 km/h	14.9 km/h	13.9 km/h
36 Körner/m ²	15 km/h	15 km/h	15 km/h	13.2 km/h	12.5 km/h
40 Körner/m ²	15 km/h	15 km/h	14.9 km/h	11.9 km/h	11.1 km/h
44 Körner/m ²	15 km/h	15 km/h	13.5 km/h	10.8 km/h	10.2 km/h
48 Körner/m ²	15 km/h	14.9 km/h	12.5 km/h	9.9 km/h	9.3 km/h
52 Körner/m ²	15 km/h	13.7 km/h	11.4 km/h	9.1 km/h	8.6 km/h
56 Körner/m ²	14.1 km/h	12.8 km/h	10.7 km/h	8.6 km/h	7.9 km/h
60 Körner/m ²	13.2 km/h	11.9 km/h	9.9 km/h	7.9 km/h	7.5 km/h
64 Körner/m ²	12.5 km/h	11.1 km/h	9.3 km/h	7.5 km/h	6.9 km/h
68 Körner/m ²	11.7 km/h	10.5 km/h	8.7 km/h	7.1 km/h	6.6 km/h
72 Körner/m ²	10.9 km/h	9.9 km/h	8.3 km/h	6.6 km/h	6.2 km/h

Singling disc with 120 holes					
Spread rate	Row width				
	0.45 m	0.5 m	0.6 m	0.75 m	0.8 m
76 Körner/m ²	10.4 km/h	9.5 km/h	7.8 km/h	6.3 km/h	5.9 km/h
80 Körner/m ²	9.9 km/h	8.9 km/h	7.5 km/h	6 km/h	5.6 km/h

- The maximum working speed for the desired spread rate can be read from the table.

6.5.10.3 Adjusting the mechanically driven grain singling unit

CMS-T-00003646-F.1

6.5.10.3.1 Determining the gear ratio with leading wheel drive

CMS-T-00003651-D.1

REQUIREMENTS

- ☑ The singling disc is selected
- ☑ The gear wheel in the leading wheel drive is selected

1. To calculate the desired grain spacing from the spread rate:

Refer to the AmaScan2 operating manual, "Entering the target rate"

or

Refer to the AmaCheck operating manual, "Determining the grain spacing".

2. Depending on the gear wheel **1** in the leading wheel drive and the desired grain spacing: Determine the gear ratio for the leading wheel drive from the table.

The screenshot shows the AmaScan2 control panel. At the top, there is a diagram of the leading wheel drive with a gear labeled '1' and a distance 'a' in cm. Below this is a large table with columns A, B, and a series of gear ratios. To the right of the table, there is a diagram of a gear with 'Z=15' and a label '330 Imp./100m'.

A	B	120	80	55	42	34	10
17	25	10,7	16,0	23,3	30,6	37,7	128,3
17	24	10,3	15,4	22,4	29,3	36,2	123,2
17	23	9,8	14,8	21,5	28,1	34,7	118,1
17	22	9,4	14,1	20,5	26,9	33,2	112,9
20	25	9,1	13,6	19,8	26,0	32,1	109,1
19	23	8,8	13,2	19,2	25,2	31,1	105,6
17	20	8,6	12,8	18,7	24,4	30,2	102,7
21	24	8,3	12,5	18,1	23,7	29,3	99,7
17	19	8,1	12,2	17,7	23,2	28,7	97,5
25	27	7,9	11,8	17,1	22,4	27,7	94,3
24	25	7,6	11,4	16,5	21,6	26,7	90,9
21	21	7,3	10,9	15,9	20,8	25,7	87,3
25	24	7,0	10,5	15,2	19,9	24,6	83,8
27	25	6,7	10,1	14,7	19,2	23,8	80,8
19	17	6,5	9,8	14,2	18,6	23,0	78,1
24	21	6,4	9,5	13,9	18,2	22,5	76,4
20	17	6,2	9,3	13,5	17,7	21,8	74,2
23	19	6,0	9,0	13,1	17,2	21,2	72,1
25	20	5,8	8,7	12,7	16,6	20,5	69,8
27	21	5,7	8,5	12,3	16,2	20,0	67,9
25	19	5,5	8,3	12,1	15,8	19,5	66,3
27	20	5,4	8,1	11,8	15,4	19,0	64,6
24	17	5,2	7,7	11,2	14,7	18,2	61,8
25	17	4,9	7,4	10,8	14,1	17,5	59,3
27	17	4,6	6,9	10,0	13,1	16,2	54,9

CMS-I-00002868

6 | Preparing the machine

Preparing the implement for operation

3. Depending on the gear wheel **2** in the leading wheel drive and the desired grain spacing:
Determine the gear ratio for the leading wheel drive from the table.

The determined gear ratio depends on the wheel slip.

4. To determine the pulses per 100 m during field operation:

refer to the AmaScan2 operating manual,
"Running in the pulses",

or

refer to the AmaCheck operating manual,
"Running in the pulses".

A	B	120	80	55	42	34	10
17	25	5,3	8,0	11,7	15,3	18,9	64,2
17	24	5,1	7,7	11,2	14,7	18,1	61,6
17	23	4,9	7,4	10,7	14,1	17,4	59,0
17	22	4,7	7,1	10,3	13,4	16,6	56,5
20	25	4,5	6,8	9,9	13,0	16,0	54,5
19	23	4,4	6,6	9,6	12,6	15,5	52,8
17	20	4,3	6,4	9,3	12,2	15,1	51,3
21	24	4,2	6,2	9,1	11,9	14,7	49,9
17	19	4,1	6,1	8,9	11,6	14,3	48,8
25	27	3,9	5,9	8,6	11,2	13,9	47,1
24	25	3,8	5,7	8,3	10,8	13,4	45,5
21	21	3,6	5,5	7,9	10,4	12,8	43,6
25	24	3,5	5,2	7,6	10,0	12,3	41,9
27	25	3,4	5,1	7,3	9,6	11,9	40,4
19	17	3,3	4,9	7,1	9,3	11,5	39,0
24	21	3,2	4,8	6,9	9,1	11,2	38,2
20	17	3,1	4,6	6,7	8,8	10,9	37,1
23	19	3,0	4,5	6,6	8,6	10,6	36,0
25	20	2,9	4,4	6,3	8,3	10,3	34,9
27	21	2,8	4,2	6,2	8,1	10,0	33,9
25	19	2,8	4,1	6,0	7,9	9,8	33,2
27	20	2,7	4,0	5,9	7,7	9,5	32,3
24	17	2,6	3,9	5,6	7,4	9,1	30,9
25	17	2,5	3,7	5,4	7,1	8,7	29,7
27	17	2,3	3,4	5,0	6,5	8,1	27,5

CMS-I-00002869

a_R	Mathematically calculated grain spacing
a_T	Grain spacing determined on the control terminal
I_E	Determined pulses per 100 m
$I_Z = \text{Pulses per 100 m}$	
$Z=15$	330
$Z=30$	660

$$a_R = \frac{a_T}{I_Z} \times I_E$$

$$a_R = \frac{18,2}{330} \times 300 = 16,6$$

$$a_R = \frac{\boxed{}}{\boxed{}} \times \boxed{} = \boxed{}$$

CMS-I-00002684

If the determined pulses per 100 m differs from the values below, the desired grain spacing must be calculated mathematically.

- Manually calculate the desired grain spacing.
- Read the gear ratio for the manually calculated grain spacing from the table.

6.5.10.3.2 Determining the gear ratio with trailing wheel drive

CMS-T-00003652-F.1

REQUIREMENTS

- ☑ The singling disc is selected

1. To calculate the desired grain spacing from the spread rate:
refer to the AmaScan2 operating manual,
"Determining the grain spacing",

or

Refer to the AmaCheck operating manual,
"Determining the grain spacing".

2. With the desired grain spacing:
Determine the gear ratio for the trailing wheel drive from the table.

The determined gear ratio depends on the wheel slip.

3. To determine the pulses per 100 m during field operation,
refer to the AmaScan2 operating manual,
"Running in the pulses",

or

refer to the AmaCheck operating manual,
"Running in the pulses".

The screenshot shows the AmaScan2 control terminal interface. At the top, there is a diagram of a trailing wheel drive with a gear selection lever (A/B) and a distance indicator 'a [cm]'. Below this is a large table with columns A, B, and a grid of values. To the right of the table, there is a diagram of a wheel with a gear ratio 'Z=24' and a pulse count '485 Imp./100m'.

A	B	120	80	55	42	34	10
17	25	7,3	10,9	15,9	20,8	25,7	87,3
17	24	7,0	10,5	15,2	20,0	24,7	83,8
17	23	6,7	10,0	14,6	19,1	23,6	80,3
17	22	6,4	9,6	14,0	18,3	22,6	76,8
20	25	6,2	9,3	13,5	17,7	21,8	74,2
19	23	6,0	9,0	13,1	17,1	21,1	71,9
17	20	5,8	8,7	12,7	16,6	20,5	69,9
21	24	5,7	8,5	12,3	16,2	20,0	67,9
17	19	5,5	8,3	12,1	15,8	19,5	66,4
25	27	5,3	8,0	11,7	15,3	18,9	64,1
24	25	5,2	7,7	11,2	14,7	18,2	61,9
21	21	4,9	7,4	10,8	14,1	17,5	59,4
25	24	4,8	7,1	10,4	13,6	16,8	57,0
27	25	4,6	6,9	10,0	13,1	16,2	55,0
19	17	4,4	6,6	9,7	12,7	15,6	53,1
24	21	4,3	6,5	9,4	12,4	15,3	52,0
20	17	4,2	6,3	9,2	12,0	14,8	50,5
23	19	4,1	6,1	8,9	11,7	14,4	49,1
25	20	4,0	5,9	8,6	11,3	14,0	47,5
27	21	3,8	5,8	8,4	11,0	13,6	46,2
25	19	3,8	5,6	8,2	10,7	13,3	45,1
27	20	3,7	5,5	8,0	10,5	12,9	44,0
24	17	3,5	5,3	7,6	10,0	12,4	42,1
25	17	3,4	5,0	7,3	9,6	11,9	40,4
27	17	3,1	4,7	6,8	8,9	11,0	37,4

CMS-I-00002790

a_R	Mathematically calculated grain spacing
a_T	Grain spacing determined on the control terminal
I_E	Determined pulses per 100 m
$I_Z = \text{Pulses per 100 m}$	
$Z=24$	485

$$a_R = \frac{a_T}{I_Z} \times I_E$$

$$a_R = \frac{18,2}{485} \times 463 = 17,4$$

$$a_R = \frac{\boxed{}}{\boxed{}} \times \boxed{} = \boxed{}$$

CMS-I-00002683

6 | Preparing the machine

Preparing the implement for operation

If the determined pulses per 100 m differs from the values below, the desired grain spacing must be calculated mathematically.

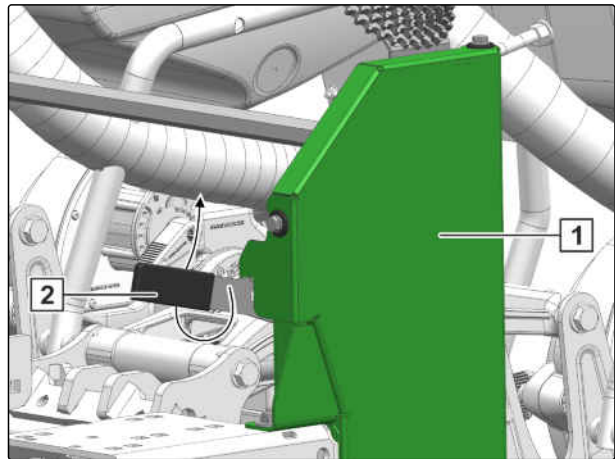
4. Manually calculate the desired grain spacing.
5. Read the gear ratio for the manually calculated grain spacing from the table.

6.5.10.3.3 Adjusting the grain spacing in the interchangeable wheel gear

CMS-T-00003634-C.1

1. Release the lever **2** and swivel it up.

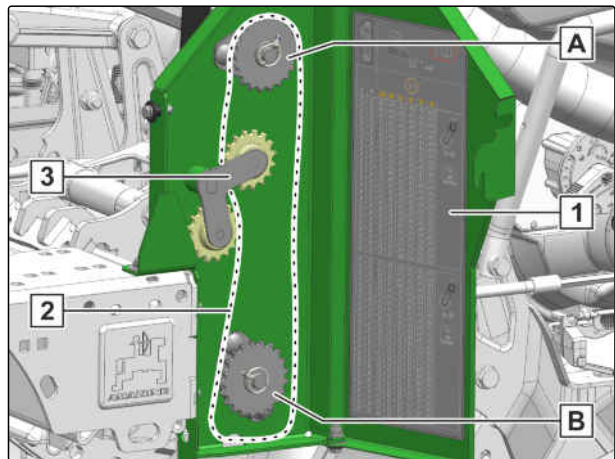
➔ The cover **1** opens automatically.



CMS-I-00002656

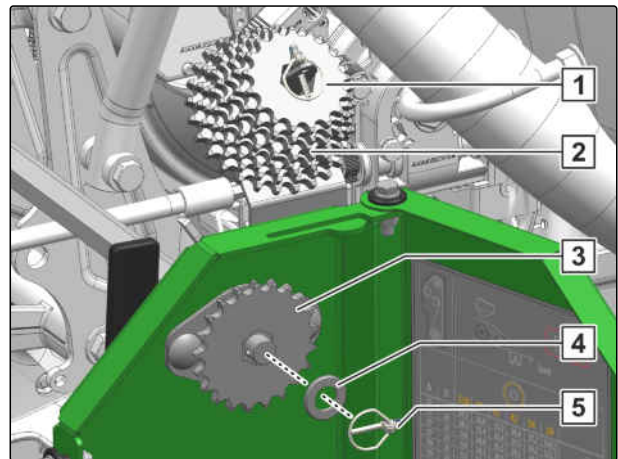
The chain tensioner **3** is relieved. The drive chain **2** is lying loosely on the chain wheels **A** and **B**.

2. To determine the right gear ratio **1**, refer to the operating manual, "Determining the gear ratio for the wheel drive".

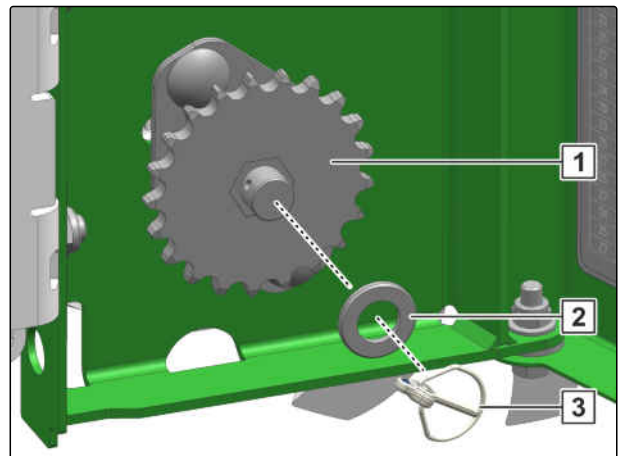


CMS-I-00002654

3. Remove the cotter pin **5**.
4. Remove the washer **4**.
5. Remove the gear wheel **3**.
6. Remove the cotter pin **1**.
7. Take the desired gear wheel from the parking position **2**.
8. Put the removed gear wheel in the parking position **2**.
9. Install the cotter pin.
10. Install the desired gear wheel on the drive shaft.
11. Install the washer.
12. Install the cotter pin.
13. Remove the cotter pin **3**.
14. Remove the washer **2**.
15. Remove the gear wheel **1**.
16. Take the desired gear wheel from the parking position.
17. Put the removed gear wheel in the parking position.
18. Install the desired gear wheel on the drive shaft.
19. Install the washer.
20. Install the cotter pin.



CMS-I-00002653



CMS-I-00002652

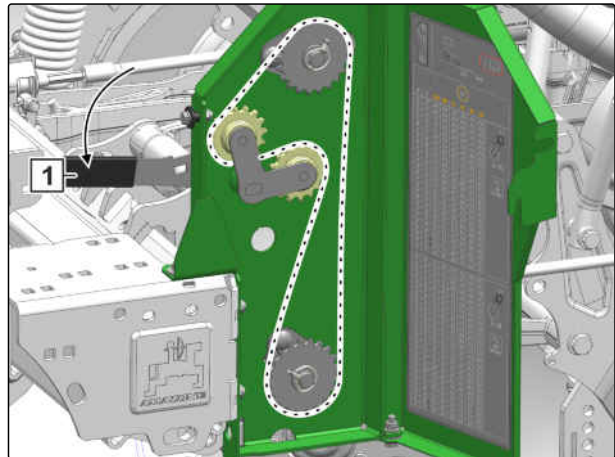
6 | Preparing the machine

Preparing the implement for operation

21. Actuate the lever **1**.

➔ The drive chain will be tightened.

22. Hold the lever.

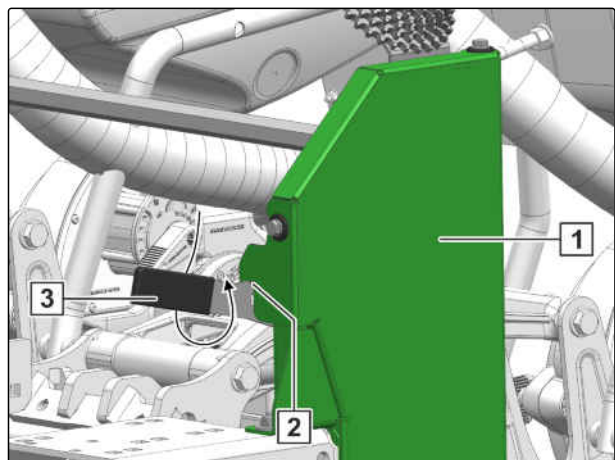


CMS-I-00002651

23. Close the cover **1** against the spring pressure.

24. *To lock the cover,*
Continue actuating the lever **3**.

➔ The cover will be locked on the chain tensioner **2**.



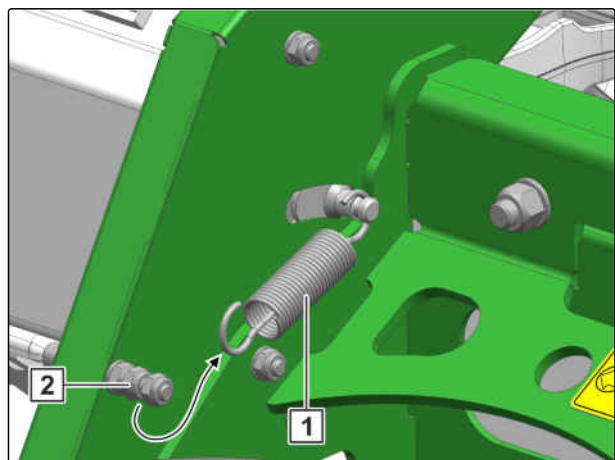
CMS-I-00002647

6.5.10.3.4 Replacing the gear wheel in the leading wheel drive

CMS-T-00003647-C.1

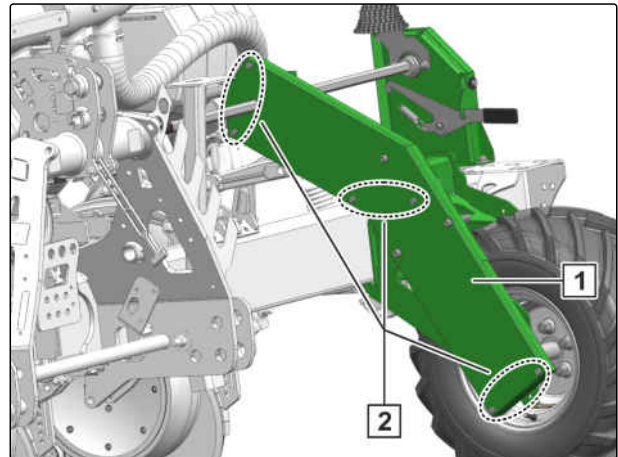
If the high spread rate is not reached when seeding rapeseed or soya, replace gear wheel Z=15 with gear wheel Z=30.

1. *To relieve the drive chain,*
release the tension spring **1** from the retaining pin **2**.



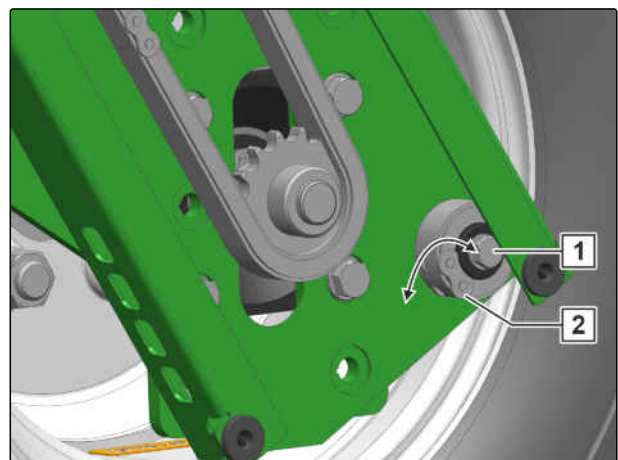
CMS-I-00002649

2. Remove the bolts **2**.
3. Push the cover **1** to the side.
4. Swivel up the cover.



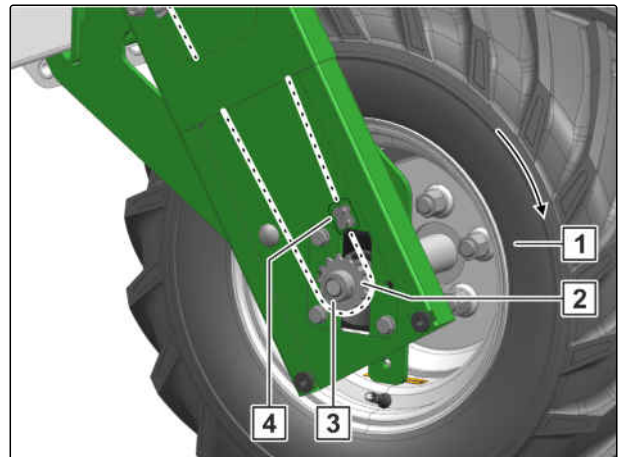
CMS-I-00002646

5. Loosen the bolt **1**.
6. *If the parking position can be tipped far enough, take the chain extension **2** from the parking position.*



CMS-I-00005656

7. *To make the chain lock **4** accessible, turn the drive wheel **1** clockwise.*
8. Remove the clamping ring **3**.
9. Remove the gear wheel Z=15.
10. Install the gear wheel Z=30.
11. Install the chain extension.
12. Put the gear wheel **2** in the chain.
13. Install the gear wheel on the drive shaft.
14. Install the clamping ring.

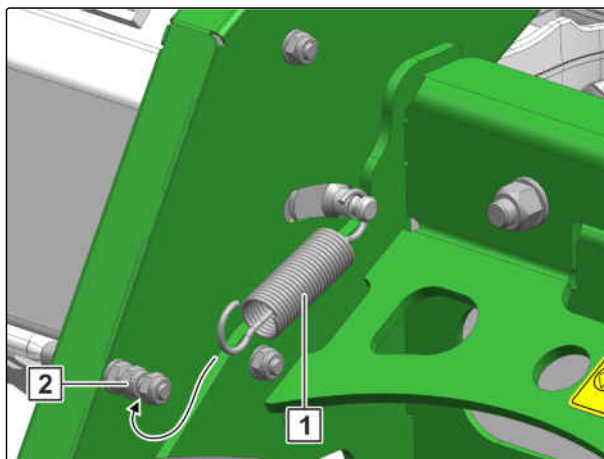


CMS-I-00002657

6 | Preparing the machine

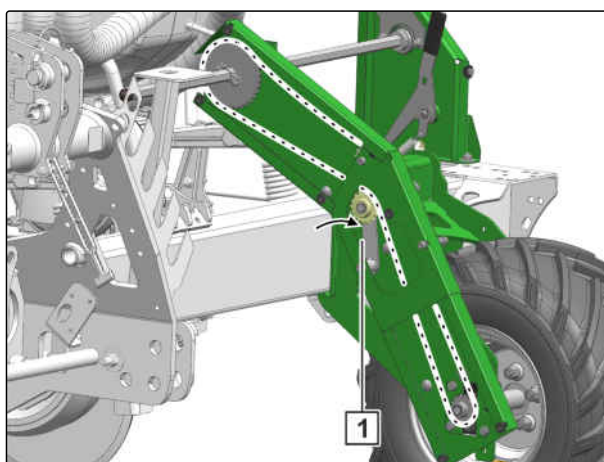
Preparing the implement for operation

15. To tighten the drive chain,
put the tension spring **2** around the retaining pin **3**.



CMS-I-00002650

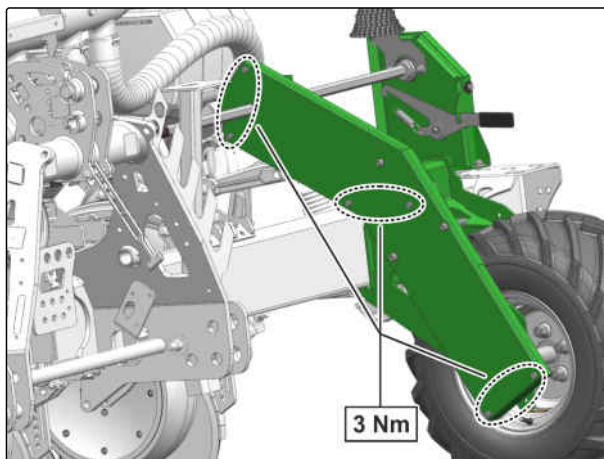
16. To ensure that the tightened drive chain **1**
runs on all of the gear wheels,
turn the drive wheel.



CMS-I-00002648

17. Install the cover **1**.

18. Install the bolts and washers **2**.

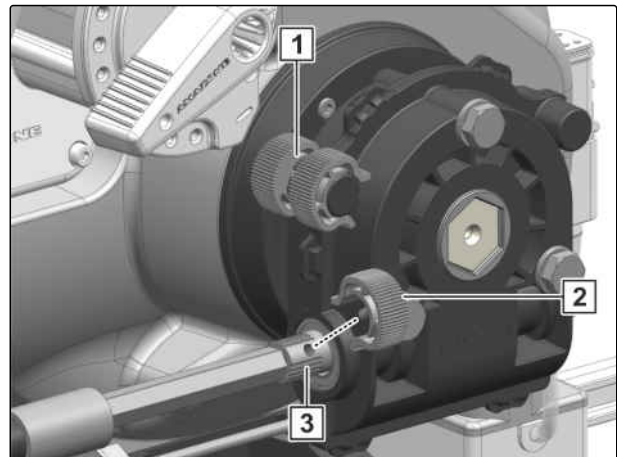


CMS-I-00002645

6.5.10.3.5 Deactivating the mechanically driven grain singling unit

CMS-T-00003865-A.1

1. To deactivate the mechanically driven grain singling unit, remove the shear pin **2**.
- ➔ The grain singling unit is separated from the drive shaft **3**.
2. Park the shear pin on the grain singling unit **1**.



CMS-I-00002696

6.5.11 Adjusting the PreTeC mulch seeding coulter

CMS-T-00005523-F.1

6.5.11.1 Adjusting the star clearers

CMS-T-00001933-E.1

The star clearers allow the seeding unit to run smoothly on soils with coarse surface structures. The star clearers should only move plant residues to the side. If the soil is moved completely, the press roller does not have enough fine soil to close the seed furrow.



CAUTION

The star clearers are subject to wear. This can cause sharp edges.

- Wear protective gloves.

1. Lift the implement.
2. Secure the tractor and implement.
3. Remove the linch pin **1**.

6 | Preparing the machine

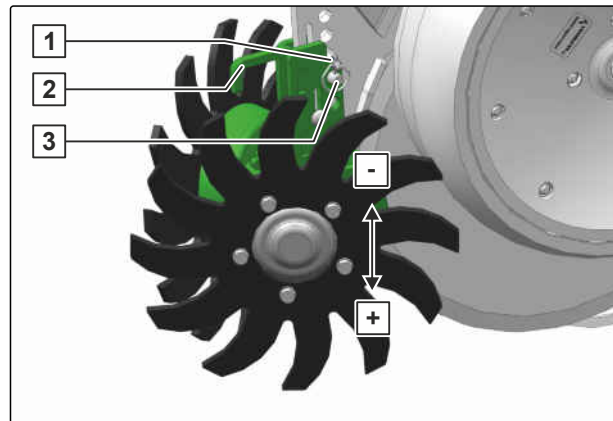
Preparing the implement for operation

4. Hold the star clearer by the handle **2**.
5. Pull out the positioning pin **3**.
6. Move the star clearer by the handle to the desired position

or

If star clearers are not needed:

Secure the star clearers in the topmost position.



CMS-I-00002084

7. Insert the positioning pin in the adjuster segment.
8. Secure the pin with the linch pin.
9. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.

6.5.11.2 Adjusting the clod clearers

CMS-T-00001934-E.1

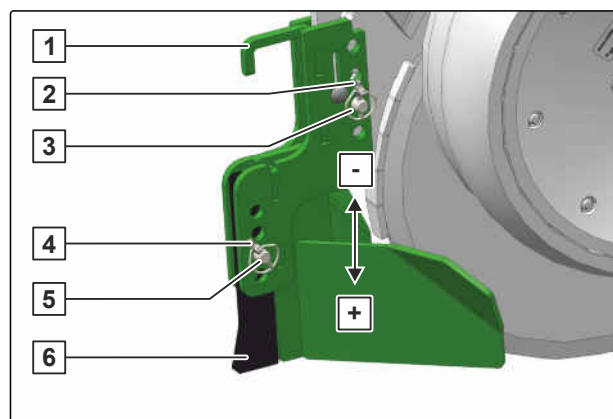
The clod clearers allow the seeding unit to run smoothly on soils with coarse surface structures. The clod clearer and the clod clearer tip should only move large clods or stones to the side. The clod clearer tip may not work deeper than the coulter. If the soil is moved completely by the clod clearer or the clod clearer tip, the press roller does not have enough fine soil to close the seed furrow.

1. Lift the implement.
2. Secure the tractor and implement.
3. Hold the clod clearer by the handle **1**.
4. Remove the linch pin **2**.
5. Pull out the positioning pin **3**.
6. Move the clod clearer by the handle to the desired position

or

If clod clearers are not needed:

Secure the clod clearers in the topmost position.



CMS-I-00002086

7. Insert the positioning pin in the adjuster segment.

8. Secure the pin with the linch pin.
9. Check the adjustment of the clod clearers on the field after driving a short distance.
10. Remove the linch pin **4**.
11. Hold the coulter tip **6**.
12. Pull out the positioning pin **5**.
13. Move the coulter tip to the desired position.



NOTE

Do not position the coulter tip too deep.

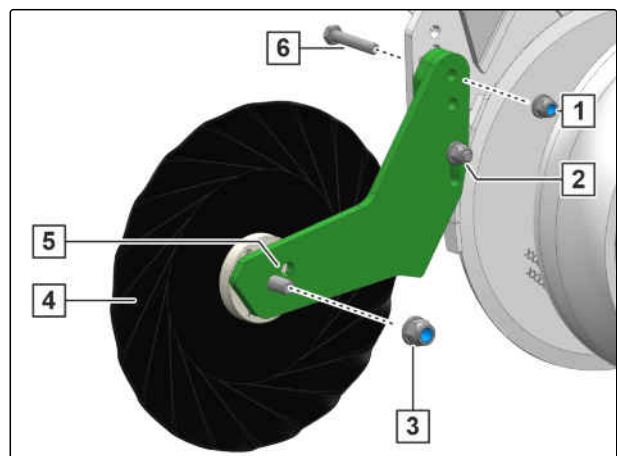
14. Insert the positioning pin in the adjuster segment.
15. Secure the pin with the linch pin.
16. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.

6.5.11.3 Adjusting the rigid cutting disc

CMS-T-00007646-C.1

The rigid cutting discs allow the seeding unit to run smoothly on soils with coarse surface structures. The rigid cutting discs cut through plant residues and clear the area of the seeding coulter.

1. Lift the implement.
2. Secure the tractor and implement.
3. Remove the nut and washer **1**.
4. Remove the bolt **6**.
5. loosen the nut **2**.
6. Move the bracket **5** to the desired height.
7. Install the bolt.
8. Install the nuts and washers and tighten them.



CMS-I-00005362

6 | Preparing the machine

Preparing the implement for operation

If the setting range is not enough, install the cutting disc **4** at the desired height on the bracket.

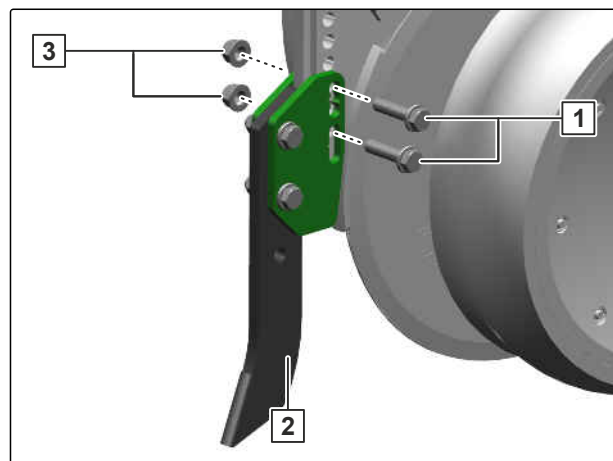
9. Remove the nut and washers **3**.
10. Install the cutting disc at the desired height on the bracket.
11. Install the nut and washer.
12. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.

6.5.11.4 Adjusting the clearing chisel

The clearing chisel moves plant residues to the side and slightly penetrates the soil surface. As a result, the coulter penetrates more easily into heavy soils.

Depending on cultivation conditions, it may be possible to spread seed without soil tillage. The prerequisite is cleared, short-cut crop stubbles on dry soils that are not too heavy or too clayey.

1. Loosen the nuts **3**.
2. Remove the nuts and washers.
3. Remove the bolts **1**.
4. Move the clearing chisel **2** to the desired position.
5. Install the bolts.
6. Install the nuts and washers and tighten them.
7. *To check the setting:*
Drive for 30 m at working speed. Check the work pattern.

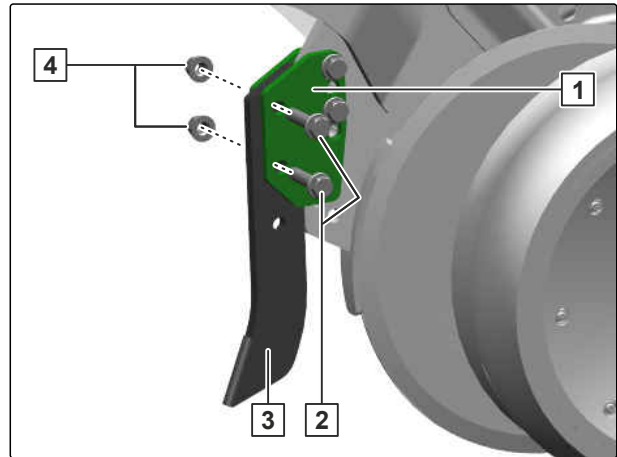


CMS-T-00013901-A.1

CMS-I-00008648

If clearing chisels are not needed, the clearing chisels must be removed for placement depths greater than 8 cm. If the placement depth is less than 8 cm, it suffices to install the holder **1** together with the clearing chisel in the topmost position.

8. Loosen the nuts **4**.
9. Remove the nuts and washers.
10. Remove the bolts **2**.
11. Move the clearing chisel **3** into the topmost position
or
Remove the clearing chisel.
12. Install the bolts.
13. Install the nuts and washers and tighten them.



CMS-I-00009197

6.5.11.5 Adjusting the seed placement depth

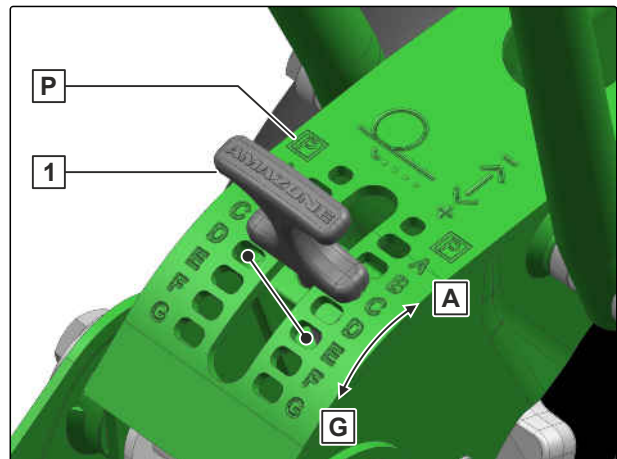
1. Lift the implement.
2. Secure the tractor and implement.
3. Unlock the setting lever **1**.



NOTE

The setting lever can also be engaged in half-steps in the grid.

4. *To increase the seed placement depth:*
Move the setting lever towards **G**
or
To reduce the seed placement depth:
Move the setting lever towards **A**.
5. *To park the implement:*
Move the seed placement depth on all rows into the position **P**.



CMS-I-00001919



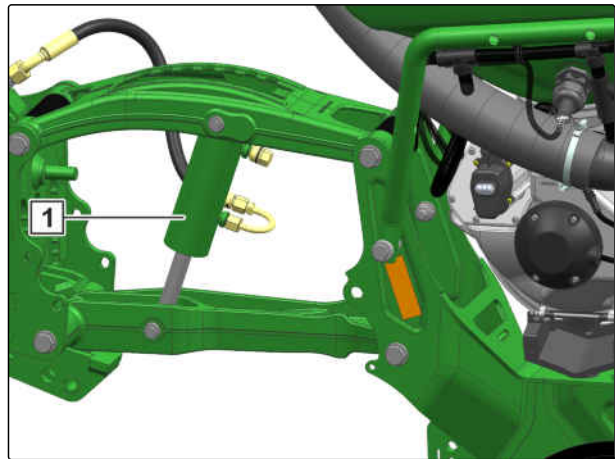
NOTE

Beyond seed placement depth positions F-G, the contact force regulation has no function.

6. *To change from contact force regulation to coulter pressure control:*
See "Configuring the coulter pressure monitoring" in the ISOBUS operating manual.
7. *To check the setting:*
Drive for 30 m at working speed and "check the seed placement depth".

6.5.11.6 Adjusting the coulter pressure hydraulically

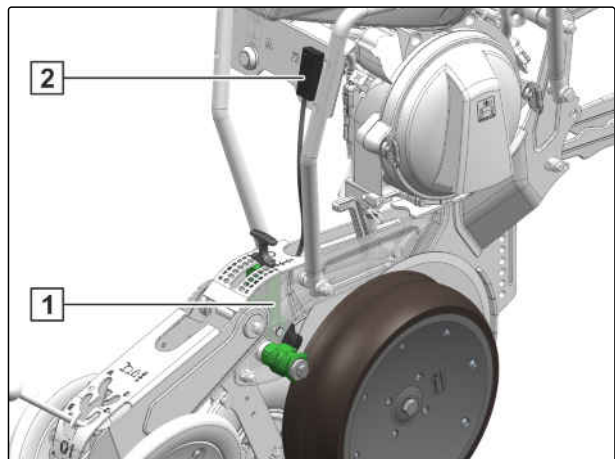
The coulter pressure is applied with a hydraulic cylinder **1**.



CMS-T-00005524-E.1

CMS-I-00003953

The hydraulic coulter pressure system can be equipped with contact force regulation. The force sensors **1** determine the contact force of the coulters. The signal processing **2** calculates an average value for all coulters and regulates the pressure in the hydraulic coulter pressure system.



CMS-I-00003921

1. Switch on the fan.



NOTE

The working range is between 5 bar and 100 bar.

2. *To increase the coulter pressure for heavy soils* ☐ **+** *or reduce it for light soils* ☐ **-**:
Refer to the ISOBUS operating manual,
"Adjusting the coulter pressure".

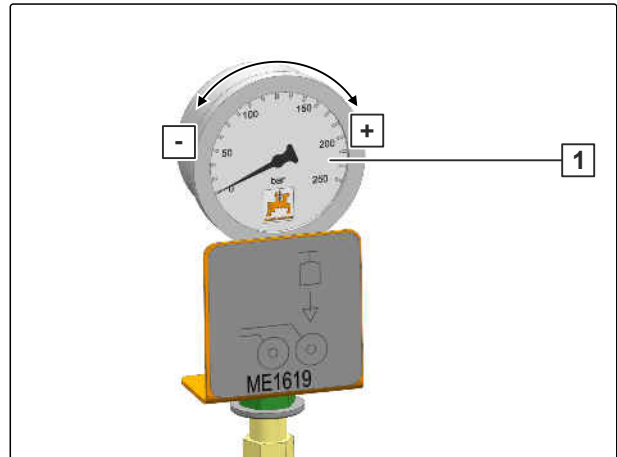


NOTE

If the hydraulic coulter pressure is set too high,
the implement will be lifted by the PreTeC mulch
seeding coulters.

Only use the contact force regulation up to seed
placement depth position F-F.

3. *To increase the coulter pressure specifically in
the tracks:*
See section "Adjusting the coulter pressure in the
track".
4. *To check the setting:*
drive for 30 m at working speed and "check the
seed placement depth".



CMS-I-00005409

6.5.11.7 Adjusting the coulter pressure mechanically

CMS-T-00001905-E.1

Operating conditions	Coulter pressure
Heavy soils	Increase the coulter pressure: <input type="checkbox"/> +
Light soils	Reduce the coulter pressure: <input type="checkbox"/> -

1. Lift the implement.
2. Secure the tractor and implement.
3. Unlock the setting lever.

6 | Preparing the machine

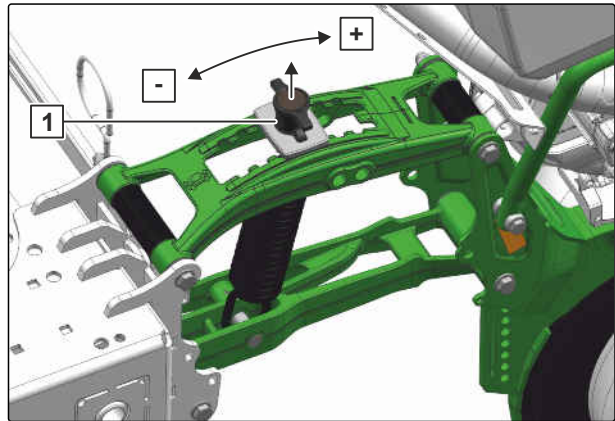
Preparing the implement for operation

4. Put the coulter pressure to the desired position.
5. Lock the setting lever in the grid.
6. Make the same adjustment for all coulters.

or

Put the coulter pressure in the tracks to the desired position.

7. *To check the setting, drive for 30 m at working speed and "check the seed placement depth".*



CMS-I-00001923

6.5.11.8 Adjusting the coulter pressure in the track

CMS-T-00007947-D.1

1. Switch on the fan.
2. *To set the coulter pressure beside the tracks to zero:*
Refer to the ISOBUS operating manual, "Adjusting the coulter pressure".



WORKSHOP WORK

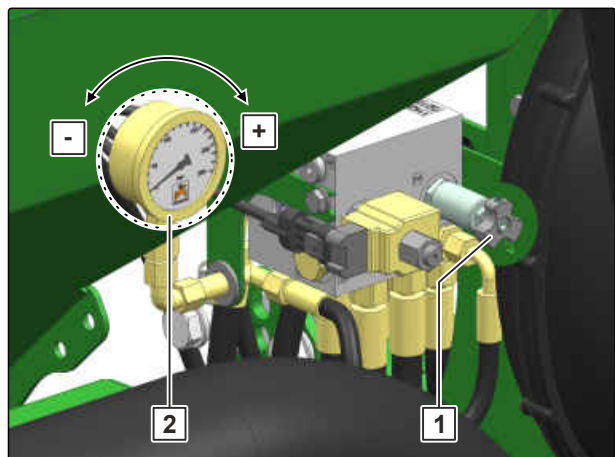


NOTE

Additional coulter pressure can be applied onto the coulters in the track. The additional coulter pressure can be set between 10 bar and 50 bar.

For implements with coulter displacement, only increase the additional coulter pressure such that the displaced coulters next to the track do not sink in.

3. *To adjust the additional coulter pressure in the track:*
put the coulter pressure in the desired position on the setting screw **1**.



CMS-I-00005532

- ➔ The pressure gauge **2** shows the additional coulter pressure in the tractor tracks.
 - ➔ When the coulter pressure beside the tracks is adjusted, the coulter pressure in the tracks is increased by the set value.
4. *To check the setting after driving a short distance:*
See "Checking the placement depth".

6.5.11.9 Adjusting the disc closer

CMS-T-00001932-G.1

The disc closers are used on ploughed or mulched soils. They cover the seed furrow with fine soil. The closer pressure can be adjusted.

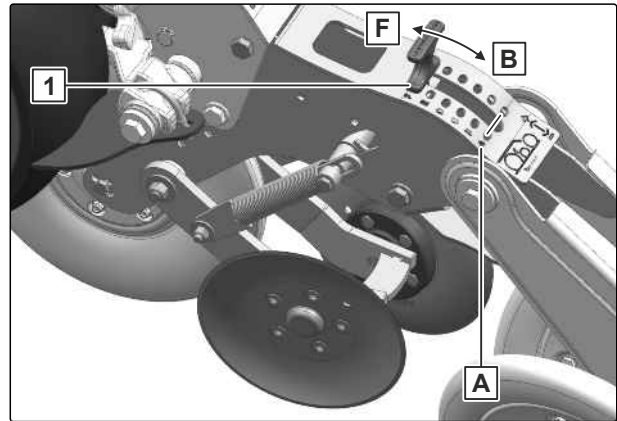
1. Lift the implement.
2. Secure the tractor and implement.
3. Unlock the setting lever **1**.
4. *On heavy soils:*
Increase the closer pressure towards **F**

or

On light soils:
Reduce the closer pressure towards **B**.
5. Make the same adjustment for all disc closers

or

Put the disc closer pressure in the tracks to the desired position
6. *To park the implement:*
Move the disc closers on all rows into the position **A**.
7. Lock the setting lever in the grid.
8. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.



6.5.11.10 Adjusting the star closer

CMS-T-00012662-A.1

The start closers are used on ploughed or mulched soils. They cover the seed furrow with fine soil. The working depth, the position of the star closers, and the spacing between the press rollers can be adjusted.

6 | Preparing the machine

Preparing the implement for operation

1. Lift the implement.
2. Secure the tractor and implement.

The star closers must not move the seed in the soil. Adjust the working depth to maximum 1 cm from the bottom of the furrow. If the star closers push up soil, reduce the working depth or increase the clearance between the star closers.

3. Unlock the setting lever **1**.
4. *To increase the working depth:*
Move the setting lever towards **+**

or

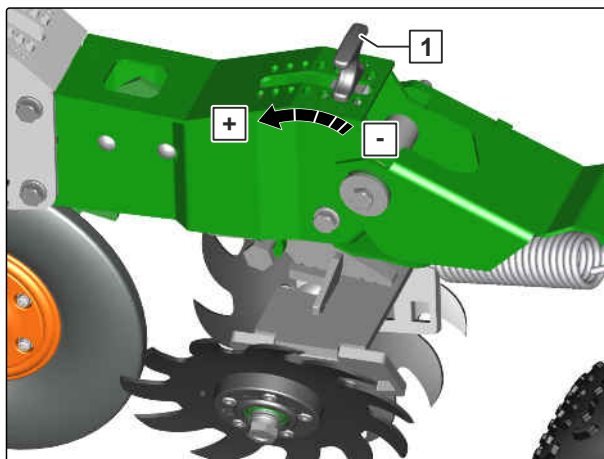
To reduce the working depth:
Move the setting lever towards **-**

5. Make the same adjustment for all star closers.

or

Put the star closers in the tracks to the desired position.

6. *To park the implement:*
Move the star closers on all rows into the topmost position.
7. Lock the setting lever in the grid.
8. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.



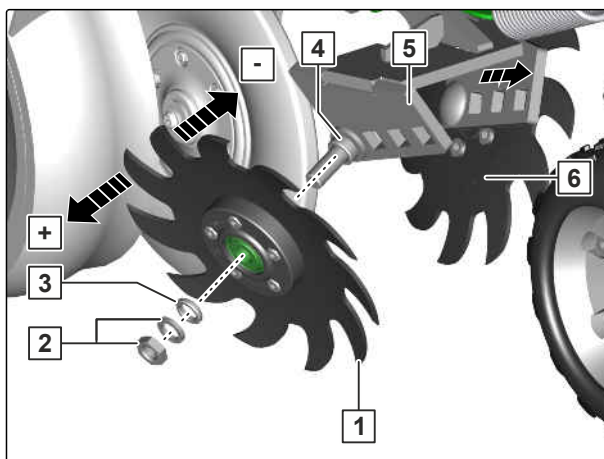
CMS-I-00008069



NOTE

To adjust the star closers at the centre of the furrow, there are setting bushings at different distances.

9. Remove the nut and locking washers **2**.
10. *To align the star closers so that they are centred relative to the furrow:*
Move the setting bushings **3** and **4** into the desired position.



CMS-I-00008763

11. *If the star closers push up soil or organic material:*

Increase the distance between the star closers

1 and **6** in the holder **5**.

or

If the star closers do not adequately cover the seed with fine soil:

Reduce the distance between the star closers.

12. *To check the setting:*

drive for 30 m at working speed and then check the work pattern.

6.5.11.11 Adjusting the mono press roller

The mono press roller closes the seed furrow. The roller pressure can be adjusted.

1. Lift the implement.
2. Secure the tractor and implement.

3. Unlock the setting lever **1**.

4. *To increase the roller pressure:*

Move the setting lever towards **+**

or

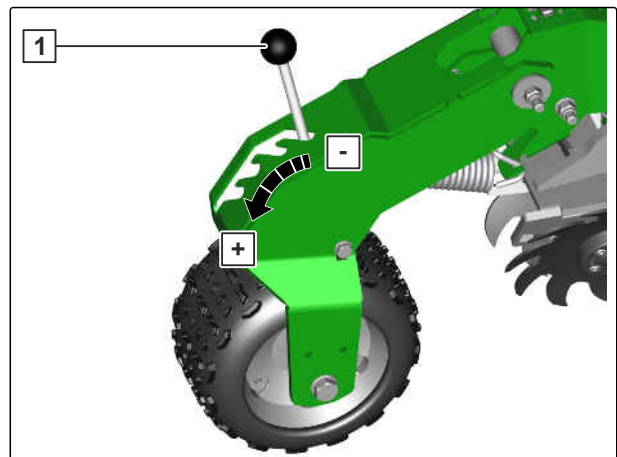
To reduce the roller pressure:

Move the setting lever towards **-**.

5. Lock the setting lever in the grid.

6. *To check the setting:*

Drive for 30 m at working speed. Check the work pattern.



CMS-T-00012663-A.1

CMS-I-00008070

6.5.11.12 Adjusting the V press rollers

The V press rollers close the seed furrow. The roller pressure, the pitch, and the distance between the press rollers can be adjusted.

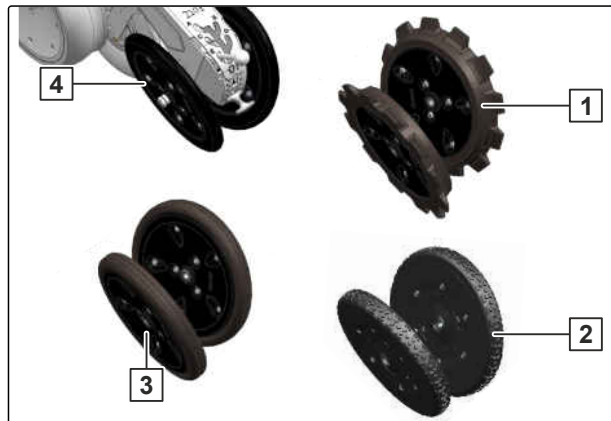
CMS-T-00001931-H.1

6 | Preparing the machine

Preparing the implement for operation

Press rollers

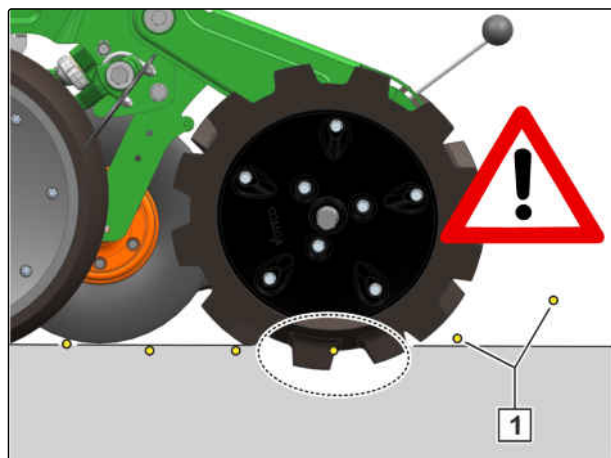
- 1** 350x50 serrated, for heavy soils
- 2** 350x50 profiled, for light to medium soils. Suitable for reducing the risk of erosion
- 3** 350x50 smooth, for light to medium soils
- 4** 350x33 smooth, for medium to heavy soils



CMS-I-00009090

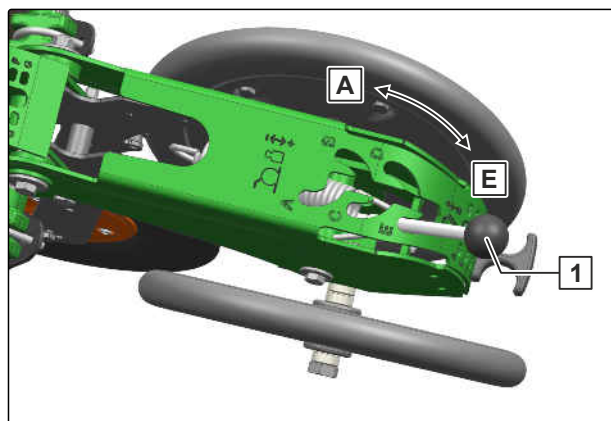
NOTE

To ensure that the seed is not moved out of the soil **1**, the serrated press rollers may not work deeper than the set seed placement depth.



CMS-I-00002743

1. Lift the implement.
2. Secure the tractor and implement.
3. Unlock the setting lever **1**.
4. *To increase the roller pressure:*
Move the setting lever towards **E**
- or
- To reduce the roller pressure:*
Move the setting lever towards **A**.
5. Lock the setting lever in the grid.
6. *To check the setting:*
Drive for 30 m at working speed. Check the work pattern.
7. *If the seed furrow is not closed at the set roller pressure:*
Adjust the pitch.



CMS-I-00001927

8. *On light soils:*

Move the setting lever towards **A**

or

On heavy soils:

Move the setting lever towards **E**.

9. *To check the setting:*

Drive for 30 m at working speed. Check the work pattern.

10. *If the seed furrow is not closed at the set pitch:*

Adjust the press roller distance.

11. Loosen the inner lock nut and remove it.

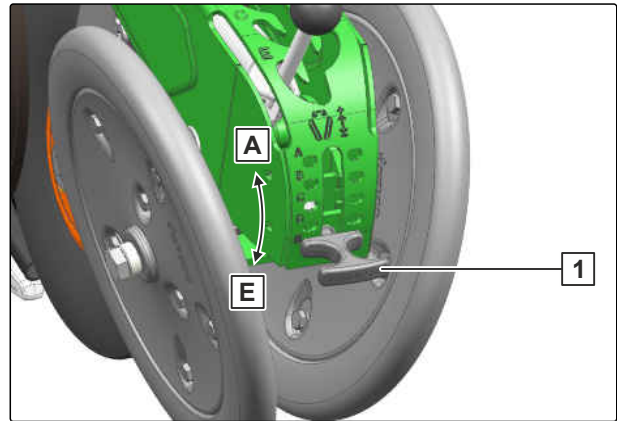
12. Remove the bolt **1** with the press roller.

Move the press roller **3** with the setting bushing **2** to the desired position.

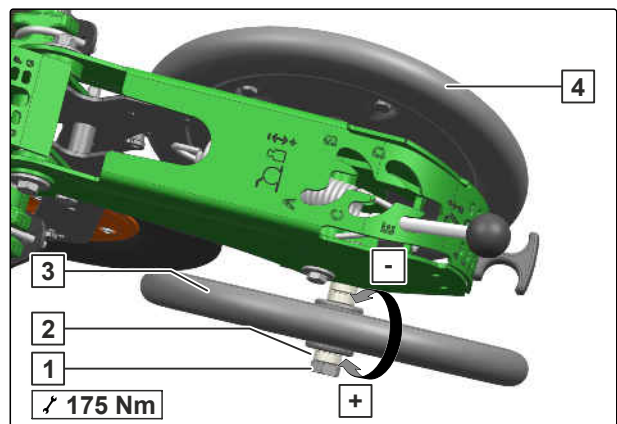


NOTE

To adjust the pressure point of the press rollers at the centre of the furrow, there are setting bushings at different distances.



CMS-I-00001929



CMS-I-00001928

13. *On light soils:*

Increase the press roller distance **+**

or

On heavy soils:

Reduce the press roller distance **-**.

14. Install the press roller with bolts.

15. Move the opposite press roller **4** to the desired position.

16. *To check the setting:*

Drive for 30 m at working speed. Check the work pattern.

17. *If the seed furrow is not closed at the set press roller distance:*

Adjust the press roller offset.

6 | Preparing the machine

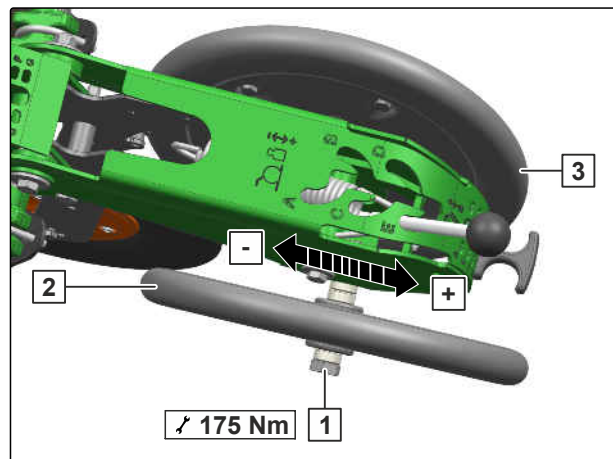
Preparing the implement for operation

18. Loosen the inner lock nut and remove it.
19. Remove the bolt **1** with the press roller.

NOTE

For implements with disc closers, install the press rollers in the rear position.

20. *For more throughput:*
Enlarge the offset of the press roller **2**.
21. Install the press roller.
22. Move the opposite press roller **3** to the desired position.
23. *To check the setting:*
Drive for 30 m at working speed. Check the work pattern.



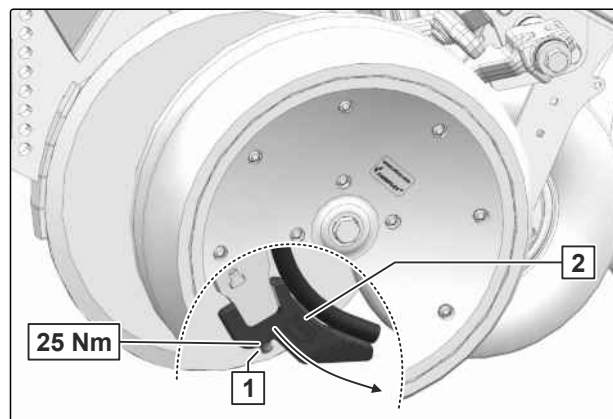
CMS-I-00009418

6.5.11.13 Changing the furrow former

NOTE

The PreTeC mulch seed coulters are only partially shown for better understanding. The depth control wheel and the cutting disc do not need to be removed to change the furrow former or furrow clearer.

1. Lift the implement.
2. Secure the tractor and implement.
3. Remove the bolt **1** and the bolt lock.
4. Pull the furrow former or furrow clearer downward and out.
5. *To select the furrow former:*
See "Determining the seed settings".
6. *If the tothing of the bolt lock is worn:*
Replace the bolt lock.
7. Install the bolt and bolt lock and tighten.
8. *To install the suitable catch roller for the furrow former:*
See "Determining the seed settings".



CMS-I-00002045

6.5.11.14 Adjusting the depth control wheel scraper

CMS-T-00001936-G.1



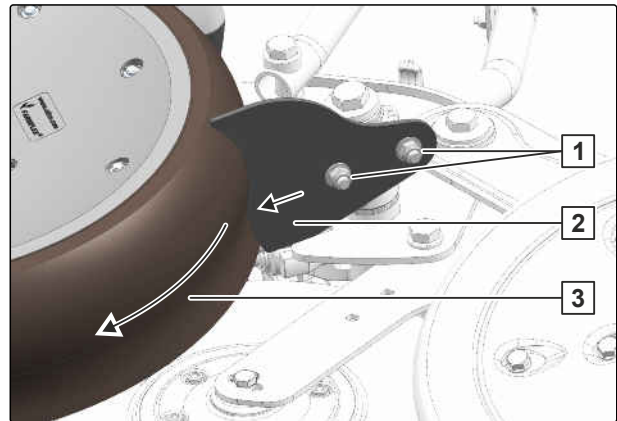
IMPORTANT

Damage to the wheel due to abrasion by the scraper

- *To check the distance:*
rotate the wheel.

The scrapers enable smooth running of the coulters on soils with sticky surface structures.

1. Lift the implement.
2. Secure the tractor and implement.
3. Loosen the nuts **1**.
4. Adjust the scraper **2** to a distance of 2.
5. *To check the distance:*
rotate the depth control wheel **3**.
6. Tighten the nuts.
7. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.

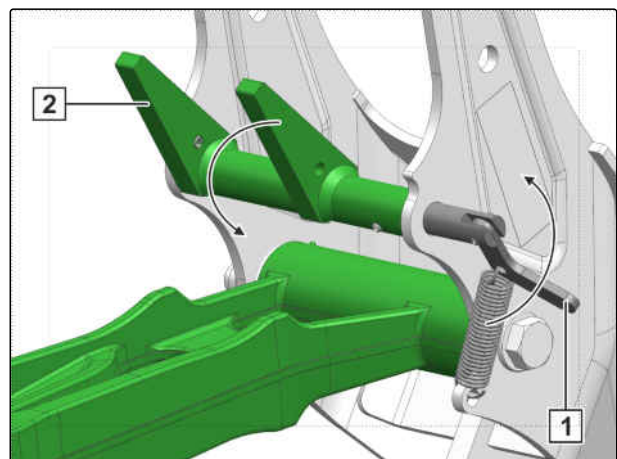


CMS-I-00001930

6.5.11.15 Using the coulter raised position

CMS-T-00003679-C.1

1. Switch over the control lever **1**.
- ➔ The locking mechanism **2** folds onto the lower link.



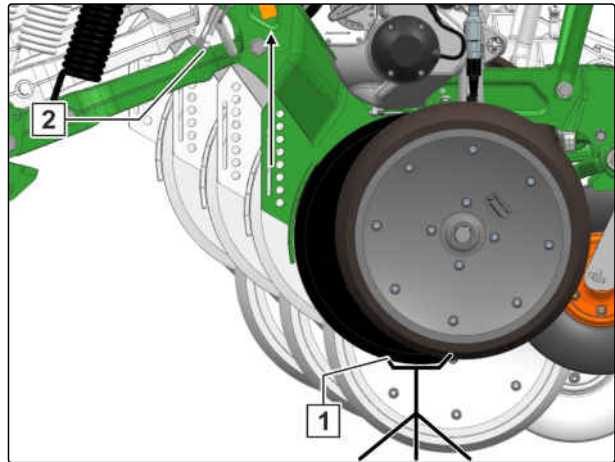
CMS-I-00002700

6 | Preparing the machine

Preparing the implement for operation

2. Put a suitable support **1** under the coulter.
3. *To move the locking mechanism **2** to the locking position,*
slowly lower the implement.

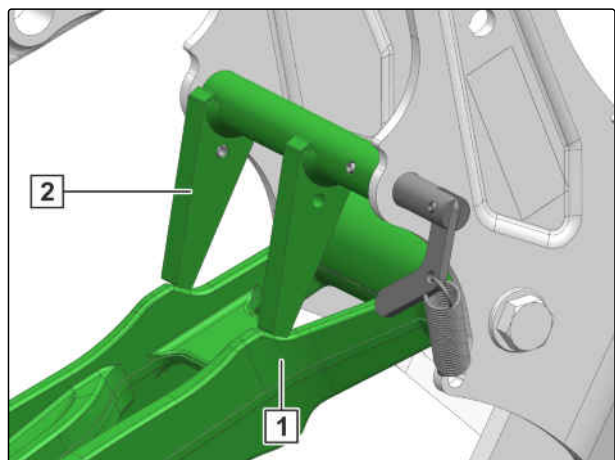
➔ The coulter is fixed in the parking position.



CMS-I-00002706

4. Put a suitable support under the coulter.
5. slowly lower the implement.

➔ The locking mechanism **1** on the lower link **1** is load-free.

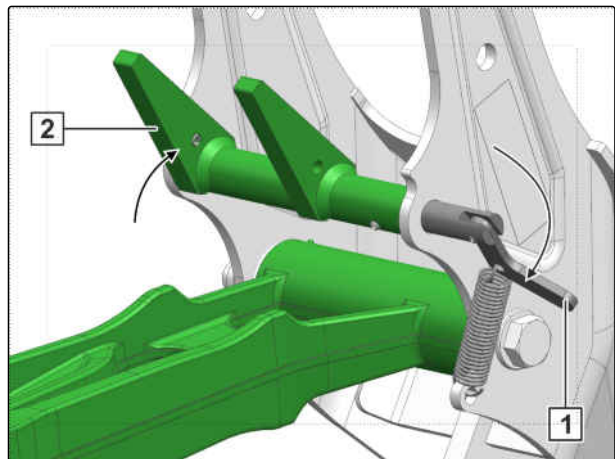


CMS-I-00002697

6. *To put the locking mechanism **2** into parking position,*
Switch over the control lever **1**.

7. Slowly lift the implement.

➔ The coulter is lowered into working position.



CMS-I-00002699

6.5.11.16 Adjusting the catch roller scraper

The scrapers enable smooth running of the catch roller on soils with sticky surface structures.

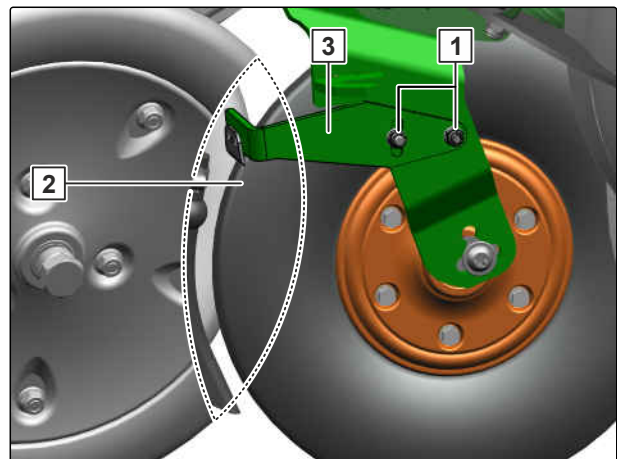
1. Lift the implement.
2. Secure the tractor and implement.
3. Loosen the nuts **1**.
4. Adjust the scraper **3** to a distance of 1 mm.



IMPORTANT Damage to the wheel due to abrasion by the scraper

► *To check the distance:*
rotate the wheel.

5. Tighten the nuts.
6. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.



CMS-I-00009085

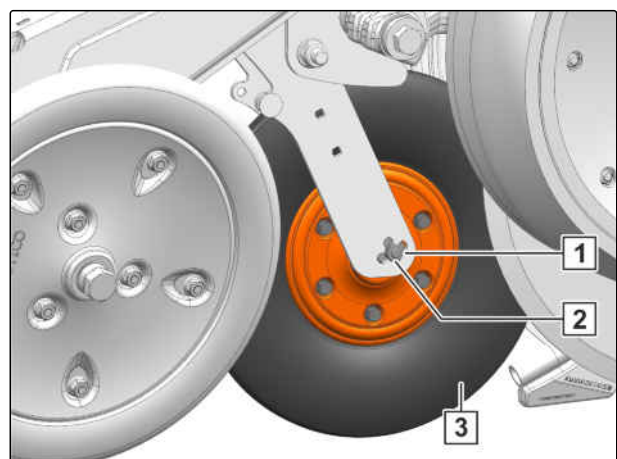
6.5.11.17 Changing the catch roller



NOTE

The catch roller must be adapted to the respective operating conditions. The optimum adjustment can only be determined during field operation.

1. Lift the implement.
2. Secure the tractor and implement.
3. Remove the nut **1**.
4. Remove the bolt lock **2**.
5. Remove the bolt.
6. Remove the catch roller **3**.
7. *To select the catch roller:*
See "Determining the seed settings".



CMS-I-00002876

8. Install the desired catch roller.
9. *To install the suitable furrow former for the catch roller:*
See "Changing the furrow former".

6.5.12 Adjusting the fan speed

CMS-T-00001946-H.1

6.5.12.1 Adjusting the fan speed via the PTO shaft

CMS-T-00001947-F.1



REQUIREMENTS

- ✓ The seed hoppers are filled
- ✓ The fan is switched on
- ✓ The singling discs are filled with seed grains

A sticker on the fan housing marks the permitted tractor PTO shaft speed **1** of the tractor.



CMS-I-00001898

Depending on the equipment, the air overpressure is displayed by a pressure gauge or the control terminal. The specified fan pressures are reference values. Check the grain placement after driving a short distance.

Seed	Fan pressure [mbar]
Beets, rapeseed, sorghum or sunflower	35 mbar ± 5 mbar
Maize, soya or field beans	45 mbar ± 5 mbar

1. *To correct the fan pressure,*
Adjust the tractor PTO shaft speed.
2. *To monitor the fan pressure,*
refer to the ISOBUS operating manual.

or

Read the fan pressure on the pressure gauge.

6.5.12.2 Adjusting the fan speed via the hydraulic system

CMS-T-00001948-H.1



REQUIREMENTS

- ✓ The seed hoppers are filled
- ✓ The implement is unfolded
- ✓ The fan is switched on
- ✓ The singling discs are filled with seed grains

The fan speed changes until the hydraulic fluid has reached its operating temperature.

Depending on the equipment, a pressure gauge, control computer or control terminal shows the air pressure. The specified fan pressures are reference values. Check the grain placement after driving a short distance.

Seed	Fan pressure
Beets, rapeseed, sorghum or sunflower	35 mbar \pm 5 mbar
Maize, soya or field beans	45 mbar \pm 5 mbar



WARNING

Risk of injury due to parts of the fan being flung out

If the fan is operated at excessive speeds, fan parts can break and be flung out.

- Make sure that the fan speed does not exceed 5,000 1/min.

1. Unfold the folded implement.
2. *To correct the fan pressure:*
adjust the oil quantity on the tractor control unit.
3. *If the cyclone separator is used:*
Check the fan speed setting.

4. *To monitor the fan,*
refer to "*Configuring the fan speed monitoring*" in
the ISOBUS operating manual

or

refer to "*Configuring the fan speed monitoring*" in
the control computer operating manual

or

Read the fan pressure on the pressure gauge.



NOTE

If the desired fan pressure is not reached, a
bigger hydraulic motor can help.

For more information, contact your specialist
workshop.

6.5.13 Preparing the track marker for operation

CMS-T-00001815-F.1

6.5.13.1 Calculating the track marker length

CMS-T-00001938-E.1

6.5.13.1.1 Marking at the centre of the tractor

CMS-T-00001939-E.1

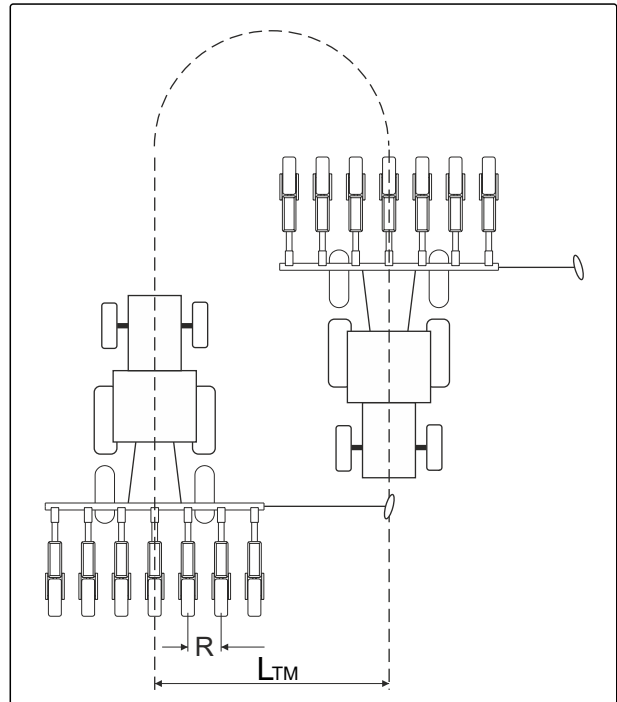
The hydraulically actuated track markers produce
alternating marks. This mark serves as an reference
to the tractor driver for driving the next bout after
turning at the headland. The length and pitch of the
track markers are adjustable.

The track marker length L_{TM} describes the distance from the centre of the implement to the contact area of the track marker disc at the centre of the tractor.

NOTE

The Precea 6000-2 can only mark 6.4 m working width in the tractor track.

Depending on equipment, the Precea 6000-TCC can mark maximum 6 m or 6.75 m working width.



CMS-I-00001215

	Unit	Designation	Calculated values
N		Number of seeding coulters	
R	cm	Row spacing	
L_{TM}	cm	Track marker length, track marker marks at the centre of the tractor	

► Calculate the track marker length.

$$L_{TM} = R \times N$$

$$L_{TM} = \quad \times$$

$$L_{TM} = \quad$$

CMS-I-00001214

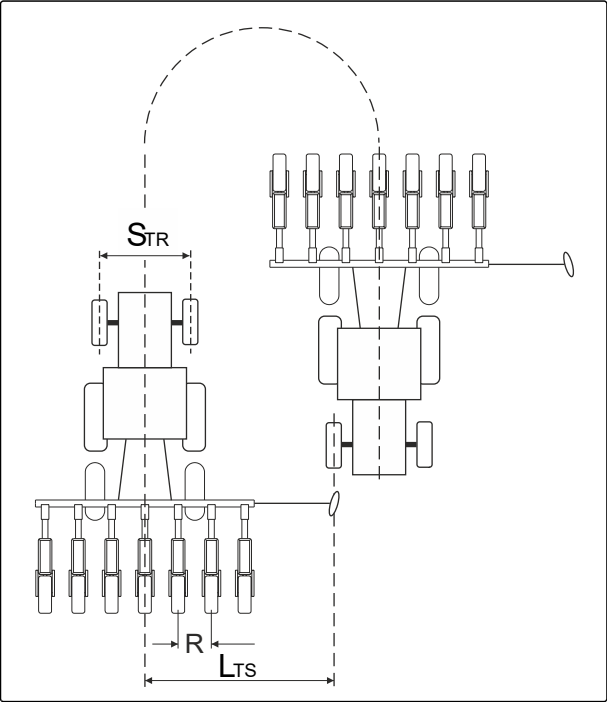
6.5.13.1.2 Marking in the tractor track

CMS-T-00001941-C.1

The hydraulically actuated track markers produce alternating marks. This mark serves as an reference to the tractor driver for driving the next bout after turning at the headland. The length and pitch of the track markers are adjustable.

6 | Preparing the machine
Preparing the implement for operation

The track marker length L_{TS} describes the distance from the centre of the implement to the contact area of the track marker disc in the tractor track.



CMS-I-00001216

	Unit	Designation	Calculated values
N		Number of seeding coulters	
R	cm	Row spacing	
L_{TS}	cm	Track marker length, track marker marks in the tractor track	
S_{TR}	cm	Tractor track width	

► Calculate the track marker length.

$$L_{TS} = R \times N - \frac{S_{Tr}}{2}$$

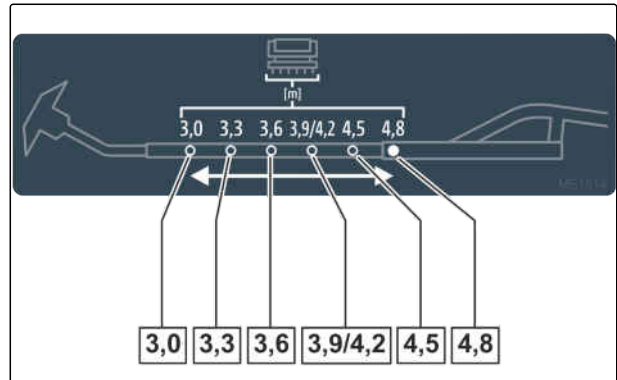
$$L_{TS} = \quad \times \quad - \frac{\quad}{2}$$

$$L_{TS} = \quad$$

CMS-I-00001213

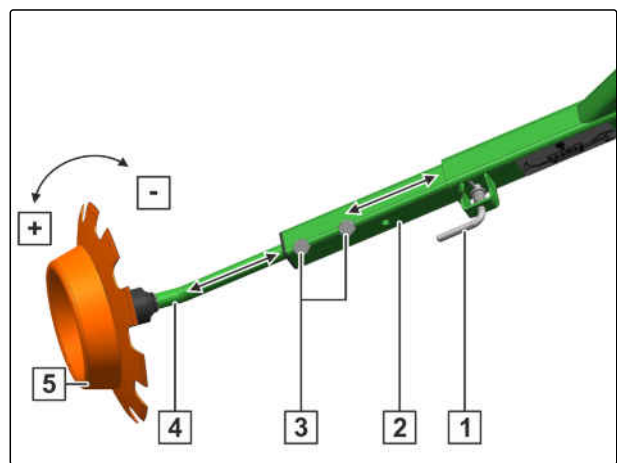
6.5.13.2 Adjusting the track marker

The overview shows the hole in which the telescopic track marker is pegged.



CMS-I-00003876

1. Unfold the track markers.
2. Unlock the linch pin **1**.
3. Push the track marker arm **2** into the desired position.
4. Lock the track marker arm with the linch pin.
5. Release the clamp connection **3**.
6. *To adjust the track marker length,* move the shaft **4** of the track marker disc **4** to the desired position.
7. *To adjust the pitch of the track marker disc,* turn the shaft of the track marker disc to the desired position.



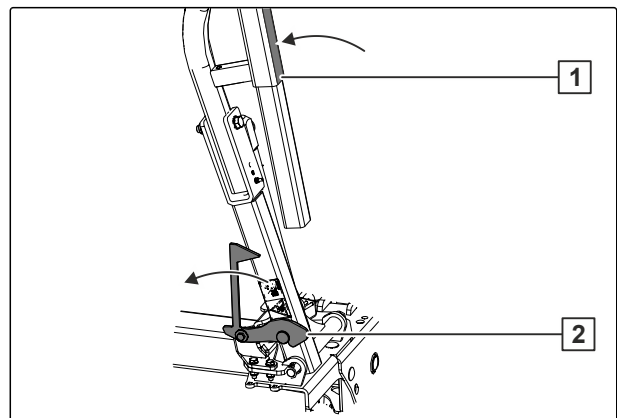
CMS-I-00003875

6.5.13.3 Actuating the track marker

NOTE

The automatic set changer for implements with Profi control is only active when the implement has reached a speed > 2 km/h in working position.

1. Press the track marker **1** against the rubber block.
- ➔ The transport lock is relieved.
2. Swivel back the transport lock **2**.



CMS-I-00001906

6 | Preparing the machine

Preparing the implement for operation

3. Repeat the procedure for the second transport lock.
4. Put the "yellow" tractor control unit in float position.

➔ The track marker is lowered.
5. *If the wrong track marker is lowered,*
apply pressure to the "yellow" tractor control unit once again.

➔ The track marker is lifted and the shuttle valve activates the opposite track marker.
6. Put the "yellow" tractor control unit in float position.

➔ The opposite track marker is lowered.

6.5.14 Preparing the wheel mark eradicator for operation

CMS-T-00001816-G.1

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

CMS-I-00001486-F.1



IMPORTANT

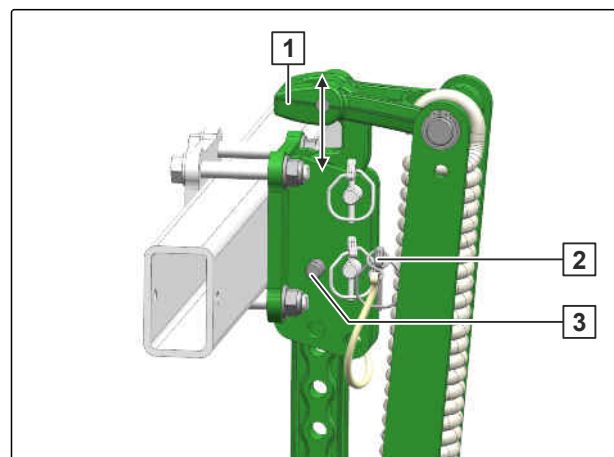
Increased wear of the wheel mark eradicator bracket

- ▶ *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 implement.
2. Release the linch pin **2**.
3. Hold the wheel mark eradicator by the recessed grip **1**.
4. Remove the locking pin **3**.

The maximum working depth is 150 mm.

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



CMS-I-00000942

6. Secure the wheel mark eradicator with the locking pin.
7. Secure the locking pin with the linch pin.
8. *To check the setting:*
drive for 30 m at working speed and then check the work pattern.

6.5.14.2 Adjusting the wheel mark eradicator to the track width

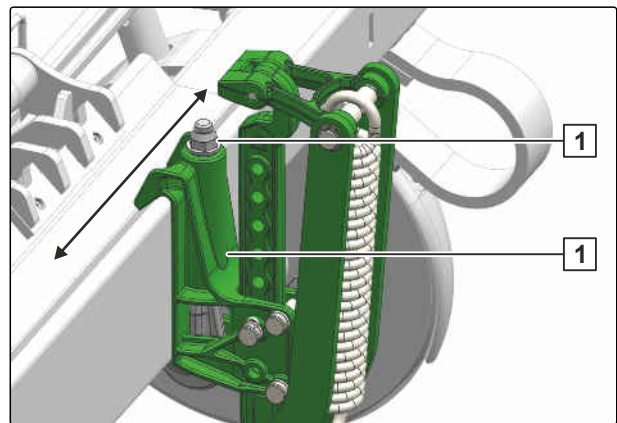
CMS-T-00001930-C.1

REQUIREMENTS

- ☑ The implement is raised
- ☑ The tractor and implement are secured

Tightening torque: 160 Nm

1. Release the clamp connection **1**.
2. Move the wheel mark eradicator bracket **2** to the desired position.
3. Tighten the clamp connection.

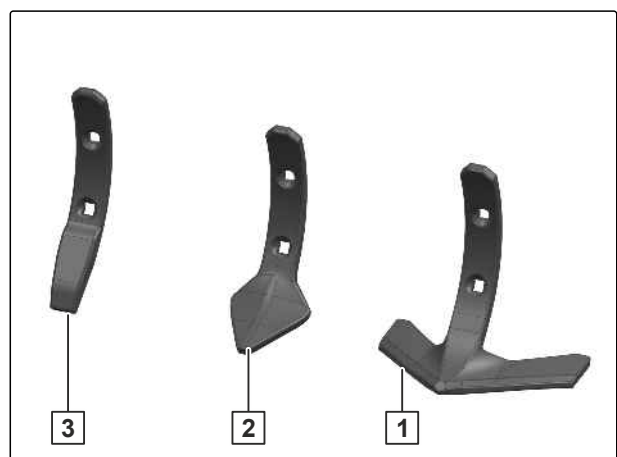


CMS-I-00001908

6.5.14.3 Changing the wheel mark eradicator coulter

CMS-T-00002425-F.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

6 | Preparing the machine

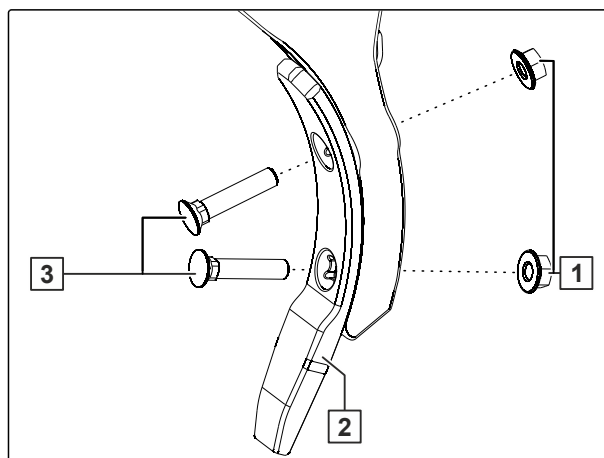
Preparing the implement for operation

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

6.5.15 Setting up the speed sensor on the implement

CMS-T-00001908-D.1

To start the metering unit or the electronic monitoring, a speed signal is required. The speed sensor on the implement can be used for this.

- ▶ *To set up the speed sensor on the implement:*
See control computer operating manual
"Determining the pulses per 100 m"

or

See ISOBUS operating manual "Setting up the speed sensor on the implement".

6.5.16 Using the multi-placement tester

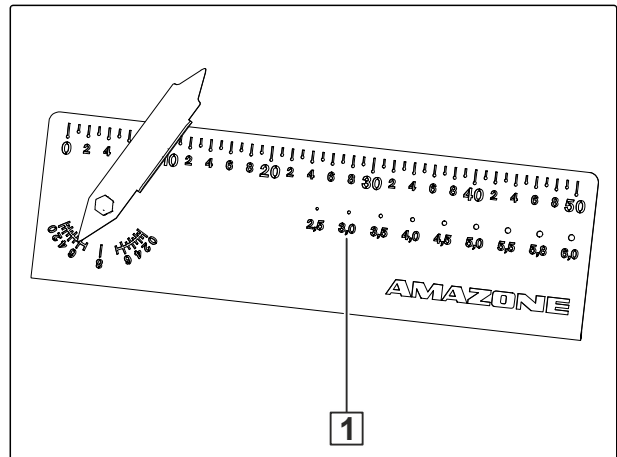
CMS-T-00005293-D.1

6.5.16.1 Determining the grain size

CMS-T-00001888-D.1

Determine the grain size of the seed with the multi-placement tester.

1. Put the seed in the reference holes **1**.
2. *If the seed lies loosely on the reference hole, read the hole diameter.*

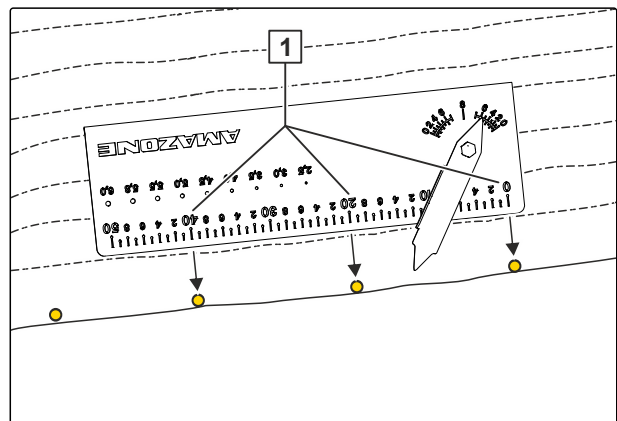


CMS-I-00001217

6.5.16.2 Checking the grain spacing

CMS-T-00002354-D.1

The spread rate determines the required grain spacing. The grain spacing is adjusted by selecting the singling discs and adjusting the singling disc speed.



CMS-I-00002011

1. Spread seed for 30 m at working speed.
2. Use the read-off edge of the multi-placement tester to remove the earth in layers.
3. Expose 11 grains in one row.
4. Place the multi-placement tester horizontally on the ground.
5. Measure 10 grain spacings with the ruler **1**.

6. Calculate the average grain spacing.

$$K_{Ab1} \rightarrow K_{Ab10}$$

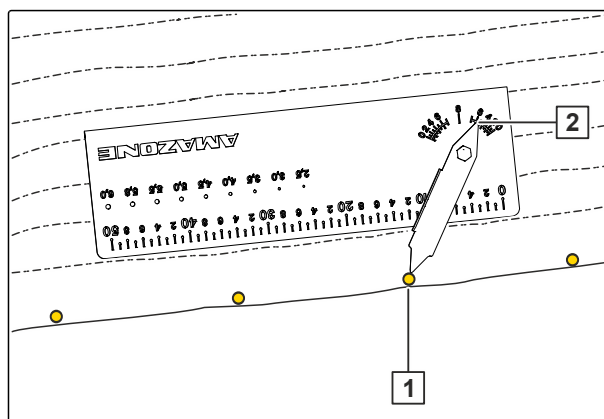
$$K_{Ab1-10} = \frac{K_{Ab1} + K_{Ab2} + K_{Ab3} + \dots + K_{Ab10}}{10}$$

$$K_{Ab1-10} = \frac{\boxed{} + \boxed{} + \boxed{} + \dots + \boxed{}}{10}$$

CMS-I-00002066

6.5.16.3 Checking the placement depth

1. *To check the placement depth after the first 30 m:*
Expose the grains at several points using the multi-placement tester.
2. Use the read-off edge of the multi-placement tester to remove the earth in layers.
3. Place the multi-placement tester horizontally on the ground.
4. Set the pointer **1** on the seed grain.
5. Read the placement depth on the scale **2**.



CMS-I-00002010

6.5.17 Creating tramlines

CMS-T-00001881-A.1

6.5.17.1 Configuring the tramline control

CMS-T-00001883-A.1



NOTE

The automatic tramline control requires an electrically driven grain singling unit.

- See "Configuring the tramline control" in the ISOBUS software operating manual.

6.5.18 Calibrating the electrically driven fertiliser metering unit

CMS-T-00003839-E.1

6.5.18.1 Performing the calibration

CMS-T-00001945-E.1

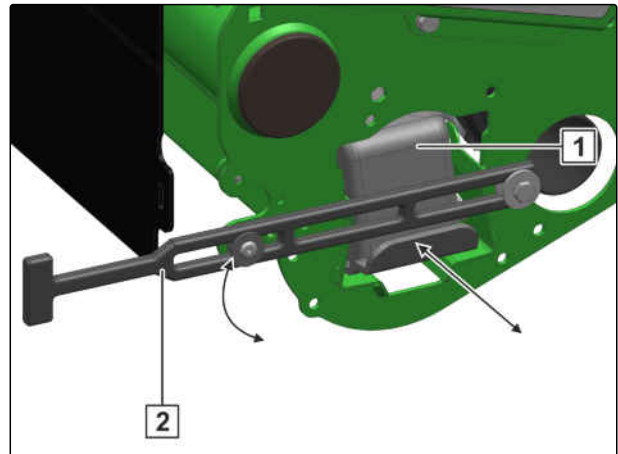
REQUIREMENTS

- ☑ The fertiliser hopper is at least $\frac{1}{4}$ full with fertiliser

1. Switch off the fan.
2. Release the lock **2** and swivel it downwards.
3. *To take the calibration buckets out of the parking position on implements with hydraulic fan drive,*
pull out the interlocked calibration buckets **1** to the side.

or

To take the calibration buckets out of the parking position on implements with mechanical fan drive,
pull out the calibration buckets individually to the side on the left and right.

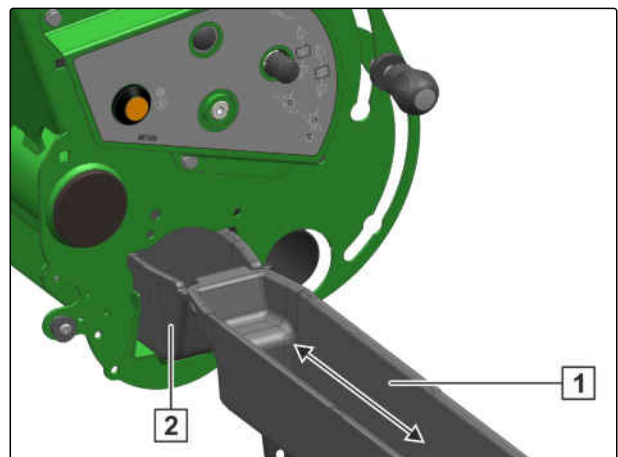


CMS-I-00001932

4. *To move the calibration buckets into calibration position on implements with hydraulic fan drive,*
slide the calibration bucket **2** under the metering unit with the opening facing up.
5. Hook on the calibration bucket **1** with the opening facing up and slide it under the metering unit.

or

To move the calibration buckets into calibration position on implements with mechanical fan drive,
slide the calibration buckets individually under the metering units from the left and right.

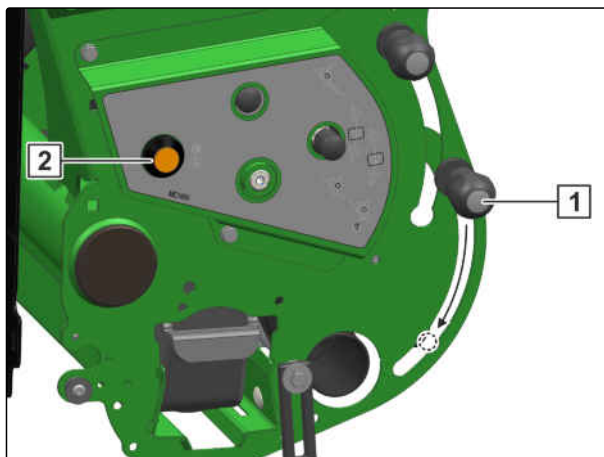


CMS-I-00001931

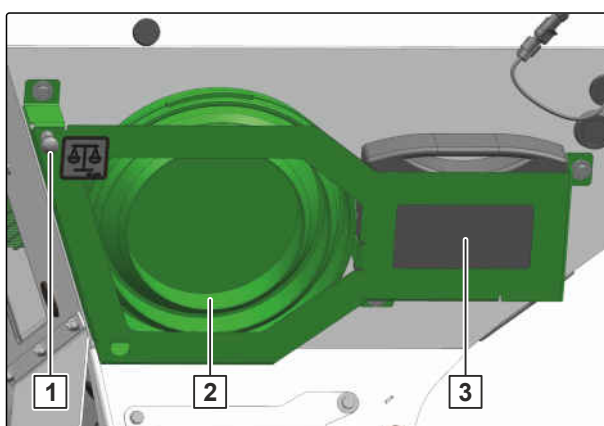
6 | Preparing the machine

Preparing the implement for operation

6. To move the calibration flap lever to the calibration position, press and hold the lock button **1** and push it down.
7. To fill the fertiliser metering unit, Actuate the calibration button **2** for 10 seconds.
8. Empty the calibration bucket.
9. To calibrate the spread rate for the fertiliser, refer to the ISOBUS software operating manual, "Calibrating the spread rate for fertiliser or micropellets".
10. Fill the fertiliser from the calibration buckets into the collapsible bucket **2**.
11. Hook on the collapsible bucket with the scale **3** on the weighing point **1**.
12. Enter the determined value on the control terminal.
13. To enter the spread rate for the fertiliser on the control terminal, refer to the ISOBUS software operating manual, "Calibrating the spread rate for fertiliser or micropellets".



CMS-I-00001933

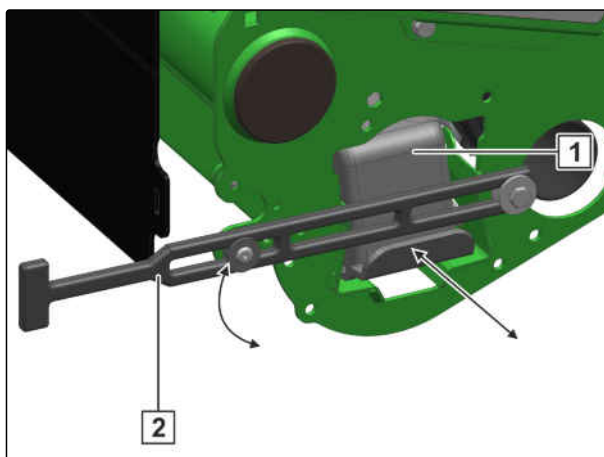


CMS-I-00001956

NOTE

To prevent overflowing of the calibration bucket, monitor the fill level.

14. Empty the calibration bucket.
15. To prevent soiling of the calibration buckets, slide the calibration bucket **1** under the metering unit with the opening facing down.
16. Swivel up the lock **2** and close it.
17. To move the calibration flap lever into working position, press and hold the lock button and push it upwards.



CMS-I-00001932

6.5.18.2 Determining the maximum fertiliser spread rate

CMS-T-00002412-D.1



NOTE

The values in the table serve as a reference and require a constant power supply of at least 12 V.

- Read the values from the table.

CAN / DAP / NPK / phosphate					
Fertiliser quantity	Row width				
	45 cm	50 cm	60 cm	75 cm	80 cm
100 kg/ha	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
140 kg/ha	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
180 kg/ha	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
220 kg/ha	15 km/h	15 km/h	15 km/h	15 km/h	15 km/h
260 kg/ha	15 km/h	15 km/h	15 km/h	13.5 km/h	12.7 km/h
300 kg/ha	15 km/h	15 km/h	14.7 km/h	11.7 km/h	11 km/h
340 kg/ha	15 km/h	15 km/h	12.9 km/h	10.4 km/h	9.7 km/h
380 kg/ha	15 km/h	13.9 km/h	11.6 km/h	9.3 km/h	8.7 km/h
420 kg/ha	14 km/h	12.6 km/h	10.5 km/h	8.4 km/h	7.9 km/h
460 kg/ha	12.8 km/h	11.5 km/h	9.6 km/h	7.7 km/h	7.2 km/h
500 kg/ha	11.7 km/h	10.6 km/h	8.8 km/h	8 km/h	7.6 km/h
540 kg/ha	10.9 km/h	9.8 km/h	8.1 km/h	6.5 km/h	6.1 km/h
580 kg/ha	10.1 km/h	9.1 km/h	7.6 km/h	6.1 km/h	5.7 km/h
620 kg/ha	9.5 km/h	8.5 km/h	7.1 km/h	5.7 km/h	5.3 km/h
660 kg/ha	8.9 km/h	8 km/h	6.7 km/h	5.3 km/h	5 km/h
700 kg/ha	8.4 km/h	7.5 km/h	6 km/h	5 km/h	4.7 km/h
740 kg/ha	7.9 km/h	7.1 km/h	5.9 km/h	4.8 km/h	4.5 km/h
780 kg/ha	7.5 km/h	6.8 km/h	5.6 km/h	4.5 km/h	4.2 km/h

Urea					
Fertiliser quantity	Row width				
	45 cm	50 cm	60 cm	75 cm	80 cm
100 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha
140 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha
180 kg/ha	15 kg/ha	15 kg/ha	15 kg/ha	13.4 kg/ha	12.6 kg/ha
220 kg/ha	15.0	15 kg/ha	13.8 kg/ha	11 kg/ha	10.3 kg/ha
260 kg/ha	15 kg/ha	14 kg/ha	11.6 kg/ha	9.3 kg/ha	8.7 kg/ha
300 kg/ha	13.4 kg/ha	12.1 kg/ha	10.1 kg/ha	8.1 kg/ha	7.6 kg/ha

Urea					
Fertiliser quantity	Row width				
	45 cm	50 cm	60 cm	75 cm	80 cm
340 kg/ha	11.9 kg/ha	10.7 kg/ha	8.9 kg/ha	7.1 kg/ha	6.7 kg/ha
380 kg/ha	10.6 kg/ha	9.6 kg/ha	8 kg/ha	6.4 kg/ha	6 kg/ha
420 kg/ha	9.6 kg/ha	8.6 kg/ha	7.2 kg/ha	5.8 kg/ha	5.4 kg/ha
460 kg/ha	8.8 kg/ha	7.9 kg/ha	6.6 kg/ha	5.3 kg/ha	4.9 kg/ha
500 kg/ha	8.1 kg/ha	7.3 kg/ha	6.1 kg/ha	4.8 kg/ha	4.5 kg/ha
540 kg/ha	7.5 kg/ha	6.7 kg/ha	5.6 kg/ha	4.5 kg/ha	4.2 kg/ha
580 kg/ha	7 kg/ha	6.3 kg/ha	5.2 kg/ha	4.2 kg/ha	3.9 kg/ha
620 kg/ha	6.5 kg/ha	5.9 kg/ha	4.9 kg/ha	3.9 kg/ha	3.7 kg/ha
660 kg/ha	6.1 kg/ha	5.5 kg/ha	4.6 kg/ha	3.7 kg/ha	3.4 kg/ha
700 kg/ha	5.8 kg/ha	5.2 kg/ha	4.3 kg/ha	3.5 kg/ha	3.2 kg/ha
740 kg/ha	5.5 kg/ha	4.9 kg/ha	4.1 kg/ha	3.3 kg/ha	3.1 kg/ha
780 kg/ha	5.2 kg/ha	4.7 kg/ha	3.9 kg/ha	3.1 kg/ha	2.9 kg/ha

6.5.19 Calibrating the mechanically driven fertiliser metering

CMS-T-00003665-E.1

6.5.19.1 Determining the crank turns for standard working widths

CMS-T-00003668-B.1

- A_B = Working width in m
- n_R = Number of rows
- R_W = Row width in cm

$$A_B = \frac{n_R}{100} \times R_W$$

$$A_B = \frac{6}{100} \times 75 = 4,5$$

$$A_B = \frac{\boxed{}}{100} \times \boxed{} = \boxed{}$$

CMS-I-00002685

1. Determine the working width of the implement with the equation above.
2. Determine the crank turns from the table above.

6.5.19.2 Determining the number of crank turns for special working widths

CMS-T-00003669-B.1

- A_B = Working width in m
- n_R = Number of rows
- R_W = Row width in cm

$$A_B = \frac{n_R}{100} \times R_W$$

$$A_B = \frac{6}{100} \times 75 = 4,5$$

$$A_B = \frac{\boxed{}}{100} \times \boxed{} = \boxed{}$$

CMS-I-00002685

1. Determine the special working width of the implement with the equation above.

- U_K = Crank turns for special working width
- A_T = The next working width in metres. See table, "Determining the crank turns for standard working widths".
- U_T = Crank turns suitable for standard working width, see table "Determining the number of crank turns for standard working width".

$$U_K = \frac{U_T \times A_T}{A_B}$$

$$U_K = \frac{27 \times 3,6}{3,4} = 28,5$$

$$U_K = \frac{\boxed{} \times \boxed{}}{\boxed{}} = \boxed{}$$

CMS-I-00001251

2. Determine the crank turns for the implement with the equation above.

6.5.19.3 Performing the calibration

CMS-T-00003655-C.1

With the calibration, you can check if the desired fertiliser quantity is being metered.



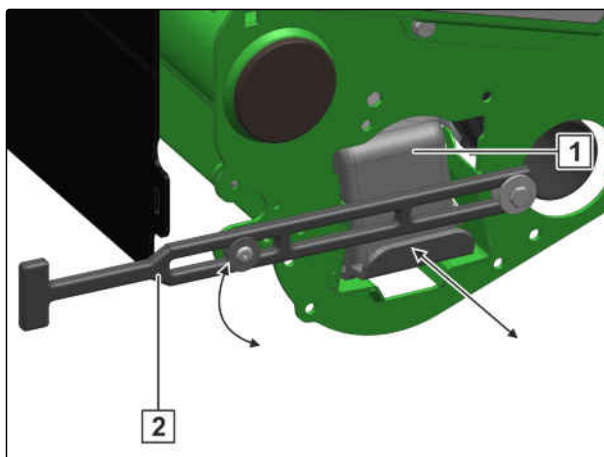
REQUIREMENTS

- ✓ The fertiliser hopper is at least $\frac{1}{4}$ full with fertiliser

1. Switch off the fan.
2. Release the lock **2** and swivel it downwards.
3. *To take the calibration buckets out of the parking position on implements with hydraulic fan drive,*
pull out the interlocked calibration buckets **1** to the side.

or

To take the calibration buckets out of the parking position on implements with mechanical fan drive,
pull out the calibration buckets individually to the side on the left and right.

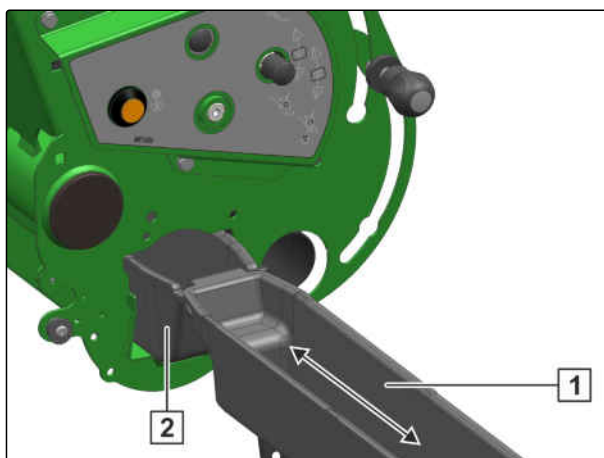


CMS-I-00001932

4. *To move the calibration buckets into calibration position on implements with hydraulic fan drive,*
slide the calibration bucket **2** under the metering unit with the opening facing up.
5. Hook on the calibration bucket **1** with the opening facing up and slide it under the metering unit.

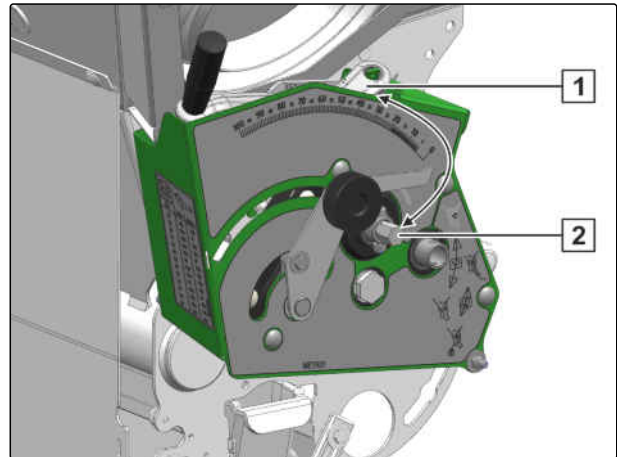
or

To move the calibration buckets into calibration position on implements with mechanical fan drive,
slide the calibration buckets individually under the metering units from the left and right.



CMS-I-00001931

6. Take the operating tool from the parking position **1**.
7. Put the operating tool on the gear shaft **2**.



CMS-I-00002785

8. Depending on the working width **1** and desired calibration area **2**, read the number of crank turns from the table.

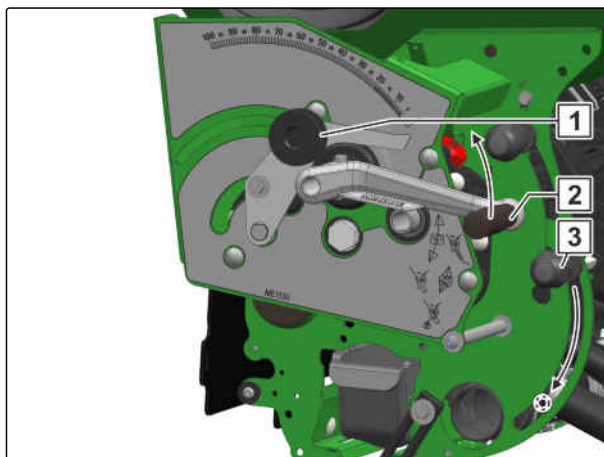
[m]		1/40ha	1/100ha
2,7		90 ½	36 ¼
2,8		87 ¼	35
3,0		81 ⅓	32 ½
3,2		76 ¼	30 ½
3,6		67 ¾	27
4,0		61	24 ½
4,2		58 ¼	23 ¼
4,5		54 ¼	21 ¾
4,8		51	20 ½
5,4		45 ¼	18
5,6		43 ½	17 ½
6,0		40 ¾	16 ¼
6,4		38 ¼	15 ¼

CMS-I-00002784

6 | Preparing the machine

Preparing the implement for operation

9. To move the calibration flap lever to the calibration position, press and hold the lock button **3** and push it down **4**.
10. Release the lock button **1**.
11. Set the pointer to the setting value 70.
12. To fill the fertiliser metering unit, turn the operating tool by 5 turns.
13. Empty the calibration bucket.
14. Turn the operating tool counterclockwise by the desired number of turns.



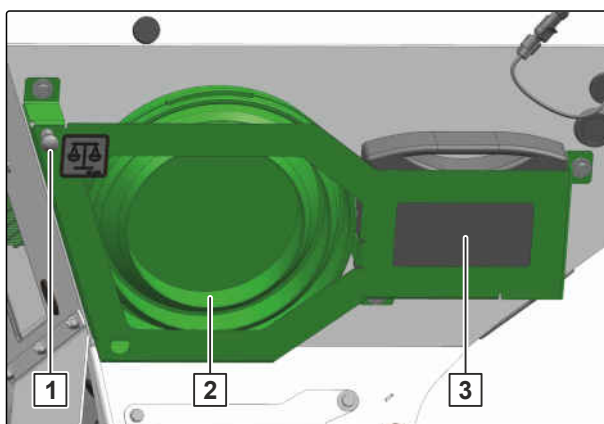
CMS-I-00002786

NOTE

To prevent overflowing of the calibration bucket, monitor the fill level.

Stop the calibration and empty the bucket if necessary.

15. Fill the fertiliser from the calibration buckets into the collapsible bucket **2**.
16. Hook on the collapsible bucket with the scale **3** on the weighing point **1**.
17. Determine the collected fertiliser quantity. Take account of the bucket weight.



CMS-I-00001956

- D_M = Fertiliser quantity in kilograms per hectare
- A_M = Collected fertiliser quantity in kilograms per 1/40 or 1/100 hectare
- K = Calibration factor depending on calibration area 40 or 100

$$D_M = A_M \times K$$

$$D_M = 4,38 \times 40 = 175$$

$$D_M = \boxed{} \times \boxed{} = \boxed{}$$

CMS-I-00002691

18. Multiply the determined weight by the calibration factor.

19. *The required spread rate is not reached during the first calibration test.*

Using the values for the first calibration, determine the gearbox position for the desired spread rate, see "*Determining the gearbox position with the calculator disc*".

20. Repeat the calibration until the desired quantity is metered.

NOTE

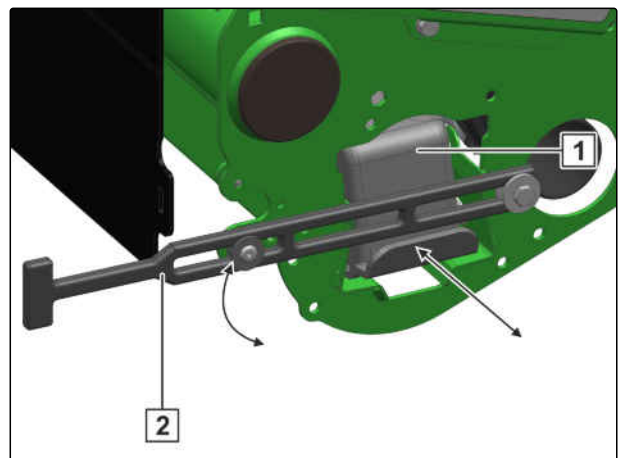
If the desired spread rate is not reached, contact your specialist workshop for more information.

21. Empty the calibration bucket.

22. *To prevent soiling of the calibration buckets,* slide the calibration bucket **1** under the metering unit with the opening facing down.

23. Swivel up the lock **2** and close it.

24. *To move the calibration flap lever into working position,* press and hold the lock button and push it upwards.

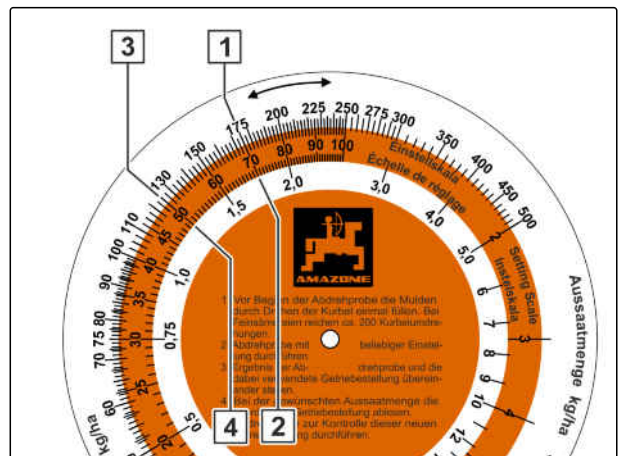


CMS-I-00001932

6.5.19.4 Determining the gearbox position with the calculator disc

CMS-T-00003671-B.1

- Determined spread rate 175 kg/ha **1**
- Utilised gearbox position 70 **2**
- Desired spread rate 125 kg/ha **3**
- Gearbox position 50 **4** for the desired spread rate



CMS-I-00002787

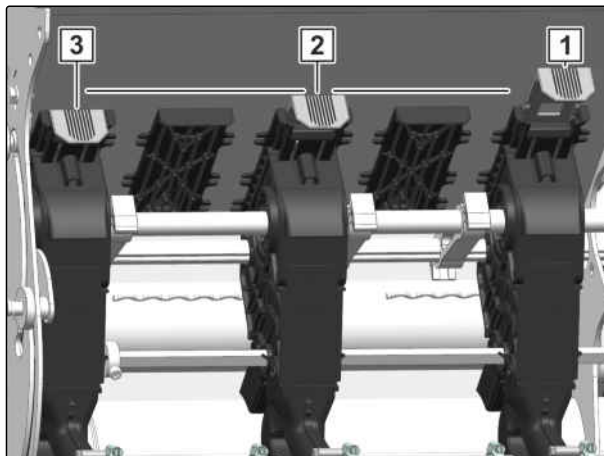
1. Align the determined spread rate **1** with the gearbox position 70 **2** on the calculator disc.
2. Read the gearbox position **4** for the desired spread rate **3** from the calculator disc.

NOTE

Set the gearbox setting lever between the scale positions 20 and 80.

3. Set the gearbox setting lever to the value read from the disc.

- The sliding shutter is completely open **1**
- The sliding shutter is opened to 1/3 **2**
- The sliding shutter is closed **3**



CMS-I-00002689

4. *If the setting range is between 0.1 and 5,* move the sliding shutter for the fertiliser metering unit to position **2**.

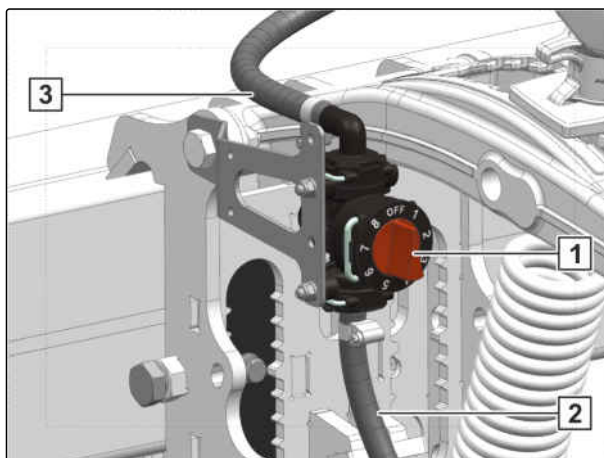
➔ The supply to the metering unit is reduced.

5. Repeat the calibration.

6.5.20 Adjusting the application rate for liquid fertiliser

CMS-T-00003722-D.1

The liquid fertiliser metering unit **1** is connected to the liquid fertiliser tank via the supply hose **3**. The liquid fertiliser flows through the hose **2** to the application point and is applied there.



CMS-I-00002729

- A = Rate in l/ha
- A_R = Pure fertiliser rate in kg/ha
- $G_{\%}$ = Fertiliser content in percent
- ρ = Density in kg/l

1. Determine the application rate for the fertiliser using the equation.

$$A = \frac{A_R \times 100}{G_{\%} \times \rho}$$

$$A = \frac{55 \times 100}{28 \times 1,28} = 153,5$$

$$A = \frac{\boxed{} \times 100}{\boxed{} \times \boxed{}} = \boxed{}$$

CMS-I-00002734

- D = Flow rate in l/min
- A = Rate in kg/ha
- v = Forward speed in km/h
- R_w = Row width in m

2. Determine the flow rate with the equation.

$$D = \frac{A \times v \times R_w}{600}$$

$$D = \frac{154 \times 15 \times 0.75}{600} = 2,89$$

$$D = \frac{\boxed{} \times \boxed{} \times \boxed{}}{600} = \boxed{}$$

CMS-I-00002733

Flow rate															
Valve position	Pressure														
	1 bar	1.5 bar	2 bar	2.5 bar	3 bar	3.5 bar	4 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar	7 bar	7.5 bar	8 bar
1	0.43 l/min	0.52 l/min	0.6 l/min	0.62 l/min	0.68 l/min	0.73 l/min	0.77 l/min	0.85 l/min	0.93 l/min	0.96 l/min	0.99 l/min	10.2 l/min	1.06 l/min	1.09 l/min	1.12 l/min
2	0.6 l/min	0.71 l/min	0.8 l/min	0.89 l/min	0.97 l/min	1.04 l/min	1.11 l/min	1.2 l/min	1.29 l/min	1.32 l/min	1.35 l/min	1.39 l/min	1.43 l/min	1.48 l/min	1.54 l/min
3	0.97 l/min	1.15 l/min	1.32 l/min	1.46 l/min	1.59 l/min	1.71 l/min	1.83 l/min	1.94 l/min	2.05 l/min	2.1 l/min	2.16 l/min	2.25 l/min	2.35 l/min	2.41 l/min	2.48 l/min
4	1.44 l/min	1.72 l/min	1.96 l/min	2.19 l/min	2.39 l/min	2.58 l/min	2.75 l/min	2.91 l/min	3.08 l/min	3.18 l/min	3.28 l/min	3.4 l/min	3.51 l/min	3.65 l/min	3.78 l/min
5	2 l/min	2.4 l/min	2.76 l/min	3.09 l/min	3.37 l/min	3.64 l/min	3.88 l/min	4.07 l/min	4.26 l/min	4.4 l/min	4.54 l/min	4.72 l/min	4.86 l/min	5.03 l/min	5.21 l/min

Valve position	Flow rate														
	Pressure														
	1 bar	1.5 bar	2 bar	2.5 bar	3 bar	3.5 bar	4 bar	4.5 bar	5 bar	5.5 bar	6 bar	6.5 bar	7 bar	7.5 bar	8 bar
6	3.07 l/min	3.47 l/min	3.91 l/min	4.31 l/min	4.67 l/min	5.01 l/min	5.33 l/min	5.52 l/min	5.71 l/min	5.92 l/min	6.14 l/min	6.33 l/min	6.52 l/min	6.8 l/min	7.08 l/min
7	4.06 l/min	4.9 l/min	5.49 l/min	6.03 l/min	6.54 l/min	6.98 l/min	7.42 l/min	7.63 l/min	7.85 l/min	8.11 l/min	8.36 l/min	8.65 l/min	8.94 l/min	9.3 l/min	9.66 l/min
8	5.81 l/min	6.63 l/min	7.31 l/min	8.03 l/min	8.73 l/min	9.35 l/min	9.93 l/min	10.18 l/min	10.44 l/min	10.77 l/min	10.94 l/min	11.48 l/min	11.82 l/min	12.26 l/min	12.7 l/min

3. read the valve position from the table above.

4. Move the valve **1** to the desired position.

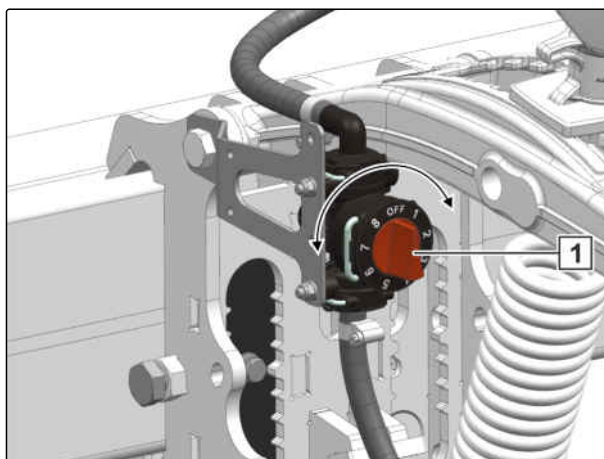
5. *Because the flow rate depends on the applied material:*

Calibrate the application rate as specified in the operating manual for the liquid fertiliser tank.



NOTE

- The determined values are reference values.
- Check the setting each time the applied material is changed.
- During application in the seed furrow, liquid fertiliser can drip out of the application point in the headland position.



CMS-I-00002735

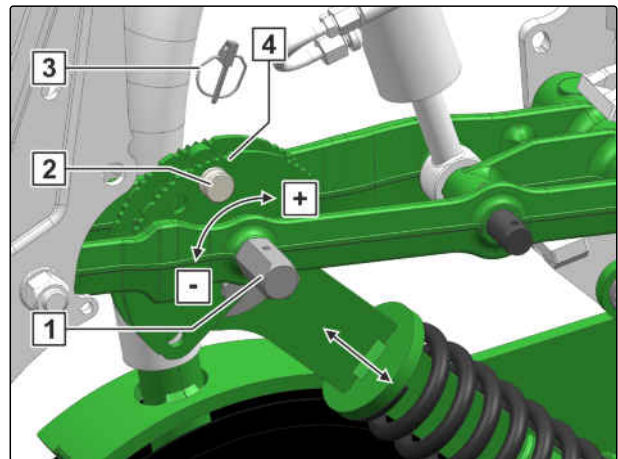
6.5.21 Adjusting the placement depth on the coupled fertiliser couler

CMS-T-00005574-B.1

1. Raise the implement.
2. Secure the tractor and implement.
3. Remove the linch pin **3**.
4. Remove the pin **2**.

The notches **4** between 1 and 5 serve as orientation.

5. *To adjust the fertiliser placement depth,* turn the setting shaft **1** to the desired position.



CMS-I-00003935

6. Install the pin.
7. Install the linch pin.
8. Make the same adjustment for all fertiliser coulers.

6.5.22 Adjusting the placement depth on the leaf spring-guided fertiliser couler

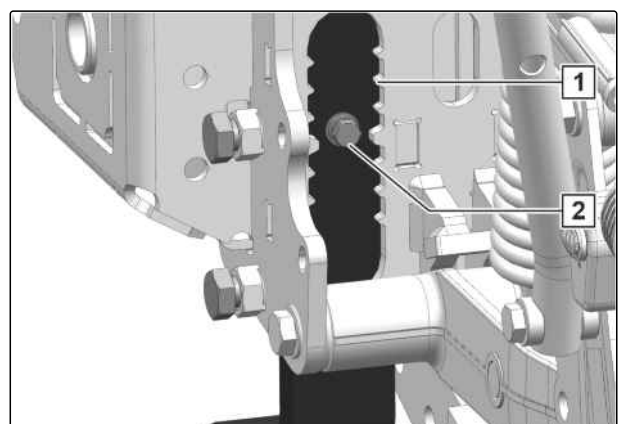
CMS-T-00002061-D.1

NOTE

The operating conditions affect the correct setting.

The adjustment of the fertiliser couler must be adapted to the respective operating conditions. Check the adjustment of the fertiliser couler on the field after driving a short distance.

The bolt **2** serves for orientation on the scale **1**.



CMS-I-00002042



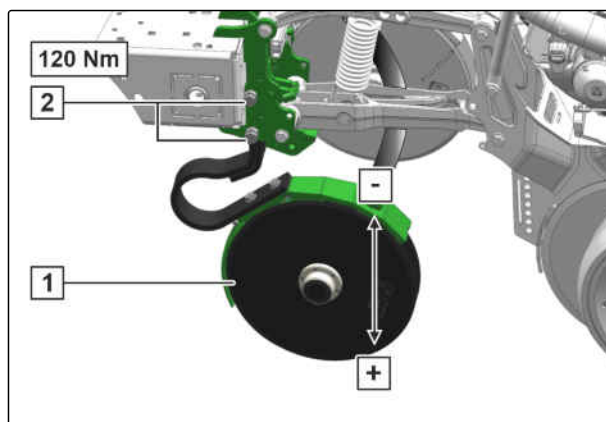
REQUIREMENTS

- ✓ Implement is standing on a solid floor of an equipment building.

1. Lift the implement.
2. *For row widths less than 70 cm*
Secure the machine.
3. *Hold the fertiliser coulters 1 in the set position,*
Loosen the bolts 2.
4. Move the fertiliser coulters to the desired position.
5. *Hold the fertiliser coulters in the desired position,*
Tighten the bolts.
6. Make the same adjustment for all fertiliser coulters.

or

Put the fertiliser placement depth in the tracks in the desired position.



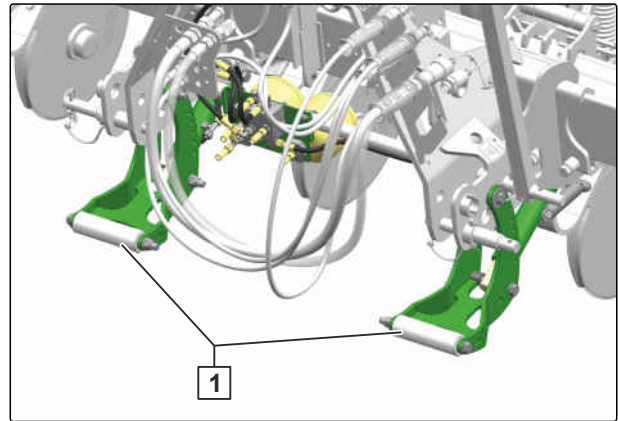
CMS-I-00001934

6.5.23 Adjusting the frame ballasting

CMS-T-00002219-F.1

The hydraulically actuated frame ballasting 1 is supported on the lower links and transfers the weight from the tractor to the implement frame. As a result, there is an additional load on the precision airplanter and the placement depth can be maintained even under difficult operating conditions.

For maximum effect of the frame ballasting, the implement must be coupled to the highest top link point on the tractor side.



CMS-I-00001984



WARNING

An unexpected hydraulic function is activated

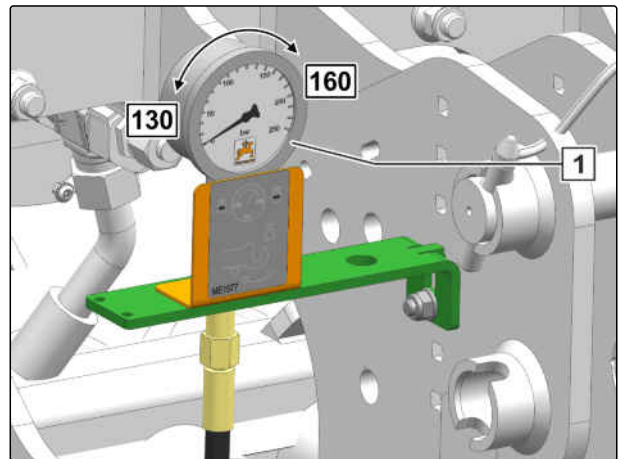
- *Before you actuate the tractor control unit, check the selected hydraulic function of the Comfort hydraulic system.*



NOTE

The working range is between 130 bar and 160 bar.

Always rest the frame ballasting on the lower link.



CMS-I-00004101

1. Lower the implement onto the ground.
2. *To increase the frame ballast:*
Actuate the "blue 1" tractor control unit

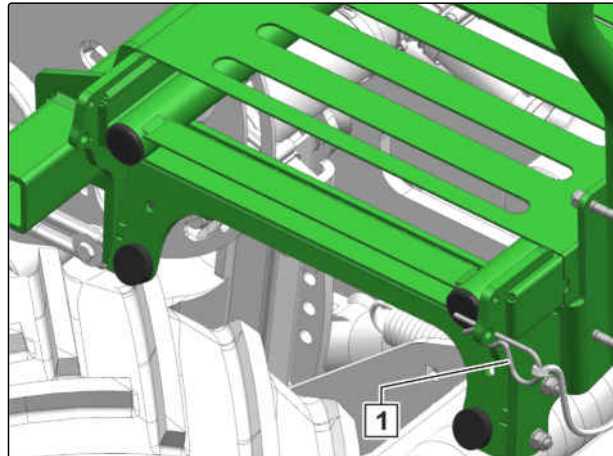
or

To reduce the frame ballast:
Actuate the "blue 2" tractor control unit.

6.5.24 Using the loading board

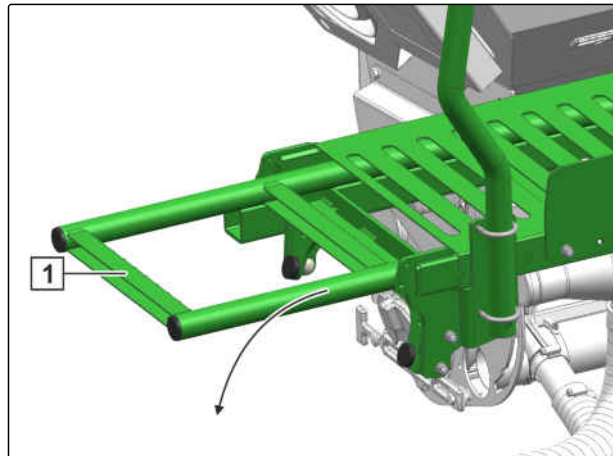
CMS-T-00003737-B.1

1. Remove the safety cotter pin **1**.



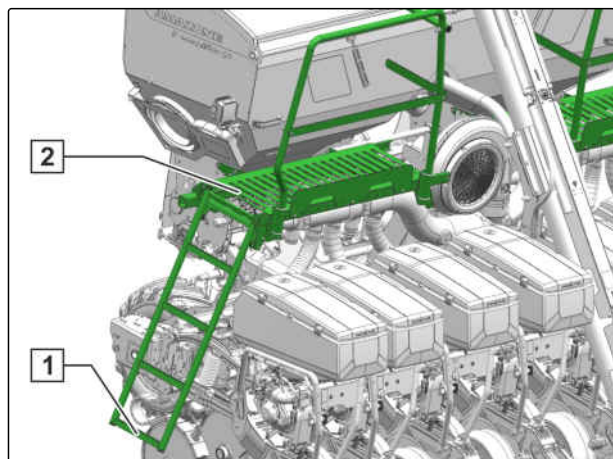
CMS-I-00002744

2. Pull out the ladder **1** and swivel it down.



CMS-I-00002836

3. Climb onto the loading board **2** using the ladder.
4. After use, swivel the ladder **1** up and put it in the parking position.
5. Secure the ladder in the parking position with the cotter pin.



CMS-I-00002745

6.5.25 Telescoping 6 rows variably

CMS-T-00005411-C.1

6.5.25.1 Converting 7 rows to 6 rows

CMS-T-00005408-C.1



REQUIREMENTS

- ☑ The implement is equipped with a central fertiliser metering drive.



NOTE

For a row spacing between 80 cm and 70 cm, the fourth row is deactivated.

With a single row drive for the fertiliser metering unit, the conversion to 6 rows cannot be performed.

1. Disconnect the ISOBUS from the tractor.
2. telescope the implement in.
3. Remove the linch pin **1** between the first and second coulter.
4. Move the linch pin to the desired position between the first and second coulter.
5. Move the opposite linch pin to the desired position between the sixth and seventh coulter.
6. Remove the linch pin between the second and third coulter.
7. Remove the opposite linch pin between the fifth and sixth coulter.

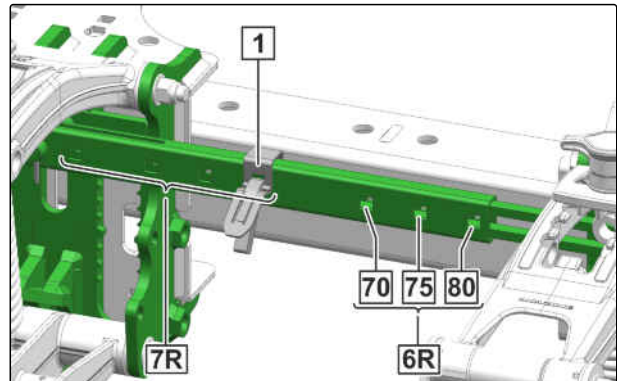
The set the row spacings of 70 cm and 75 cm, the coulters in the third and fifth row must be moved towards the fourth coulter.

8. Telescope the implement out.

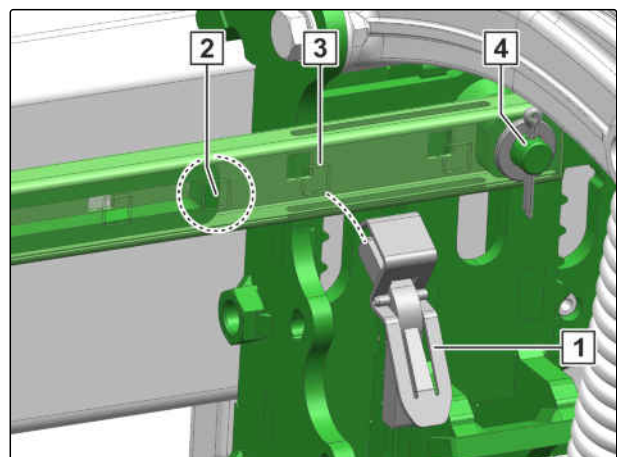
➔ The second and sixth coulter are pushed 10 cm outwards.

➔ The inner telescopic rod **2** lies beside the 50 cm pegging position **3**.

9. Insert the linch pin **1** between the second and third coulter **4** in the 50 cm position **3**.



CMS-I-00003831



CMS-I-00003843

6 | Preparing the machine

Preparing the implement for operation

10. Insert the opposite linch pin between the fifth and sixth coulter in the 50 cm position.

11. telescope the implement in.

➔ The third coulter pushes on the fourth coulter.

➔ On the opposite side, the fifth coulter pushes on the fourth coulter.

12. Remove the linch pin **1** between the third and fourth coulter.

13. Move the linch pin to the desired position between the third and fourth coulter.

14. Move the opposite linch pin to the desired position between the fourth and fifth coulter.

15. *To prevent the telescope rails from falling apart:*
Telescope the implement out by a maximum of 5 cm.

➔ The linch pin between the second and third coulter is without tension.

➔ The linch pin between the fifth and sixth coulter is without tension.

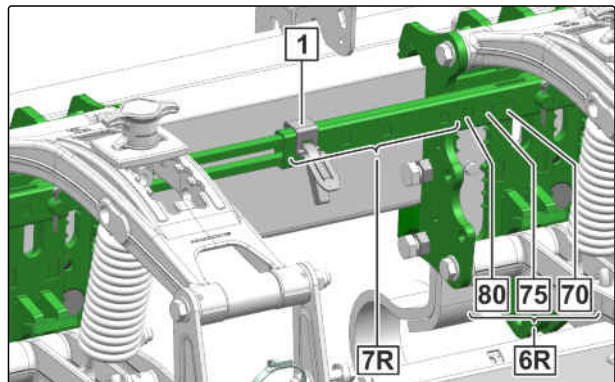
16. Remove the linch pin **1** between the second and third coulter.

17. Move the linch pin to the desired position between the second and third coulter.

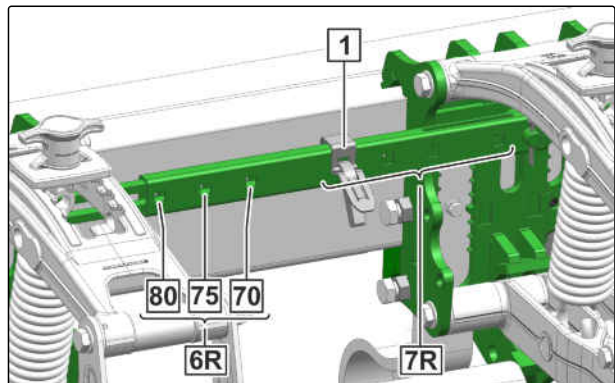
18. Move the opposite linch pin to the desired position between the fifth and sixth coulter.

19. Telescope the implement out.

➔ The desired row spacing is adjusted between all of the coulters.

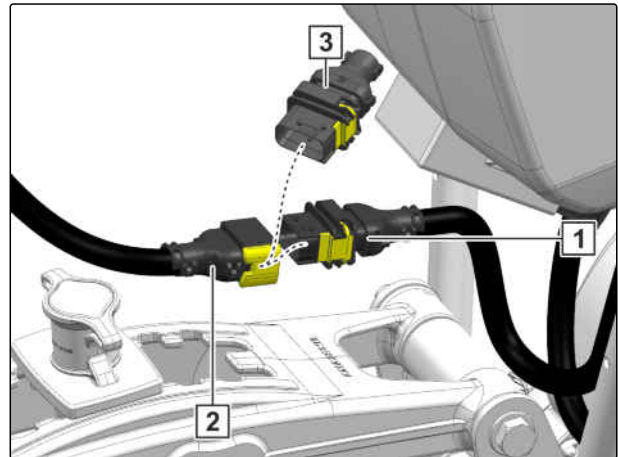


CMS-I-00003833

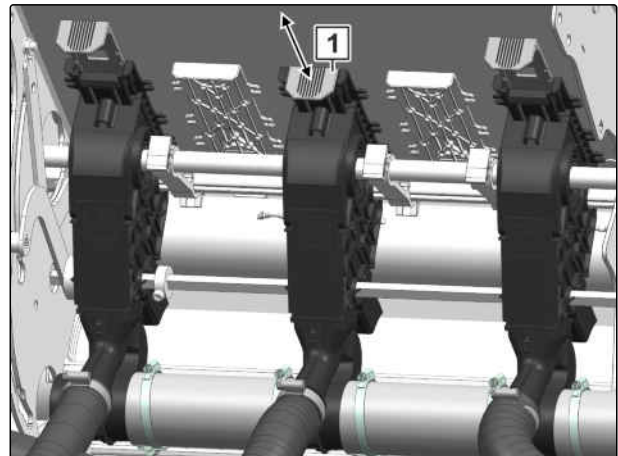


CMS-I-00003832

20. *To deactivate the fourth seeding coulter:*
Disconnect the seeding coulter wiring harness **1** from the implement wiring harness **2**.
21. Connect the implement wiring harness to the bridge plug **3**.
22. Seal the seeding coulter wiring harness **1** with a dust cap.
23. *To lift the fourth seeding coulter:*
"Use the coulter raised position".
24. Connect the ISOBUS to the tractor.
25. Restart the implement.
26. *If fertiliser should not be spread in the fourth row:*
close the sliding shutter **1** on the fertiliser metering unit of the fourth row.



CMS-I-00003830



CMS-I-00003915

6.5.25.2 Adjusting the row spacing between 80 and 50 cm

CMS-T-00003715-D.1



CAUTION

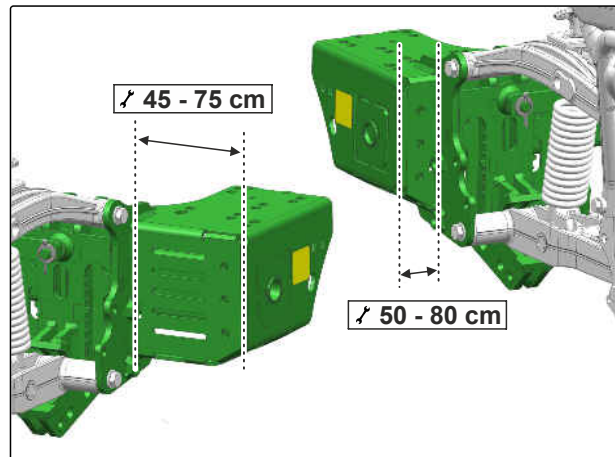
There are crushing and shear points between the implement sections and the implement.

- When folding or unfolding the implement sections, never reach into the crushing area.



NOTE

Telescopic frames with the short protrusion can be telescoped from 50 cm to 80 cm.

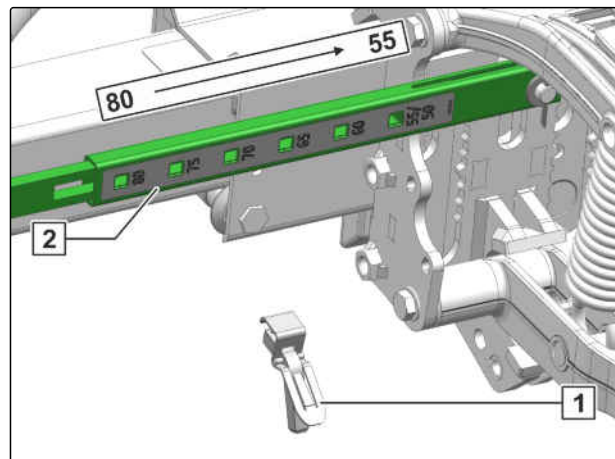


CMS-I-00003845

1. Raise the implement.
2. *To set the row spacing to 50 cm:*
Telescope the implement completely in.

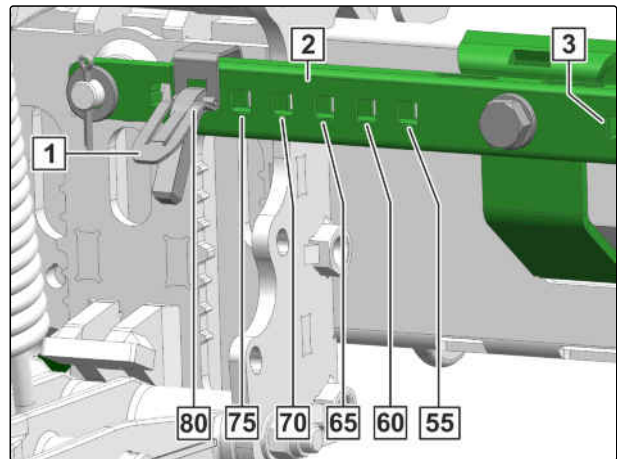
To set the row spacing between 55 cm and 80 cm, the linch pins **1** must be positioned between the rows.

3. Remove the linch pin between the first and second coulter.
4. Move the linch pin in the slotted link **2** to the desired position between the first and second coulter.
5. Move the linch pin in the slotted link to the desired position between the second and third coulter.
6. Move the opposite linch pin in the slotted link to the desired position between the fourth and fifth coulter.
7. Move the opposite linch pin in the slotted link to the desired position between the fifth and sixth coulter.



CMS-I-00003840

8. Remove the linch pin **1** between the third and fourth coulter.
9. Move the linch pin in the slotted link **2** to the desired position between the third and fourth coulter.
10. Remove the opposite linch pin between the third and fourth coulter.
11. Move the opposite linch pin in the slotted link to the desired position **3** between the third and fourth coulter.
12. *To set the the desired row spacing:*
Telescope the implement out.
- ➔ When the implement sections have reached their end position, the conveyor hoses to the fertiliser coulters may not sag.
13. *If the conveyor hoses are sagging:*
fasten the fertiliser hoses.
14. *When the implement sections have reached the end position:*
release the pull rope and move the "green" tractor control unit to the neutral position.



CMS-I-00003847

6.5.25.3 Adjusting the row spacing between 75 and 45 cm

CMS-T-00005412-C.1



CAUTION

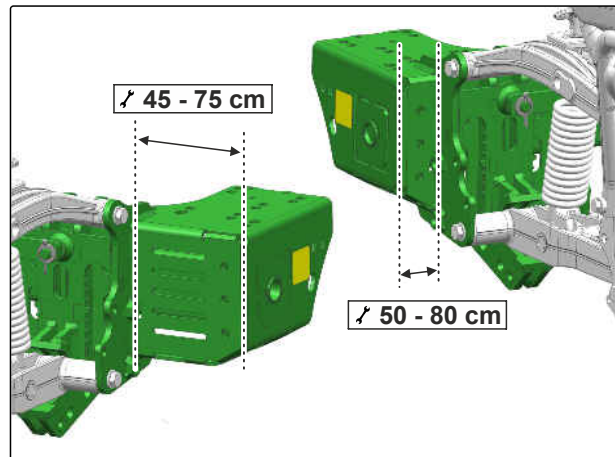
There are crushing and shear points between the implement sections and the implement.

- ▶ *When folding or unfolding the implement sections,*
never reach into the crushing area.



NOTE

Telescopic frames with the long protrusion can be telescoped from 45 cm to 75 cm.

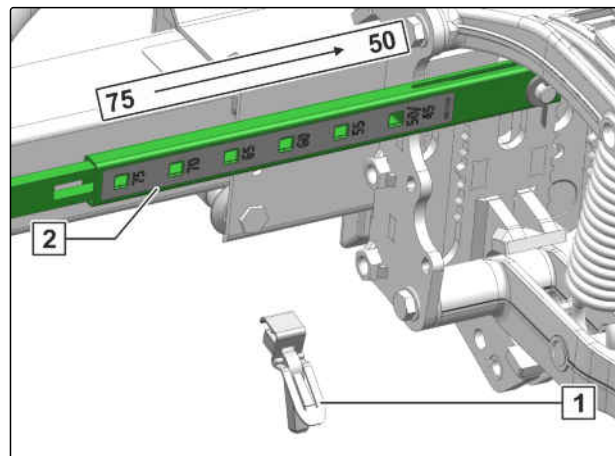


CMS-I-00003845

1. Raise the implement.
2. *To set the row spacing to 45 cm:*
Telescope the implement completely in.

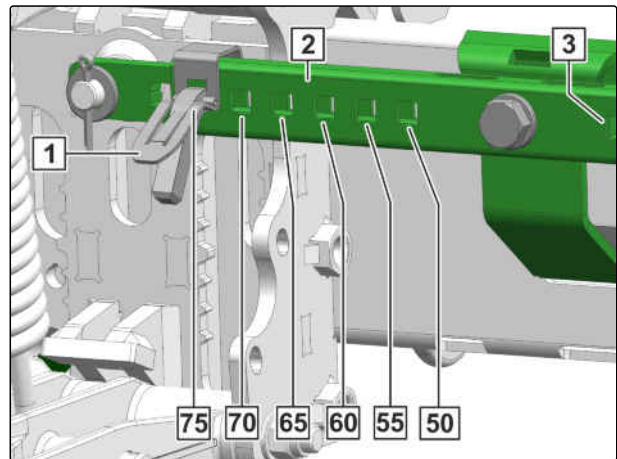
To set the row spacing between 50 cm and 75 cm, the linch pins **1** must be positioned between the rows.

3. Remove the linch pin between the first and second coulter.
4. Move the linch pin in the slotted link **2** to the desired position between the first and second coulter.
5. Move the linch pin in the slotted link to the desired position between the second and third coulter.
6. Move the opposite linch pin in the slotted link to the desired position between the fourth and fifth coulter.
7. Move the opposite linch pin in the slotted link to the desired position between the fifth and sixth coulter.



CMS-I-00003839

8. Remove the linch pin **1** between the third and fourth coulter.
9. Move the linch pin in the slotted link **2** to the desired position between the third and fourth coulter.
10. Remove the opposite linch pin between the third and fourth coulter.
11. Move the opposite linch pin in the slotted link to the desired position **3** between the third and fourth coulter.
12. *To set the the desired row spacing:*
Telescope the implement out.
- ➔ When the implement sections have reached their end position, the conveyor hoses to the fertiliser coulters may not sag.
13. *If the conveyor hoses are sagging:*
fasten the fertiliser hoses.
14. *When the implement sections have reached the end position:*
release the pull rope and move the "green" tractor control unit to the neutral position.



CMS-I-00003846

6.5.26 Telescoping 7 rows variably

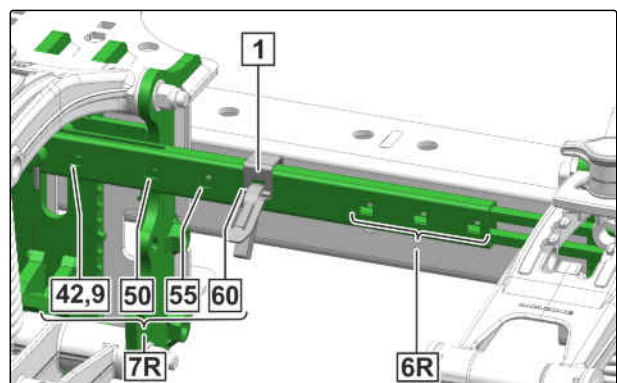
CMS-T-00005409-C.1

6.5.26.1 Converting 6 rows to 7 rows

CMS-T-00005410-C.1

For a row spacing between 60 cm and 42.9 cm, the fourth coulter is reactivated.

1. Disconnect the ISOBUS from the tractor.
2. telescope the implement in.
3. Remove the linch pin **1** between the first and second coulter.
4. Move the linch pin to the desired position between the first and second coulter.
5. Move the opposite linch pin to the desired position between the sixth and seventh coulter.



CMS-I-00002810

6 | Preparing the machine

Preparing the implement for operation

6. Remove the linch pin between the second and third coulter.
7. Remove the opposite linch pin between the fifth and sixth coulter.

The implement is set to a row spacing of 70 cm or 75 cm.

8. Telescope the implement out.

- ➔ The second and sixth coulter are pushed 10 cm outwards.
- ➔ The inner telescopic rod **2** lies beside the 50 cm pegging position **3**.

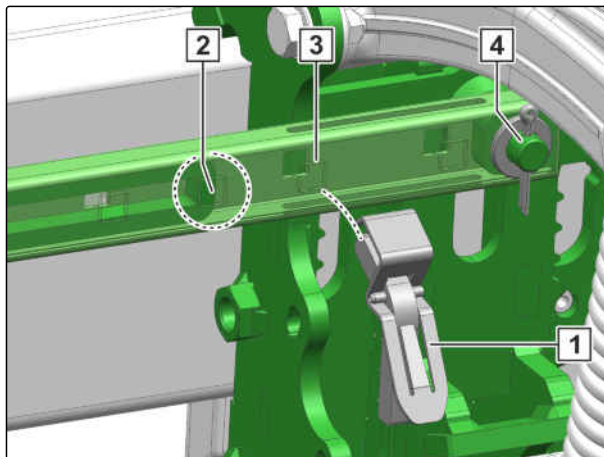
9. telescope the implement in.

- ➔ The linch pin between the third and fourth coulter **4** is without tension.
- ➔ The linch pin between the fourth and fifth coulter is without tension.

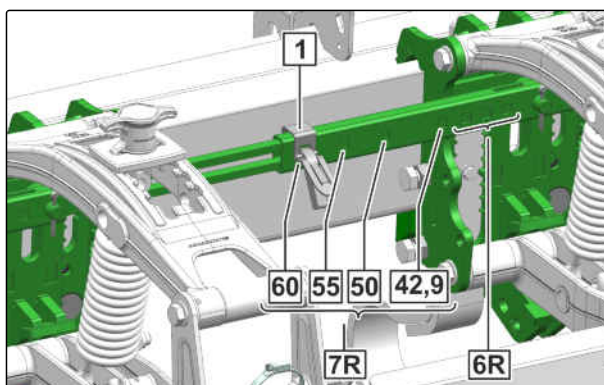
10. Remove the linch pin **1** between the third and fourth coulter.

11. Move the linch pin to the desired position between the third and fourth coulter.

12. Move the opposite linch pin to the desired position between the fourth and fifth coulter.



CMS-I-00003843



CMS-I-00002809

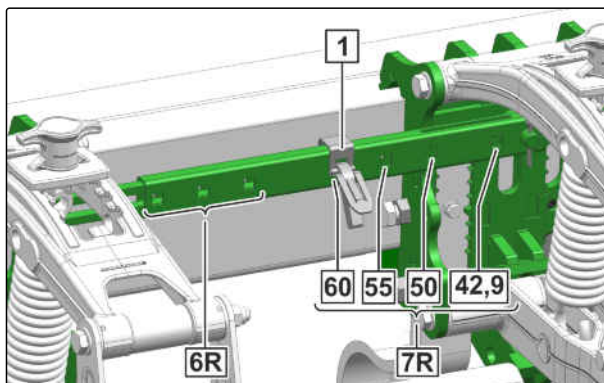
13. Remove the linch pin **1** between the second and third coulter.

14. Move the linch pin to the desired position between the second and third coulter.

15. Move the opposite linch pin to the desired position between the fifth and sixth coulter.

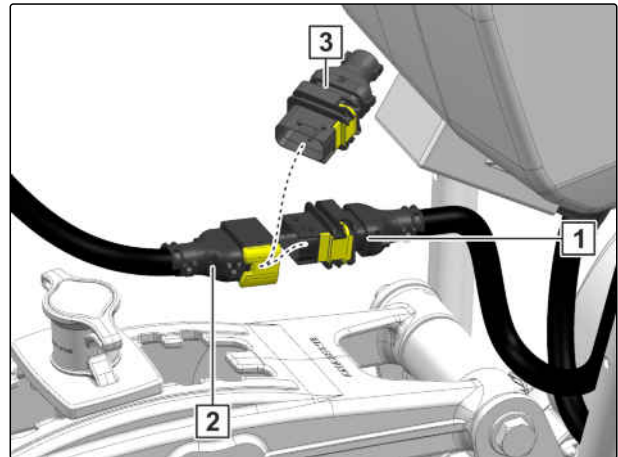
16. Telescope the implement out.

- ➔ The desired row spacing is adjusted between all of the coulters.

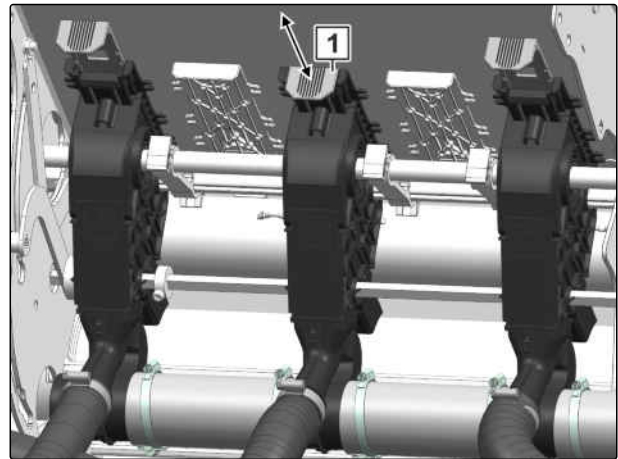


CMS-I-00002808

17. To activate the fourth seeding coulters, disconnect the seeding coulters wiring harness **1** from the bridge plug **3**.
18. Connect the implement wiring harness **2** to the seeding coulters wiring harness **1**.
19. Seal the bridge plug with a dust cap.
20. To lower the fourth seeding coulters, see "Using the coulters raised position".
21. Connect the ISOBUS to the tractor.
22. Restart the implement.
23. If the fertiliser metering unit was deactivated on the fourth row, open the sliding shutter **1** on the fertiliser metering unit of the fourth row.



CMS-I-00003830



CMS-I-00003915

6.5.26.2 Adjusting the row spacing between 60 and 42.9 cm

CMS-T-00003842-D.1



CAUTION

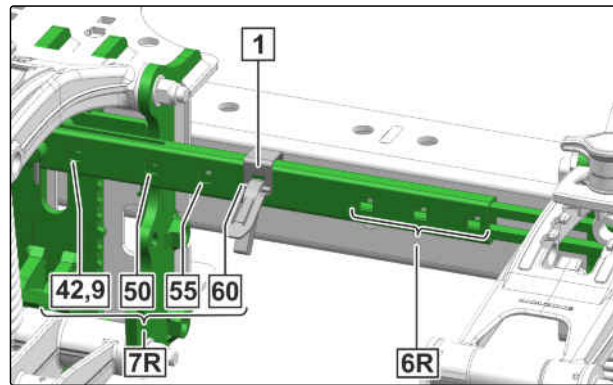
There are crushing and shear points between the implement sections and the implement.

- When folding or unfolding the implement sections, never reach into the crushing area.

6 | Preparing the machine

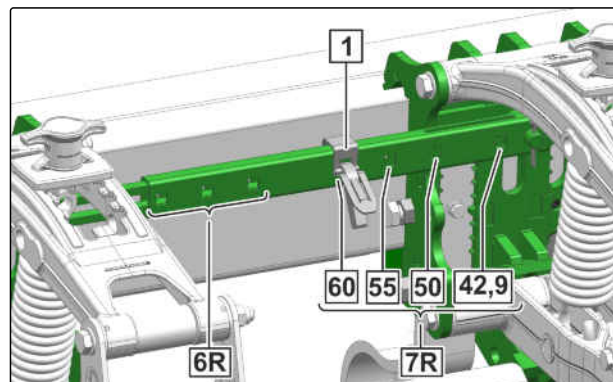
Preparing the implement for operation

1. Raise the implement.
2. telescope the implement in.
3. Remove the linch pin **1** between the first and second coulter.
4. Move the linch pin to the desired position between the first and second coulter.
5. Move the linch pin to the desired position between the sixth and seventh coulter.



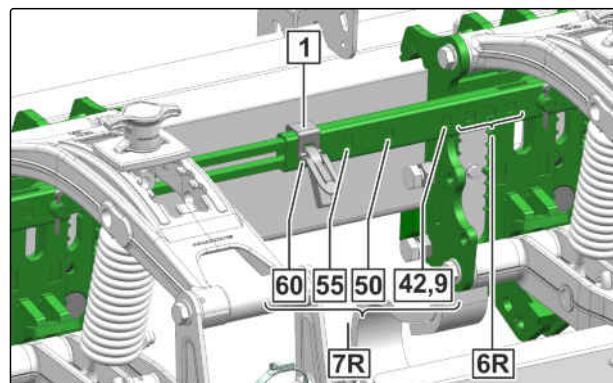
CMS-I-00002810

6. Remove the linch pin **1** between the second and third coulter.
7. Move the linch pin to the desired position between the second and third coulter.
8. Move the opposite linch pin to the desired position between the fifth and sixth coulter.



CMS-I-00002808

9. Remove the linch pin **1** between the third and fourth coulter.
10. Move the linch pin to the desired position between the third and fourth coulter.
11. Move the opposite linch pin to the desired position between the fourth and fifth coulter.



CMS-I-00002809

12. *Until the implement sections have reached the end position,*
Actuate the pull rope and actuate the "green" tractor control unit.

➔ When the implement sections have reached their end position, the conveyor hoses to the fertiliser coulters may not sag.

13. *If the conveyor hoses are sagging,*
fasten the fertiliser hoses.
14. *When the implement sections have reached the end position,*
release the pull rope and move the "green" tractor control unit to the neutral position.

6.5.27 Adjusting the running gear height

CMS-T-00008168-B.1



NOTE

In the factory settings, the running gear wheels are installed in the centre position.

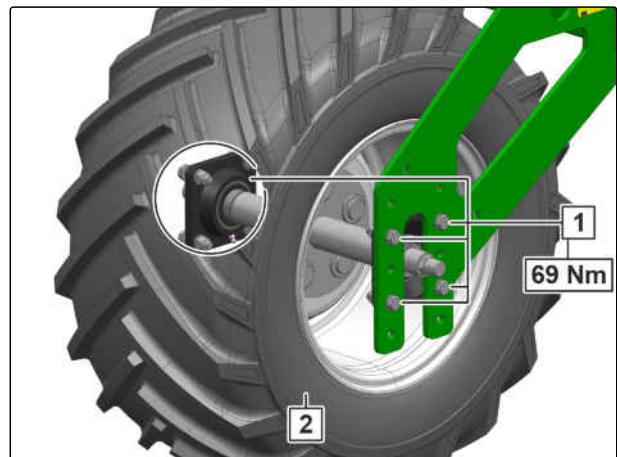
Special operating conditions can require a different running gear height. In doing so, it must be noted that the range of movement of the seeding coulter is restricted. For example, if the running gear height is increased, the set placement depth may not be reached on very hilly terrain.



REQUIREMENTS

- ☑ Implement is standing on a solid floor of an equipment building.

1. Lift the implement.
2. Secure the machine.
3. Fix the height of the wheel **2** with a suitable aid.
4. Remove the bolts **1**.
5. Move the wheel to the desired position with a suitable aid.
6. Install the bolts and tighten them.
7. After 5 hours of operation, check the bolt connection for tight fit.



CMS-I-00005634

For implements with mechanical drives, the length of the drive chain must be adjusted.

6 | Preparing the machine

Preparing the implement for operation

In the upper position, the chain must be shortened by 3 links, and in the lower position, it must be lengthened by 3 links.

8. *To adjust the length of the drive chain, see "Replacing the gear wheel in the leading wheel drive".*



NOTE

For more information, please contact your AMAZONE customer service.

6.5.28 Installing a seed row

CMS-T-00005483-F.1

6.5.28.1 Installing the PreTeC mulch seeding coulter

CMS-T-00005491-D.1



NOTE

Depending on the row conversion that is performed, new supply hoses for air and fertiliser supply are required.

Have other conversion possibilities tested by a specialist workshop.

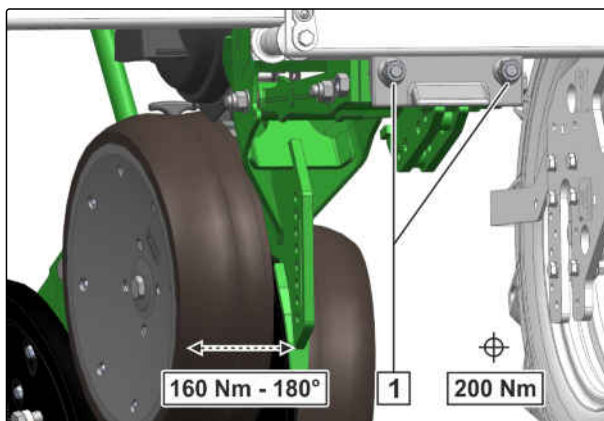
Installation recommendation for implements with a hydraulic coulter pressure system.

Conversion	Installation recommendation
From 4 to 6 rows	Rows 2 and 5
From 8 to 12 rows	Rows 3, 5, 8 and 10

Installation recommendation for implements with a mechanical coulter pressure system.

Conversion	Installation recommendation
From 4 to 6 rows	Rows 2 and 5
From 8 to 12 rows	Rows 2, 5, 8 and 11

1. *To ensure optimal hose routing after installing the PreTeC mulch seeding coulters:*
Refer to the table to determine the rows that must be installed.
2. Loosen the bolts **1**.



CMS-I-00002039

3. Push the already installed coulters into the desired position.
4. Tighten bolts on telescopic coulters to 160 Nm minus 180°

or

Tighten bolts on non-telescopic coulters to 200 Nm.



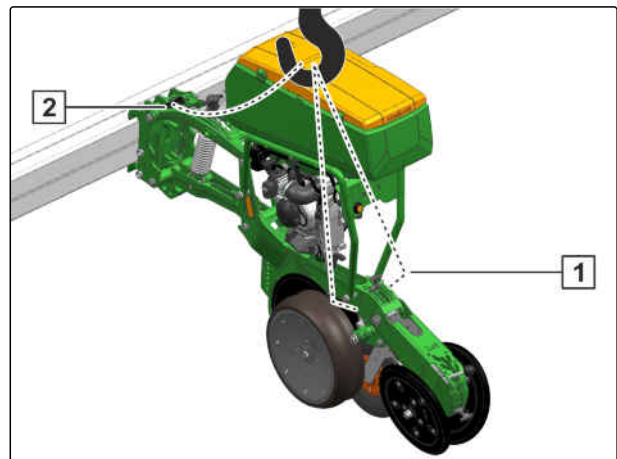
WORKSHOP WORK

5. *For coulter installation with a crane:*
Proceed as follows

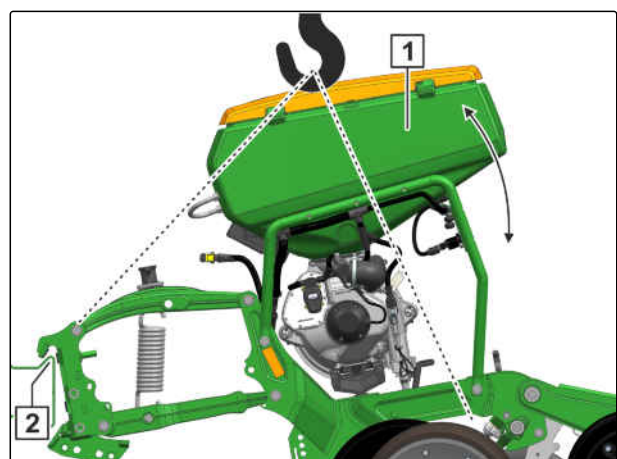
or

For coulter installation with a PreTeC transport dolly:
Follow the instructions starting with Point 9.

6. *To make the coulter tip slightly towards the front for installation:*
select a longer front load handling device at the front than at the rear.
7. Fasten the load handling device on the coulter top link **2**.
8. Fasten 2 load handling devices on the coulter body **1**.
9. Guide the tilted coulter **1** along the frame **2**.
10. Lower the coulter.



CMS-I-00004137



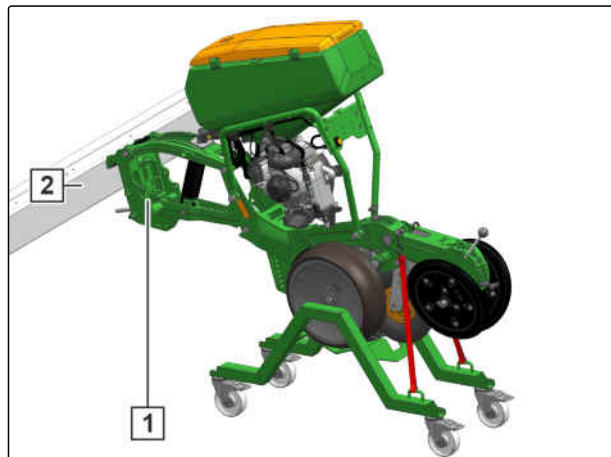
CMS-I-00004136

6 | Preparing the machine

Preparing the implement for operation

11. Lower the implement.

12. Move the transport dolly with the tilted coulter **1** towards the frame **2**.



CMS-I-00005133

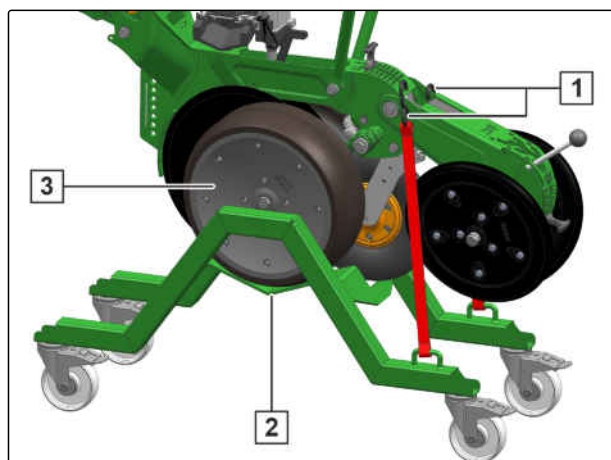
13. Slightly lift the implement.

➔ Belts **1** must be tension-free.

14. Release the belts from the coulter.

15. Lift the implement further.

➔ The depth control wheels **3** are lifted off the transport dolly **2**.



CMS-I-00005134

16. Install the coulter bracket.

17. Tighten bolts on telescopic coulters to 160 Nm minus 180°

or

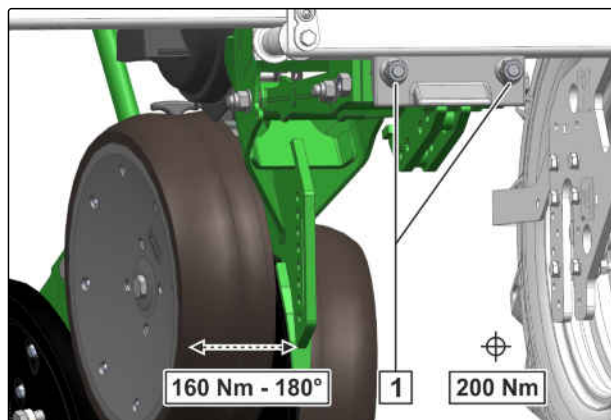
Tighten bolts on non-telescopic coulters to 200 Nm.

18. Establish the energy supply.

19. Establish the hydraulic supply.

20. Establish the air and fertiliser supply on the distributor head or the fertiliser hopper.

21. Couple the ISOBUS onto the tractor.

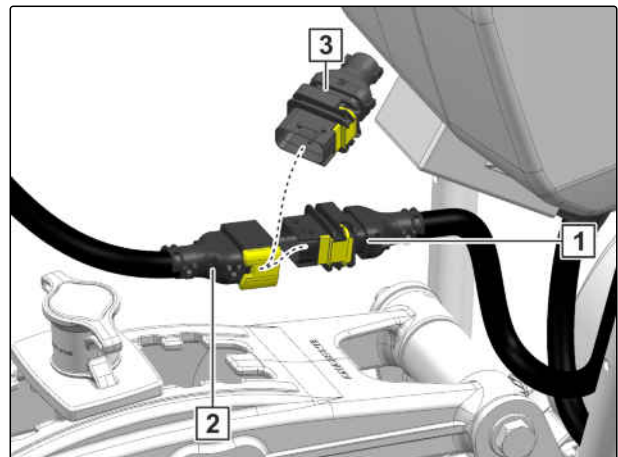


CMS-I-00002039

22. Restart the implement.
23. *To enter the changed working width on the control terminal:*
see "ISOBUS software operating manual" > "Defining the geometry".

6.5.28.2 Establishing the energy supply

1. Uncouple the ISOBUS from the tractor.
2. Disconnect the bridge plug **3** from the coultter wiring harness **1**.
3. Connect the coultter wiring harness **1** to the implement wiring harness **2**.



CMS-T-00005490-D.1

CMS-I-00003830

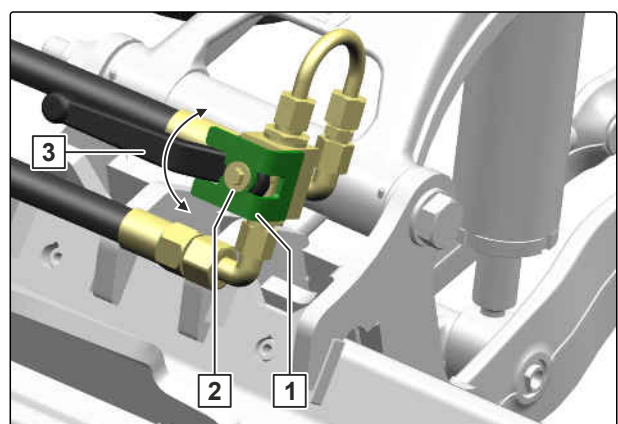
6.5.28.3 Establishing the hydraulic supply



REQUIREMENTS

- ✓ The implement is lifted
- ✓ The tractor and implement are secured

1. Unfold the implement sections.
 2. *To set the coultter pressure to zero:*
Refer to the ISOBUS operating manual, "Adjusting the coultter pressure".
 3. Switch off the fan.
 4. Lower the implement. Move the 3-point hydraulic system of tractor into float position.
- ➔ The coultter pressure cylinders are retracted. The coultter pressure is dissipated.



CMS-I-00007310

5. Secure the tractor and implement.
6. Remove the bolt **2**.
7. Remove the fastener **1**.

8. Open the valve **3**.
9. Repeat steps 6 to 8 on the opposite side of the implement.



ENVIRONMENTAL INFORMATION

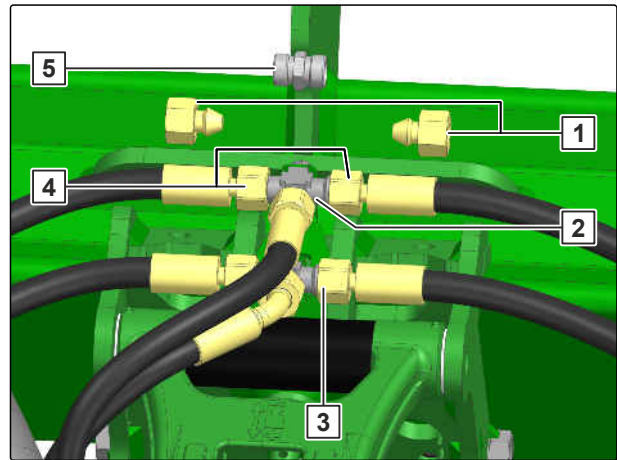
Danger due to escaping oil

- Collect any escaping oil.
- Dispose of oil removal material in an environmentally friendly manner.

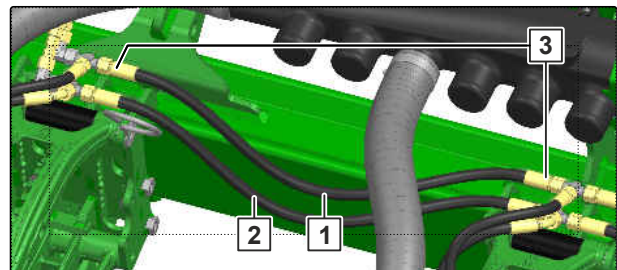
10. Disconnect the connection **4**. Store connectors **5** in the threaded cartridge.
11. Remove the sealing caps **1** from the T-piece **2**.
12. Install the hydraulic hoses on the T-piece.
13. *To convert the hydraulic supply of the second line **3**:*
Repeat steps 10 to 12.

For a conversion from 8 to 12 rows, the longer hydraulic hoses between row 1 and 2 and between row 11 and 12 are no longer needed.

14. Disconnect the connection **3**.
15. Remove the long hydraulic hose **1**.
16. Install the original hydraulic hose between the coulters.
17. *To replace the second line **2**:*
Repeat steps 14 to 16.

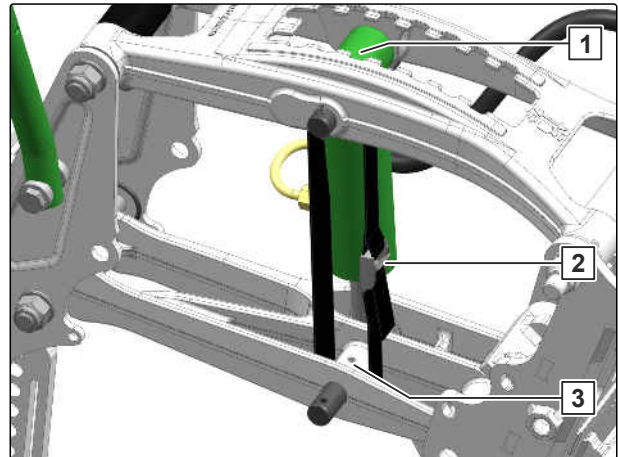


CMS-I-00007201



CMS-I-00007202

18. Loosen the tension belt **2** from the top link **1** and lower link **3** and remove it.



CMS-I-00005312

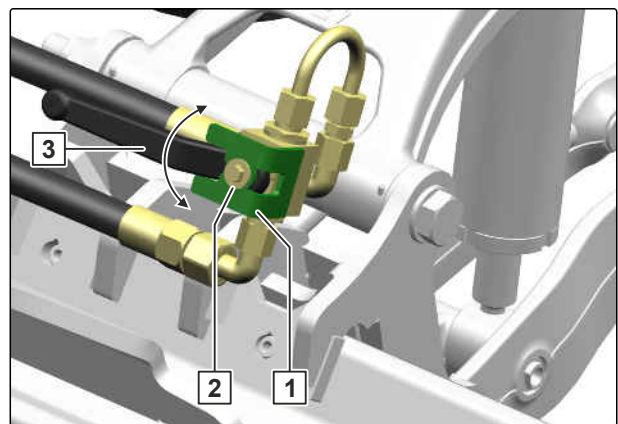
After installing additional coulters, the hydraulic coulters pressure system must be vented.

19. *To set the coulters pressure to zero:*
ISOBUS operating manual, "Adjusting the coulters pressure".

20. Switch on the fan at 2,000 1/min.

NOTE

Establish the oil supply to the hydraulic unit.



CMS-I-00007310

21. Lift and lower the seeding units one after the other with a crane

or

Place the seeding units on the coulter wagon one after the other and lift and lower the implement.

22. *When the hydraulic coulters pressure system has been vented:*

Close the valve **3**.

23. Install the fastener **1**.

24. Install the bolt **2**.

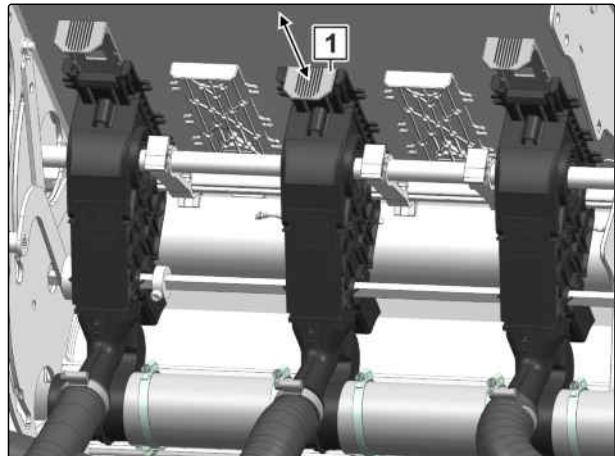
25. *To close the valve on the opposite side of the implement:*

Repeat steps 22 to 24.

6.5.28.4 Establishing the air and fertiliser supply on the rear hopper

CMS-T-00005487-D.1

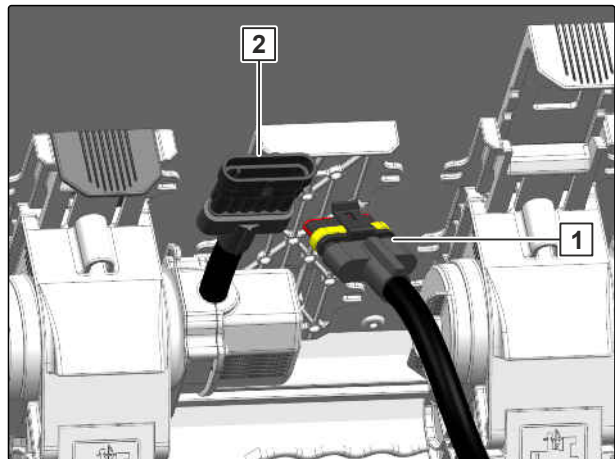
1. Open the sliding shutter **1** on the fertiliser metering unit.



CMS-I-00003915

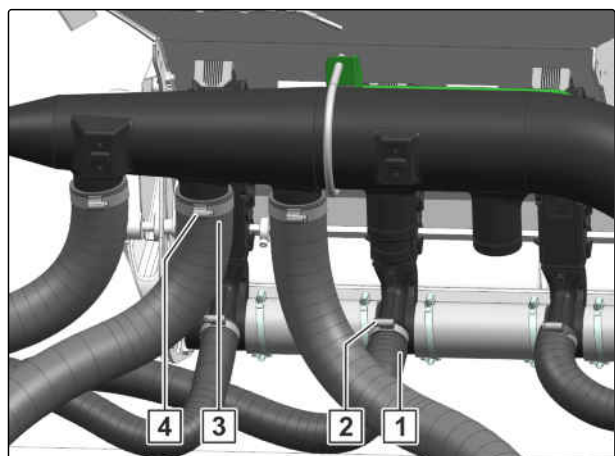
Conversion from 4 to 6 rows	
Metering unit	Coulter row
1	1
2	2
3	3
4	4
5	5
6	6

For implements with a decentralised fertiliser metering drive, the connection of the metering drives must be re-assigned after the conversion.



CMS-I-00003922

2. Disconnect the motor cable **2** on row 2 to 6 from the implement wiring harness **1**.
3. Connect the motor cable on row 2 to 6 to the implement wiring harness as specified in the table.
4. Install the fertiliser hose **1** on the fertiliser metering unit.
5. Install the clamp **2**.
6. Install the air supply **3** on the air distributor.
7. Install the clamp **4**.



CMS-I-00003916

6.5.28.5 Establishing the air and fertiliser supply on the distributor head

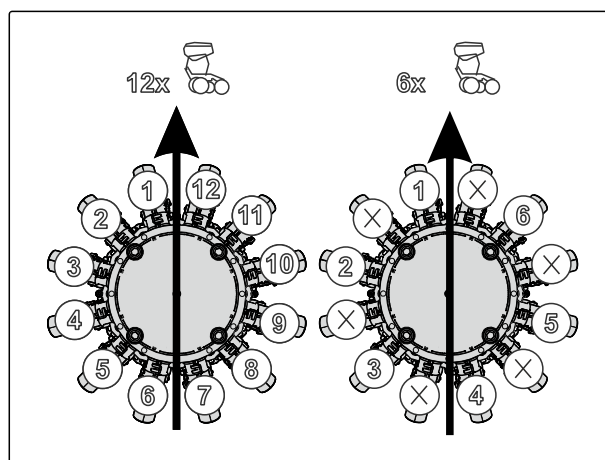
CMS-T-00005489-E.1

Distributor head connection	Conversion from 8 to 12 rows		Conversion from 4 to 6 rows	
	Setting motor	Coulter row	Setting motor	Coulter row
1	A	1	A	1
2	B	2	Dust cap	X
3	C	3	B	2
4	D	4	Dust cap	X
5	E	5	C	3
6	F	6	Dust cap	X
7	G	7	D	4
8	H	8	Dust cap	X
9	I	9	E	5
10	J	10	Dust cap	X
11	G	11	F	6
12	L	12	Dust cap	X



WORKSHOP WORK

1. Connect the connection cable for the setting motors to the wiring harness according to the table.
2. Seal the free cables of the wiring harness with dust caps.
3. Seal the free cables of the setting motors with dust caps.

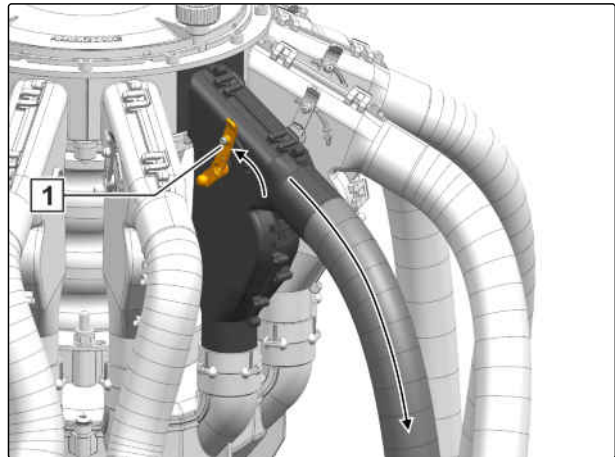


CMS-I-00008638



WORKSHOP WORK

4. Connect the conveyor hoses to the distributor head as specified in the table.
5. *To ensure the fertiliser flow on implements with distributor heads and without single row control:*
Push the lever **1** upwards.

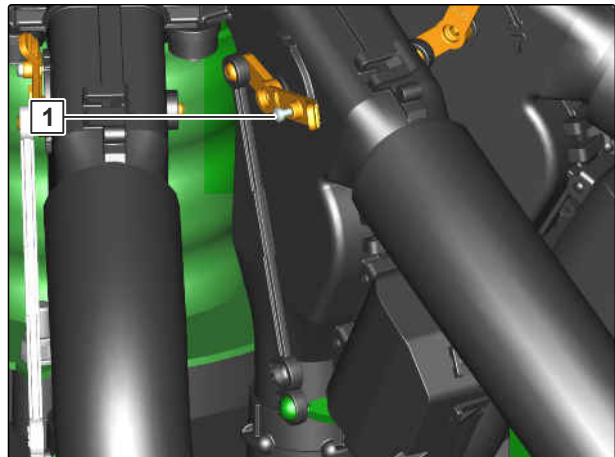


CMS-I-00003960



WORKSHOP WORK

6. Connect the conveyor hoses to the distributor head as specified in the table.
7. *To ensure the fertiliser flow on implements with distributor heads and single row control,*
Unscrew the bolt **1** until the lever can move freely.

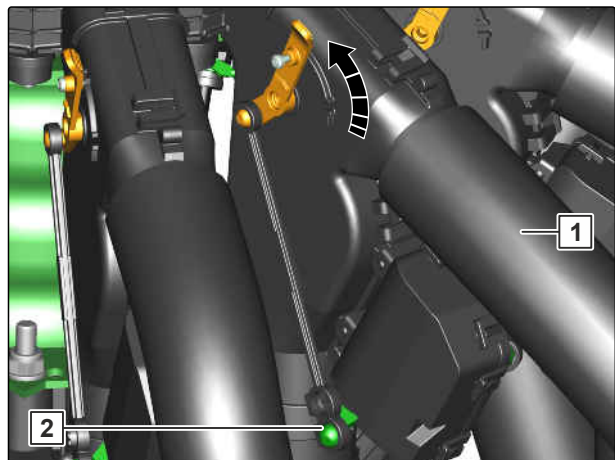


CMS-I-00007406



WORKSHOP WORK

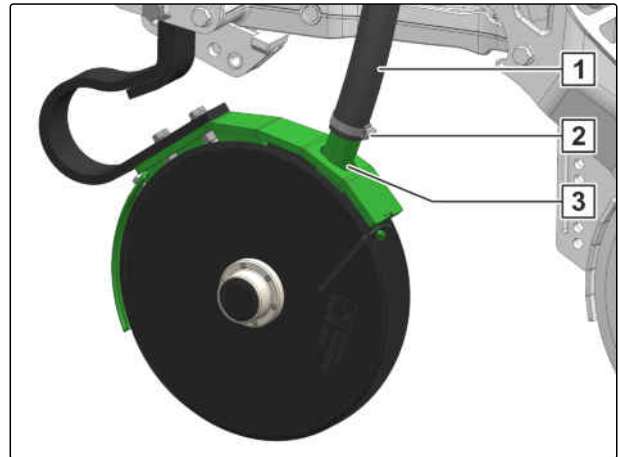
8. Actuate the coupling rod **2**.
9. Connect the conveyor hoses **1** to the distributor head as specified in the table.



CMS-I-00007405

10. Install the conveyor hose **1** on the fertiliser coulter **3**.

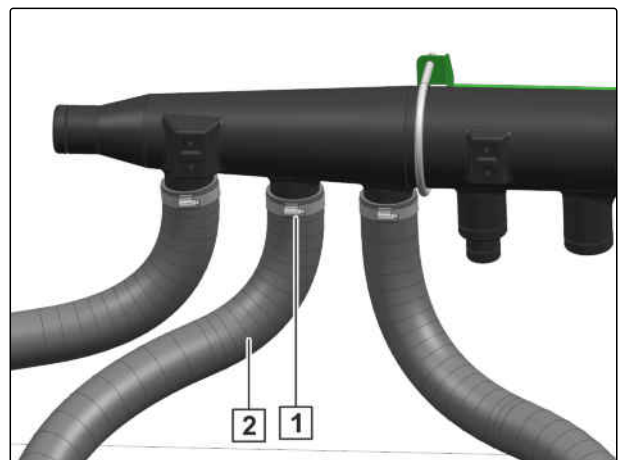
11. Install the clamp **2**.



CMS-I-00003920

12. Install the air supply **2** on the air distributor.

13. Install the clamp **1**.



CMS-I-00003919

6.5.29 Removing seed rows

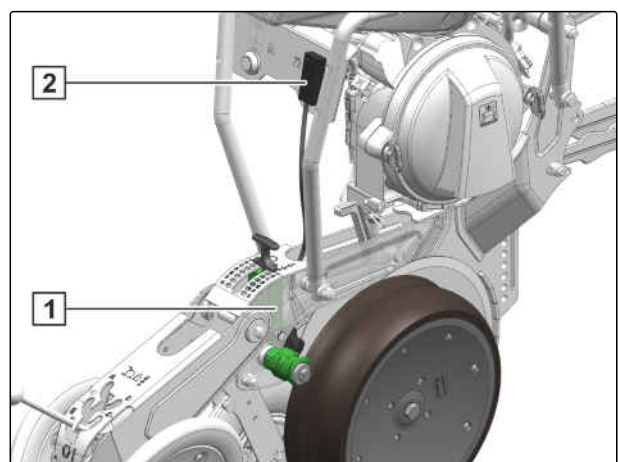
CMS-T-00005471-F.1

6.5.29.1 Removing recommendation

CMS-T-00010522-B.1

NOTE

Rows with a contact force sensor **1** may not be removed. The contact force sensor can be recognised by the signal processing **2**.



CMS-I-00003921

NOTE

Depending on the row conversion that is performed, new supply hoses for air and fertiliser supply are required.

Have other conversion possibilities tested by a specialist workshop.

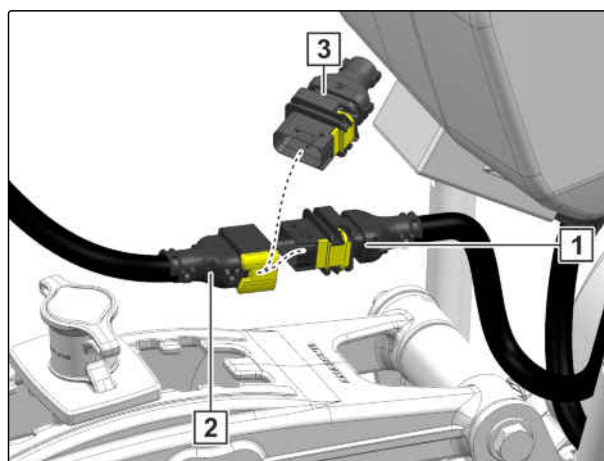
Removal recommendation for implements with a hydraulic coulter pressure system.	
Conversion	Removing recommendation
From 6 to 4 rows	Rows 2 and 5
From 12 to 8 rows	Rows 3, 5, 8 and 10

Removal recommendation for implements with a mechanical coulter pressure system.	
Conversion	Removing recommendation
From 6 to 4 rows	Rows 2 and 5
From 12 to 8 rows	Rows 2, 5, 8 and 11

- *To ensure optimal hose routing after removing the PreTeC mulch seeding coulters:*
Refer to the table to determine the rows that must be removed.

6.5.29.2 Disconnecting the energy supply

1. Uncouple the ISOBUS from the tractor.
2. Disconnect the coulter wiring harness **1** from the implement wiring harness **2**.
3. Connect the bridge plug **3** to the implement wiring harness.



CMS-T-00005474-D.1

CMS-I-00003830

6.5.29.3 Adjusting the hydraulic supply

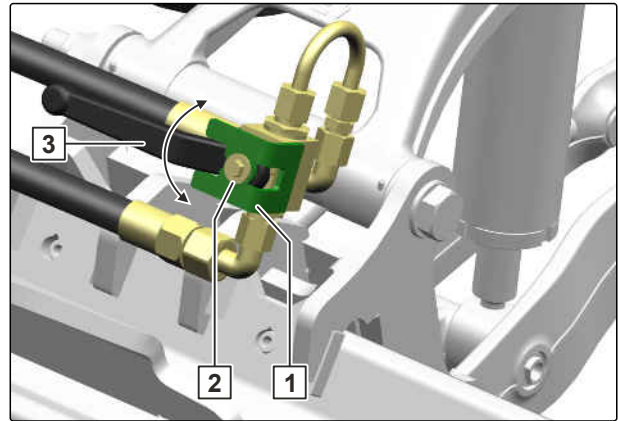
CMS-T-00005478-E.1



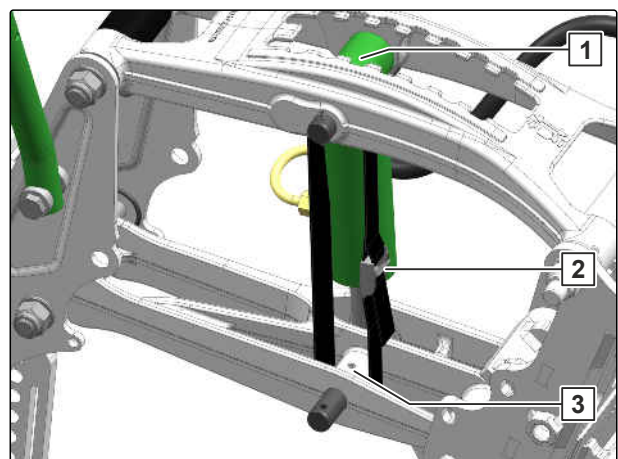
REQUIREMENTS

- ☑ The implement is lifted
- ☑ The tractor and implement are secured

1. Unfold the implement sections.
2. *To set the coulter pressure to zero:*
Refer to the ISOBUS operating manual,
"Adjusting the coulter pressure".
3. Switch off the fan.
4. Lower the implement and move the three-point hydraulic system of tractor into float position.
➔ The coulter pressure cylinders retract and the coulter pressure is relieved.
5. Secure the tractor and implement.
6. Remove the bolt **2**.
7. Remove the fastener **1**.
8. Open the valve **3**.
9. Repeat steps 6 to 8 on the opposite side of the implement.
10. *To fix the coulter pressure cylinder:*
Lash the top link **1** and the lower link **3** with a tension belt **2**.



CMS-I-00007310



CMS-I-00005312



ENVIRONMENTAL INFORMATION

Danger due to escaping oil

- ▶ Collect any escaping oil.
- ▶ Dispose of oil removal material in an environmentally friendly manner.

11. Disconnect the connection **4**.
12. Install connectors **5** between the hydraulic hoses.
13. Install sealing caps **1** from the sealing kit on the T-piece **2**.
14. *To convert the hydraulic supply of the second line **3**:*
repeat steps 10 to 12.

For a conversion from 12 to 8 rows, longer hydraulic hoses are needed between row 1 and 2 and between row 11 and 12. This is the only way to shift the remaining coulter to the desired row spacing after the conversion.

15. Disconnect the connection **3**.
16. Remove the hydraulic hose **1**.
17. Install the long hydraulic hose from the sealing kit between the coulters.
18. *To replace the second line **2**:*
Repeat steps 14 to 16.

After installing additional coulters, the hydraulic coulters pressure system must be vented.

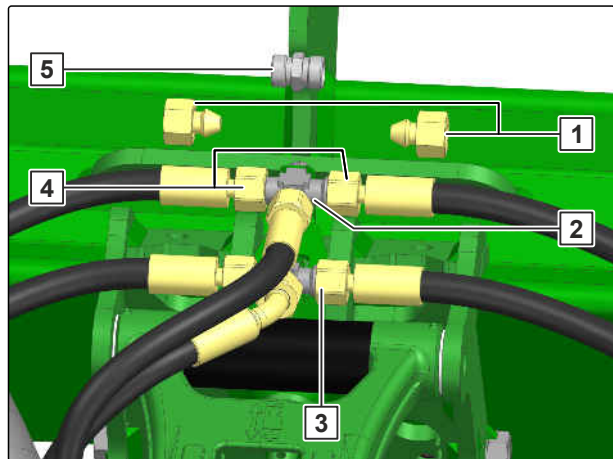
19. *To set the coulters pressure to zero:*
Refer to the ISOBUS operating manual, "Adjusting the coulters pressure".

20. Switch on the fan at 2,000 1/min.

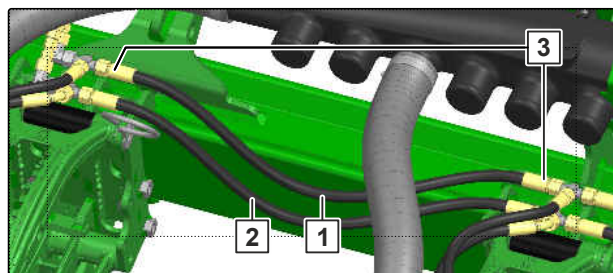


NOTE

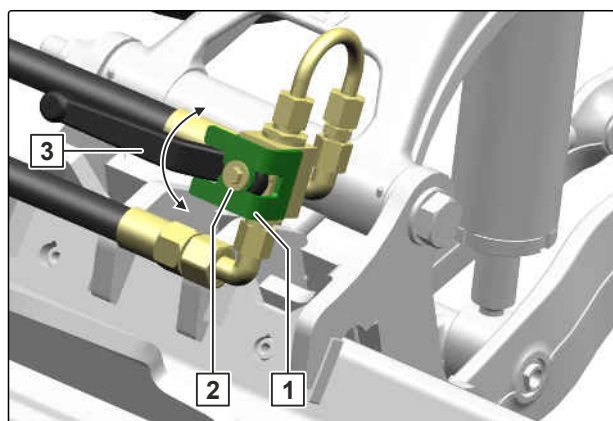
Establish the oil supply to the hydraulic unit.



CMS-I-00007201



CMS-I-00007202



CMS-I-00007310

21. Lift and lower the seeding units one after the other with a crane

or

Place the seeding units on the coulter wagon one after the other and lift and lower the implement.

22. *When the hydraulic coulter pressure system has been vented:*

Close the valve **3**.

23. Install the fastener **1**.

24. Install the bolt **2**.

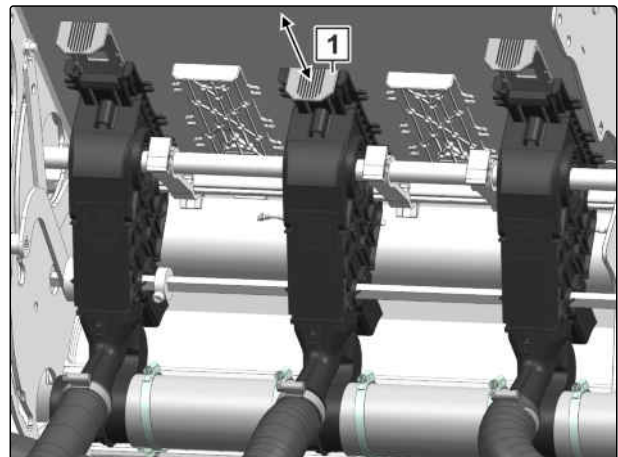
25. *To close the valve on the opposite side of the implement:*

Repeat steps 21 to 23.

6.5.29.4 Disconnecting the air and fertiliser supply on the rear hopper

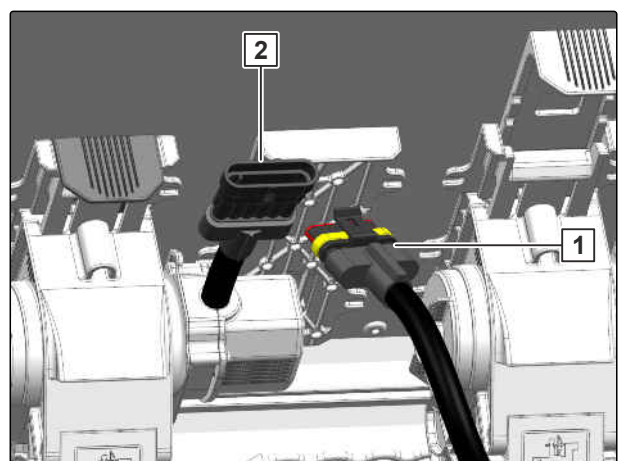
CMS-T-00005480-D.1

1. Close the sliding shutter **1** on the fertiliser metering unit.



CMS-I-00003915

Conversion from 6 to 4 rows	
Metering unit	Coulter row
1	1
2	Dust cap
3	2
4	3
5	Dust cap
6	4



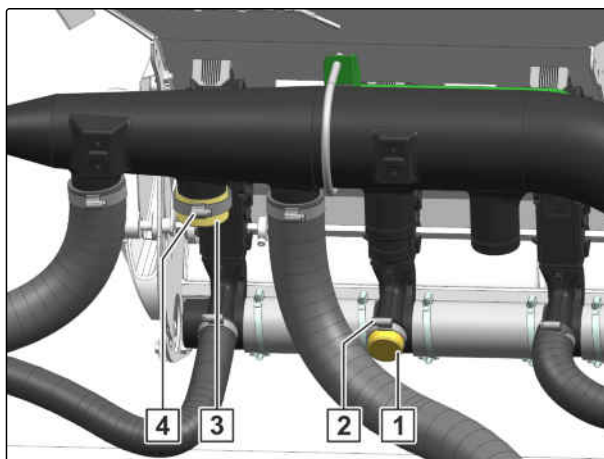
CMS-I-00003922

6 | Preparing the machine

Preparing the implement for operation

For implements with a decentralised fertiliser metering drive, the connection of the metering drives must be re-assigned after the conversion.

2. Disconnect the motor cable **2** on row 2 to 6 from the implement wiring harness **1**.
3. Connect the motor cable on row 2 to 6 to the implement wiring harness as specified in the table.
4. Remove the fertiliser hose from the fertiliser metering unit.
5. Seal the open connection with a cap **1**.
6. Install the clamp **2**.
7. Disconnect the air supply on the air distributor.
8. Seal the open connection with a cap **3**.
9. Install the clamp **4**.



CMS-I-00003917

6.5.29.5 Disconnecting the air and fertiliser supply on the distributor head

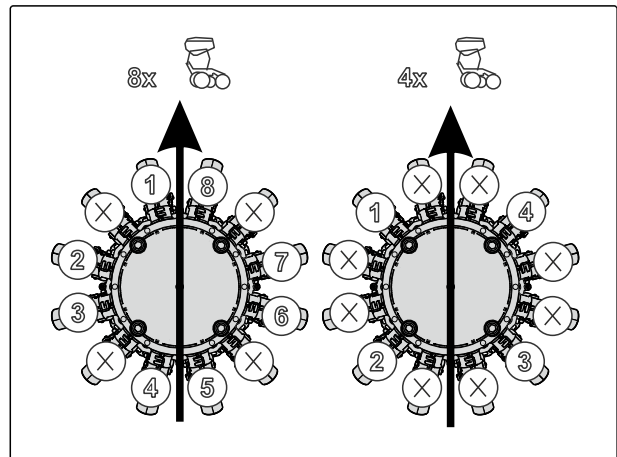
CMS-T-00005477-E.1

Distributor head connection	Conversion from 12 to 8 rows		Conversion from 6 to 4 rows	
	Setting motor	Coulter row	Setting motor	Coulter row
1	A	1	Dust cap	X
2	Dust cap	X	A	1
3	B	2	Dust cap	X
4	C	3	Dust cap	X
5	Dust cap	X	B	2
6	D	4	Dust cap	X
7	E	5	Dust cap	X
8	Dust cap	X	C	3
9	F	6	Dust cap	X
10	G	7	Dust cap	X
11	Dust cap	X	D	4
12	I	8	Dust cap	X



WORKSHOP WORK

1. Connect the connection cable for the setting motors to the wiring harness according to the table.
2. Seal the free cables of the wiring harness with dust caps.
3. Seal the free cables of the setting motors with dust caps.



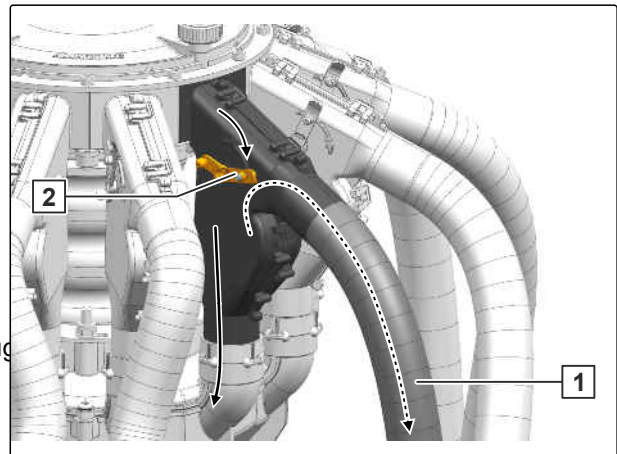
CMS-I-00008637



WORKSHOP WORK

4. Connect the conveyor hoses to the distributor head as specified in the table.
5. *To interrupt the fertiliser flow on the inactive rows on implements with distributor heads and without single row control:*
actuate the lever **1**.

➔ The fertiliser is then conveyed back into the corrug



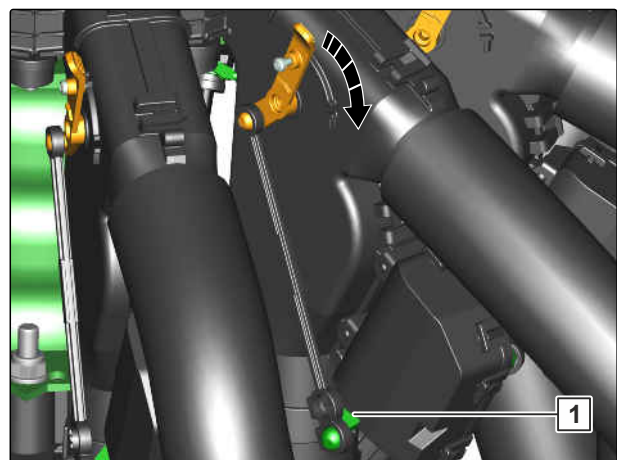
ground.

CMS-I-00003959



WORKSHOP WORK

6. *To interrupt the fertiliser flow on the inactive rows on implements with distributor heads and single row control:*
Actuate the coupling rod **1** on the rows to be removed.

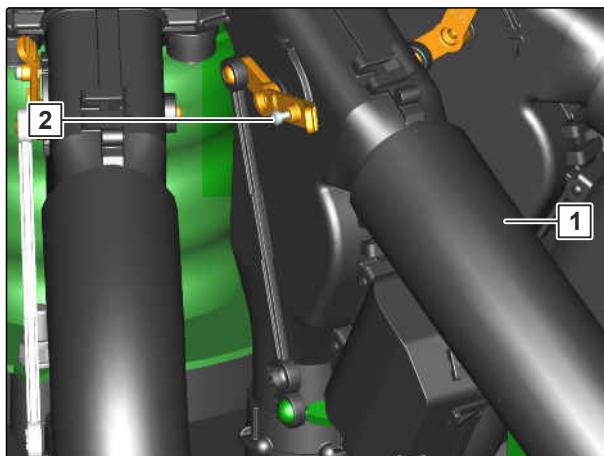


CMS-I-00007404



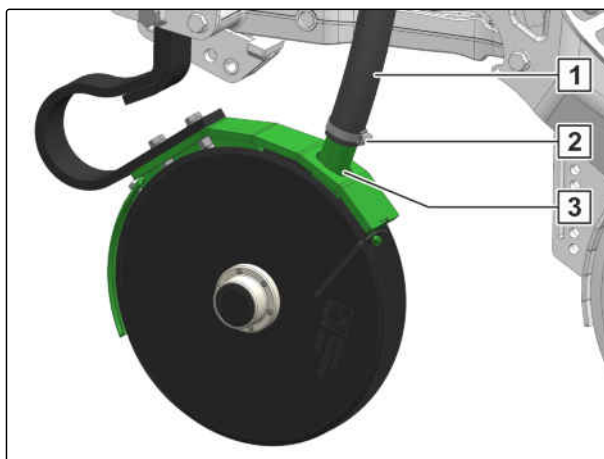
WORKSHOP WORK

7. *To fix the flap in the position:*
Tighten the bolt **2**.
8. Connect the conveyor hoses **1** to the distributor head as specified in the table.



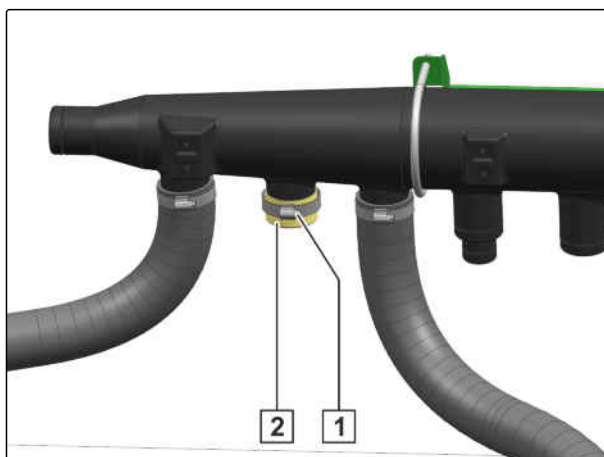
CMS-I-00007403

9. Remove the clamp **2**.
10. Remove the conveyor hose **1** from the fertiliser coulters **3**.
11. fasten the conveyor hose on the implement with the opening facing down.



CMS-I-00003920

12. Disconnect the air supply on the air distributor.
13. Seal the open connection with a cap **2**.
14. Install the clamp **1**.



CMS-I-00003918

6.5.29.6 Removing the PreTeC mulch seeding coulter

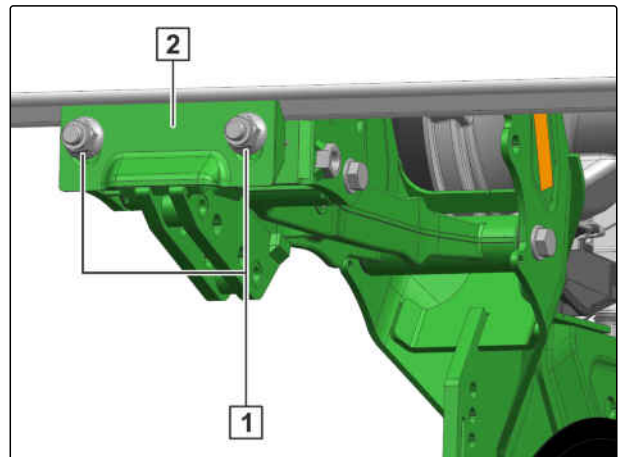
CMS-T-00005475-D.1



REQUIREMENTS

- ✓ Energy supply disconnected
- ✓ Hydraulic supply disconnected
- ✓ Air and fertiliser supply disconnected

1. Remove the bolts **1**.
2. Remove the coulter bracket **2**.



CMS-I-00004135

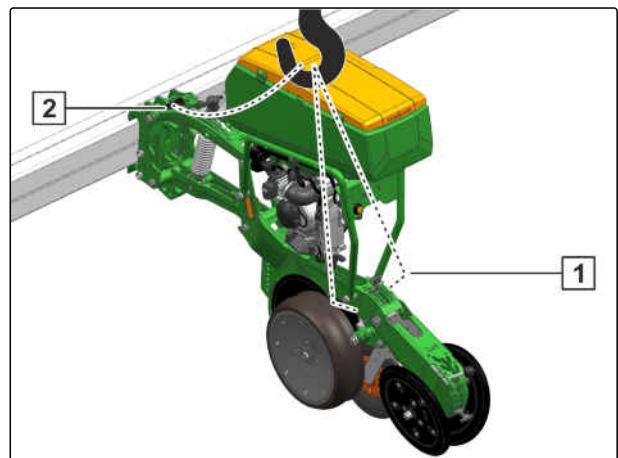


WORKSHOP WORK

3. *For coulter removal with a crane:*
Proceed as follows

or

For coulter removal with a PreTeC transport dolly:
Follow the instructions starting with Point 9.
4. *To make the coulter tip slightly towards the front for removal:*
select a longer front load handling device at the front than at the rear.
5. Fasten the load handling device on the coulter top link **2**.
6. Fasten 2 load handling devices on the coulter body **1**.

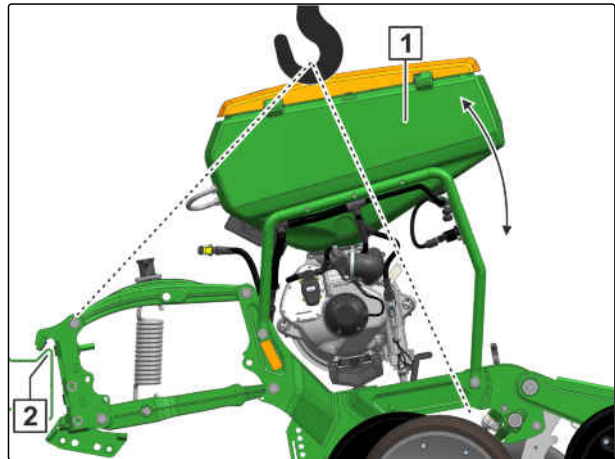


CMS-I-00004137

6 | Preparing the machine

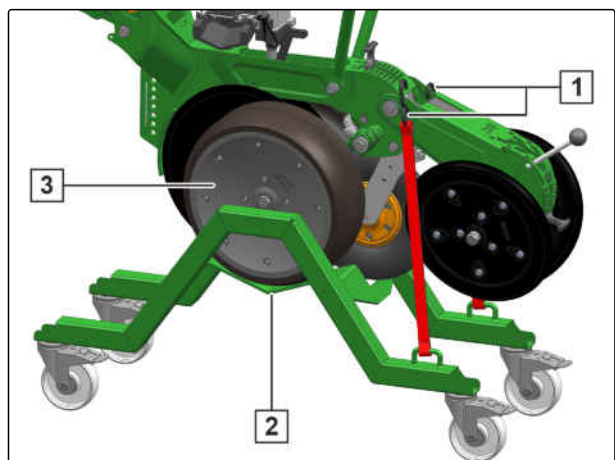
Preparing the implement for operation

7. Lift the coulter **1**.
8. Release the tilted coulter from the frame **2**.



CMS-I-00004136

9. *To set the fertiliser coulters to the topmost position:
see "Adjusting the fertiliser placement depth".*
10. *To set the coulter pressure to the highest value:
see "Adjusting the coulter pressure mechanically".*
11. *To move the placement depth into parking position **P**:
see "Adjusting the seed placement depth"*
12. *To move the catch roller to position **A**:
See "Adjusting the catch roller".*

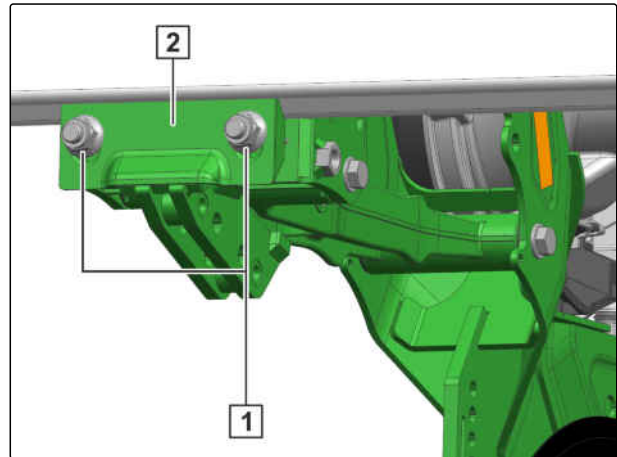


CMS-I-00005134

13. Lift the implement.
14. Position the transport dolly **2** under the coulter to be removed.
15. Lower the implement.
- ➔ The depth control wheels **3** are resting on the transport dolly.
16. Hook the belts **1** onto the coulter.

17. Remove the bolts **1**.

18. Remove the coulter bracket **2**.

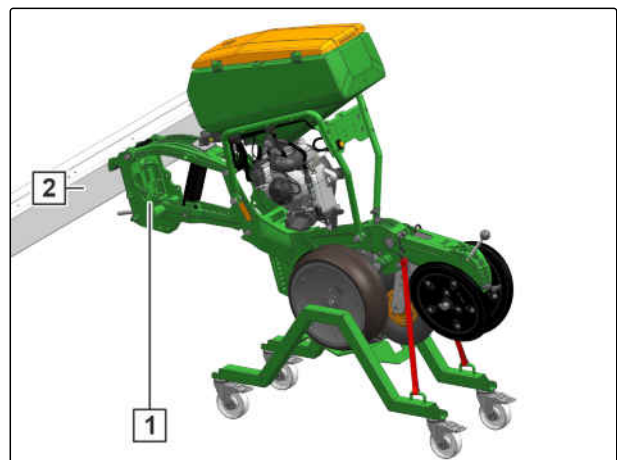


CMS-I-00004135

19. Continue lowering the implement.

➔ The coulter **1** tips forward.

20. Release the tilted coulter from the frame **2**.



CMS-I-00005133

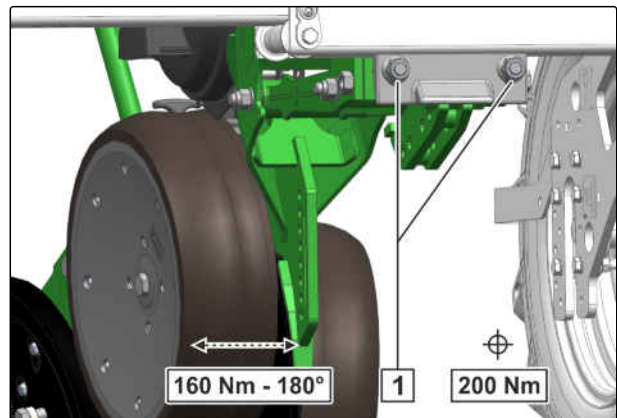
21. Loosen the bolts **1**.

22. Slide the coulters to the desired row width.

23. Tighten bolts on telescopic coulters to 160 Nm
minus 180°

or

Tighten bolts on non-telescopic coulters to
200 Nm.



CMS-I-00002039

24. Connect the ISOBUS to the tractor.

25. Restart the implement.

26. *To enter the changed working width on the
control terminal:
See "ISOBUS software operating manual" >
"Defining the geometry".*

6.6 Preparing the machine for road travel

CMS-T-00002072-E.1

6.6.1 Folding in the track marker

CMS-T-00005580-A.1

6.6.1.1 Precea 4500 / 4500-2

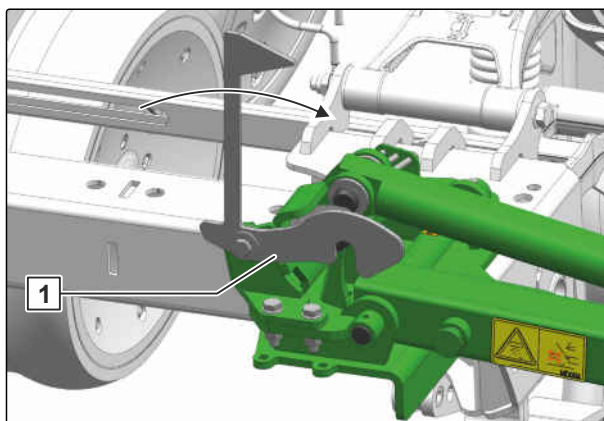
CMS-T-00001923-B.1



REQUIREMENTS

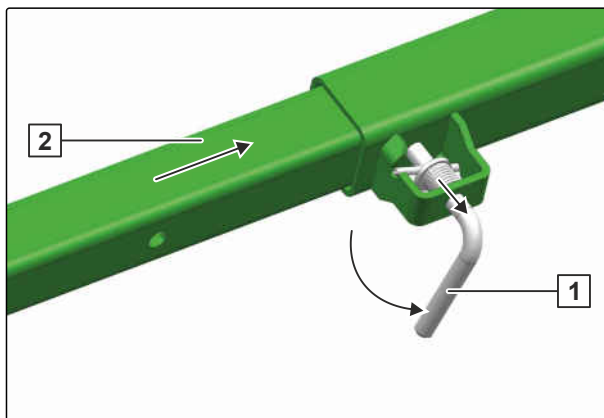
- ✓ The tractor with implement are standing on a level surface

1. Fold the transport lock **1** into the locked position.



CMS-I-00001940

2. Pull out the pins **1** and lock them.
3. Push in the section tube **2** completely.
4. Secure the section tube with pins.



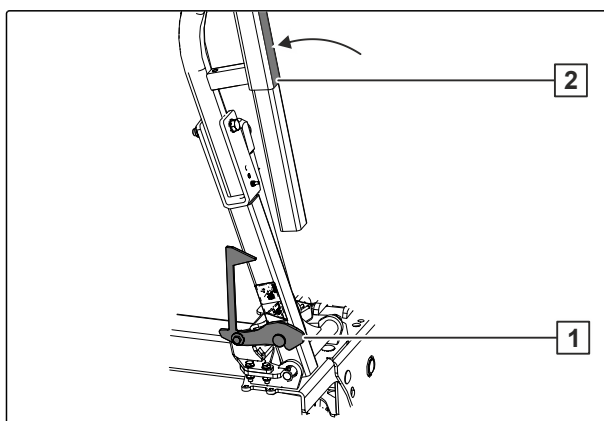
CMS-I-00001941



WARNING

An unexpected hydraulic function is activated

- Before you actuate the tractor control unit, check the selected hydraulic function of the Comfort hydraulic system.



CMS-I-00000956

5. *To lift the track marker,*
apply pressure to the "yellow" tractor control unit.

or

apply pressure to the "green" tractor control unit.

6. *When the track marker is completely lifted,*
Press the track marker **2** against the rubber block.

➔ The transport lock **1** engages.

6.6.2 Lifting the implement

CMS-T-00002071-A.1



REQUIREMENTS

- ☑ The lighting system is clean and in perfect technical condition
- ☑ Track markers are folded in

1. Lift the implement with the 3-point power lift of the tractor.
2. Check the connections of the hydraulic lines and the power supply.
3. Switch off control terminal.
4. Switch off the work lights.
5. Lock the tractor control units.

6.6.3 Telescoping the implement sections

CMS-T-00001909-B.1



CAUTION

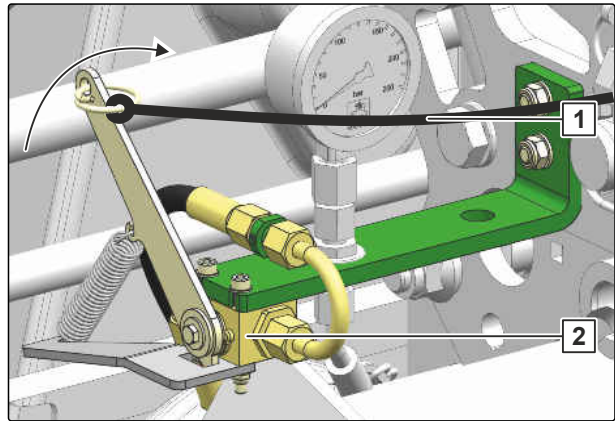
There are crushing and shear points between the implement sections and the implement.

- *When folding or unfolding the implement sections,*
never reach into the crushing area.

6 | Preparing the machine

Preparing the machine for road travel

1. Raise the implement.
2. Pull on the pull rope **1**.
- ➔ The hydraulic valve is opened **2**.
3. *Until the implement sections have reached the end position,*
Actuate the pull rope and actuate the "green" tractor control unit.
- ➔ When the implement sections have reached their end position, the conveyor hoses to the fertiliser coulters may not sag.
4. *If the conveyor hoses are sagging,*
fasten the fertiliser hoses.
5. *When the implement sections have reached the end position,*
release the pull rope and move the "green" tractor control unit to the neutral position.



CMS-I-00001897

6.6.4 Locking the tractor lower links laterally

CMS-T-00007550-C.1

- *To prevent uncontrolled lateral motions of the implement:*
Lock the tractor lower links before road travel.

6.6.5 Locking the tractor control units

CMS-T-00006337-D.1

- Depending on the equipment, the tractor control units are locked mechanically or electrically.

6.6.6 Switching off the work lights

CMS-T-00013341-B.1

- *To switch off the work lights:*
refer to the "ISOBUS" operating manual

or

refer to the "Control computer" operating manual.

Using the machine

7

CMS-T-00001760-F.1

7.1 Spreading fine seeds

CMS-T-00014754-A.1



REQUIREMENTS

For smooth running of the coulters and reliable embedding of fine seeds:

- ☑ The seed bed must be worked at least to the application depth of the fine seed or fertiliser
- ☑ Seedbed is sufficiently reconsolidated and load-bearing
- ☑ Seedbed has sufficient fine soil

1. *If the fine seed will be sown with a thin covering height:*
Adapt the working speed to the ground contour.
2. *For smooth running of the coulters and reliable embedding of the fine seed:*
Seeding direction parallel to the soil tillage
3. *If the conveyor air blows away structureless soil:*
Correct the air pressure in the singling unit.
4. *If a load-bearing soil structure is not present for reliable embedding at the desired placement depth:*
Increase the placement depth: see page 115.
5. *If the fine seed is placed too deep with the selected setting:*
Heap-up less cover: see page 121.

7.2 Using the implement

CMS-T-00001921-C.1

1. Lower the implement on the field.
2. Align the implement parallel to the ground.

3. Unfold the track markers.
4. Move the hydraulic system of the 3-point power lift into float position.
5. *For implements with universal shaft drive:*
Switch on the tractor PTO shaft. Slowly couple the tractor PTO shaft only at an idle or at low tractor engine speed.
6. Drive off with the tractor.



NOTE

To prevent deviations in the distribution along the row, avoid strong braking and accelerating.

The speed of the singling discs is immediately adjusted to normal changes in speed.

7. *To check the placement depth after the first 30 m:*
see page 191

or

With the multi-placement tester:
see page 138

8. *Check the grain spacing after the first 30 m:*
see page 191

or

With the multi-placement tester:
see page 137

7.3 Performing maintenance work during operation

CMS-T-00013986-A.1

During operation with high amounts of organic residues on the field, the fan intake opening must be cleaned regularly.

- *To clean the suction guard screen:*
see page 234

7.4 Turning on the headlands

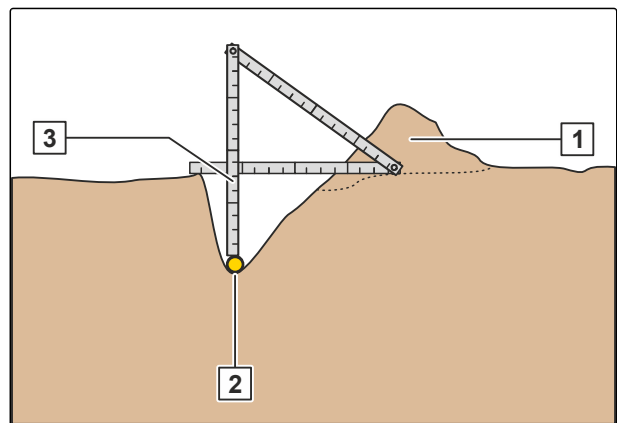
CMS-T-00001922-B.1

1. To ensure filling of the singling discs, make sure that there is an overpressure of at least 20 mbar in the grain singling unit.
2. To prevent lateral loads when driving in curves on the headlands, raise the soil tillage tools.
3. When the direction of the implement matches that of the direction of travel, lower the soil tillage tools.

7.5 Checking the placement depth

CMS-T-00004517-D.1

1. Remove the fine soil **1** over the seed **2**.
2. Determine the placement depth **3**.
3. Cover the seed with fine soil again.
4. Check the placement depth in several places in a longitudinal and transverse direction relative to the implement.

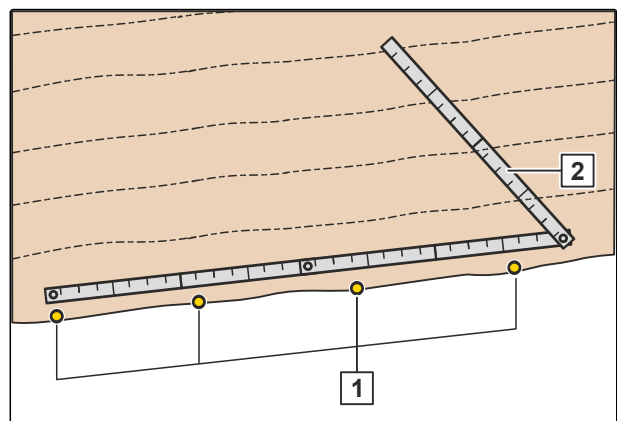


CMS-I-00003257

7.6 Checking the grain spacing

CMS-T-00012307-A.1

The spread rate determines the required grain spacing. The grain spacing is adjusted by selecting the singling discs and adjusting the singling disc speed.



CMS-I-00007922

1. Remove the fine soil over the seed.

2. Expose 11 grains **1** in one row.
3. Measure 10 grain spacings with the ruler **2**.
4. Calculate the average grain spacing.
5. Cover the seed with fine soil again.

$$K_{Ab1} \rightarrow K_{Ab10}$$

$$K_{Ab1-10} = \frac{K_{Ab1} + K_{Ab2} + K_{Ab3} + \dots + K_{Ab10}}{10}$$

$$K_{Ab1-10} = \frac{\text{[]} + \text{[]} + \text{[]} + \dots + \text{[]}}{10}$$

CMS-I-00002066

7.7 Using the multi-placement tester

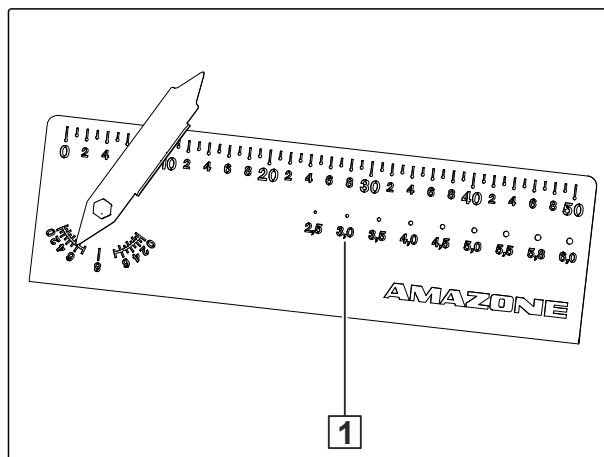
CMS-T-00005293-D.1

7.7.1 Determining the grain size

CMS-T-00001888-D.1

Determine the grain size of the seed with the multi-placement tester.

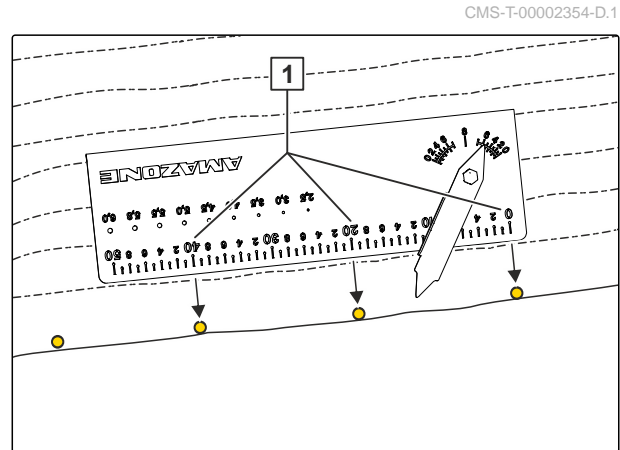
1. Put the seed in the reference holes **1**.
2. *If the seed lies loosely on the reference hole,* read the hole diameter.



CMS-I-00001217

7.7.2 Checking the grain spacing

The spread rate determines the required grain spacing. The grain spacing is adjusted by selecting the singling discs and adjusting the singling disc speed.



CMS-T-00002354-D.1

CMS-I-00002011

1. Spread seed for 30 m at working speed.
2. Use the read-off edge of the multi-placement tester to remove the earth in layers.
3. Expose 11 grains in one row.
4. Place the multi-placement tester horizontally on the ground.
5. Measure 10 grain spacings with the ruler **1**.
6. Calculate the average grain spacing.

$$K_{Ab1} \rightarrow K_{Ab10}$$

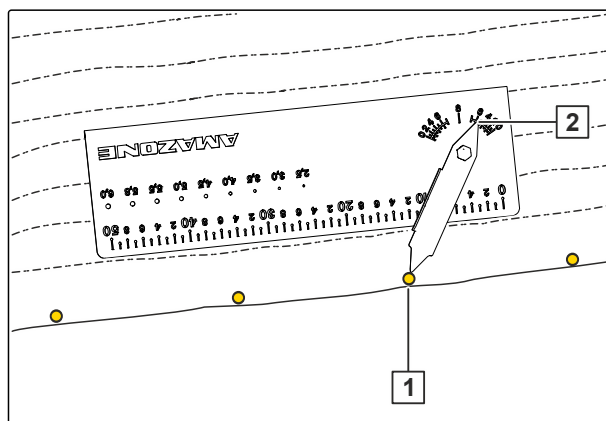
$$K_{Ab1-10} = \frac{K_{Ab1} + K_{Ab2} + K_{Ab3} + \dots + K_{Ab10}}{10}$$

$$K_{Ab1-10} = \frac{\text{[]} + \text{[]} + \text{[]} + \dots + \text{[]}}{10}$$

CMS-I-00002066

7.7.3 Checking the placement depth

1. *To check the placement depth after the first 30 m:*
Expose the grains at several points using the multi-placement tester.
2. Use the read-off edge of the multi-placement tester to remove the earth in layers.
3. Place the multi-placement tester horizontally on the ground.
4. Set the pointer **1** on the seed grain.
5. Read the placement depth on the scale **2**.



CMS-T-00002411-E.1

CMS-I-00002010

7.8 Using the shifted tramline

CMS-T-00005493-C.1



REQUIREMENTS

- ☑ The fan is running

1. *To adjust the tramline width for the cultivating implement:*
See "Adjusting the shifted tramline".
2. *To configure the shifted tramline:*
See "ISOBUS software operating manual" > "Configuring the tramline control".
3. *To shift the coulter:*
Drive into the upcoming tramline with the lifted implement.

or

If the coulters have not reached the end position:
slowly drive up with the implement lowered.

Eliminating faults

8

CMS-T-00002343-H.1

Errors	Cause	Solution
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 197
Gaps can be caused by insufficient seed in the grain singling unit.	The grain shape or the dressing can cause the seed to be poorly conveyed.	► see page 197
An increased cleaning effort of the opto-sensor is observed.	Talc in the seed shortens the cleaning interval of the opto-sensor.	► Clean the opto-sensor.
The seed is not caught and jumps out of the furrow.	The seed collides against the catch roller or against the seed furrow.	► see page 198
The control terminal shows a spread rate error.	The shot channel is blocked.	► see page 198
The control terminal shows a speed error.	Check the gap on the inductive sensor. Defect on the mechanical drive.	► Adjust the distance between the inductive sensor and pulse wheel to 1-2 mm.
Press rollers get blocked.	Clods or stones get jammed between the press rollers.	► see page 199
Blocking the depth control wheels.	Soil gets stuck between the cutting discs and the depth control wheels with closed rim.	► see page 199
	Organic residues get stuck on the open rims.	► see page 200
The electric drives do not run or start running at the wrong time.	The switch points of the working position sensor are wrong.	► <i>To configure the working position sensor, see "Configuring the working position sensor".</i>
The lighting for road travel has a malfunction.	Lamp or lighting supply line is damaged.	► Replace the lamp. ► Replace the lighting supply line.
Stopping of one or several singling discs.	The fuse for the electric drive is defective.	► see page 200
	Fuse for the mechanical drive is defective.	► see page 201

Errors	Cause	Solution
The grain spacings are larger than the setpoint.	Too much slip on the drive wheels.	► <i>To configure the working position sensor, see "Configuring the working position sensor".</i>
	Too much slip on the drive wheels.	► <i>To configure the working position sensor, see "Configuring the working position sensor".</i>
Speed fluctuations on the hydraulic drive.	Speed fluctuations occur on the hydraulic drive.	► Contact your specialist workshop.
The fill level in the singling unit housing is too high.	The brushes of the filling block are worn.	► see page 201
The seed furrow is unstable or does not maintain its shape.	The furrow former is worn.	► <i>To replace the furrow former, see "Changing the furrow former".</i>
Micropellets are not emerging	The outlet of the micropellet spreader is clogged with soil	► see page 201
The universal joint shaft is not running smoothly.	The universal joint shaft is angled down too strongly:	► Only use original and intended universal joint shafts.
Blockages in the feed channel	Seed is too large or flows poorly.	► see page 202

Track marker collision protection is triggered

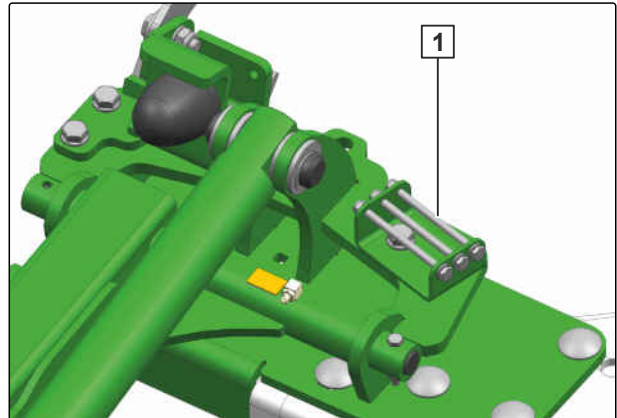
CMS-T-00002345-E.1

1. Remove the spare shear bolts **1** from the track marker holder.



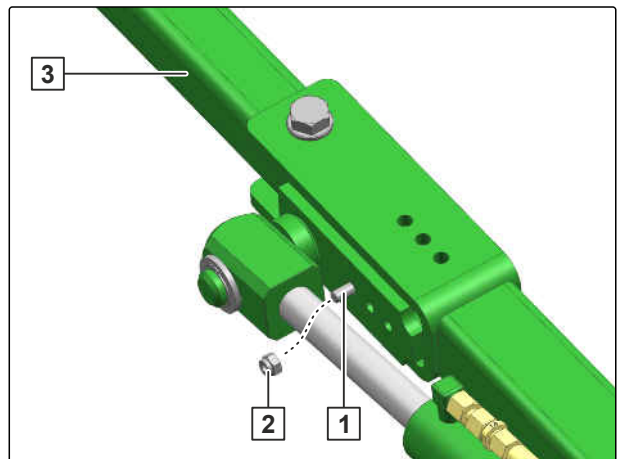
NOTE

Only use original parts as a replacement.



CMS-I-00002081

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

Gaps due to insufficient seed in the grain singling unit

CMS-T-00002346-B.1



NOTE

Talc in the seed shortens the cleaning interval of the opto-sensor.

Do not use graphite. Graphite disturbs the function of the opto-sensor.

1. Check the position of the sliding shutter.
2. *To improve the sliding capacity of the seed:*
Mix 1.6 g of talcum powder into 1 kg of seed

or

Mix 500 g of talcum with 40 units of 50,000 grains each.

Seed is not caught and jumps out of the furrow

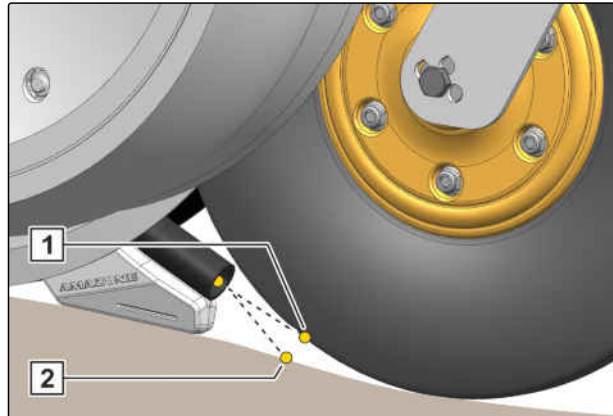
CMS-T-00002347-C.1

NOTE

If the seed collides against the catch roller **1** or the seed furrow **2**, it is not reliably caught. The position of the catch roller can be adjusted.

The position of the catch roller must be adjusted by trained specialist personnel.

- Contact your specialist workshop.

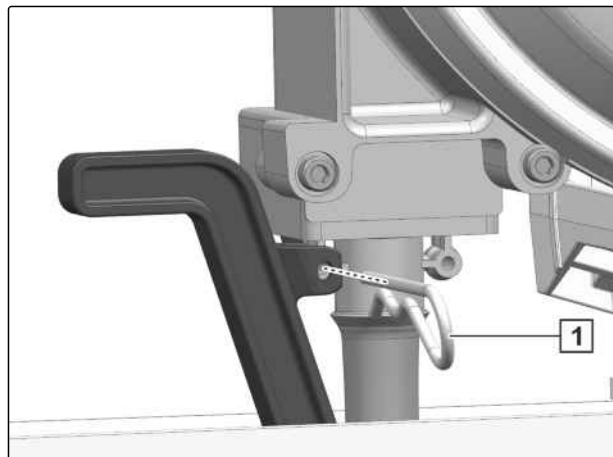


CMS-I-00001925

Control terminal shows a spread rate error

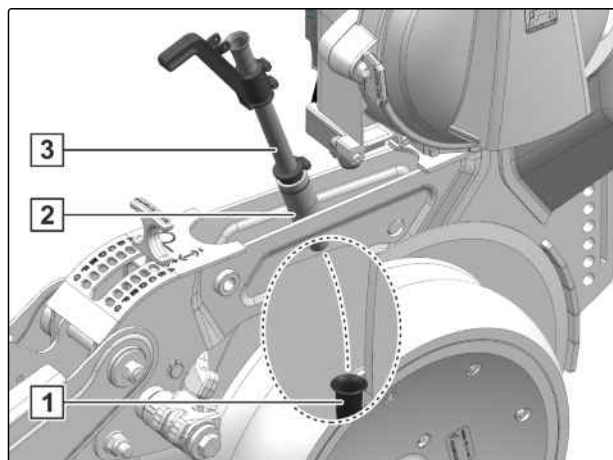
CMS-T-00002348-C.1

1. Remove the spring cotter pin **1**.



CMS-I-00003814

2. Press the shot channel **3** down against the spring element **2**.
3. Remove the shot channel upwards.
4. Clean the shot channel.
5. Install the feed tube **1**.
6. Secure the shot channel with a spring cotter pin.



CMS-I-00003815

Blocking of the press rollers

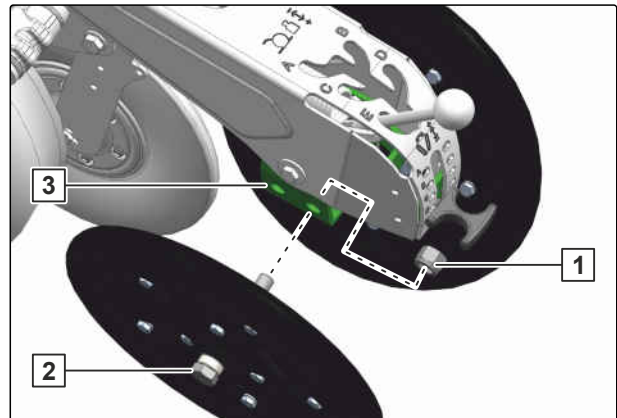
CMS-T-00002373-B.1



NOTE

Offset installation is not possible in conjunction with disc closers.

1. Unscrew the nut **1** and remove it.
2. Remove the press roller.
3. *To increase the throughput on the press rollers, install the press roller with offset.*
4. Install the press roller with the bolt **2** in the hole **3**.
5. Put on the nut and tighten it.



CMS-I-00002041

Blocking the depth control wheels

CMS-T-00007530-C.1

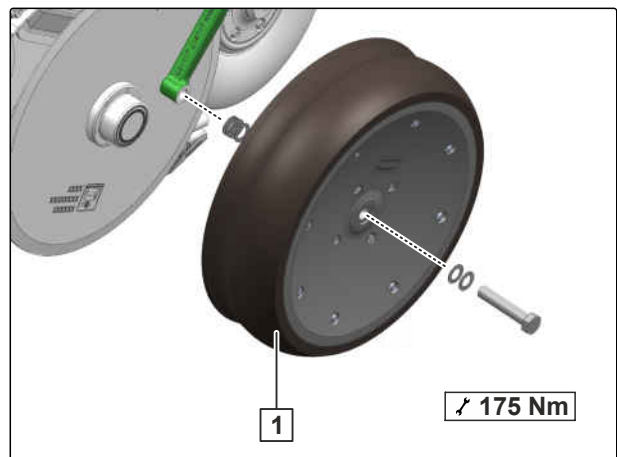
Soil gets stuck between the cutting discs and the depth control wheels with closed rim.

- Remove the depth control wheels **1** and clean them

or

If the predominant operating conditions do not allow for continuous operation of the implement:

replace the depth control wheels with closed rim with depth control wheels with open rim.



CMS-I-00005302

Organic residues get stuck on the open rims.

- Clean the depth control wheels

or

If the predominant operating conditions do not allow for continuous operation of the implement:

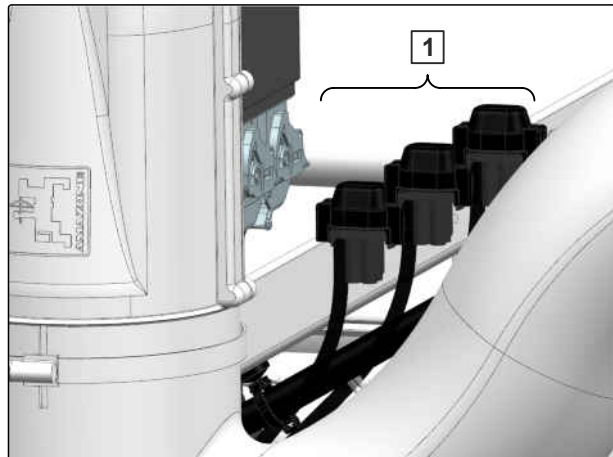
Replace the depth control wheels with open rim with depth control wheels with closed rim.

Stopping of one or several singling discs

CMS-T-00003677-C.1

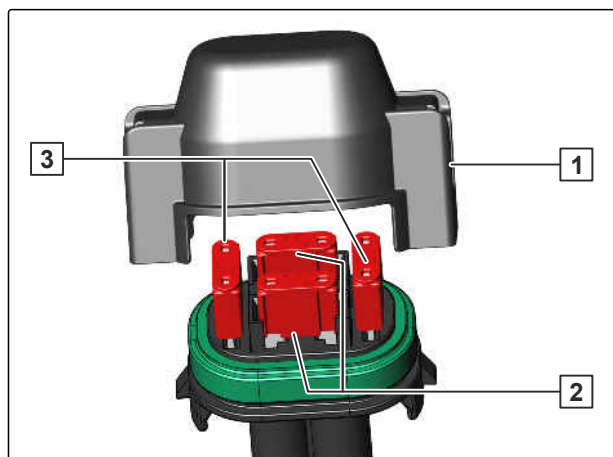
The fuse for the electric drive is defective.

1. Clean the singling unit.
2. Check the singling disc for ease of movement.
3. Check the fuses **1**.



CMS-I-00002695

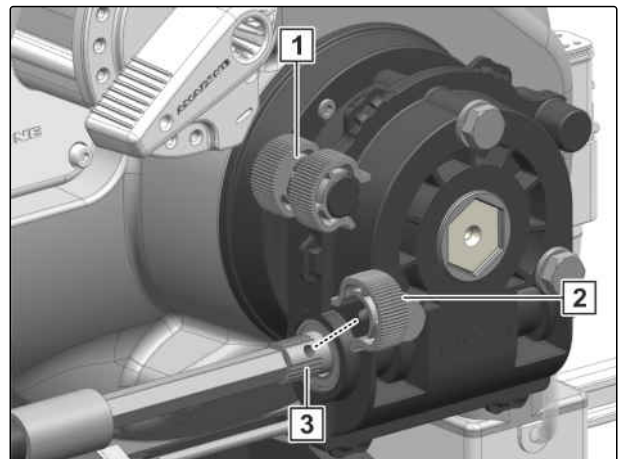
4. Remove the cover **1**.
5. Replace any defective fuse **2** with a spare fuse **3**.



CMS-I-00008206

Fuse for the mechanical drive is defective.

1. Remove the defective shear pin **2**.
2. Remove the defective shear pin from the drive shaft **3**.
3. Clean the singling unit.
4. Check the singling disc for ease of movement.
5. Install the new shear pin **1**.



CMS-I-00002696

Fill level in the singling unit housing is too high

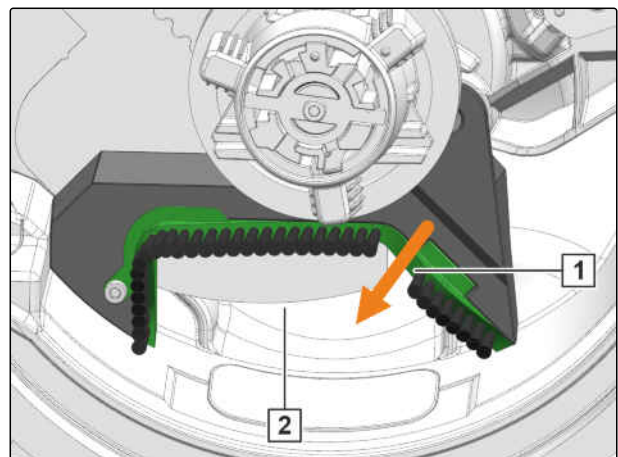
CMS-T-00008170-A.1

The scraper removes excess seed from the singling disc. If the brushes of the filling block are worn, the seed does not flow back into the storage area **2** within the filling block.

- *To replace the defective filling block, see "Changing the singling disc"*

or

contact your specialist workshop.

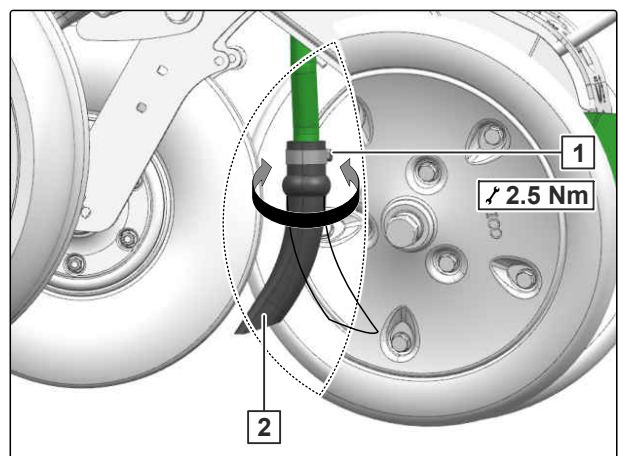


CMS-I-00005635

Micropellet outlet in the seed furrow is clogged

CMS-T-00014556-A.1

1. Open the clamp **1**.
2. Install the micropellet outlet **2** towards the rear.
3. Tighten the clamp.



CMS-I-00009204

Blockages in the feed channel

CMS-T-00014766-A.1



NOTE

If diameters larger than specified in the section "*Determining the seed settings*", restrictions can occur in the distribution along the row.

- *To increase feed reliability:*
Install an opto-sensor, feed channel, and furrow former with a larger diameter.

Parking the machine

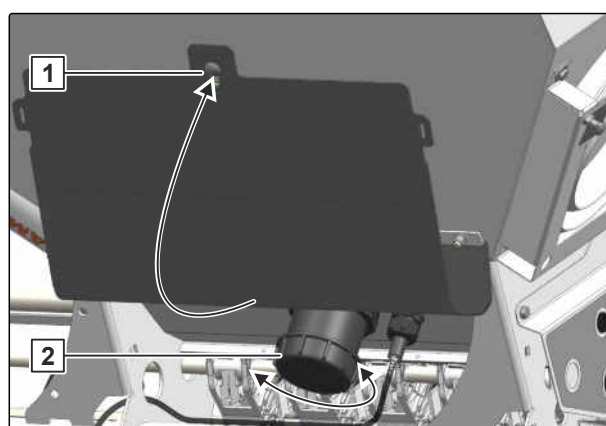
9

CMS-T-00001842-G.1

9.1 Emptying the fertiliser hopper

CMS-T-00001915-C.1

1. Open the spray protection **1**.
2. Open the residual emptying **2**.
3. Collect the residual quantity from the hopper tips on both sides.
4. Close the residual emptying.
5. Close the spray protection.



CMS-I-00001993

9.2 Emptying the seed hopper through the singling disc

CMS-T-00002194-D.1



REQUIREMENTS

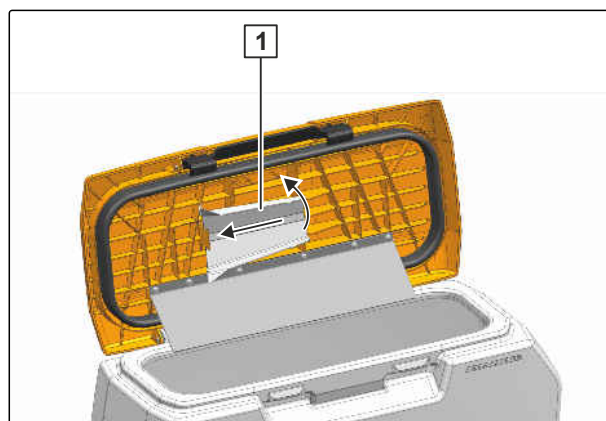
- ✓ The implement is coupled to the tractor
- ✓ The tractor and implement are secured



NOTE

The parking position for the chute is in the hopper cover for row 1.

1. Take out the chute **1**.

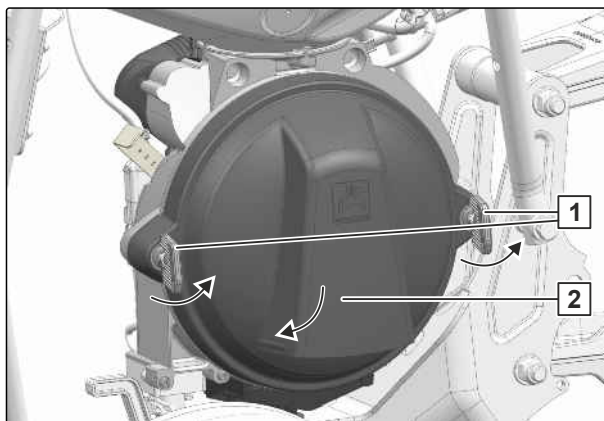


CMS-I-00001888

9 | Parking the machine

Emptying the seed hopper through the singling disc

2. Open the locks **1**.
3. Remove the cover **2**.



CMS-I-00001909

4. Hook the chute **1** onto the singling unit.

NOTE

When the collection bucket is hooked onto the chute, the chute can be loaded with a maximum of 12 kg.

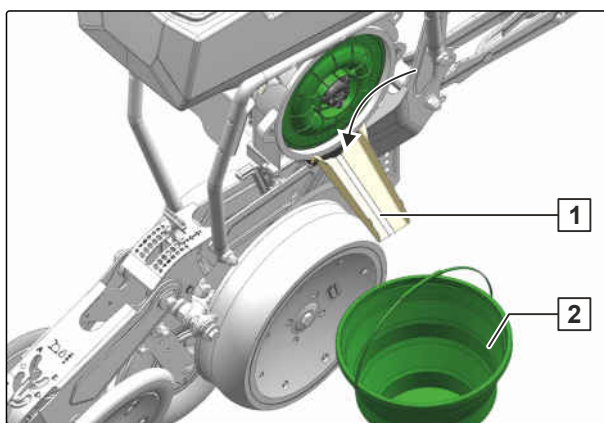
5. Put the collection bucket **2** under the chute.

or

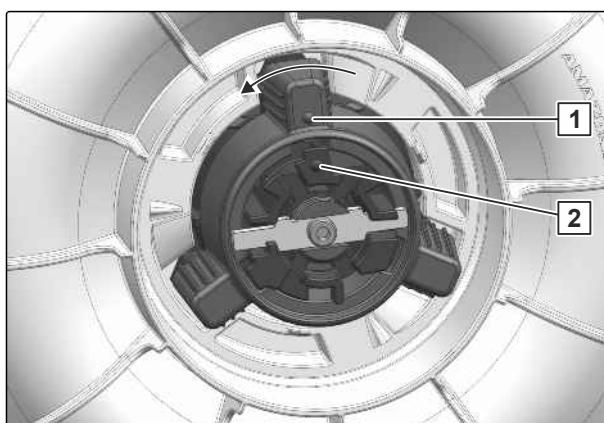
Hook the collection bucket **2** onto the chute.

6. Put the collection bucket **2** under the chute.

7. Release the lock **1** until the points **2** are aligned.



CMS-I-00001997



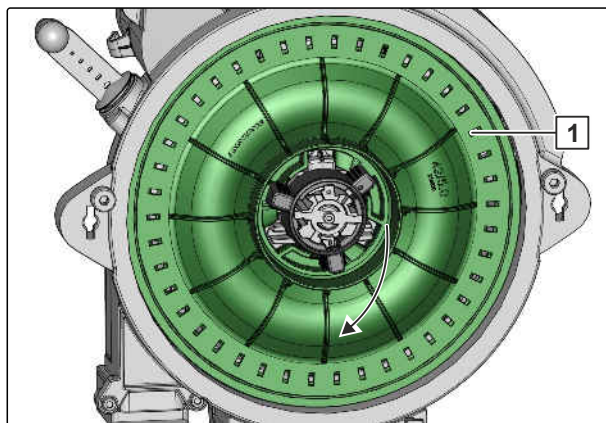
CMS-I-00001910

8. To collect the residual quantity, remove the singling disc **1** from the drive hub.

NOTE

When the collection bucket is hooked onto the chute, the chute can be loaded with a maximum of 12 kg.

9. When the residual quantity has been collected, park the chute back into the hopper cover.

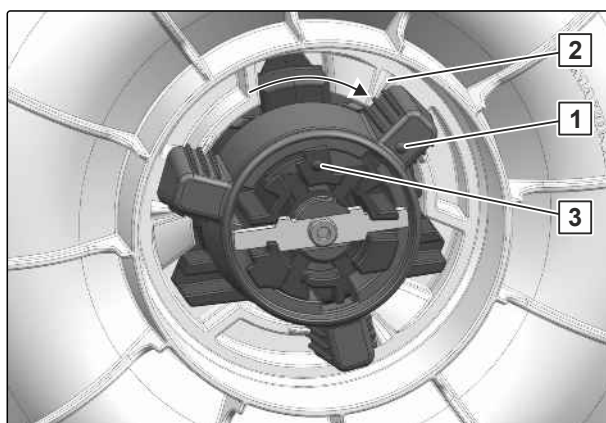


CMS-I-00001912

10. Position the singling disc **1** on the drive hub.

11. Turn the lock **1** beyond the notch **2**.

➔ The points **3** are no longer aligned.



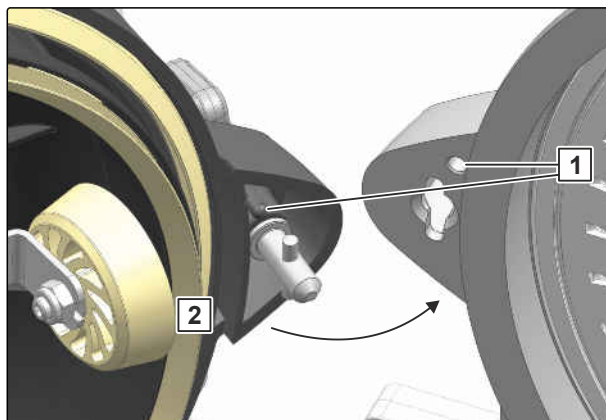
CMS-I-00001911

12. Close the cover **2**.

NOTE

Pay attention to the guide pin **1**.

13. Close the locks.



CMS-I-00001913

9.3 Emptying the seed hopper through the residual quantity flap

CMS-T-00001917-C.1



REQUIREMENTS

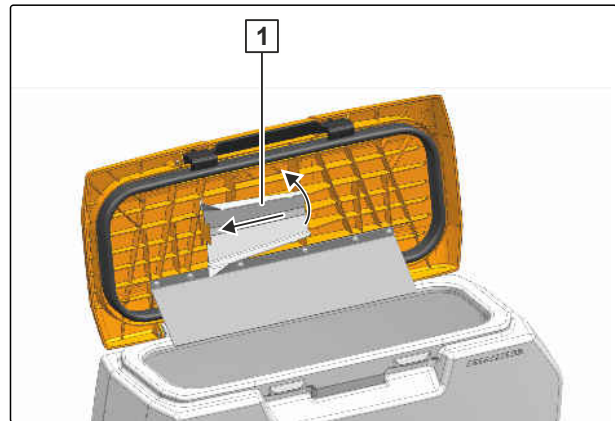
- ✓ The implement is coupled to the tractor
- ✓ The tractor and implement are secured



NOTE

The parking position for the chute is in the hopper cover for row 1.

1. Take out the chute **1**.



CMS-I-00001888

2. Hook the chute **1** onto the singling unit.



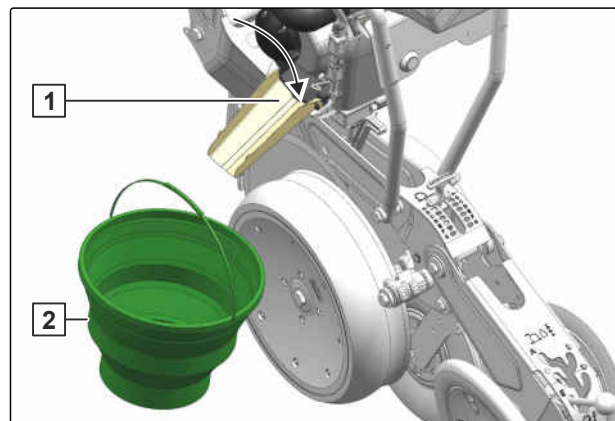
NOTE

When the collection bucket is hooked onto the chute, the chute can be loaded with a maximum of 12 kg.

3. Put the collection bucket **2** under the chute

or

Hook the collection bucket **2** onto the chute.



CMS-I-00001995

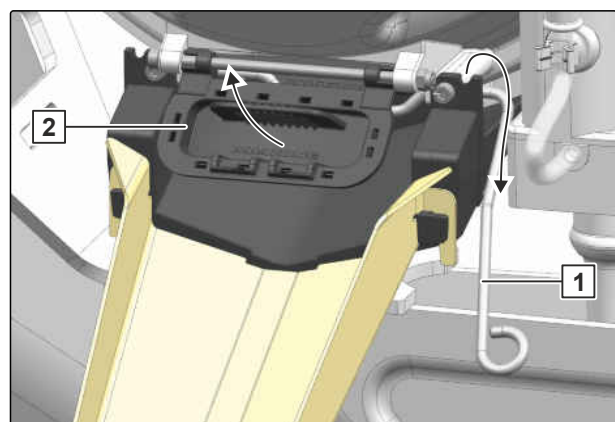
4. Open the locking spring **1**.

➔ The flap **2** is opened and the residual quantity is collected.

5. *When the residual quantity has been collected, park the chute back into the hopper cover.*

6. Close the flap.

7. Lock the locking spring.



CMS-I-00001996

9.4 Emptying the fertiliser metering unit

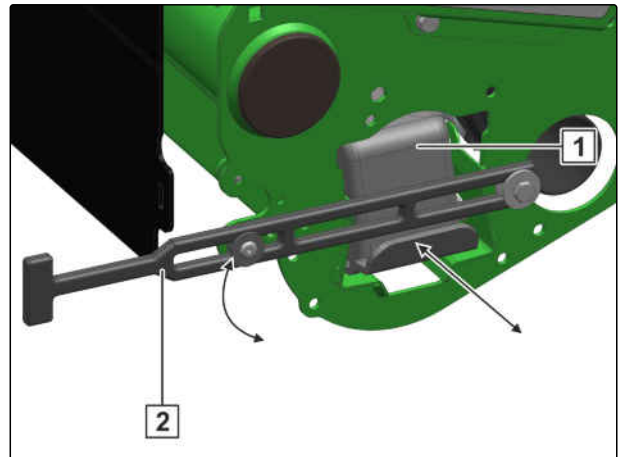
CMS-T-00003599-B.1

1. Switch off the fan.
2. Release the lock **2** and swivel it downwards.
3. *To take the calibration buckets out of the parking position on implements with hydraulic fan drive,*
pull out the interlocked calibration buckets **1** to the side.

or

To take the calibration buckets out of the parking position on implements with mechanical fan drive,

pull out the calibration buckets individually to the side on the left and right.



CMS-I-00001932

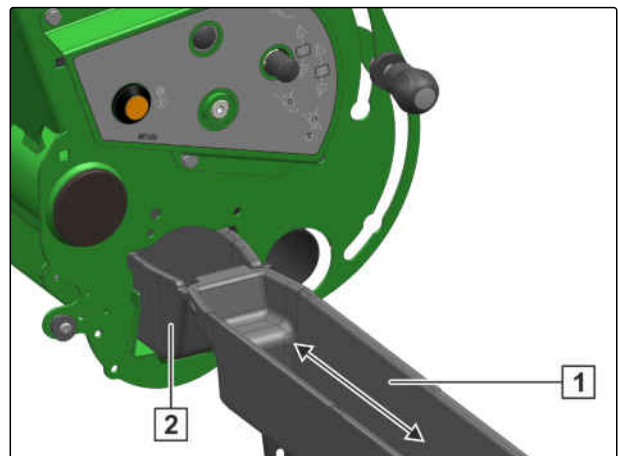
4. *To move the calibration buckets into calibration position on implements with hydraulic fan drive,*
slide the calibration bucket **2** under the metering unit with the opening facing up.

5. Hook on the calibration bucket **1** with the opening facing up and slide it under the metering unit.

or

To move the calibration buckets into calibration position on implements with mechanical fan drive,

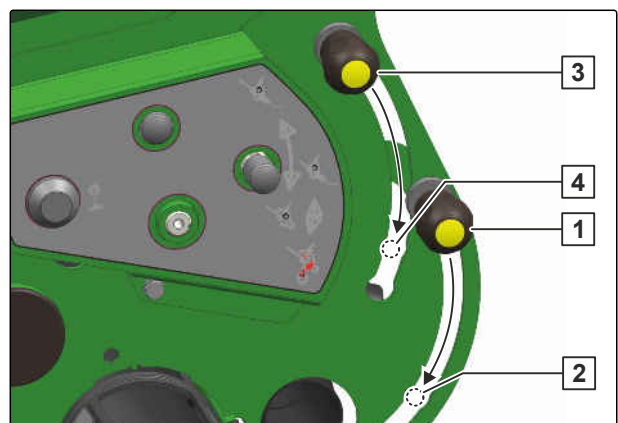
slide the calibration buckets individually under the metering units from the left and right.



CMS-I-00001931

6. *To move the calibration flap lever to the calibration position,*
press and hold the lock button **1** and push it down **2**.
7. *To move the bottom flap lever to the emptying position,*
press and hold the lock button **3** and push it down **4**.

8. Take out the residual quantity.

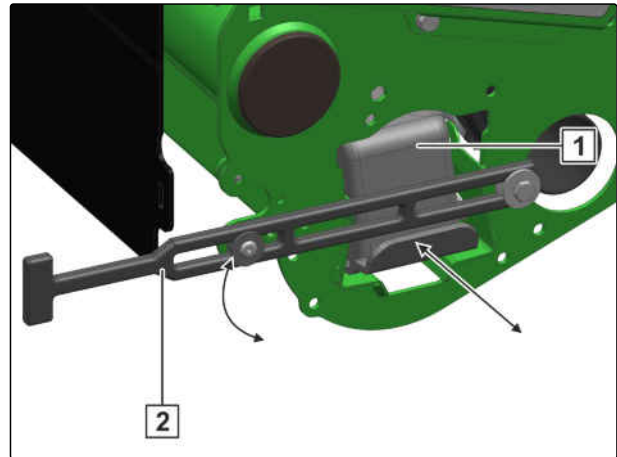


CMS-I-00001994

9 | Parking the machine

Emptying the micropellet hopper

9. Empty the calibration bucket.
10. *To prevent soiling of the calibration buckets,* slide the calibration bucket **1** under the metering unit with the opening facing down.
11. Swivel up the lock **2** and close it.
12. *To move the calibration flap lever into working position,* press and hold the lock button and push it upwards.
13. *To move the bottom flap lever into working position,* press and hold the lock button and push it upwards.



CMS-I-00001932

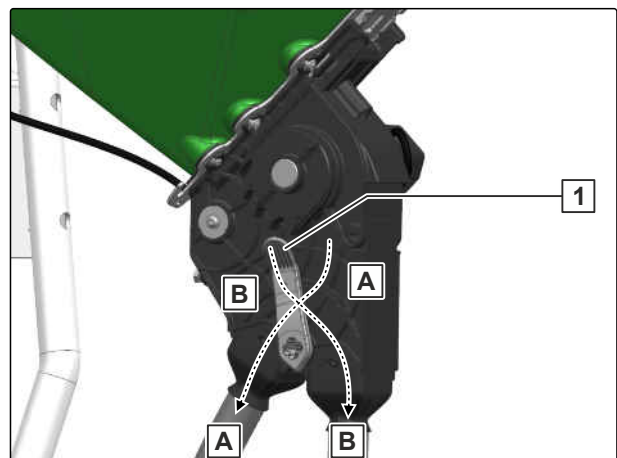
9.5 Emptying the micropellet hopper

CMS-T-00003603-B.1

1. Close the the sliding shutter **1** on the micropellet hopper.
2. Move the switchover flap **1** to position **A**.

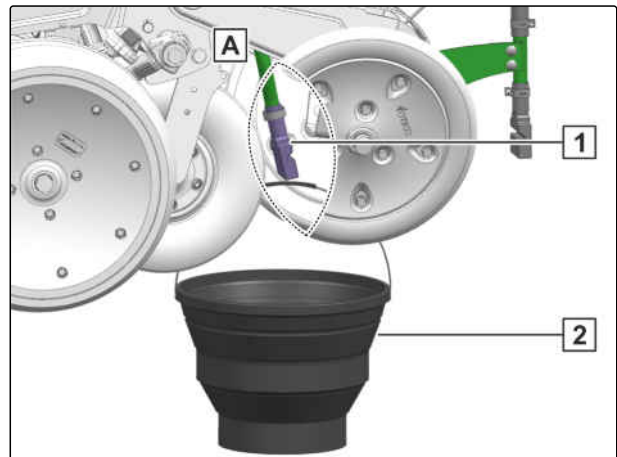


CMS-I-00002586



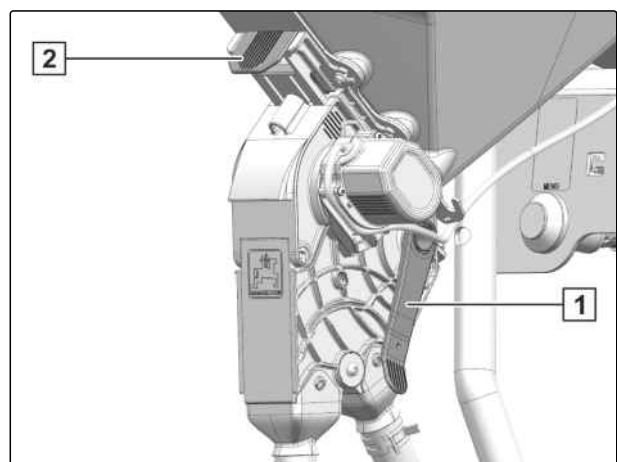
CMS-I-00002580

3. Put the collapsible bucket **2** under the activated micropellet outlet **1**.



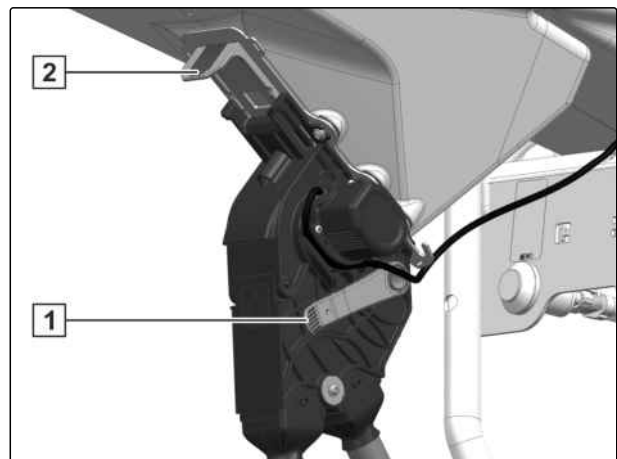
CMS-I-00002621

4. Relieve the bottom flap lever **1**.
 5. Slowly open the sliding shutter **1**.
- ➔ The micropellets are collected in the collapsible bucket.



CMS-I-00002576

6. *When the residual quantity has be fully collected,*
move the bottom flap lever **1** back into working position.
7. Open the sliding shutter **2** completely.

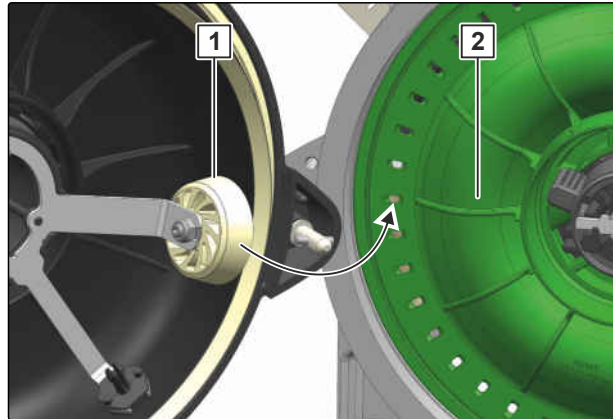


CMS-I-00002622

9.6 Relieving the hole covering rollers

CMS-T-00002211-C.1

To ensure the concentricity of the hole covering rollers **1**, the hole covering rollers must be relieved when they are not used for longer periods. To do so, the singling discs **2** must be removed from all of the grain singling units.



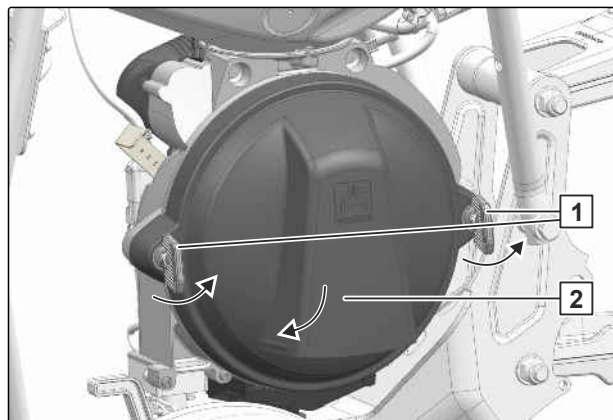
CMS-I-00002023



REQUIREMENTS

- ✓ The implement is in working position
- ✓ The implement is coupled to the tractor
- ✓ The tractor and implement are secured

1. Open the locks **1**.
2. Remove the cover **2**.



CMS-I-00001909

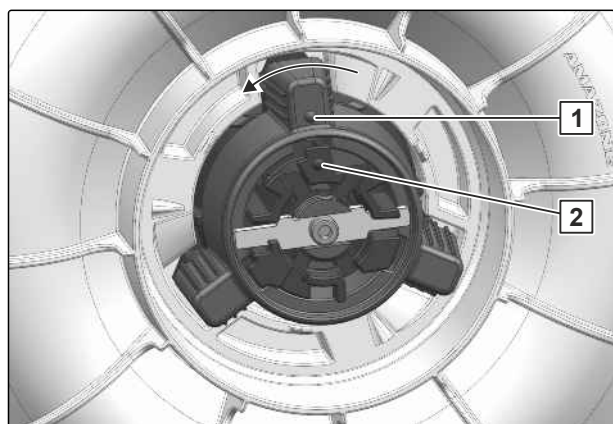


WARNING

Risk of chemical burns by dressing dust

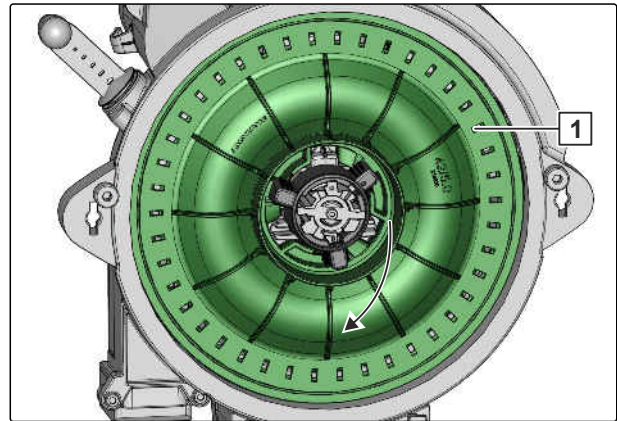
- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.

3. Release the lock **1** until the points **2** are aligned.



CMS-I-00001910

4. remove the singling disc **1** from the drive hub.
5. Keep the singling disc in the seed hopper.



CMS-I-00001912

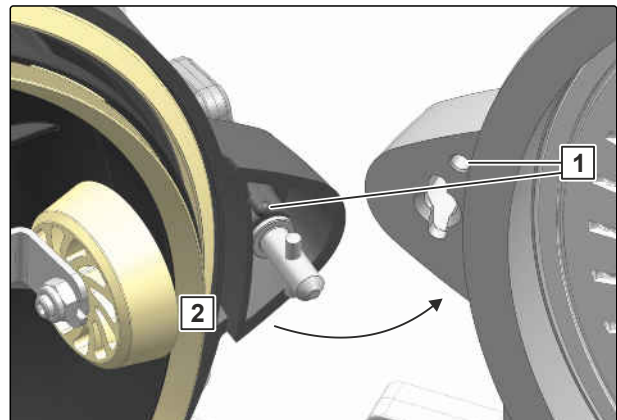
6. Close the cover **2**.



NOTE

Pay attention to the guide pin **1**.

7. Close the locks.



CMS-I-00001913

9.7 Parking the wheel mark eradicator

CMS-T-00001919-B.1



REQUIREMENTS

- ✓ The implement is raised
- ✓ The fan is switched off
- ✓ The tractor and implement are secured

Depending on the implement equipment, the topmost position can differ.



IMPORTANT

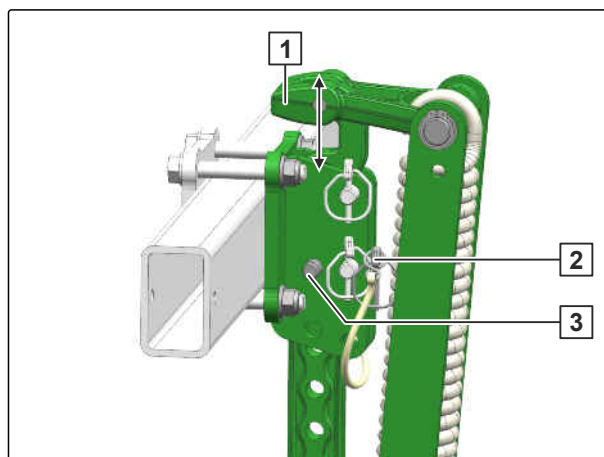
Damage to the wheel mark eradicator

- *Before parking the implement on solid ground,*
move the wheel mark eradicators into parking position.

9 | Parking the machine

Parking the PreTeC mulch seeding coulters

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

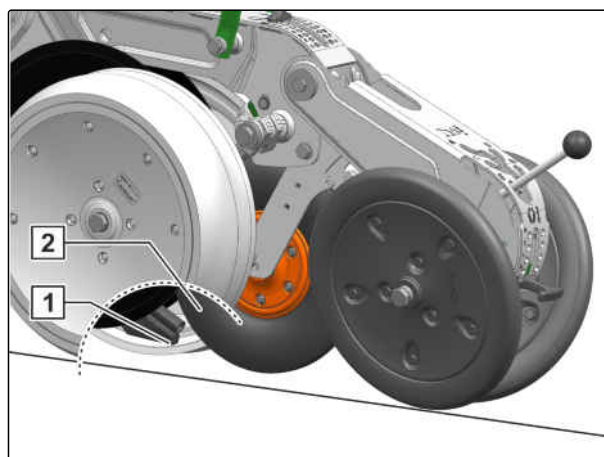


CMS-I-00000942

9.8 Parking the PreTeC mulch seeding coulters

CMS-T-00001920-E.1

In the **P** position, the lowered depth control wheels protect the furrow formers **1** and catch roller **2**.



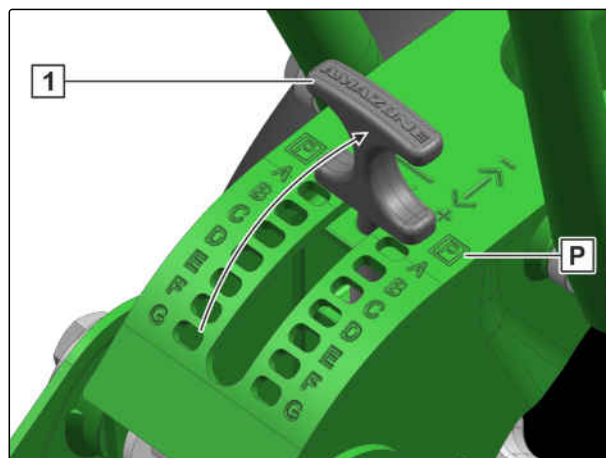
CMS-I-00001999



REQUIREMENTS

- ☑ The implement is raised
- ☑ The fan is switched off

1. Move the setting lever **1** to the topmost position **P**.
2. Lock the setting lever in the grid.
3. Move the disc closers or star closers into the topmost position.

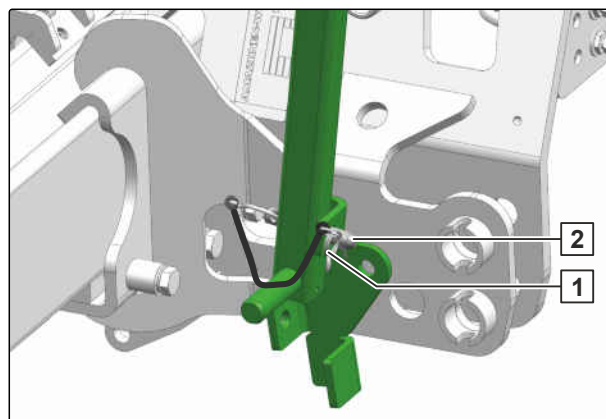


CMS-I-00001998

9.9 Putting down the jacks

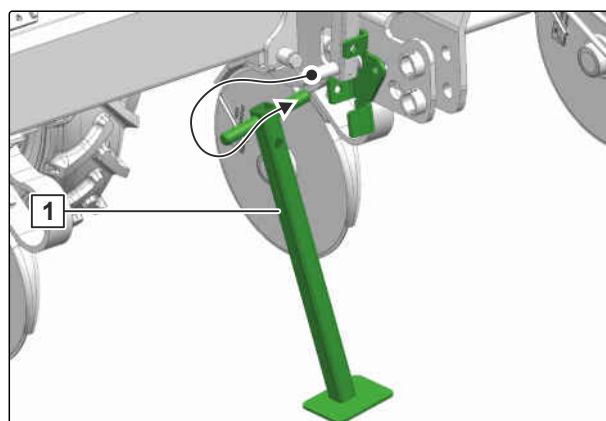
CMS-T-00002074-A.1

1. Pull out the spring cotter pin **1**.
2. Hold the jack firmly.
3. Remove the pin **2**.



CMS-I-00002002

4. Take the jack **1** out of the parking position.
5. Peg the jack **1** in the support position.

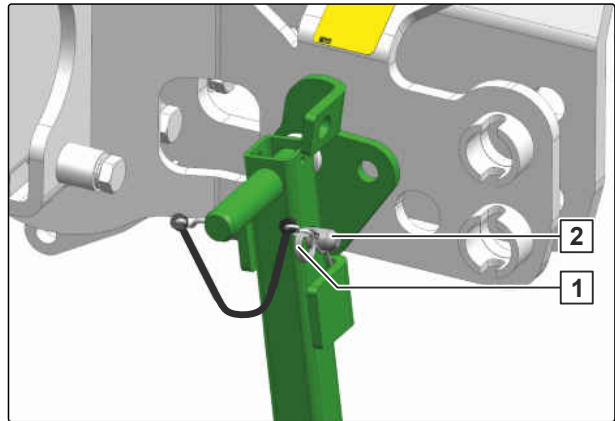


CMS-I-00002000

9 | Parking the machine

Uncoupling the 3-point mounting frame

6. Secure the jack with a pin **2**.
7. Secure the pin with a spring cotter pin **1**.
8. Repeat the procedure for the second jack.

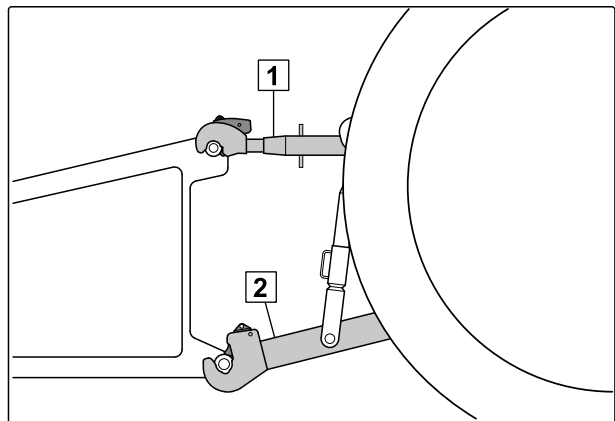


CMS-I-00002003

9.10 Uncoupling the 3-point mounting frame

CMS-T-00001401-C.1

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



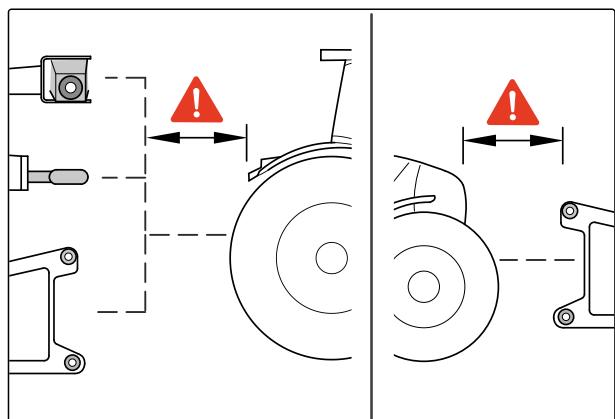
CMS-I-00001249

9.11 Driving the tractor away from the implement

CMS-T-00005795-D.1

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

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

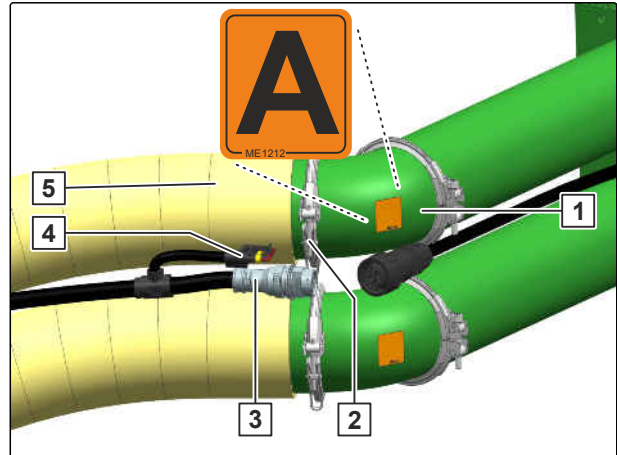


CMS-I-00004045

9.12 Disconnecting the supply lines from the front-mounted hopper

CMS-T-00004440-B.1

1. To disconnect the conveyor hose **5** from the front-mounted hopper **1**, remove the bracket **2** on the connecting piece.
2. Depending on the implement equipment, disconnect the second conveyor hose from the hose package.
3. Depending on the implement equipment, disconnect the front hopper supply **3** from the hose package.
4. Depending on the implement equipment, disconnect the metering unit shutoff **4** from the hose package.

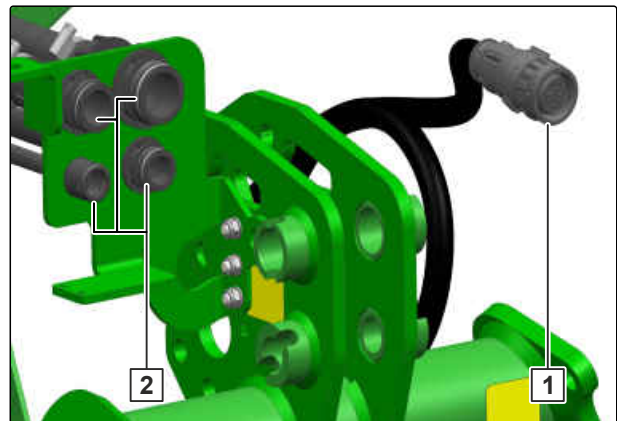


CMS-I-00003124

9.13 Disconnecting the supply lines from the front hopper

CMS-T-00010804-A.1

1. Disconnect the plug for the ISOBUS line **1** from the front hopper.
2. Disconnect the supply lines **2** from the conveyor hoses of the front hopper.

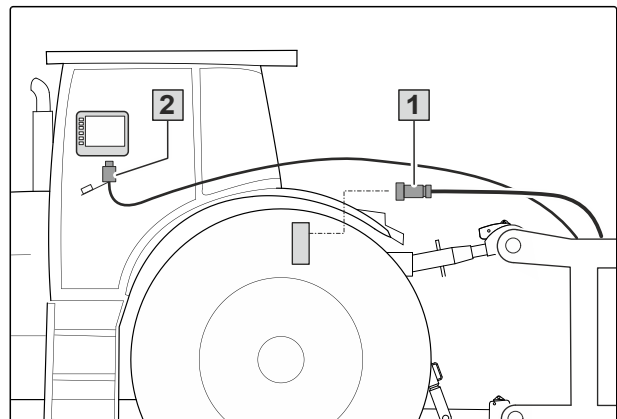


CMS-I-00007399

9.14 Uncoupling the ISOBUS or control computer

CMS-T-00006174-D.1

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

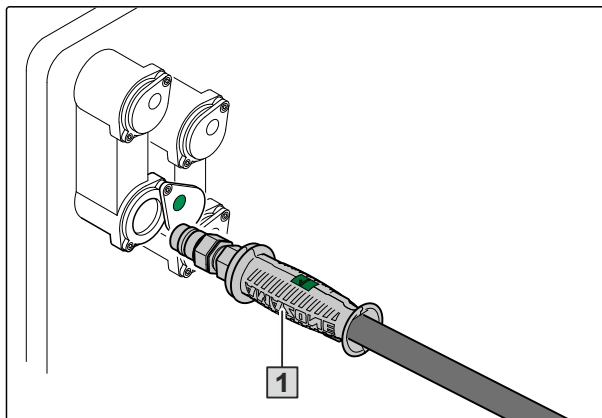


CMS-I-00006891

9.15 Disconnecting the hydraulic hose lines

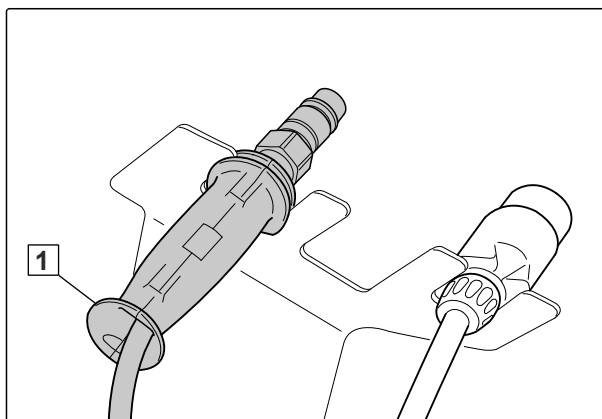
CMS-T-00000277-F.1

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



CMS-I-00001065

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

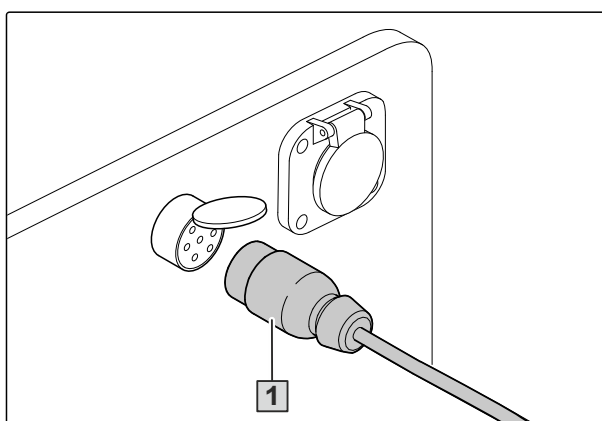


CMS-I-00001250

9.16 Uncoupling the power supply

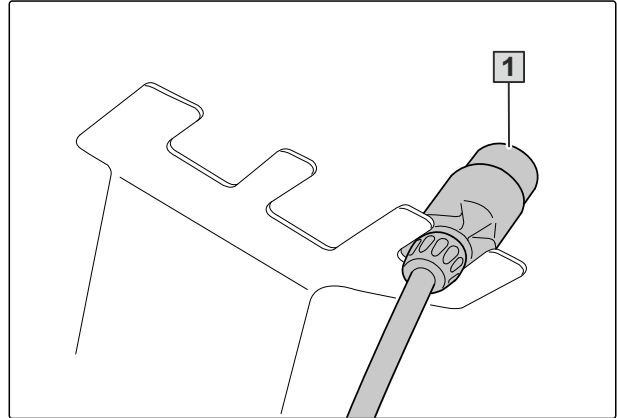
CMS-T-00001402-H.1

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



CMS-I-00001048

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

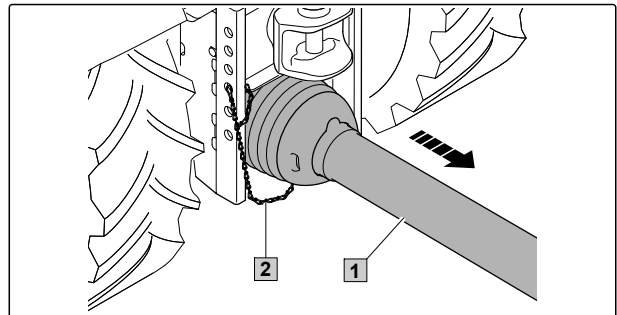


CMS-I-00001248

9.17 Uncoupling the universal joint shaft

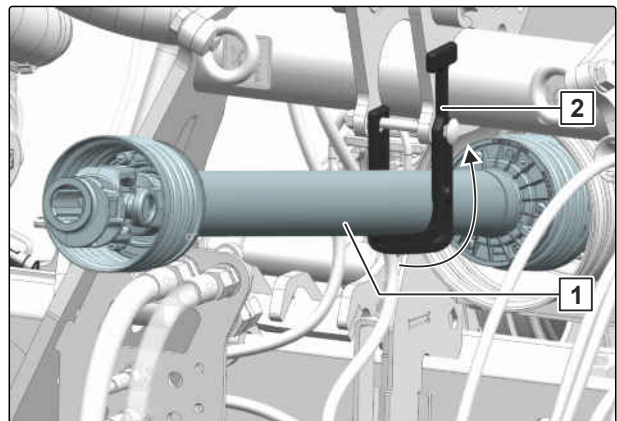
CMS-T-00001843-B.1

1. Remove the safety chain **2** from the tractor.
2. Release the lock of the universal joint shaft **1**.
3. Pull off the universal joint shaft from the tractor PTO shaft.



CMS-I-00001069

4. Put the universal joint shaft **1** into the parking position with the rubber strap **2**.

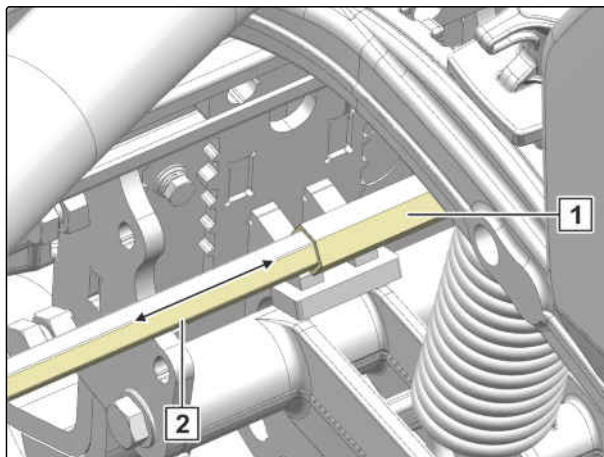


CMS-I-00001935

9.18 Conserving the drive shaft

CMS-T-00003870-A.1

- *To ensure that the drive shafts can be smoothly telescoped,*
seal the shafts with a non-adhesive conservation agent after washing.



CMS-I-00002825

Repairing the machine

10

CMS-T-00001761-G.1

10.1 Maintaining the machine

CMS-T-00002351-G.1

10.1.1 Maintenance schedule

After initial operation	
Checking the wheel bolt tightening torque	see page 229
Checking the tightening torque for the radar sensor bolts	see page 230
Checking the frame connection tightening torque	see page 230
Checking the coulter connection tightening torque	see page 231
Checking the running gear connection tightening torque	see page 231
Checking the tyre inflation pressure	see page 232
Checking the hydraulic hose lines	see page 232

At the end of the season	
Cleaning the fan rotor	see page 233
Cleaning the suction baskets	see page 234
Cleaning the cyclone separator	see page 235
Cleaning the FertiSpot	see page 241
Checking the FertiSpot rotor	see page 243
Cleaning the distributor head	see page 245

Daily	
Checking the lower link pins and top link pins	see page 232

Every 12 months	
Checking the tightening torque for the radar sensor bolts	see page 230
Checking the frame connection tightening torque	see page 230
Checking the coulter connection tightening torque	see page 231
Checking the running gear connection tightening torque	see page 231

Every 50 operating hours	
Checking the wheel bolt tightening torque	see page 229
Checking the tyre inflation pressure	see page 232

Every 150 operating hours	
Checking and replacing the clearing chisel	see page 225

Every 10 operating hours / Daily	
Cleaning the suction guard screen	see page 234
Cleaning the fertiliser metering unit	see page 240
Cleaning the micropellet metering unit	see page 246
Clean the singling unit	see page 249

Every 50 operating hours / Weekly	
Checking the hydraulic hose lines	see page 232

Every 50 operating hours / As required	
Cleaning the opto-sensor	see page 251

Every 50 operating hours / Every 3 months	
Adjusting the cutting disc drive on the PreTeC mulch seeding coulter	see page 223
Checking the wheel mark eradicator coulter	see page 255

Every 100 operating hours / As required	
Adjusting the cutting disc distance on the PreTeC mulch seeding coulter	see page 222
Adjusting the cutting disc distance on the FerTeC Twin coulter	see page 228

Every 100 operating hours / Every 3 months	
Checking and replacing the cutting discs on the PreTeC mulch seeding coulter	see page 221
Checking and replacing the disc closers on the PreTeC mulch seeding coulter	see page 224
Checking and replacing the star closers on the PreTeC mulch seeding coulter	see page 224
Checking and replacing the cutting disc on the FerTeC Twin coulter	see page 227
Checking and replacing the inner scraper on the FerTeC Twin coulter	see page 228

Every 100 operating hours / Every 12 months	
Cleaning the filling auger	see page 237
Cleaning the fertiliser hopper	see page 238
Adjusting the micropellet metering unit bottom flap	see page 248
Every 250 operating hours / At the end of the season	
Checking furrow formers or furrow clearers on the PreTeC mulch seeding coulters	see page 226

10.1.2 Checking and replacing the cutting discs on the PreTeC mulch seeding coulters

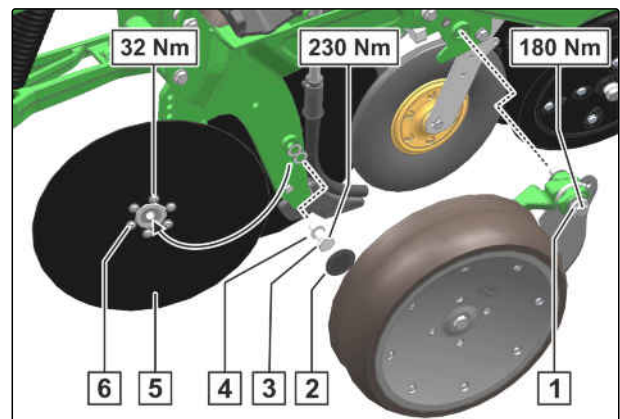
CMS-T-00002375-F.1



INTERVAL

- Every 100 operating hours
or
Every 3 months

1. Determine the cutting disc diameter.
2. *If the diameter of the cutting discs is less than 360 ml:*
replace the cutting discs.
3. Remove the depth control wheel along with the bracket **1**.
4. Remove the dust caps **2**.



CMS-I-00002044



NOTE

The central bolts have different threads:

- The right central bolt has right-hand thread
- The left central bolt has left-hand thread

5. Unscrew and remove the central bolts **3**.
6. Remove worn cutting discs **5**.
7. Unscrew and remove the bolts on the bearing seat **6**.
8. Replace worn cutting discs with new cutting discs.
9. Put on and tighten the bolts on the bearing seat.

10. Install new cutting discs.
11. *To ensure that the cutting discs touch slightly,* adjust the spacing of the cutting discs with the spacer discs **4**.
12. Install spacer discs that are not required on the opposite side of the cutting disc bearing with the central bolt.
13. Put on and tighten the central bolt.
14. Install the dust caps.
15. Install the depth control wheel along with the bracket.
16. Put on and tighten the bolt.

10.1.3 Adjusting the cutting disc distance on the PreTeC mulch seeding coulter

CMS-T-00002376-E.1



INTERVAL

- Every 100 operating hours
or
As required

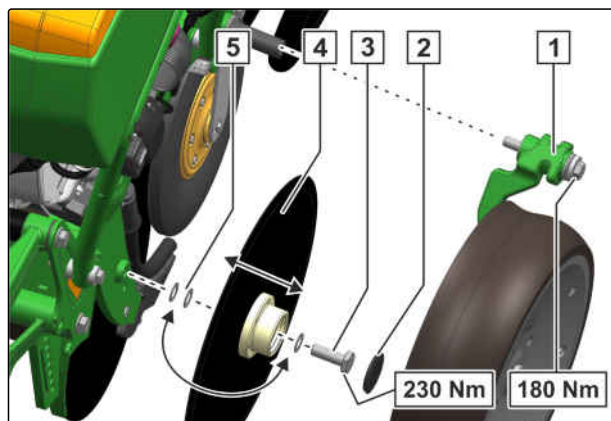
1. Remove the depth control wheel along with the bracket **1**.
2. Remove the dust caps **2**.
3. Unscrew and remove the central bolts **3**.



NOTE

The central bolts have different threads:

- The right central bolt has right-hand thread
- The left central bolt has left-hand thread



CMS-I-00002017

4. *To ensure that the cutting discs touch slightly,*
remove **5**

or

add the spacer discs as required.
5. Install spacer discs that are not required on the opposite side of the cutting disc bearing with the central bolt.
6. Put on and tighten the central bolt.
7. Install the dust caps.
8. Install the depth control wheel along with the bracket.

10.1.4 Adjusting the cutting disc drive on the PreTeC mulch seeding coulter

CMS-T-00002377-G.1



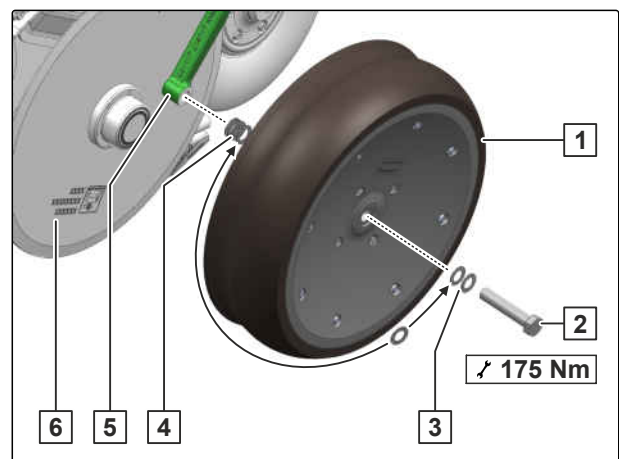
INTERVAL

- Every 50 operating hours
or
Every 3 months

1. Remove the bolt **2**.
2. Remove the depth control wheel **1**.

The depth control wheel drives the cutting disc through rotation.

3. *To ensure that the depth control wheel **1** slightly touches the cutting disc **6**,*
adjust the distance of the depth control wheel with the spacer discs **3** and **4**.
4. *Spacer discs that are not needed are fastened to the depth control wheel arm **5**.*
Fasten the discs on the opposite side using the bolt.



CMS-I-00002016

10.1.5 Checking and replacing the disc closers on the PreTeC mulch seeding coulters

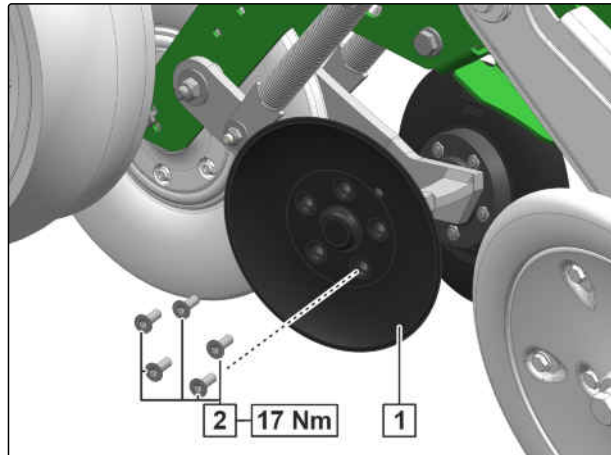
CMS-T-00008304-D.1



INTERVAL

- Every 100 operating hours
or
Every 3 months

1. Determine the diameter of the closer discs.
2. *If the diameter of the closer discs is smaller than 180 mm:*
replace the closer discs in pairs.
3. Loosen and remove the bolts [2].
4. Replace worn closer discs [1]. Pay attention to the seat of the sealing ring.
5. Put on and tighten the bolts.



CMS-I-00005666

10.1.6 Checking and replacing the star closers on the PreTeC mulch seeding coulters

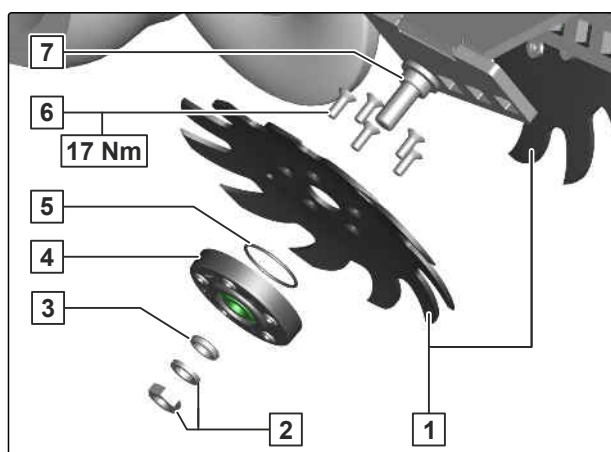
CMS-T-00014021-A.1



INTERVAL

- Every 100 operating hours
or
Every 3 months

1. Determine the star closer diameter.
2. *If the diameter of the star closers is less than 230 mm:*
Replace the star closers in pairs.
3. Remove the nut and locking washers [2].
4. Remove the bushes [3] and bearing unit [4].
5. Remove the bolts [6].
6. Replace worn star closers. Pay attention to the seat of the sealing ring [5].



CMS-I-00008768

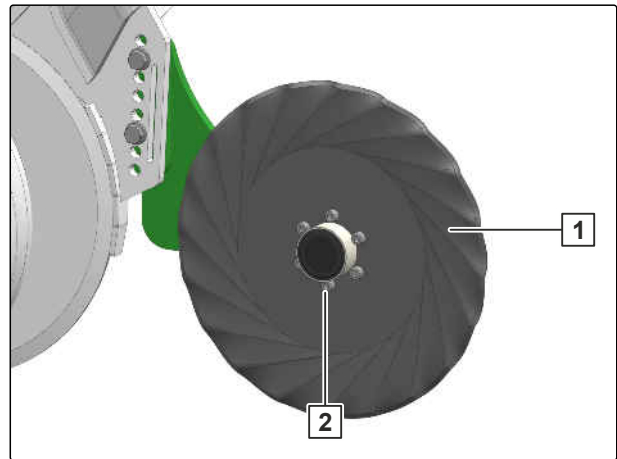
7. *To align the star closers so that they are centred relative to the furrow:*
Move the setting bushings **3** and **7** into the desired position.
8. Install the nut and locking washers.

10.1.7 Checking and replacing the rigid cutting disc on the PreTeC mulch seeding coulter

CMS-T-00007650-C.1

INTERVAL

1. Determine the cutting disc diameter.
2. *If the diameter of the cutting discs is less than 320 mm,*
replace the worn cutting discs **1**.
3. Remove the bolts **2**.
4. Replace worn cutting discs with new cutting discs.
5. Install the bolts.



CMS-I-00005361

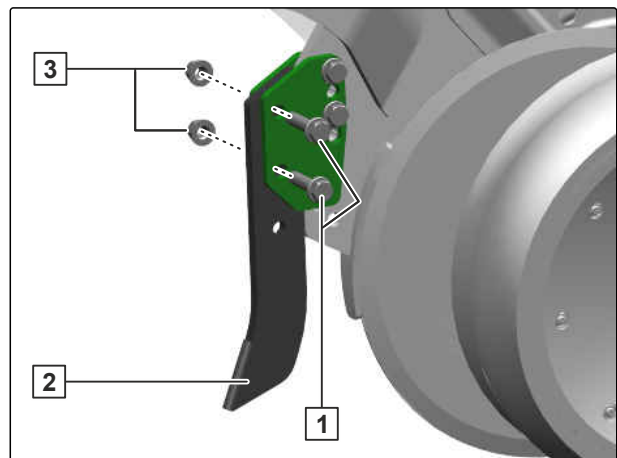
10.1.8 Checking and replacing the clearing chisel

CMS-T-00014551-A.1

INTERVAL

- Every 150 operating hours

1. *If the clearing chisel **2** shows fluting or if the coulter tip is worn:*
Replace the clearing chisel as follows.
2. Loosen the nuts **3**.
3. Remove the nuts and washers.
4. Remove the bolts **1**.
5. Replace the clearing chisel.
6. Install the bolts.
7. Install the nuts and washers and tighten them.



CMS-I-00009206

10.1.9 Checking furrow formers or furrow clearers on the PreTeC mulch seeding coulters

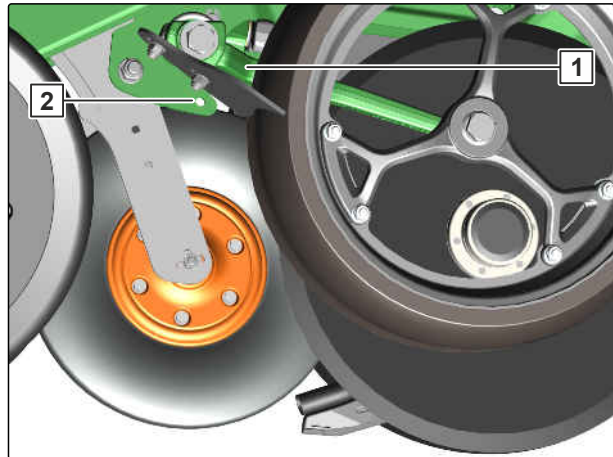
CMS-T-00013233-A.1



INTERVAL

- Every 250 operating hours
or
At the end of the season

1. To arrest the carrier rollers **1** in the upper position:
Swivel up the carrier rollers on both sides. Peg in the hole **2**.



CMS-I-00009426



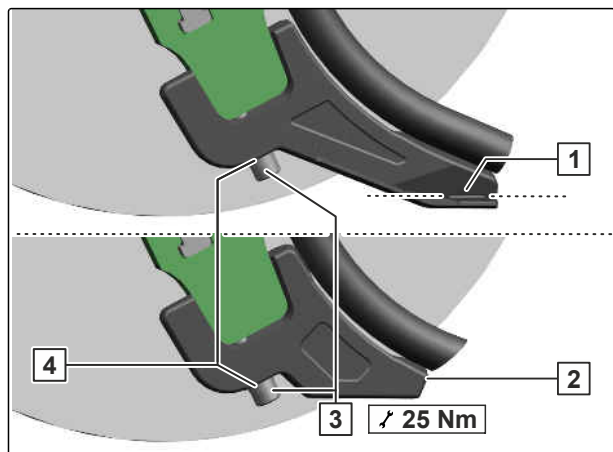
NOTE

The cutting disc does not need to be removed to change the furrow former or the furrow clearer.

2. If the indicator **1** is no longer visible:
Replace the furrow former

or

If the furrow clearer **2** is worn down to the feed channel:
Replace the furrow clearer.



CMS-I-00009428

3. Lift the implement.
4. Secure the tractor and implement.
5. Remove the bolt **3** and the bolt lock **4**.
6. Replace the furrow former or furrow clearer.
7. If the toothing of the bolt lock is worn:
Replace the bolt lock.
8. Install the bolt and bolt lock and tighten.

10.1.10 Checking and replacing the cutting disc on the FerTeC Twin coulter

CMS-T-00002379-F.1

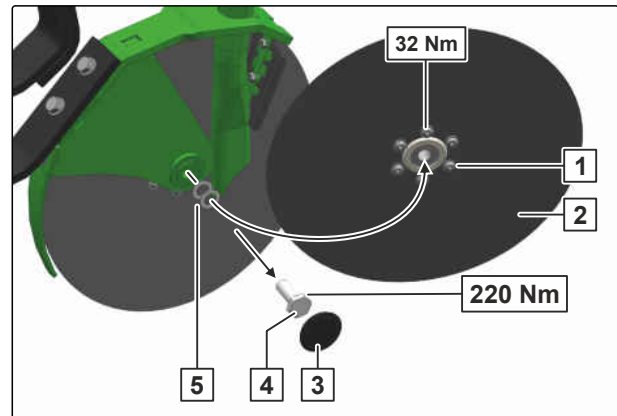


INTERVAL

- Every 100 operating hours
or
Every 3 months

Fertiliser coulter	Smallest diameter of the cutting disc
FerTeC Twin	340 mm
FerTeC Twin HD	360 mm

1. Determine the cutting disc diameter.
2. *If the cutting disc is worn:*
Replace the cutting disc as described in the following.



CMS-I-00002043

3. Remove the dust caps **3**.
4. Unscrew and remove the central bolts **4**.



NOTE

- The right central bolt has right-hand thread.
- The left central bolt has left-hand thread.

5. Remove the worn cutting disc **2**.
6. Unscrew and remove the bolts on the bearing seat **1**.
7. Replace the worn cutting disc with a new cutting disc.
8. Put on and tighten the bolts on the bearing seat.
9. Install the new cutting disc.
10. *To ensure that the cutting discs touch slightly:*
adjust the spacing of the cutting discs with the spacer discs **5**.
11. Install spacer discs that are not required on the opposite side of the cutting disc bearing.
12. Put on and tighten the central bolt.
13. Install the dust caps.

10.1.11 Adjusting the cutting disc distance on the FerTeC Twin coulter

CMS-T-00002380-E.1



INTERVAL

- Every 100 operating hours
or
As required

With increasing wear of the cutting discs, the distance between the cutting discs also increases.

1. Remove the dust caps **1**.
2. Unscrew and remove the central bolts **2**.

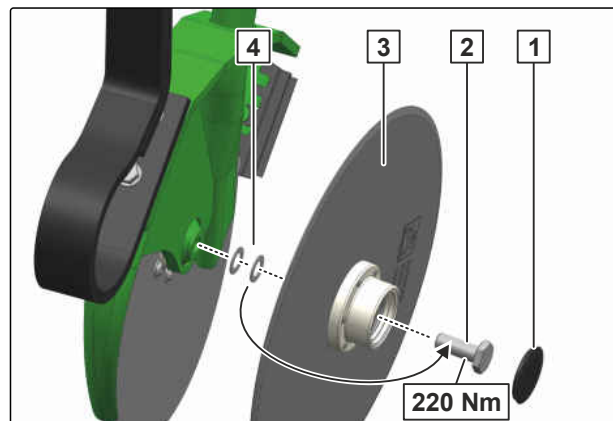


NOTE

The central bolts have different threads:

- The right central bolt has right-hand thread
- The left central bolt has left-hand thread

3. *To ensure that the cutting discs **5** touch slightly,*
remove or add spacer discs **4** as required.
4. Install spacer discs that are not required on the opposite side of the cutting disc bearing with the central bolt.
5. Put on and tighten the central bolt.
6. Install the dust caps.



CMS-I-00002019

10.1.12 Checking and replacing the inner scraper on the FerTeC Twin coulter

CMS-T-00002381-D.1



INTERVAL

- Every 100 operating hours
or
Every 3 months

The inner scrapers ensure smooth coulter running and are subject to wear.



REQUIREMENTS

- ☑ The tractor and implement are secured

1. Remove the dust caps **1**.
2. Unscrew and remove the central bolts **2**.

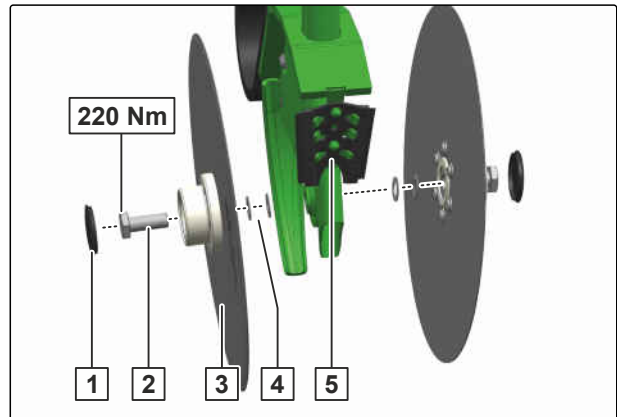


NOTE

The central bolts have different threads:

- The right central bolt has right-hand thread
- The left central bolt has left-hand thread

3. Remove the cutting discs **3**.
4. Pay attention to the number of spacer discs **4**.
5. Replace inner scrapers **5** if worn.
6. Install the cutting discs.
7. Put on and tighten the central bolt.
8. Install the dust caps.



CMS-I-00002020

10.1.13 Checking the wheel bolt tightening torque

CMS-T-00002382-D.1



INTERVAL

- After initial operation
- Every 50 operating hours

Tyres	Wheel bolt tightening torque
Tyres 6.5/80x15-AS	325 Nm
Tyres 26x12-12 AS	325 Nm

- Check the wheel bolt tightening torque.

10.1.14 Checking the tightening torque for the radar sensor bolts

CMS-T-00002383-H.1



INTERVAL

- After initial operation
- Every 12 months

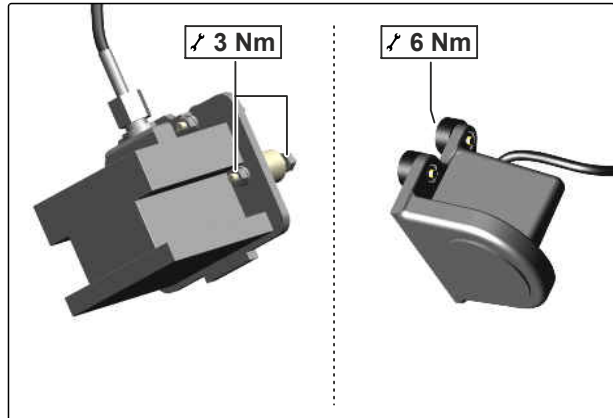


NOTE

When the tightening torque is too high, the spring-suspended sensor mount is warped. As a result, the radar sensor does not work properly.

Depending on the equipment of the implement, different radar sensors can be installed.

- Check the tightening torque on the radar sensor.



CMS-I-00002600

10.1.15 Checking the frame connection tightening torque

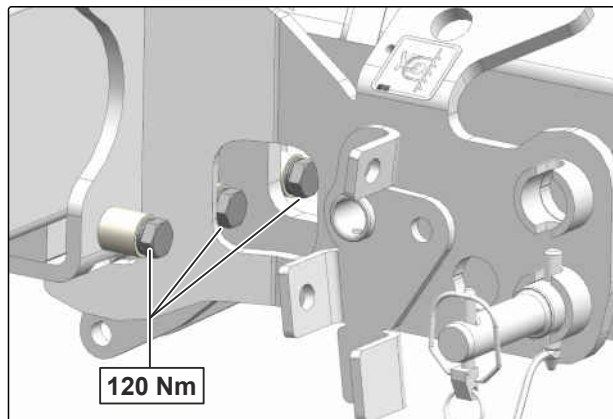
CMS-T-00002384-B.1



INTERVAL

- After initial operation
- Every 12 months

- Check the tightening torque on both sides.



CMS-I-00002037

10.1.16 Checking the coulter connection tightening torque

CMS-T-00002385-C.1



INTERVAL

- After initial operation
- Every 12 months

- *On telescopic coulters*
Tighten the bolts to 160 Nm -180°

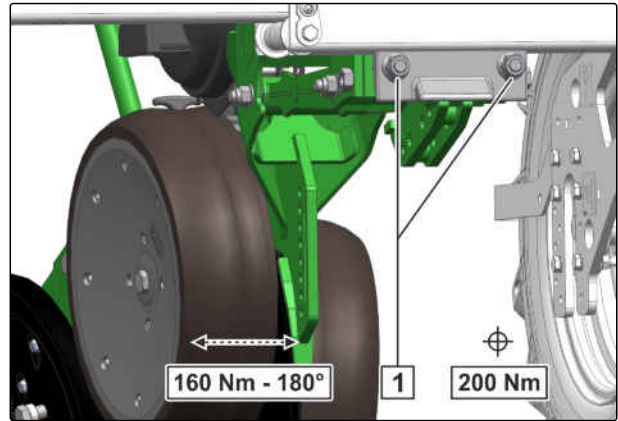
or

On non-telescopic coulters
Tighten the bolts to 200 Nm.



NOTE

The tightening torques must be checked when the coulters are unloaded.



CMS-I-00002039

10.1.17 Checking the running gear connection tightening torque

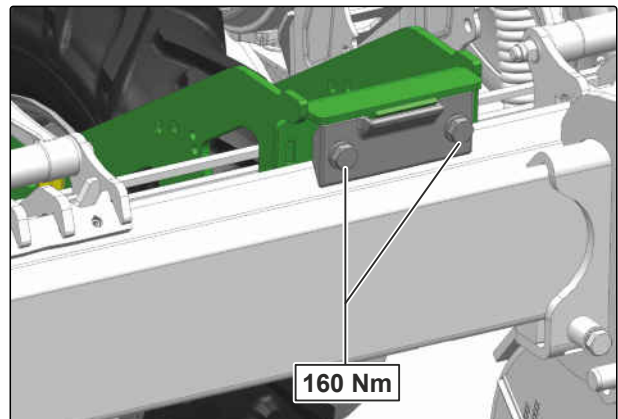
CMS-T-00002386-B.1



INTERVAL

- After initial operation
- Every 12 months

- Check the tightening torque on both sides.



CMS-I-00002038

10.1.18 Checking the tyre inflation pressure

CMS-T-00002387-A.1



INTERVAL

- After initial operation
- Every 50 operating hours

Tyres	Tyre inflation pressure
Tyres 6.5/80x15-AS	2.4 bar
Tyres 26x12-12 AS	2.4 bar

- Check the tyre inflation pressure.

10.1.19 Checking the lower link pins and top link pins

CMS-T-00002330-J.1



INTERVAL

- Daily

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

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

10.1.20 Checking the hydraulic hose lines

CMS-T-00002331-F.1



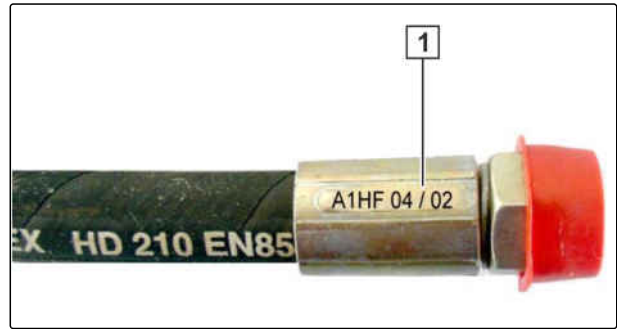
INTERVAL

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

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

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

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



CMS-I-00000532



WORKSHOP WORK

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

10.1.21 Cleaning the fan rotor

CMS-T-00002390-C.1



INTERVAL

- At the end of the season

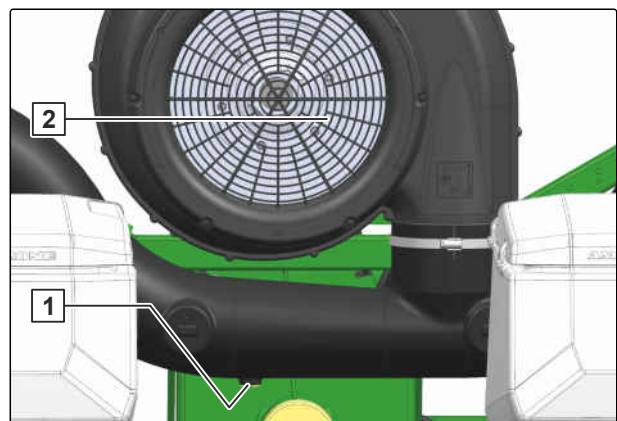
The air drawn by the fan can contain fertiliser dust or sand. These impurities can accumulate on the fan rotors and cause imbalance of the fan. This can destroy the fan.



REQUIREMENTS

- ☑ The implement is coupled to the tractor
- ☑ The singling unit housings are open
- ☑ The singling discs are removed

1. Open the water drain **1** on the air distributor.
 2. *To wash the deposits from the fan rotors:*
Direct a jet of water into the suction opening **2**.
 3. *When most of the water has escaped through the air distributor:*
Run the fan for about 5 minutes.
- ➔ The air supply is blown dry.
4. Switch off the fan.
 5. Close the water drain on the air distributor.



CMS-I-00002024

10.1.22 Cleaning the suction guard screen

CMS-T-00006210-C.1

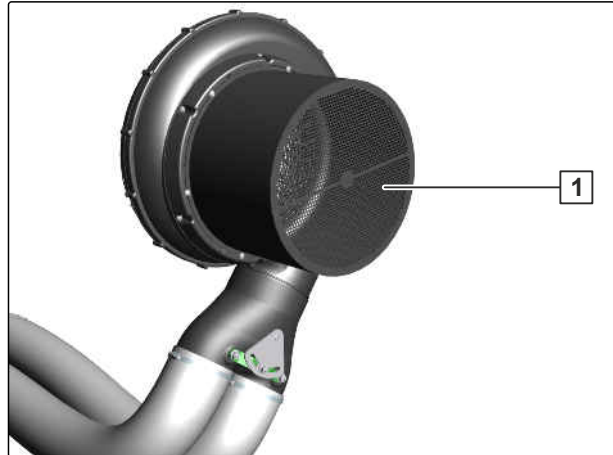


INTERVAL

- Every 10 operating hours
or
Daily

The suction guard screen **1** prevents plant residues from being drawn into the fan.

1. Switch off the fan.
2. Remove impurities from the suction guard screen **1** of the fan.



CMS-I-00002970

10.1.23 Cleaning the suction baskets

CMS-T-00003836-B.1



INTERVAL

- At the end of the season



WORKSHOP WORK



NOTE

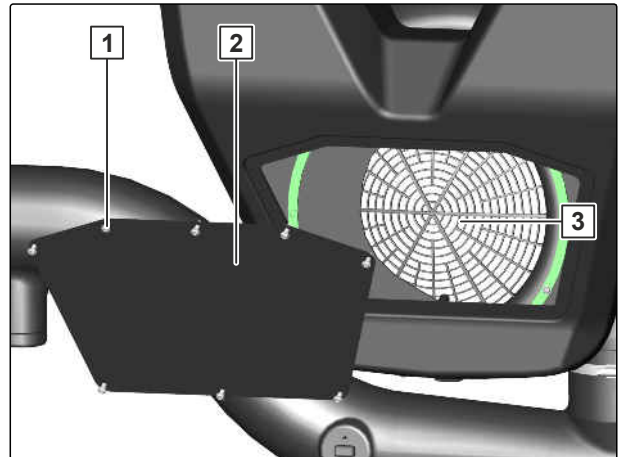
Depending on the implement equipment, enable safe access to the suction baskets.

1. Clean the suction baskets **1**.



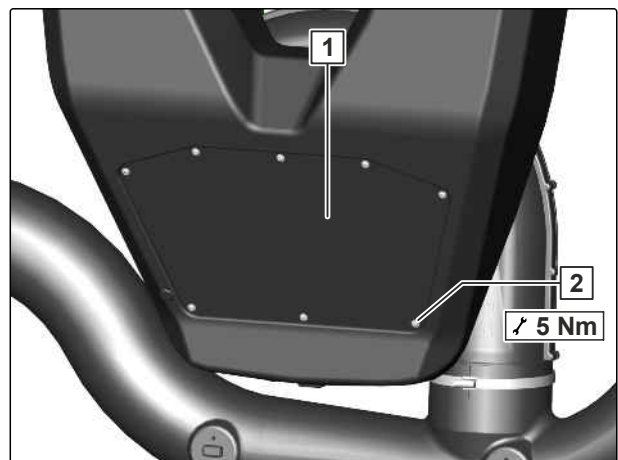
CMS-I-00002793

2. Remove the bolts **1**.
3. Remove the cover **2**.
4. *To clean the fan rotor **3**:*
see page 233



CMS-I-00009137

5. Remove the cover **1**.
6. Install the bolts **2**.



CMS-I-00009136

10.1.24 Cleaning the cyclone separator

CMS-T-00014661-A.1



INTERVAL

- At the end of the season



WORKSHOP WORK



NOTE

Depending on the implement equipment,
enable safe access to the cyclone separators.

1. Open the clips **3**.
2. Loosen the wing nut **1**.

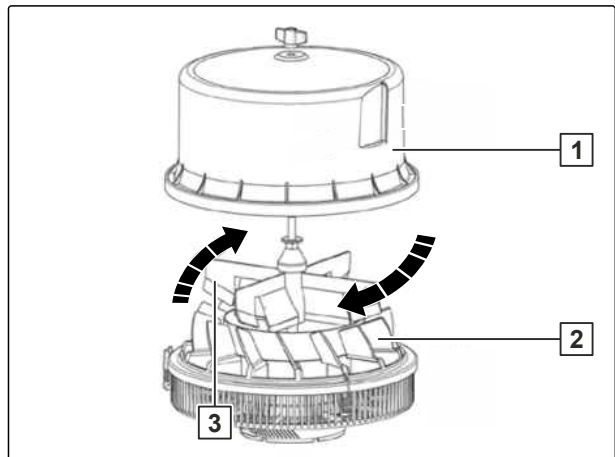


CMS-I-00002765



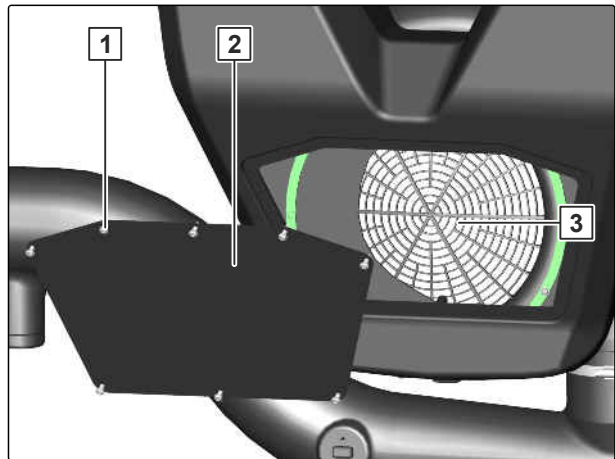
WORKSHOP WORK

3. Remove the cover **1** and clean it.
4. Clean the air guide elements **2**.
5. Clean the impeller **3**. Make sure that it runs smoothly.
6. Ensure that the impeller runs smoothly.
7. Install the cover with the wing nut.
8. Fasten the suction cage with the clips.



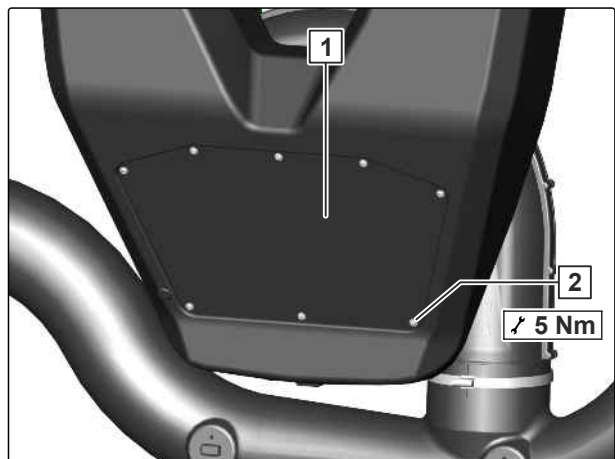
CMS-I-00009310

9. Remove the bolts **1**.
10. Remove the cover **2**.
11. To clean the fan rotor **3**:
see page 233



CMS-I-00009137

12. Remove the cover **1**.
13. Install the bolts **2**.



CMS-I-00009136

10.1.25 Cleaning the filling auger

CMS-T-00002391-B.1



INTERVAL

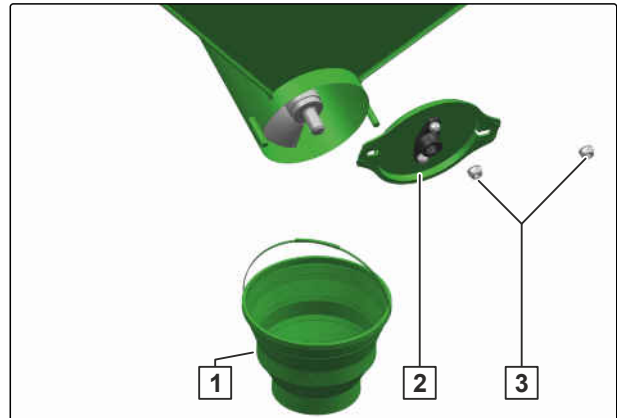
- Every 100 operating hours
or
Every 12 months



REQUIREMENTS

- ✓ The implement is coupled to the tractor
- ✓ The fan is switched off
- ✓ The filling auger is switched off
- ✓ The tractor and implement are secured

1. Place a collection bucket **1** under the conveyor tube.
2. Loosen the nuts **3** and remove them.
3. Remove the cover **2**.
4. Knock out the fertiliser residue from the conveyor tube and collect it.

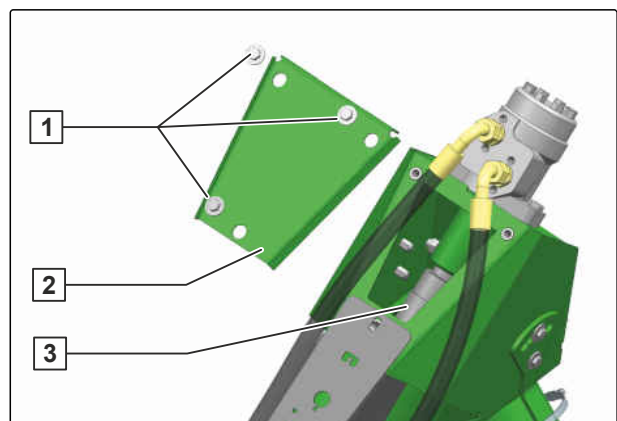


CMS-I-00002026



WORKSHOP WORK

5. Unscrew and remove the bolts **1**.
6. Remove the installation flap **2**.
7. Thoroughly clean the filling auger **3** with a water jet.
8. Put on the installation flap.
9. Put on the bolts and tighten them.
10. Install the cover.
11. Put on the nuts and tighten them.



CMS-I-00002027

10.1.26 Cleaning the fertiliser hopper

CMS-T-00002392-B.1



INTERVAL

- Every 100 operating hours
or
Every 12 months



REQUIREMENTS

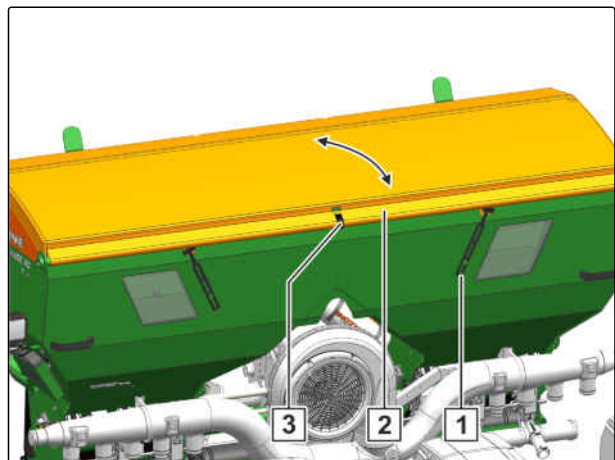
- ✓ The implement is coupled to the tractor
- ✓ The tractor and implement are secured

1. Switch off the filling auger
2. Switch off the fan.
3. Climb onto the loading board using the steps.
or

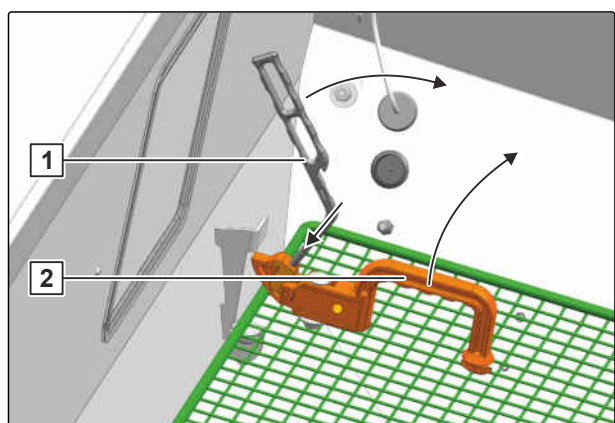
To unfold the ladder, see "Operating the loading board with ladder".

Climb onto the loading board using the ladder.

4. Open the rubber straps **1**.
5. Open the fertiliser hopper tarpaulin **2**.
6. Remove residues or foreign objects from the fertiliser hopper.
7. Insert the unlocking tool **1** into the lock.
8. *To open the protective screens,* unlock the lock and swivel the protective screen upwards by the handle **2**.
9. Remove residues or foreign objects from the fertiliser hopper.
10. Close the protective screen.
11. Park the unlocking tool on the fertiliser hopper.



CMS-I-00001892



CMS-I-00002028

12. Release the lock **1** and swivel it downwards.

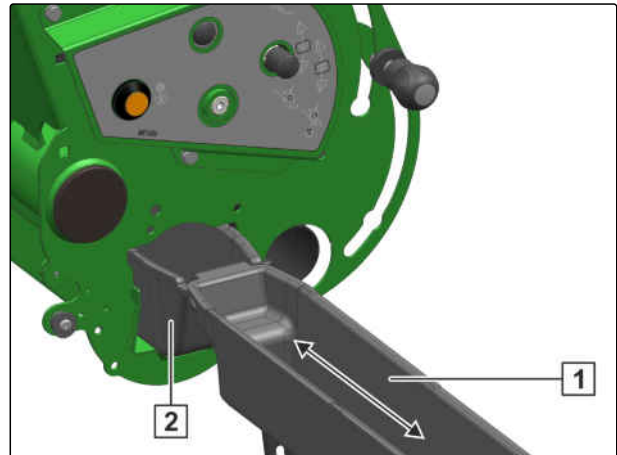
13. *To move the calibration buckets into calibration position on an implement with hydraulic fan drive,*

pull out the interlocked calibration buckets **2** by 10 cm to the side.

or

To move the calibration buckets into calibration position on an implement with mechanical fan drive,

pull out the calibration buckets **2** individually by 10 cm to the side.



CMS-I-00001931

14. Turn the calibration bucket upwards and align the opening with the guide marks **3**.

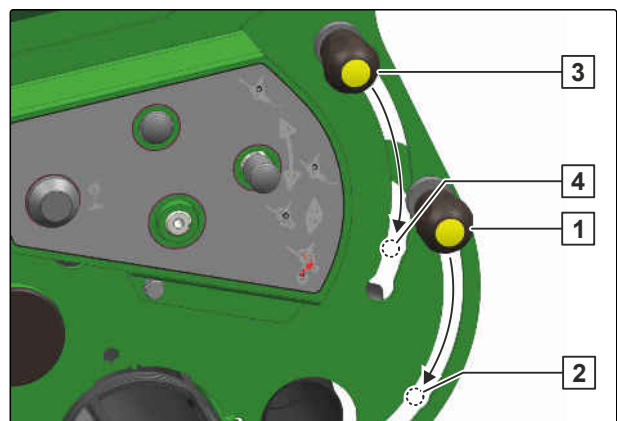
15. Insert the calibration bucket.

16. *To move the calibration flap lever to the calibration position,*

press and hold the lock button **1** and push it down **2**.

17. *To move the bottom flap lever to the emptying position,*

press and hold the lock button **3** and push it down **4**.



CMS-I-00001994

18. Clean the metering units thoroughly with a water jet.

19. Clean the calibration buckets.

20. Push in the the calibration bucket **2** with the opening facing down.

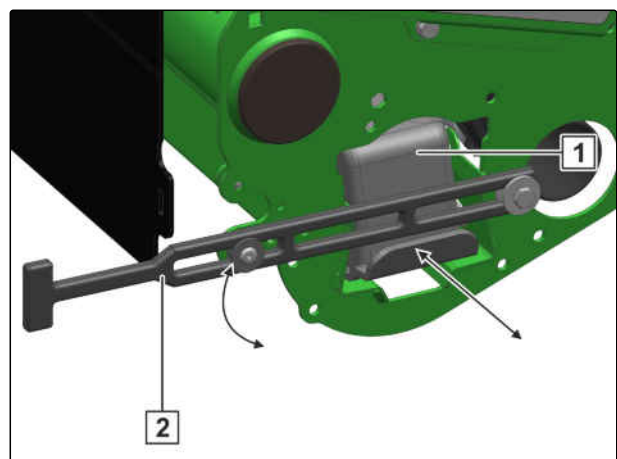
21. Swivel up the lock **1** and close it.

22. *To move the calibration flap lever into working position,*

press and hold the lock button and push it upwards.

23. *To move the bottom flap lever into working position,*

press and hold the lock button and push it upwards.



CMS-I-00001932

24. Close the fertiliser hopper tarpaulin.
25. Secure the fertiliser hopper tarpaulin with rubber straps.

10.1.27 Cleaning the fertiliser metering unit

CMS-T-00002473-C.1



INTERVAL

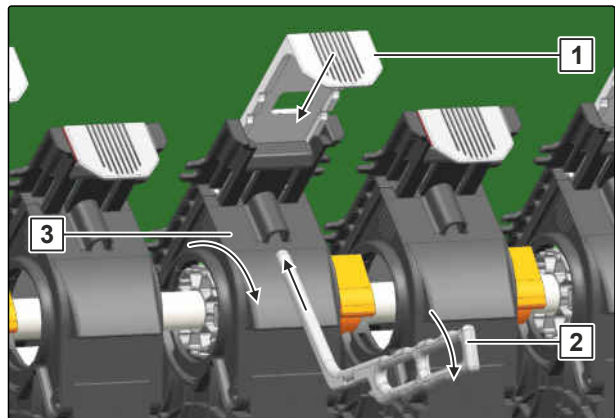
- Every 10 operating hours
or
Daily



REQUIREMENTS

- ☑ The implement is coupled to the tractor
- ☑ The fan is switched off
- ☑ The filling auger is switched off

1. *To close the fertiliser hopper on the metering housing,*
close the sliding shutter **1**.
2. Take the unlocking tool from the threaded cartridge or the parking position on the fertiliser hopper.
3. *To unlock the metering unit cover,*
insert the unlocking tool **2** into the metering unit cover.
4. Open the metering unit cover **3** with the unlocking tool.
5. Remove residues or foreign objects from the metering housing.
6. Close the metering unit cover **3**.
7. Park the unlocking tool from the threaded cartridge or the parking position in the fertiliser hopper.



CMS-I-00002256

10.1.28 Cleaning the FertiSpot

CMS-T-00014404-A.1



INTERVAL

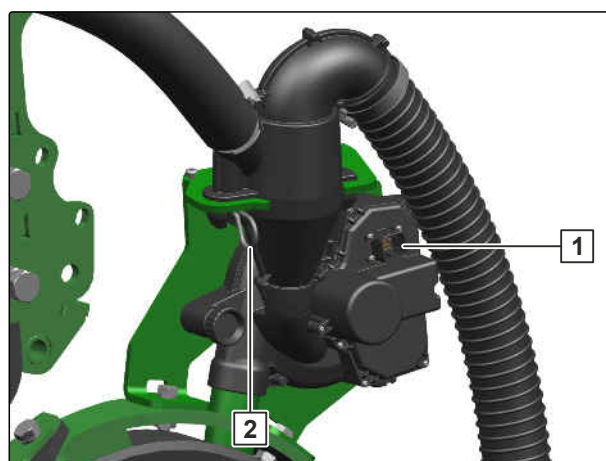
- At the end of the season



REQUIREMENTS

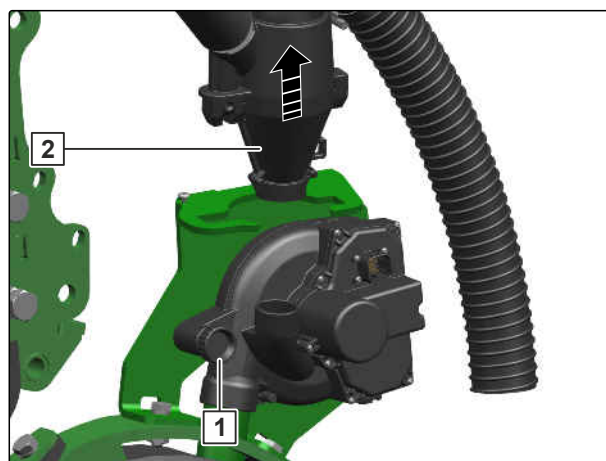
- ✓ The implement is coupled to the tractor
- ✓ The fan is switched off
- ✓ The filling auger is switched off

1. Disconnect the energy supply from the metering unit housing **1**.
2. Remove the cotter pin **2**.



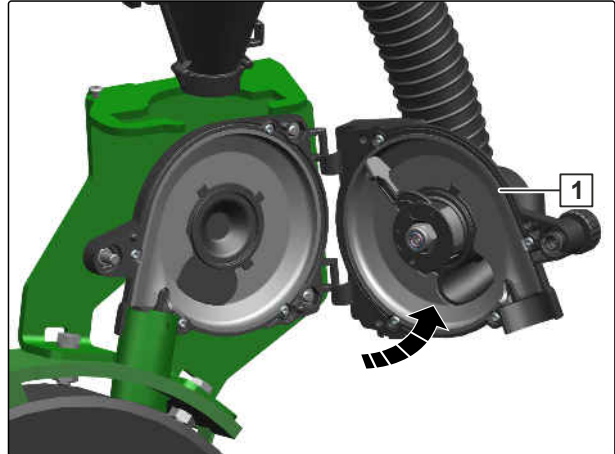
CMS-I-00009105

3. Remove the air separator **2**.
4. Loosen the knurled nut **1**.



CMS-I-00009104

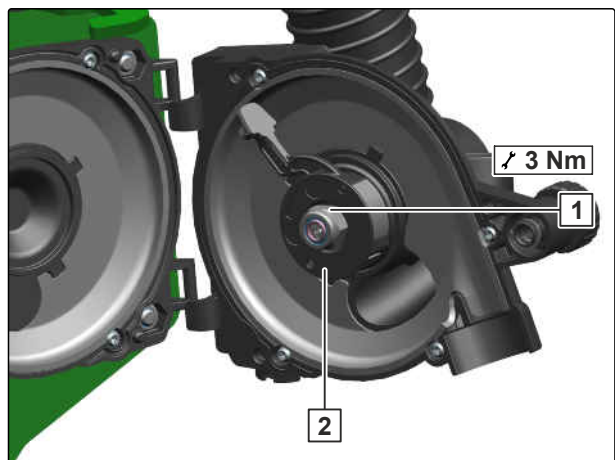
5. Open the cover **1** of the metering unit housing.
6. Clean the sheet metal tracks in the metering unit housing and rotor with a brush.
7. Check the rotor for ease of movement.



CMS-I-00009103

If the rotor does not spring back into the end position after deflecting, clean the rotor intensively.

8. Remove the nut **1**.
9. Remove the rotor **2** and clean it.
10. Install the rotor.
11. Put on the nut.
12. Close the cover of the metering unit housing.
13. Tighten the knurled nut.
14. Install the air separator.
15. Install the cotter pin.
16. Establish the energy supply.



CMS-I-00009405

10.1.29 Checking the FertiSpot rotor

CMS-T-00014405-A.1



INTERVAL

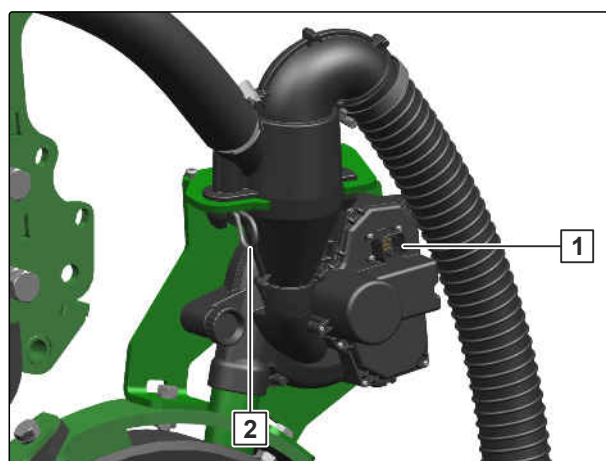
- At the end of the season



REQUIREMENTS

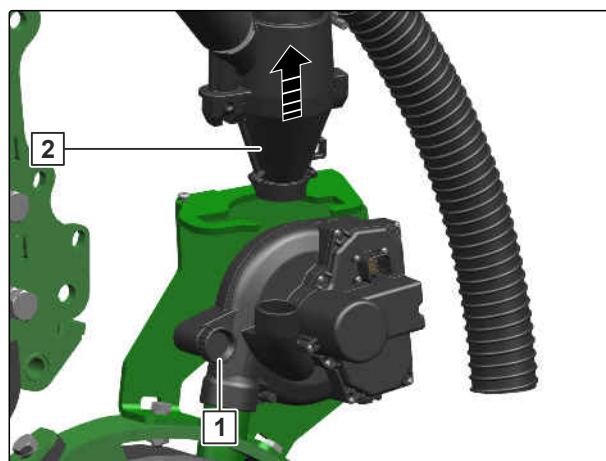
- ✓ The implement is coupled to the tractor
- ✓ The fan is switched off
- ✓ The filling auger is switched off

1. Disconnect the energy supply from the metering unit housing **1**.
2. Remove the cotter pin **2**.



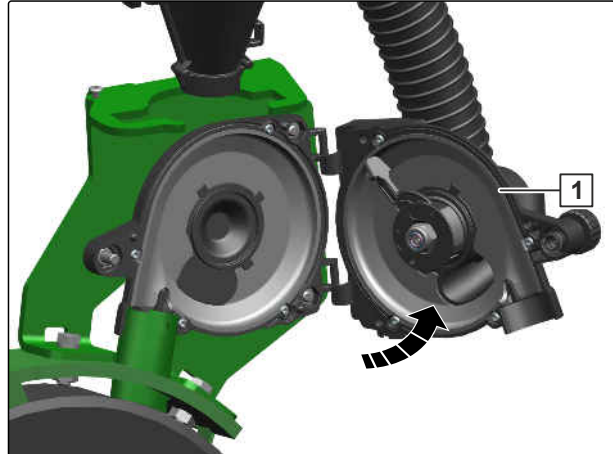
CMS-I-00009105

3. Remove the air separator **2**.
4. Loosen the knurled nut **1**.



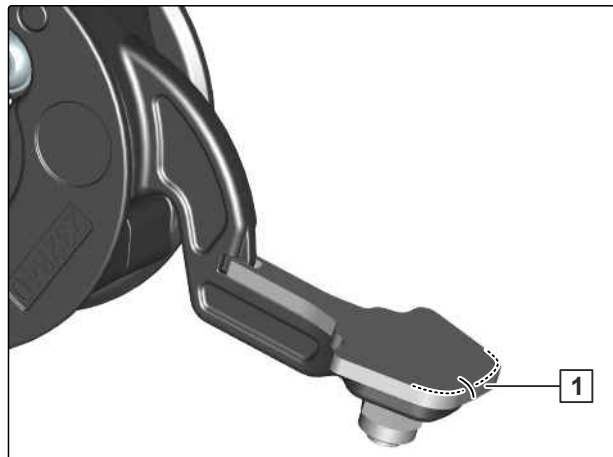
CMS-I-00009104

5. Open the cover **1** of the metering unit housing.



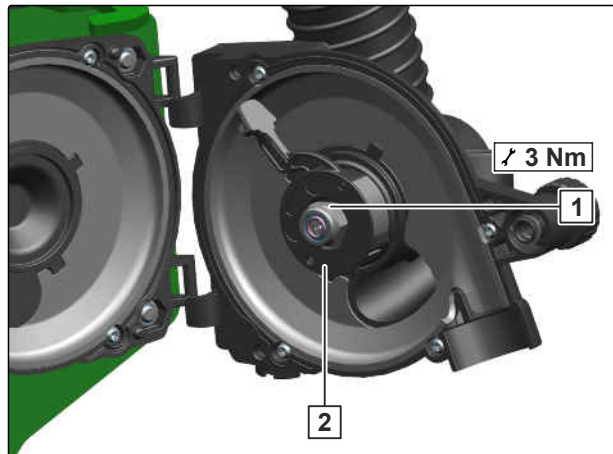
CMS-I-00009103

6. *If the sheet metal edge on the conveyor rotor **1** has taken on the shape of radius:*
Replace the conveyor rotor as follows.



CMS-I-00009397

7. Remove the nut **1**.
8. Replace the rotor **2**.
9. Put on the nut.
10. Close the cover of the metering unit housing.
11. Tighten the knurled nut.
12. Install the air separator.
13. Install the cotter pin.
14. Establish the energy supply.



CMS-I-00009405

10.1.30 Cleaning the distributor head

CMS-T-00005594-C.1



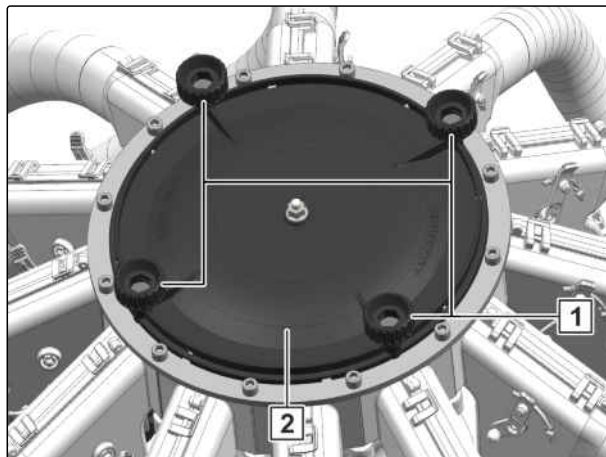
INTERVAL

- At the end of the season



WORKSHOP WORK

1. *To safely reach the distributor head:*
Use a suitable aid.
2. Loosen the knurled screws **1**.
3. Remove the cover **2**.

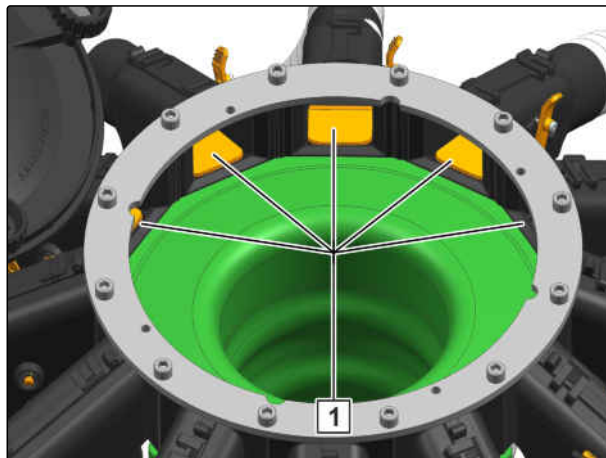


CMS-I-00003957



WORKSHOP WORK

4. Clean all of the outlets **1**.
5. Install the cover.
6. Tighten the knurled screws.



CMS-I-00003958

10.1.31 Cleaning the micropellet metering unit

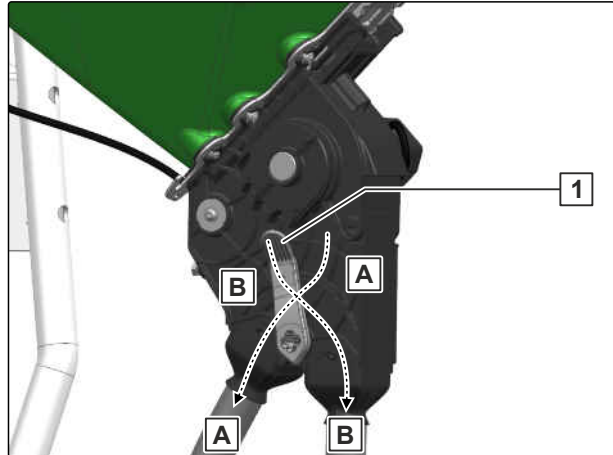
CMS-T-00003601-D.1



INTERVAL

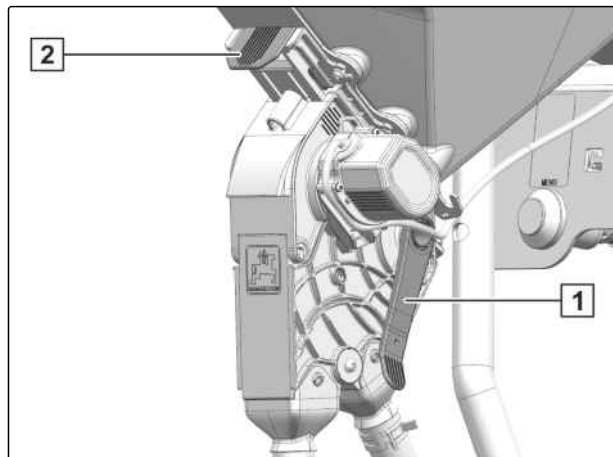
- Every 10 operating hours
or
Daily

1. Move the switchover flap **1** to position **A**.



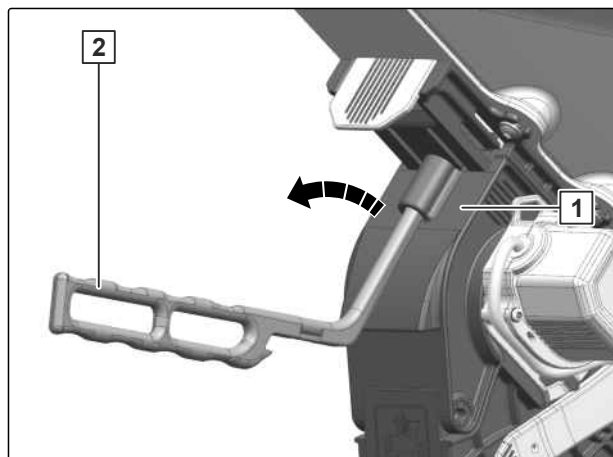
CMS-I-00002580

2. Close the sliding shutter **2** on the micropellet hopper.
3. Relieve the bottom flap lever **1**.



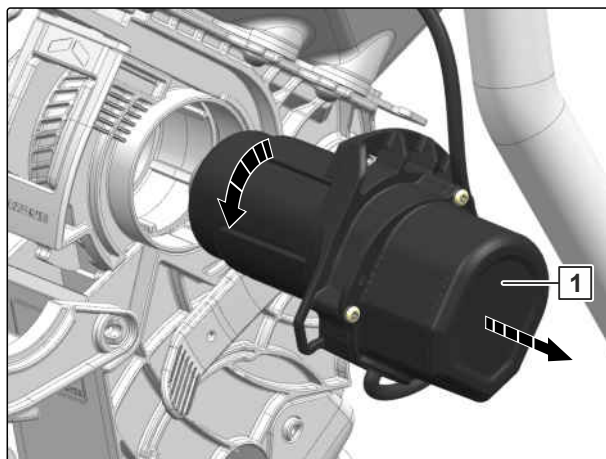
CMS-I-00002576

4. Insert the unlocking tool **2** into the metering unit cover **1**.
5. Unlock the metering unit cover on the metering housing **3**.
6. Open the metering unit cover.



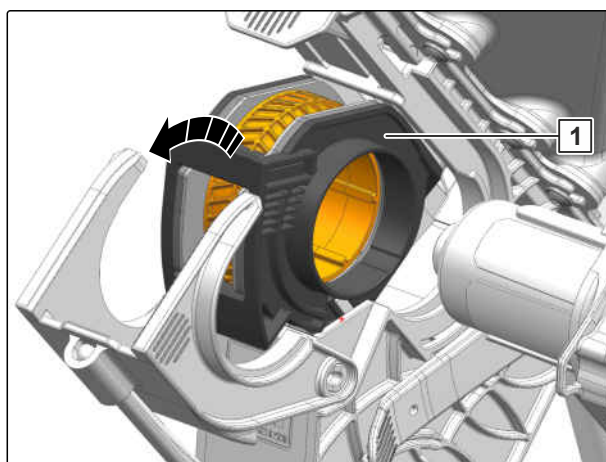
CMS-I-00002582

7. Turn the drive unit **1** counterclockwise.
8. Pull the drive unit out of the metering housing.



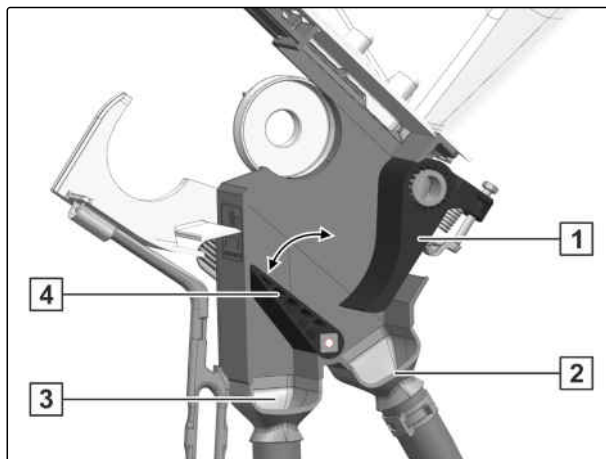
CMS-I-00002585

9. Take the roller cage **1** along with the metering roller out of the metering housing.



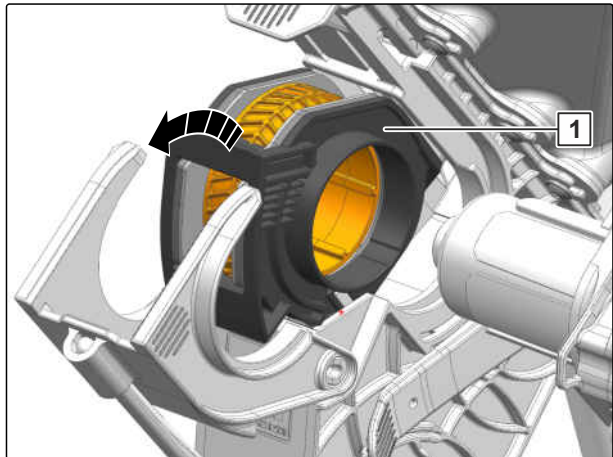
CMS-I-00002584

10. Clean the metering housing
11. Actuate the switchover flap **4** several times.
12. Actuate the bottom flap lever **1** several times.
13. Clean the outlets **2** and **3**.



CMS-I-00002577

14. Insert the roller cage **1** along with the metering roller into the metering housing.



CMS-I-00002584

15. Insert the drive unit **1** into the metering roller.

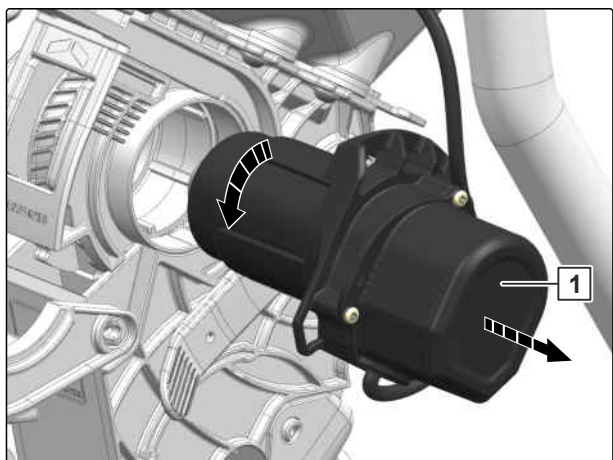
16. Rotate the drive unit clockwise.

17. Close the metering unit cover.

➔ The locking mechanism engages.

18. Set the sliding shutter to the top position.

19. Move the bottom flap lever to the working position.



CMS-I-00002585

10.1.32 Adjusting the micropellet metering unit bottom flap

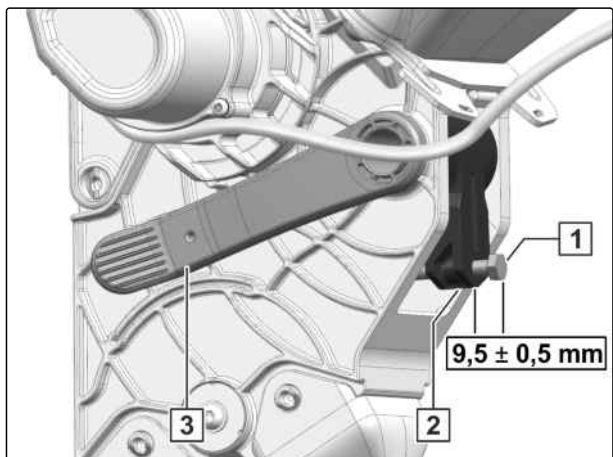
CMS-T-00003602-A.1



INTERVAL

- Every 100 operating hours
or
Every 12 months

1. Move the bottom flap lever **3** into working position.
2. *To adjust the pre-tension,*
the bolt head **1** should be 9 -10 mm above the clamping lever **2**.



CMS-I-00002581

10.1.33 Clean the singling unit

CMS-T-00003718-C.1



INTERVAL

- Every 10 operating hours
or
Daily

Keep the singling unit head free of dust, deposits, and foreign objects.



NOTE

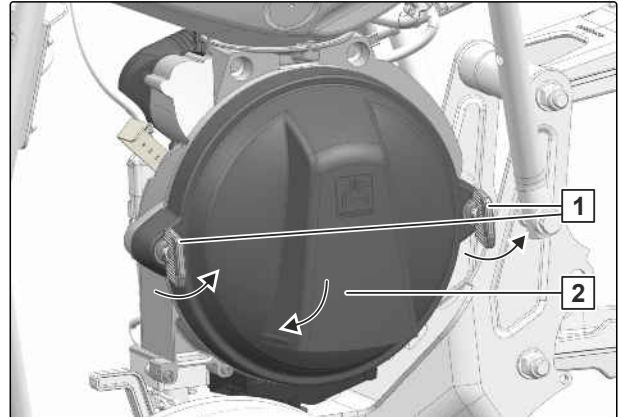
Under very dusty operating conditions, the inspection interval must be shortened.



WARNING

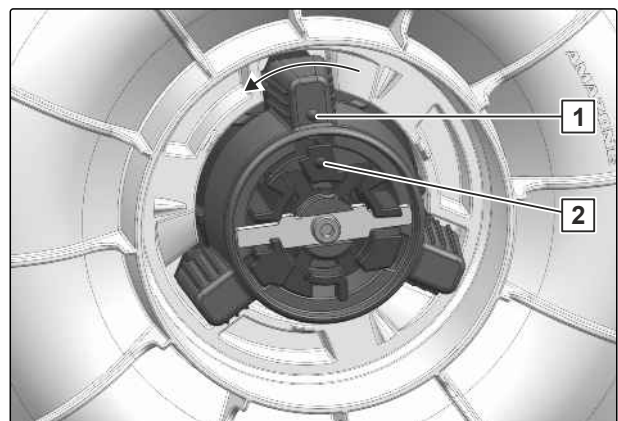
Risk of chemical burns by dressing dust

- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.



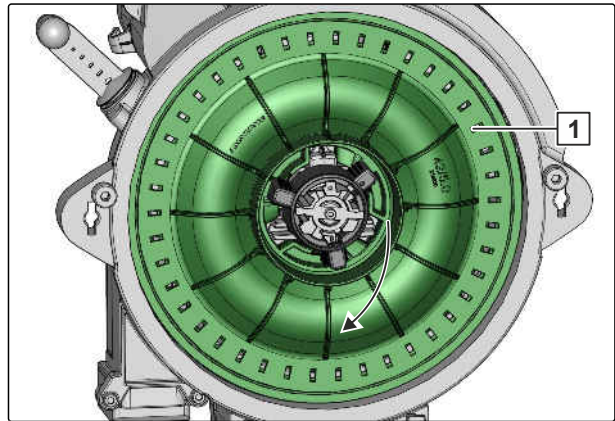
CMS-I-00001909

1. Open the locks **1**.
2. Remove the cover **2**.
3. Clean the inside of the cover with a brush.
4. Release the lock **1** until the points **2** are aligned.



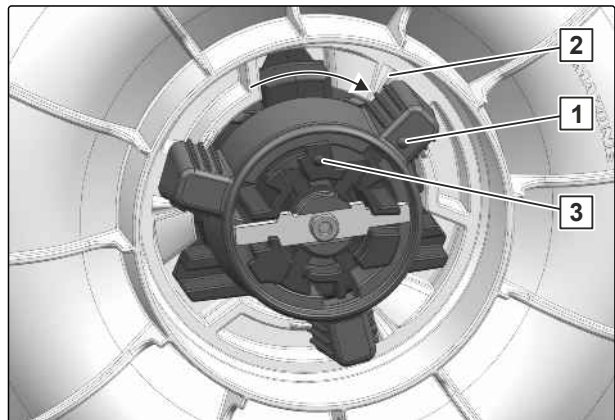
CMS-I-00001910

5. remove the singling disc **1** from the drive hub.
6. Clean the singling unit housing.
7. Install the singling disc.



CMS-I-00001912

8. Turn the lock beyond the notch **2**.
- ➔ The points **1** and **3** are no longer aligned.



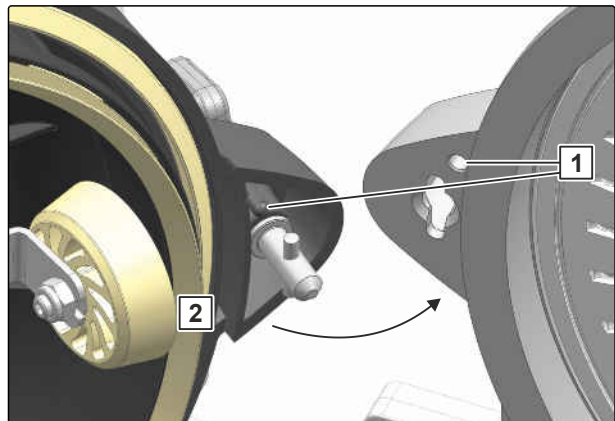
CMS-I-00001911

9. Close the cover **2**.

NOTE

Pay attention to the guide pin **1**.

10. Close the locks.



CMS-I-00001913

10.1.34 Cleaning the opto-sensor

CMS-T-00002393-E.1



INTERVAL

- Every 50 operating hours
or
As required

1. Disconnect the ISOBUS connection to the tractor.

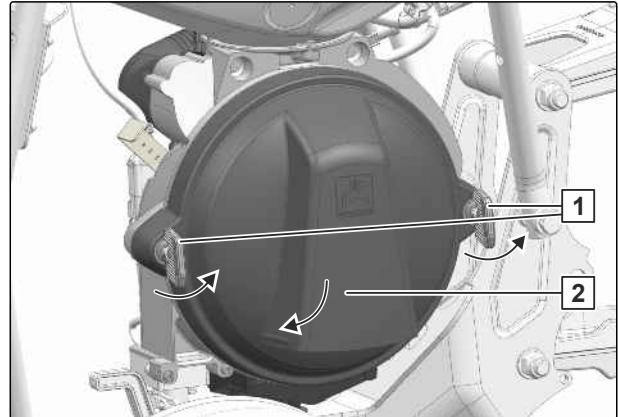


WARNING Risk of chemical burns by dressing dust

- Before working with hazardous materials, put on the protective clothing recommended by the manufacturer.

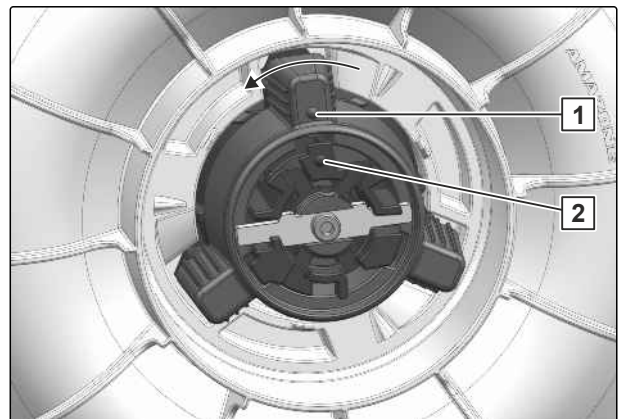
2. Open the locks **1**.

3. Remove the cover **2**.



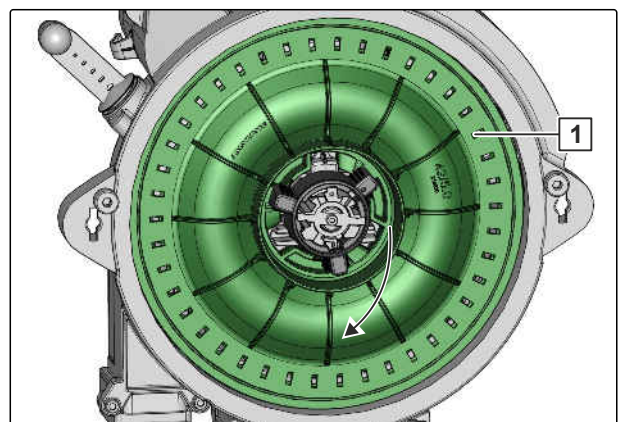
CMS-I-00001909

4. Release the lock **1** until the points **2** are aligned.



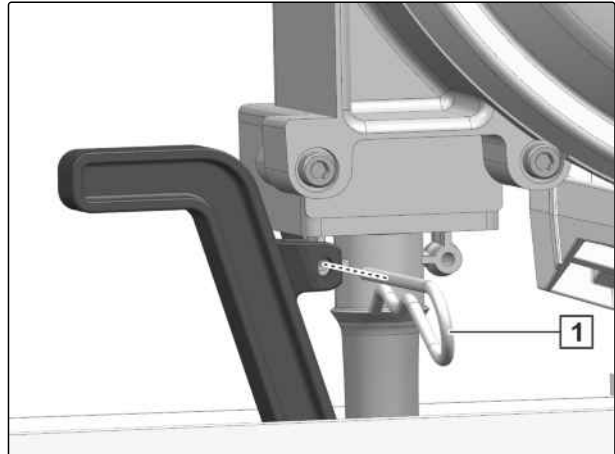
CMS-I-00001910

5. remove the singling disc **1** from the drive hub.



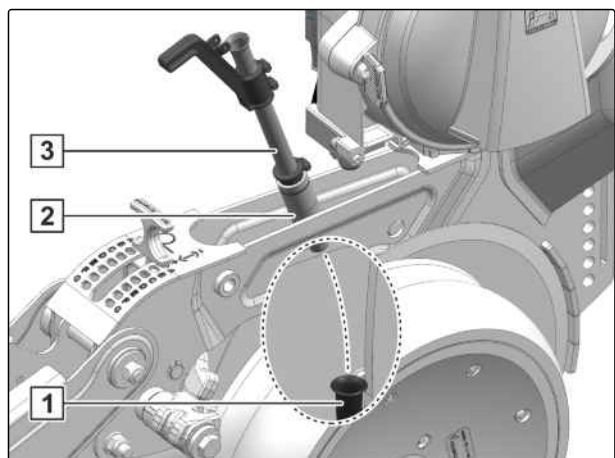
CMS-I-00001912

6. *To clean the opto-sensor, use tap water with dishwashing detergent.*
Loosen contamination with the supplied brush for 1 minute
7. Rinse the opto-sensor with clear fresh water.
8. Install the singling disc.
9. Install the cover.
10. *To remove stubborn contamination, remove the opto-sensor.*
Remove the spring cotter pin **1**.



CMS-I-00003814

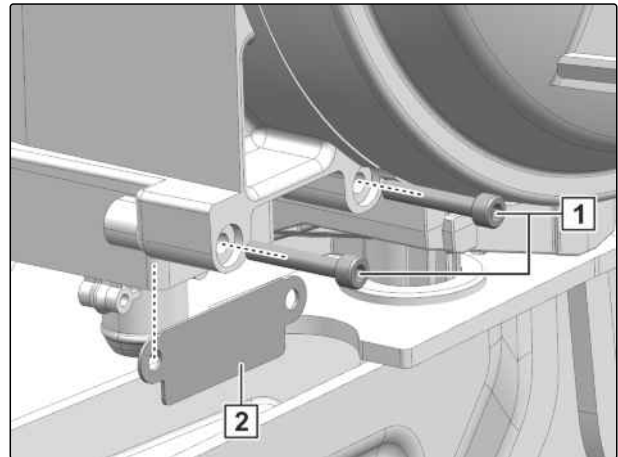
11. Press the shot channel **3** against the gasket **2** in the funnel **1**.
12. Swivel the shot channel away from the opto-sensor and pull it up.



CMS-I-00003815

13. Remove the bolts **1**.

14. Remove the spacer plate **2**.

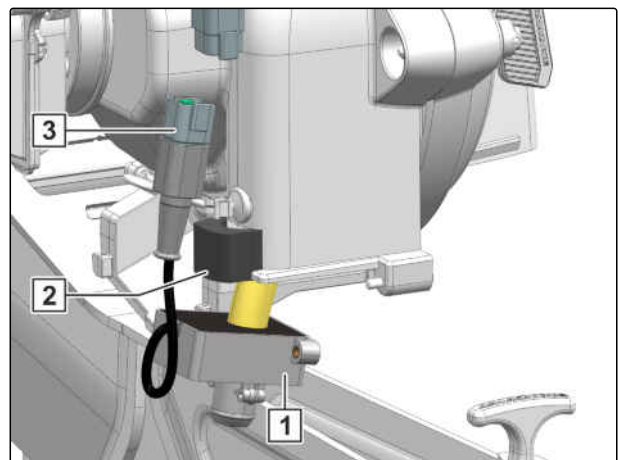


CMS-I-00003816

15. Disconnect the plug connection **3**.

16. Move the opto-sensor **1** down.

17. Remove the gasket **2**.



CMS-I-00003817



IMPORTANT

Damage to the opto-sensor due to cleaning

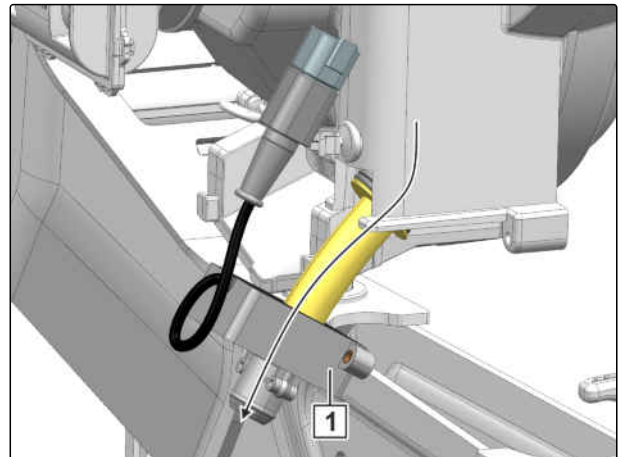
- ▶ To avoid damage to the sensors, only clean the opto-sensor with the supplied brush.
- ▶ To avoid damage to the electronics, never immerse the plug connector in liquids when it is unplugged.

18. Remove the opto-sensor **1**.

19. Soak the opto-sensor for 1 minute.

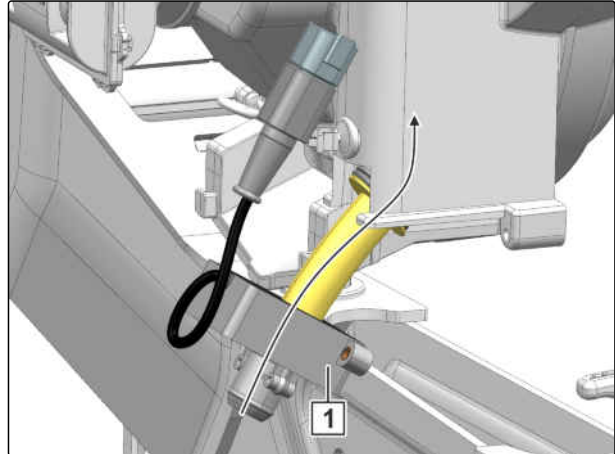
20. Clean the opto-sensor with the supplied brush.

21. Rinse the opto-sensor with clear fresh water.



CMS-I-00002827

22. Insert the opto-sensor **1**.

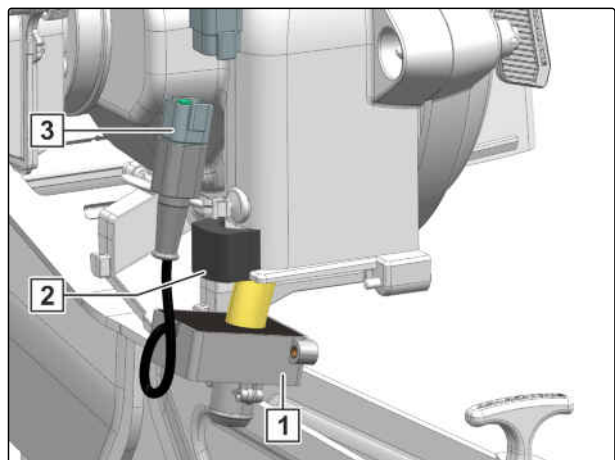


CMS-I-00002826

23. Move the opto-sensor **1** up.

24. Put on the gasket **2**.

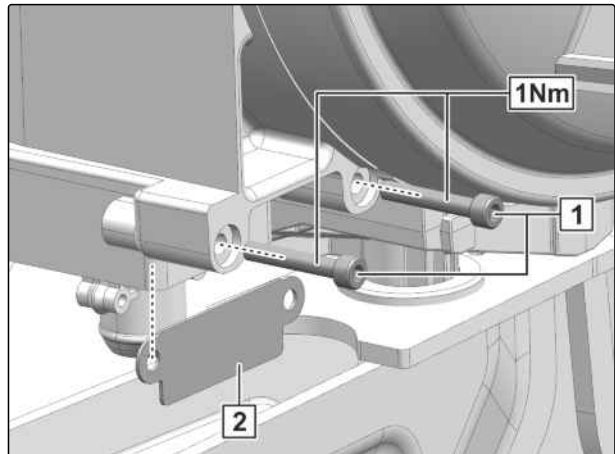
25. Establish the plug connection **3**.



CMS-I-00003817

26. Install the spacer plate **2**.

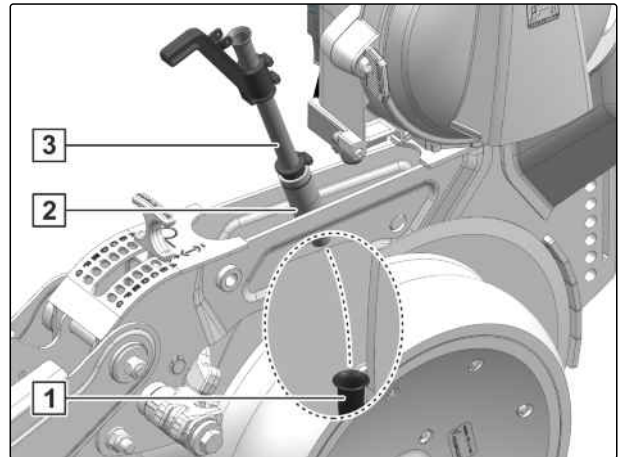
27. Install the bolts **1**.



CMS-I-00003818

28. Press the shot channel **3** against the gasket **2** in the funnel **1**.

29. Swivel the shot channel under the opto-sensor.

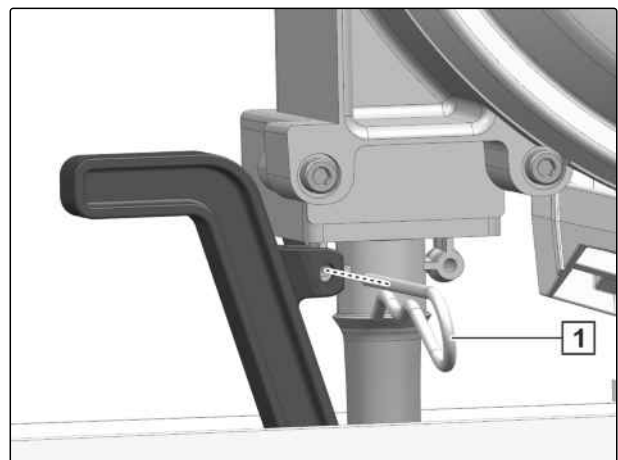


CMS-I-00003815

30. Install the shot channel with the spring cotter pin **1**.

31. Establish the ISOBUS connection to the tractor.

32. Restart the implement.



CMS-I-00003814

10.1.35 Checking the wheel mark eradicator coulter

CMS-T-00002497-E.1



INTERVAL

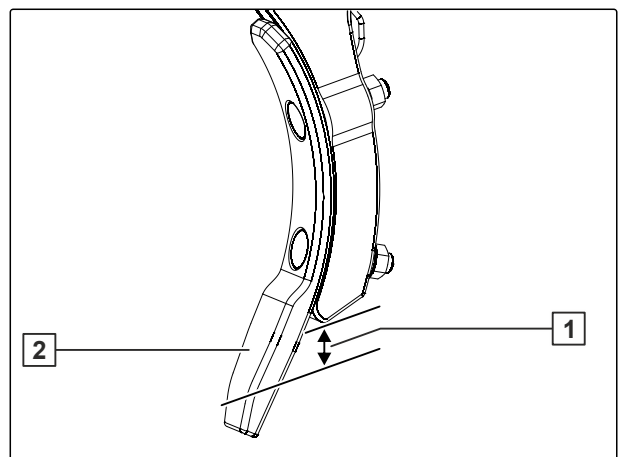
- Every 50 operating hours
or
Every 3 months



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.



CMS-I-00001081

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 section "Changing the wheel mark eradicator coulter".*

10.2 Lubricating the machine

CMS-T-00002349-E.1



IMPORTANT

Implement damage due to improper lubrication

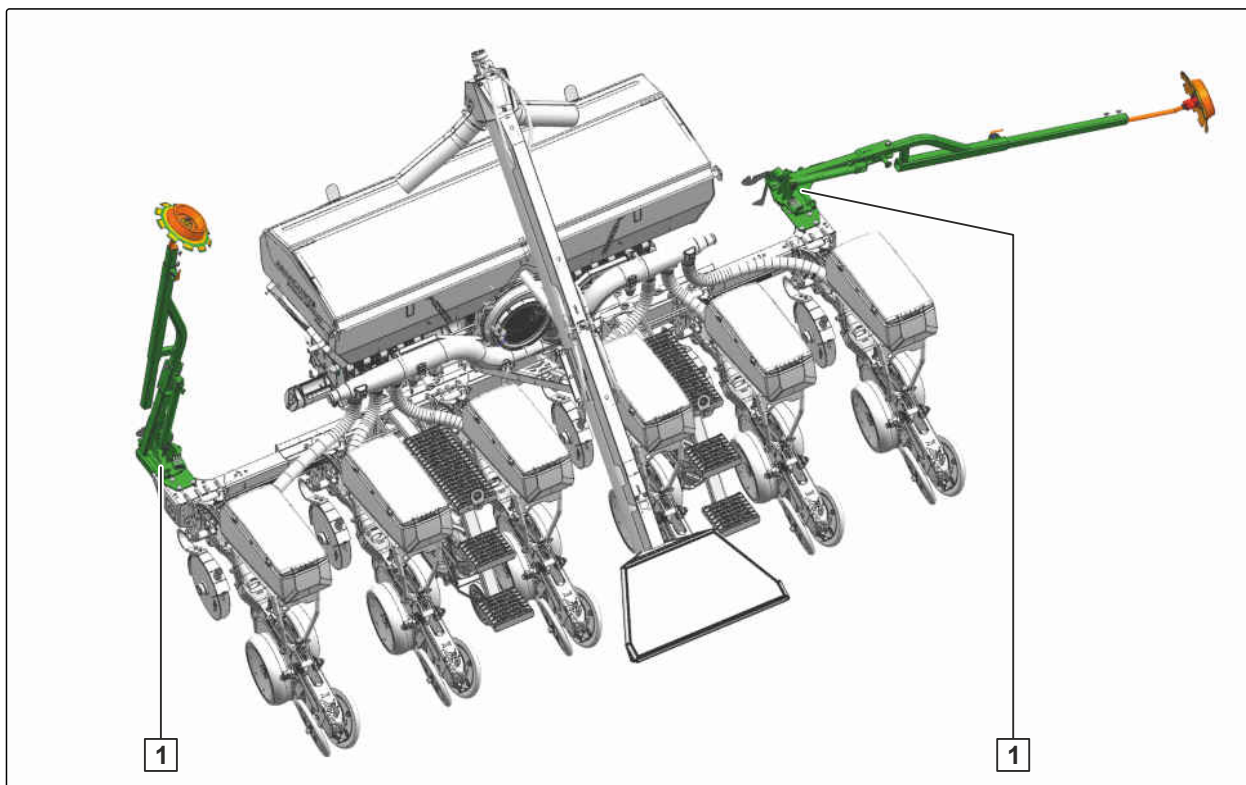
- ▶ Grease the implement at the marked lubrication points according to the lubrication schedule.
- ▶ *To ensure that dirt is not pressed into the lubrication points,* thoroughly clean the grease nipples and the grease gun.
- ▶ Only grease the implement with the lubricants listed in the technical data.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



CMS-I-00002270

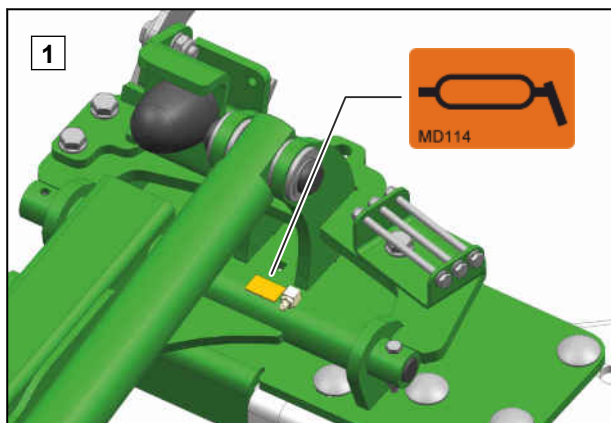
10.2.1 Overview of lubrication points

CMS-T-00002350-B.1



CMS-I-00002082

Every 50 operating hours



CMS-I-00002080

10.3 Lubricating the roller chains

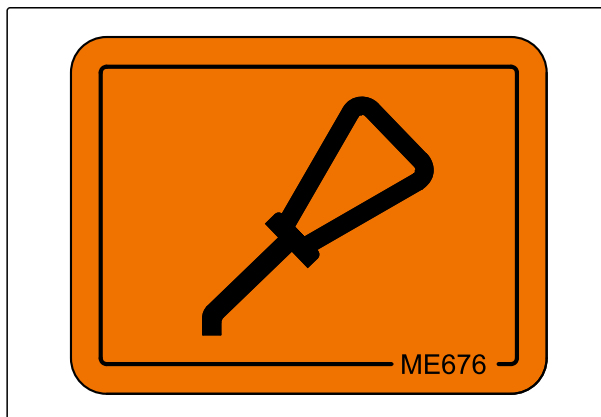
CMS-T-00007653-A.1



IMPORTANT

Implement damage due to improper lubrication

- ▶ Grease the implement at the marked lubrication points according to the lubrication schedule.
- ▶ Before lubrication, clean the chain with only a penetrating oil and a brush.
- ▶ Only grease the implement with the lubricants listed in the technical data.
- ▶ Do not let the lubricants drip off of the chain.



CMS-I-00001879

10.3.1 Lubricating the roller chain in the leading wheel drive

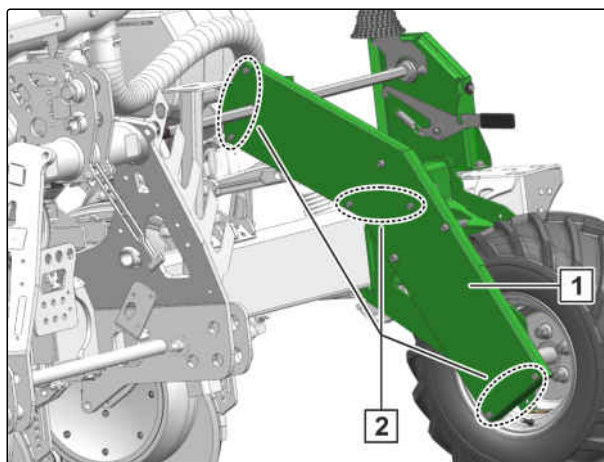
CMS-T-00005448-B.1



INTERVAL

- After the first 10 operating hours
 - Every 50 operating hours
- or
- At the end of the season

1. Remove the bolts **2**.
2. Push the cover **1** to the side.
3. Swivel up the cover.

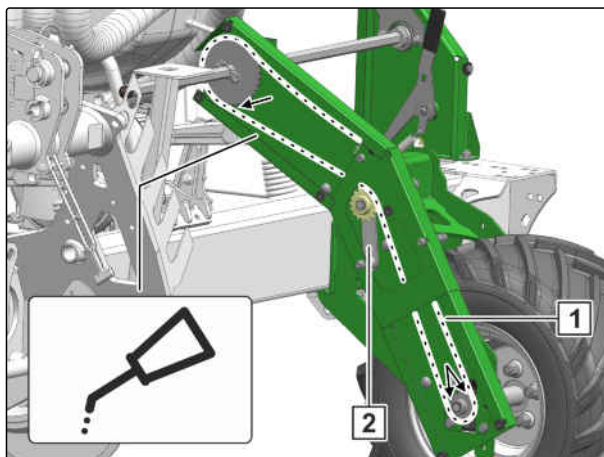


CMS-I-00002646

10 | Repairing the machine

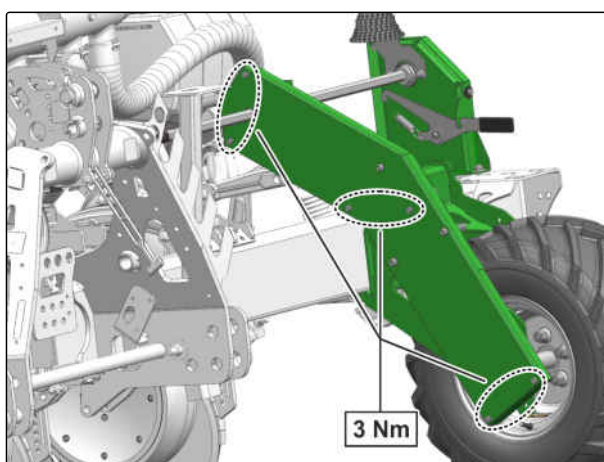
Lubricating the roller chains

4. Lubricate the roller chain **1** from the inside going out.
5. Check chain tensioner **2** for ease of movement.



CMS-I-00003884

6. Install the cover.
7. Install the bolts and washers.



CMS-I-00002645

10.3.2 Lubricating the roller chain in the interchangeable wheel gear

CMS-T-00005449-B.1

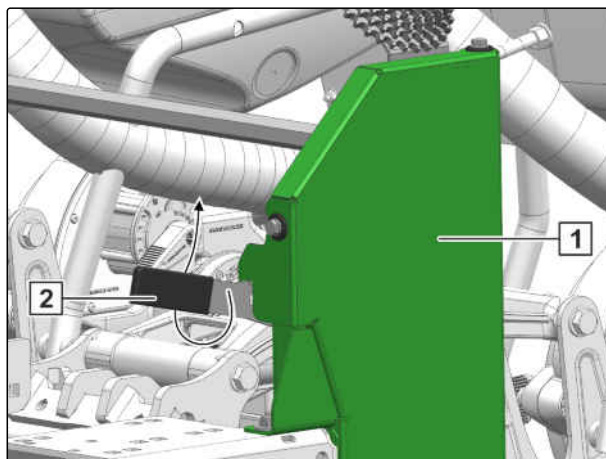


INTERVAL

- After the first 10 operating hours
- Every 50 operating hours
- or
- At the end of the season

1. Release the lever **2** and swivel it up.

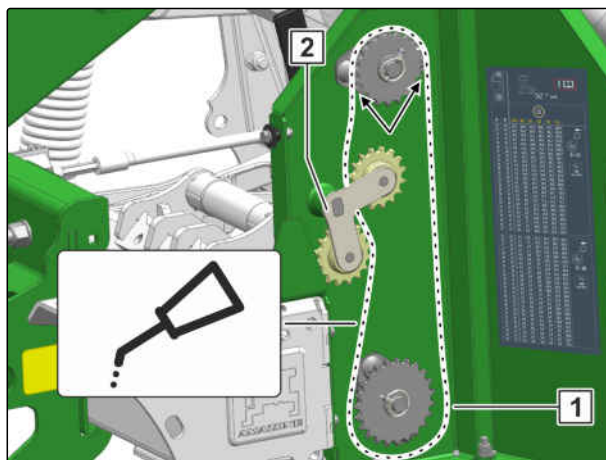
➔ The cover **1** opens automatically.



CMS-I-00002656

2. Lubricate the roller chain **1** from the inside going out.

3. Check chain tensioner **2** for ease of movement.

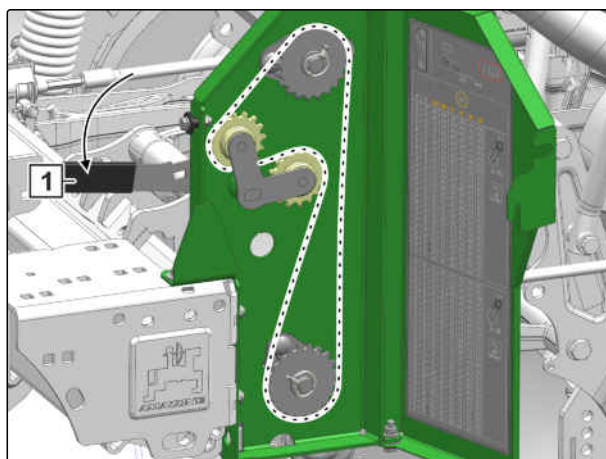


CMS-I-00003885

4. Actuate the lever **1**.

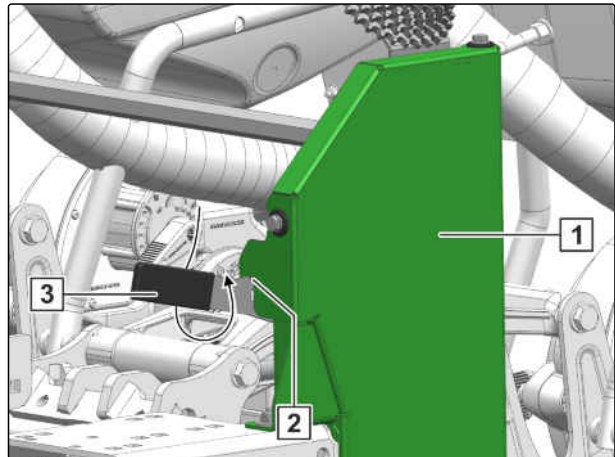
➔ The drive chain will be tightened.

5. Hold the lever.



CMS-I-00002651

6. Close the cover **1** against the spring pressure.
 7. *To lock the cover,*
Continue actuating the lever **3**.
- ➔ The cover will be locked on the chain tensioner **2**.



CMS-I-00002647

10.3.3 Lubricating the roller chain in the trailing wheel drive

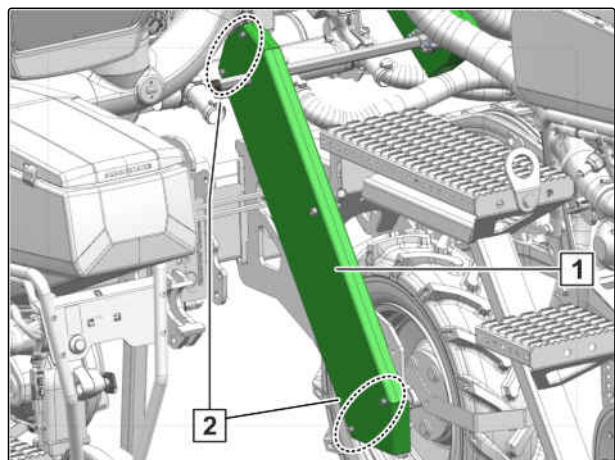
CMS-T-00005450-B.1



INTERVAL

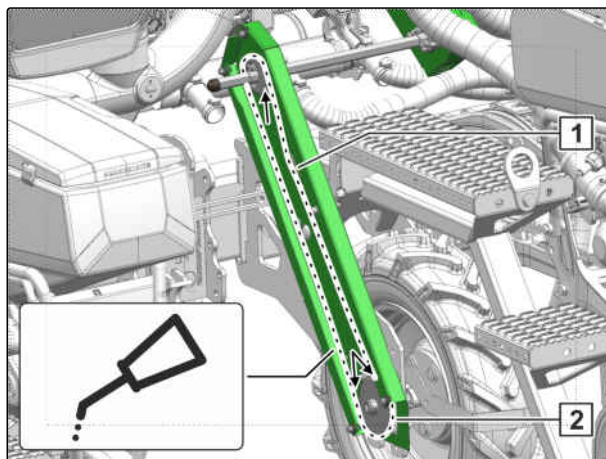
- After the first 10 operating hours
 - Every 50 operating hours
- or
- At the end of the season

1. Remove the bolts **2**.
2. Remove the cover **1**.



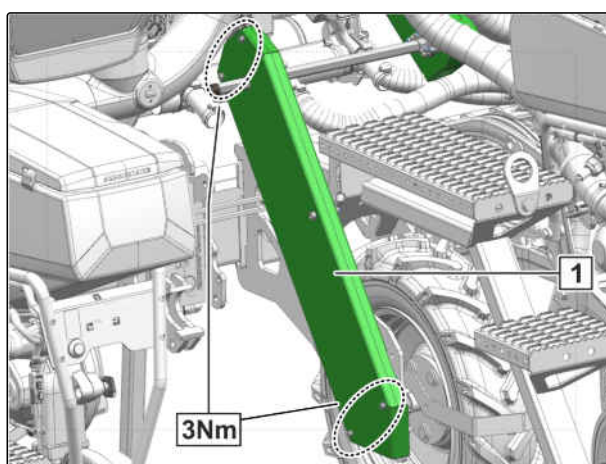
CMS-I-00002721

3. Lubricate the roller chain **2** from the inside going out.
4. Check chain tensioner **1** for ease of movement.



CMS-I-00003887

5. Install the cover.
6. Install the bolts and washers.



CMS-I-00002720

10.3.4 Lubricating the roller chain on the mechanical metering drive

CMS-T-00005877-B.1

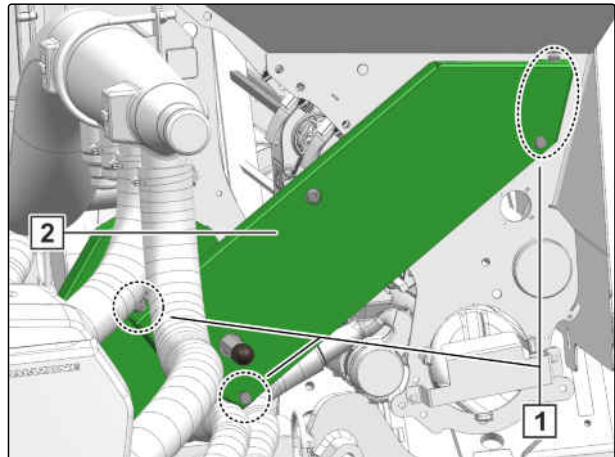


INTERVAL

- After the first 10 operating hours
 - Every 50 operating hours
- or
- At the end of the season

1. Remove the bolts **1**.

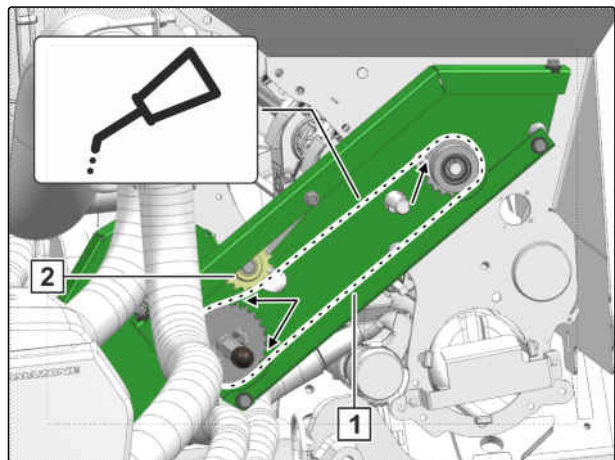
2. Remove the cover **2**.



CMS-I-00002724

3. Lubricate the roller chain **1** from the inside going out.

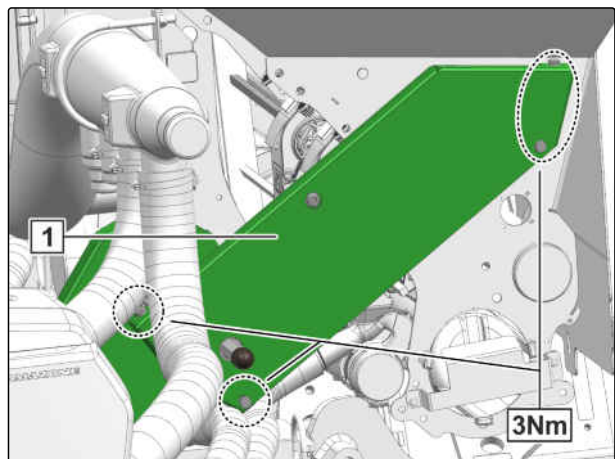
4. Check chain tensioner **2** for ease of movement.



CMS-I-00003886

5. Install the cover **1**.

6. Install the bolts.



CMS-I-00002723

10.3.5 Lubricating the roller chain on the central fertiliser metering drive

CMS-T-00005451-B.1



INTERVAL

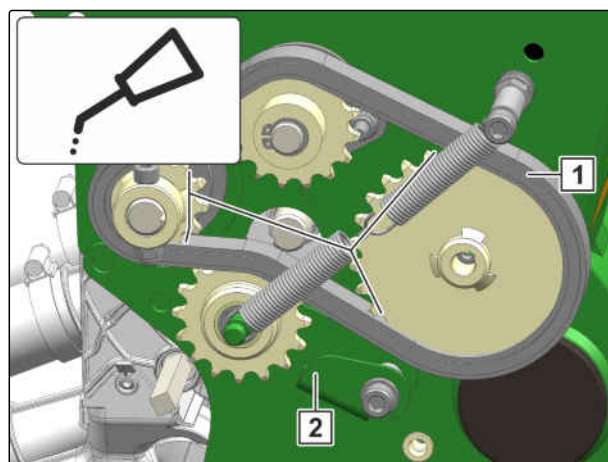
- After the first 10 operating hours
- Every 50 operating hours
- or
- At the end of the season

1. Remove the bolts **1**.
2. Remove the cover **2**.



CMS-I-00004157

3. Lubricate the roller chain **1** from the inside going out.
4. Check chain tensioner **2** for ease of movement.
5. Install the cover.
6. Install the bolts.



CMS-I-00004156

10.3.6 Lubricating the roller chain on the electric agitator shaft drive

CMS-T-00007652-A.1



INTERVAL

- After the first 10 operating hours
- Every 50 operating hours
- or
- At the end of the season

1. Remove the bolts **1**.

2. Remove the cover **2**.



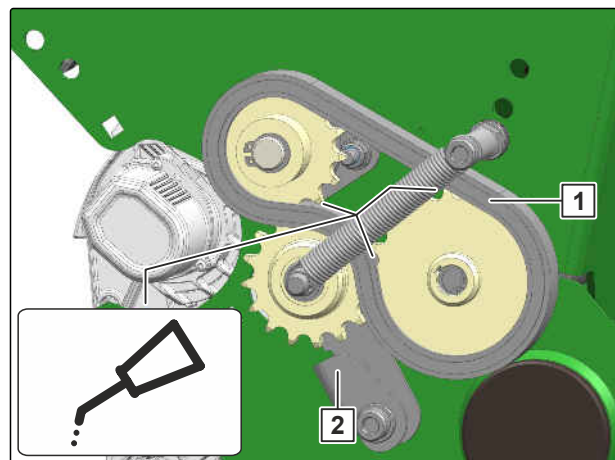
CMS-I-00004157

3. Lubricate the roller chain **1** from the inside going out.

4. Check chain tensioner **2** for ease of movement.

5. Install the cover.

6. Install the bolts.



CMS-I-00005365

10.4 Cleaning the implement

CMS-T-00000593-F.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.
-
- ▶ Clean the machine with a high-pressure cleaner or a hot water high-pressure cleaner.



CMS-I-00002692

Loading the implement

11

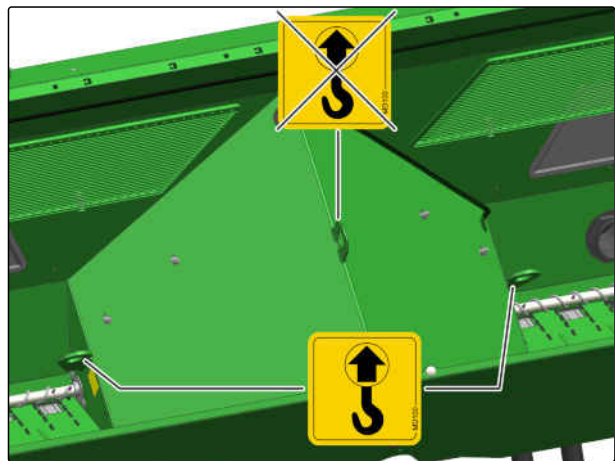
CMS-T-00001762-E.1

11.1 Loading the implement with a crane

CMS-T-00001839-D.1

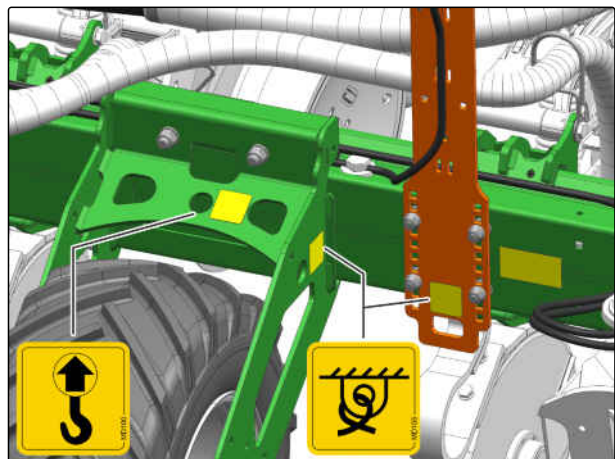
The implement has lashing points for slings.

For implements with fertiliser hopper, the lashing points are in the fertiliser hopper.



CMS-I-00004146

For implements without fertiliser hopper, the lashing points are on the swing arms.



CMS-I-00004150

The implement has lashing points for slings.

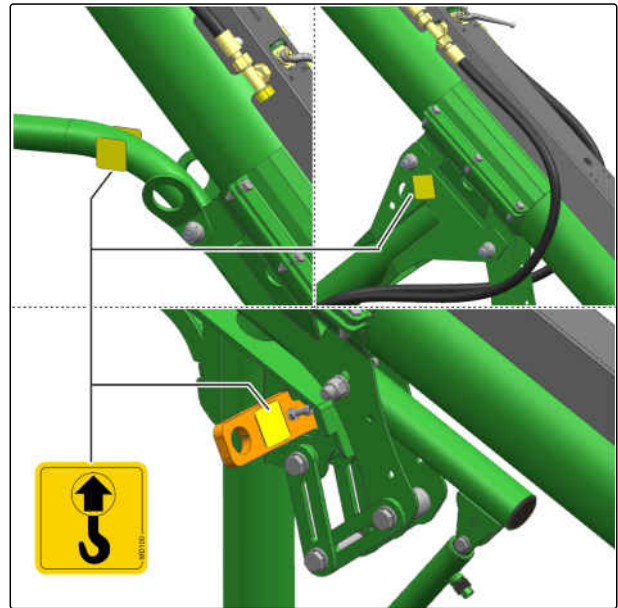


WARNING

Risk of accidents due to improperly attached slings for lifting

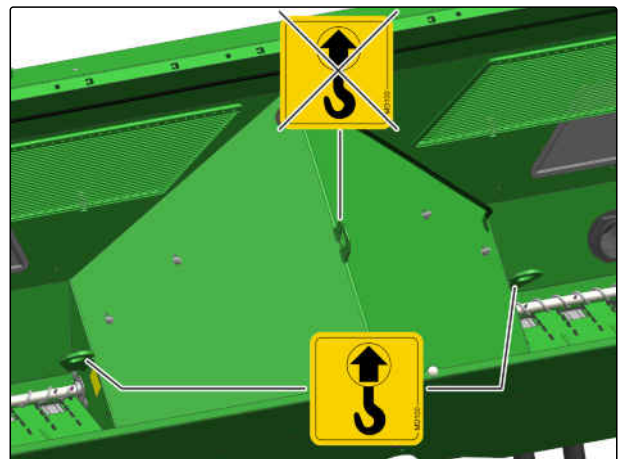
If the slings are not attached at the marked lashing points, the implement can be damaged during lifting and endanger safety.

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



CMS-I-00004148

Improperly attached lifting gear in the fertiliser hopper.

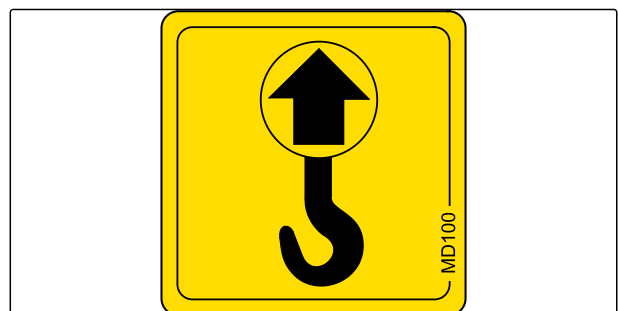


CMS-I-00004146



REQUIREMENTS

- ☑ Implement is in transport position
1. Attach the slings for lifting on the intended lashing points.
 2. Slowly lift the implement.

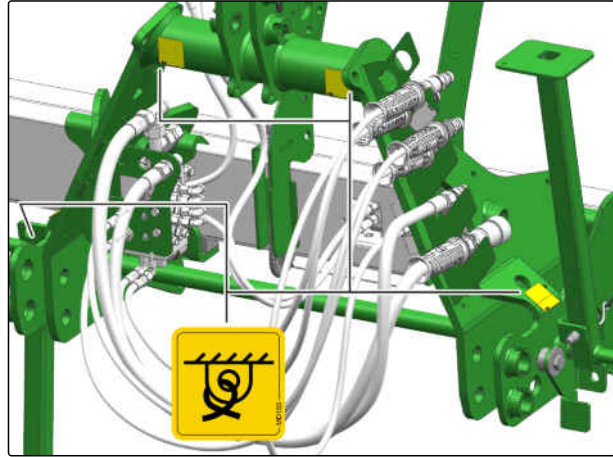


CMS-I-000089

11.2 Lashing the implement

CMS-T-00002196-D.1

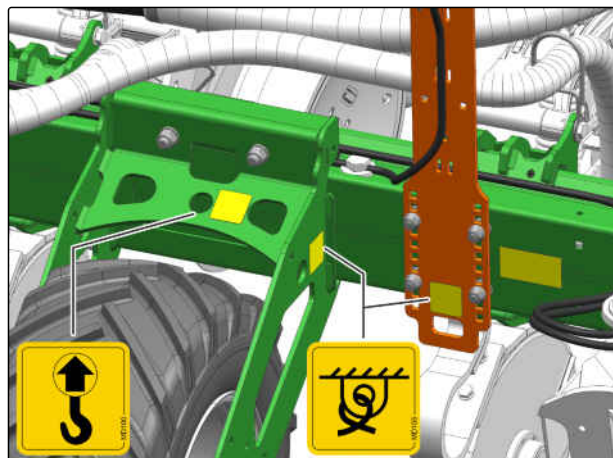
The implement has lashing points for securing the load.



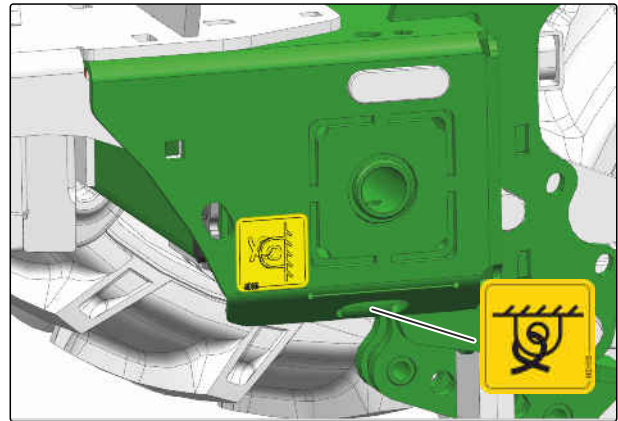
CMS-I-00004145



CMS-I-00002006



CMS-I-00004150

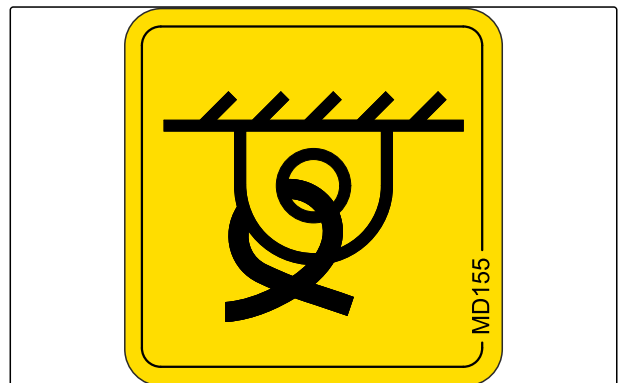


CMS-I-00002074



REQUIREMENTS

- ☑ Implement is folded
- 1. Only attach the lifting gear at the marked positions.
- 2. Secure the implement in accordance with the regulations to the transport vehicle.



CMS-I-00000450

Disposing of the implement

12

CMS-T-00010906-B.1

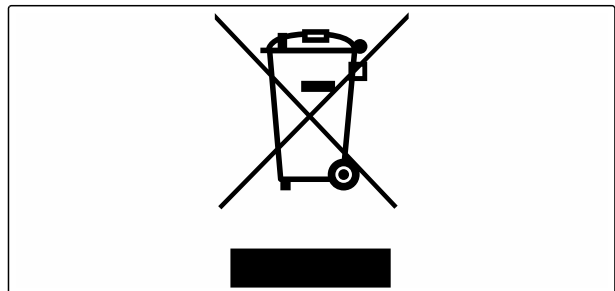


ENVIRONMENTAL INFORMATION

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.

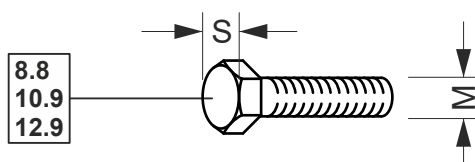
Appendix

13

CMS-T-00001755-F.1

13.1 Bolt tightening torques

CMS-T-00000373-E.1



CMS-I-000260

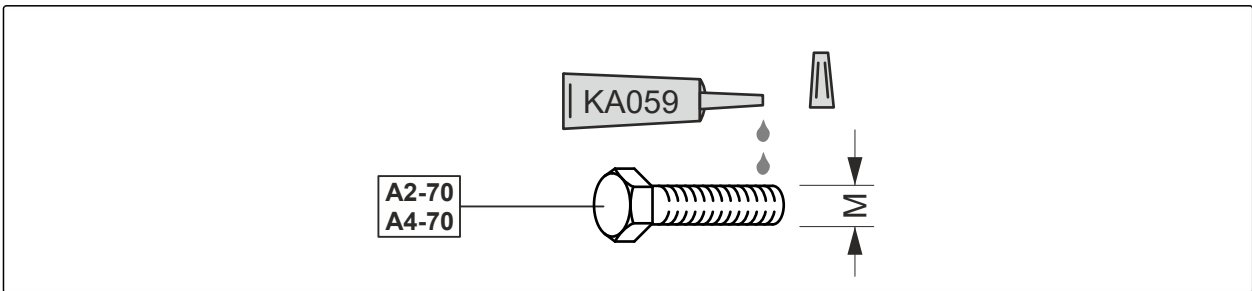


NOTE

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

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

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



CMS-I-00000065

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

13.2 Other applicable documents

CMS-T-00001756-C.1

- Tractor operating manual
- ISOBUS software operating manual
- Control terminal operating manual

Directories

14

14.1 Glossary

CMS-T-00000513-B.1

M

Machine

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

O

Operating materials

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

T

Tractor

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

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