

PP1001

Operating manual

Original operator's manual

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Model	Rigid
Reference number	A156307840

Machine identification

Operating manual valid from machine number	PP1001	ACKPPxx444

In order for your dealer to assist you as efficiently as possible, you will need to provide some information about your machine. Please enter the details here:

Designation	PP1001
Operating width	
Weight	
Machine number	
Accessories	
Address of supplier	
Address of the manufacturer	Kverneland Group Soest GmbH Coesterweg 42 D-59494 Soest Germany Tel. +49 (0) 2921/974-0

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Target group

This operating manual is intended for trained farmers and individuals who are otherwise qualified to perform agricultural activities and who have received instruction in the operation of this machine.

Safety

Study the contents of this operating manual carefully, which are relevant for your activity, before initial operation or assembly of the machine. Always read through the safety instructions in the chapter “Safety” and observe the warning information in the individual chapters. You will obtain optimal operating results and will also be working more safely.

For the employer

Inform all persons who work with the machine about this safety instruction at regular intervals and in accordance with statutory regulations. Untrained or unauthorised persons must not be allowed to use the machine.

The following are included in this training:

- Checking that staff possess the necessary requirements for safely handling the machine
- Handing out the operating manual and the other relevant and applicable documents or an intensive course of training which, in particular, includes the safe handling of the machine

Regular instruction sessions

Instruct your staff regularly, but at least once year, concerning the basic procedural measures for safely handling the machine.

Instruction

You will receive training from your dealer concerning using the controls, safe operation and care of the machine. Initial operation without first receiving training is not permitted.

Other applicable documents

The EC Conformity Declaration	Integral part of this operating manual → Chapter »Original EC Declaration of Conformity«, page246
Spare parts list	Available via https://www.kvgportal.com/publicquest/
Operating manual of the PTO shaft manufacturer	Integral part of the delivery with this machine
Operating manual for the micro-drill [+]	Integral part of the delivery with this machine
Operating manual for the electronic control system [+]	For example, e-drive II
Operating manual for the terminal [+]	For example, IsoMatch Tellus

Symbols

In order to make this manual clear and easy to read, we have used various symbols. They are explained below:

- A bullet point stands next to enumerations

▸ A triangle is located before activities which you should undertake

→ An arrow indicates cross-references to other text passages

[+] A plus sign indicates an accessory that is not included in the standard version.

Pictograms

We also use pictograms which will help you in finding text passages:



The warning triangle indicates warning information. Failure to observe these safety instructions can result in:

- Moderate to serious injury
- Fatal injury

You will find the warning information associated with individual operations, where it is important to observe the warning information before these operations are carried out.
In the »Safety« chapter, you will also find safety instructions which are not related to individual operations, but rather are designed to encourage safety-conscious behaviour in various situations.



This sign indicates important instructions regarding the machine. Failure to observe these safety instructions can result in:

- Serious faults in the correct operation of the machine
- Damage to the machine



This symbol indicates information, tips and notes on operation.



This symbol indicates tips for assembling or setting up work.



This symbol indicates examples that assist a better understanding of the instructions.

Parts in the text which refer to individual machines or to conditions have a coloured background. After the coloured section, the text then again applies to all conditions and machines. For example:

Before folding out only

▸ Release the locking mechanism for transport

▸ Actuate the control unit



For your safety

This chapter contains general safety instructions. Each chapter of the operating manual contains additional specific safety instructions, which are not described here. Observe the safety instructions:

- In the interest of your own safety
- In the interest of the safety of others
- To ensure the safety of the machine

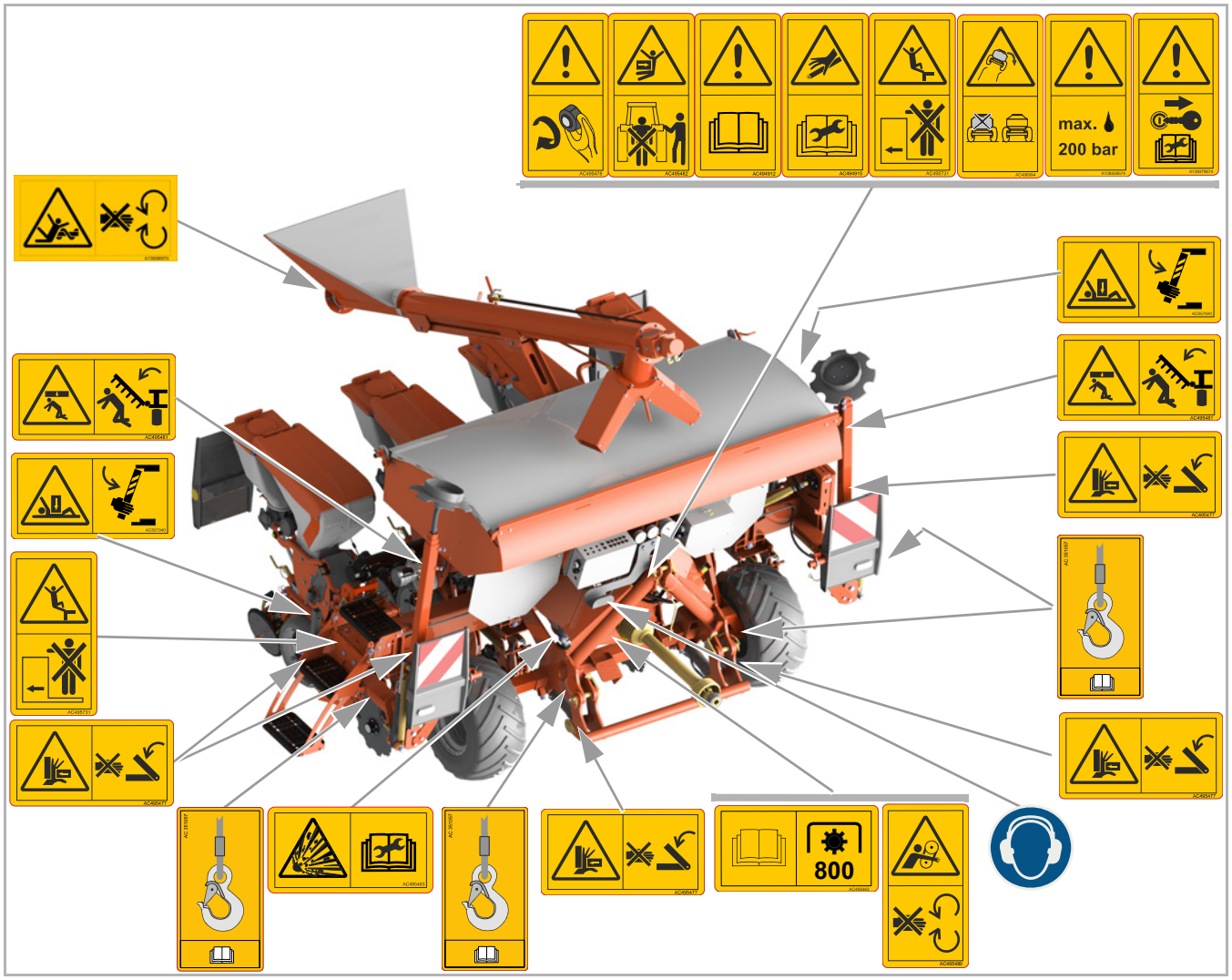
Numerous risks can result from handling agricultural machines in the wrong way. Therefore, always work with particular care and never under time pressure.

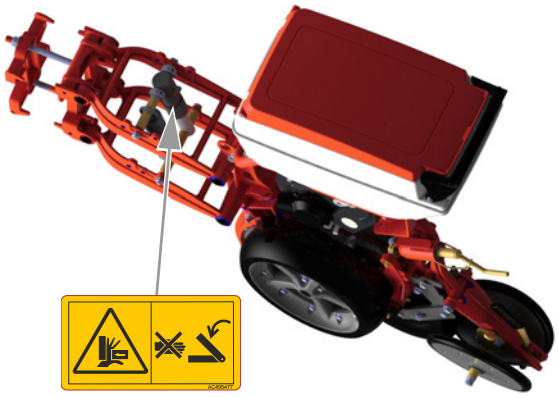
For the employer

Regularly provide the following information to all persons who work with the machine: The safety instructions and the statutory regulations.

Warning signs

On the machine you will find stickers that serve to ensure your safety. The stickers must not be removed. If stickers become illegible or begin to peel off, order new stickers and attach these in the appropriate places.
Hazard areas, which are located on both sides of the machine, are marked with a warning sign only on one side of the machine in the images, as an example.


max.
200 bar
800



Meaning



Switch off the engine and remove the key
Before performing maintenance work or repairs, switch off the engine and remove the ignition key.
You can find further instructions in the operating manual.



Read the operating manual carefully and follow the instructions
Initial operation of the machine must not take place before the operating manual has been read and understood. This particularly applies to safety instructions.



Retightening bolts
After the first hours of operation, all bolts must be checked and tightened if necessary. Screw connections might have come loose due to vibrations.



Do not stand between the tractor and the machine
Standing between the tractor and the machine with the engine running is prohibited, especially during coupling and uncoupling. The tractor must be additionally immobilised.



Riding on the machine is strictly prohibited
Serious or fatal injury can result.



Caution in the event of leaking hydraulic fluid
Observe the corresponding safety instructions in the operating manual.



Do not remove the protective devices
The protective devices must not be removed or by-passed. Check all protective devices before starting the machine. Unprotected machine components can cause serious or fatal injury.



Do not drive on roads with filled seed hopper or fertiliser hopper
Road transport with filled seed hopper or fertiliser hopper is not permissible. Fill the seed hopper or fertiliser hopper fully on the field later. Road transport with filled seed hopper or fertiliser hopper can cause accidents.



Do not exceed the maximum hydraulic pressure
The hydraulic pressure on the tractor must not exceed 200 bar. Exceeding the 200 bar limit could damage the machine.



Lifting eye
Only lift the machine at the marked positions and using lifting devices or secure it to a transporter.



Risk of tipping
The machine or parts can tip over. Before entering the hazard area, attach supporting legs. To uncouple, use the supports provided and position the machine on firm ground.



Stay clear of the slewing range
There is serious risk of injury in the slewing range due to swivelling or folding machine components.



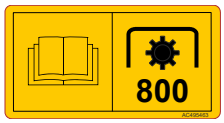
Do not reach into the drive shaft when it is turning
The protective devices must not be removed or by-passed. Check all protective devices before starting the machine. Unprotected machine components can cause serious or fatal injury.



Risk of explosion
The pressure accumulator contains pressurised gas and oil. Disassembly and repair work must only be carried out by qualified specialists.



Risk of crushing
Avoid hazard area. The space between components may become smaller or disappear completely.



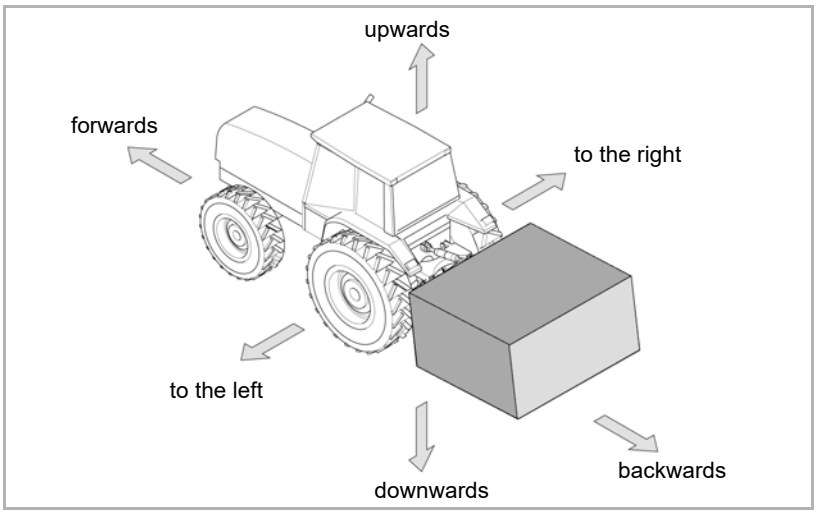
Checking the PTO speed
Connect the PTO shaft to a PTO with the rotational speed specified on the machine. Never exceed the maximum rotational speed. Always switch off the PTO stub shaft when working on the machine.



Wear ear protection
When the fan is running, there is a high level of noise. Excessively loud noise can result in hearing damage.

Definitions

For all direction information, the direction of travel is the starting direction:



Who is authorised to operate the machine?

Only qualified personnel
The machine must only be operated, maintained or repaired by persons who are qualified to do so and who have been informed of the risks involved in dealing with the machine. As a rule, such persons are trained and experienced in agricultural work or have been thoroughly trained in a similar activity.

General safety information

The general safety information and warning signs apply to every phase of the life cycle of the machine and to every application.

Training required before initial operation
The machine may only be put into operation if thorough training has been carried out by an authorised dealer or by an employee of the manufacturer. Operation without proper training can lead to damage to the machine due to incorrect operation, or may cause accidents.

Safety is your responsibility
Follow the safety instructions. Ensure that all operators comply with the safety instructions. Prevent serious or fatal accidents by following the safety instructions.

Instructions in the event of malfunctions
In the event of a malfunction

- Shut down,
- Stop and secure the machine immediately.
- Immediately rectify the faults, if you are qualified to do so, or
- Commission an authorised dealer.

Operating a faulty machine can cause accidents or damage.

No persons in the working area
Ensure that no persons – children in particular – are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. Accidents with serious or fatal injuries may be caused as a result.

Safety for children
Never assume that children will remain where you last saw them. Be alert and shut down the machine if children are in the working area of the machine. Prohibit children from playing on or around the machine and from operating the machine.

Perfect working condition
Ensure that the tractor and the machine are always in perfect working condition. Make sure that the tractor brakes work in synchronisation with the machine. Also follow the instructions in your tractor's operating manual.

Specified workwear
Do not wear baggy, loose-fitting or other unsuitable clothing. Loose fitting items of clothing may become caught in rotating parts. Wear workwear and protective clothing which is suitable for the working environment and the operating conditions. Wear workwear and protective clothing, as specified by the Accident Prevention and Insurance Association. Serious or fatal injury can result.

Wearing proper shoes
Wear proper shoes. So you can prevent injury. Carrying out work without wearing proper shoes can lead to crushing injuries.

Do not place limbs below components that can be lowered
Some components are lowered when you work on the machine. Do not place limbs below these components.

No riding on the machine
Persons or objects must never be transported on the machine. Carrying passengers – particularly children – on the machine is life-threatening and prohibited. Serious or fatal injury can result.

Safe distance from raised and unsecured loads
Never work under suspended loads. Maintain a sufficient distance from raised and unsecured loads. Serious or fatal injury may be caused as a result.

Unrestricted field of vision to the rear
After it has been coupled, ensure that you have an unrestricted view of the machine, in both its work and transport positions. Otherwise, dangerous situations may not be detected in good time. Accidents or damage may be caused as a result.

Make sure the machine is standing level
Before changing from the transport to the work position (and vice versa), make sure the machine is standing level. The machine could tip over, particularly on hillside locations. Damage to the machine and serious or fatal injury may be caused as a result.

Never work on the machine while it is running
No operations may be performed on the machine while it is running. Objects or persons can be caught, drawn in or crushed. Serious or fatal injury can result.

Do not make any modifications to the machine
No modifications of any kind may be made to the machine. Unauthorised modifications can adversely affect the correct operation and safety of the machine and shorten its service life. Unauthorised modifications to the machine render the manufacturer's guarantee null and void and free the manufacturer from all liability.

Switch off the tractor PTO shaft drive
Switch off the tractor's PTO shaft drive, especially if people could enter the working area of the machine when you

- raise the machine,
- Switch from the work position to the transport position (and vice versa)
- reverse the vehicle in the work position

Rotating, unprotected parts can damage the machine and cause life-threatening injuries.

Coupling

Increased risk of injury
Coupling the machine to the tractor creates an increased risk of injury:

- Secure the tractor against rolling away
- The tractor and machine categories must be the same
- Never stand between the tractor and the machine during coupling
- Actuate the three-point power lift system slowly and carefully

Failure to observe these instructions may result in serious or fatal injuries.

Only use the PTO shaft specified
Use only the PTO shafts specified by the manufacturer and read the attached operator's manual carefully. Adjust the length of the PTO shaft as required. Incorrect PTO shaft lengths can cause damage to the machine and personal injury.

Check and fasten the PTO shaft guard in position
The rotating PTO shaft is protected by the PTO shaft guard. Ensure that the guard is not damaged. Secure the PTO shaft guard in position by hooking the chains onto the tractor and the machine. Unguarded PTO shafts can cause life-threatening injuries.

Observe the PTO shaft manufacturer's operating manual
The PTO shaft manufacturer's operating manual provides instructions on correct handling of the PTO shaft. Failure to observe these instructions can result in damage to the PTO shaft and the machine.

Hydraulics

Only connect the hydraulics when depressurised
Only connect the hydraulic hoses to the tractor hydraulic system if the tractor and machine hydraulic system is depressurised. A hydraulic system under pressure can trigger unpredictable machine movements.

High pressures in the hydraulic system
The hydraulic system is under high pressure. Regularly check all pipes, hoses and screw-on connections for leaks and externally visible damage. Use suitable tools only when looking for leaks. Eliminate damage immediately. Escaping oil can result in injuries and fires. In the event of injuries, seek medical attention immediately.

Hot hydraulic components
During operation, the hydraulic components heat up considerably.
There is a risk of light to serious burns if you touch hot hydraulic components.

Colour-coded hydraulic hoses
To prevent false operation, the hydraulic connections between the tractor and machine are colour-coded. Incorrectly connected hydraulic hoses can trigger unpredictable machine movements.

Electrics

Connect electrical supply only after mounting the equipment
Only fit the lighting equipment when the power supply to the tractor has been switched off. Short-circuits and damage to the electronics are possible.

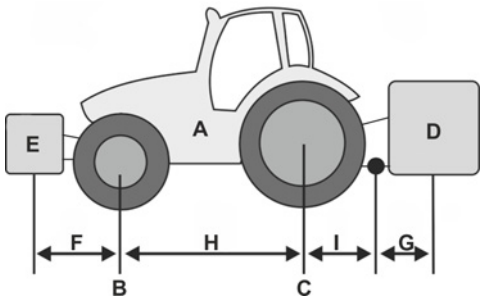
Calculation of axle loads

Observe the total weight, axle loads, tyre load-bearing capacity and minimum ballast specifications.
The machine's front or rear attachment must not exceed the tractor's permissible total weight, its permissible axle load or its tyre load-bearing capacity. To guarantee the steering capability, the front axle must bear at least 20% of the tractor's empty weight.

You calculate:

- Total weight
- Axle loads
- Minimum ballast

For this calculation, the following data is required:



From the tractor's operating manual:

- **(**A) Empty weight
- (B) Front axle load
- (C) Rear axle load
- (H) The tractor's wheel base.

Take additional weights into consideration, for example, the weight of water in the tyres and accessories.

From the documentation from the tyre manufacturer

- Tyre load-bearing capacity

From the operating manual

- (D) Total weight of the machine when rear-mounted; the supporting load with the machine hitched.
- (E) Total weight of the machine when front-mounted.
- (G) Distance between the lower link ball midpoint and the machine's centre of gravity when rear-mounted. With machines attached, G=0.

Measurements

- (F) Distance between the machine's centre of gravity when front-mounted and the front-axle midpoint.
- (I) Distance between the centre of the rear axle and the centre of the lower link ball – for attached machines, up to the centre of the yoke or ball.

Calculation

You can calculate the values using the formulas.

Ballast with front weights

Ballast with front weights on rear-mounted machines:

$$\text{Front ballast in kg} = \frac{D \times (I + G) - (B \times H) + (0,2 \times A \times H)}{F + H}$$

Ballast with rear weights

Ballast with rear weights on front-mounted machines:

$$\text{Rear ballast in kg} = \frac{(E \times F) - (C \times H) + (0,45 \times A \times H)}{H + I + G}$$

Front axle load

Actual front axle load (J) in kg

$$J = \frac{E \times (F + H) + (B \times H) - D \times (I + G)}{H}$$

Total weight

Actual total weight (K) in kg

$$K = E + A + D$$

Rear axle load

Calculating the actual rear axle load (L) in kg

$$L = K - J$$

Summary

The following conditions must be fulfilled:

- The actual rear axle load must be less than the permissible rear axle load given in the tractor's operating manual.
- The actual total weight must be less than the permissible total weight given in the tractor's operating manual.
- The actual front axle load must not exceed the total permissible tyre load-bearing capacity of the front wheels.
- The actual rear axle load must not exceed the total permissible tyre load-bearing capacity of the rear wheels.

If one or more of these conditions is not met, the machine must not be attached to the tractor or used in on public roads.

You can determine the total weight, front axle load and rear axle load on a weighbridge.

Road transport

Ensure that the condition of the machine conforms to traffic regulations

The machine must conform to current road traffic regulations if you intend to drive with it on public roads. This includes, for example:

- Lighting, warning and protective devices must be fitted
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- The machine must only be towed by agricultural or forestry tractors. The empty weight of the tractor must be greater than the weight of the machine.

The driver and keeper of the vehicle are liable should the road traffic regulations not be observed.

Close the ball valves

If there are ball valves on the hydraulic lines or chassis cylinders, the ball valves must be closed for driving on the road. Otherwise, accidental actuation of control units in the tractor could trigger machine movements. Accidents with serious or fatal injuries or damage to the machine may be caused as a result.

Check tyre pressures

Check the tyre pressures on a regular basis. If the tyre pressure is too high or too low, this can reduce the service life of the tyre and result in undesirable work results and can result in accidents when travelling on roads.

Check the hitch pins

Hitch pins must be in perfect condition. Hitch pins must show no signs of wear and be properly secured. Otherwise, hitched machines may detach themselves of their own accord. Accidents with serious or fatal injuries may be caused as a result.

Check trip ropes for the quick release coupling

Trip ropes must hang loose and must not, when in their lowered position, release the couplings of their own accord. Coupled machines could otherwise be released of their own accord from the three-point linkage.

Take altered driving and braking performance into account
Driving and braking performance are altered when the machine is attached to the tractor. Take the width and balancing weight of the machine into consideration, especially when cornering. A driving style not adapted to conditions can cause accidents.

Adapted driving speed
Always adapt the driving speed to the ambient conditions. Driving too fast, for example on uneven terrain, can result in damage to the machine and cause accidents.

Putting the machine into operation

Ensure that the machine is in perfect working condition
Do not operate the machine unless it is in perfect working condition. Check all important components and replace any defective components before starting the machine. Defective components can cause damage to equipment and personal injuries.

Do not remove the protective devices
The protective devices must not be removed or by-passed. Check all protective devices before starting the machine. Unprotected machine components can cause serious or fatal injury.

Height of machine and overhead power lines
If a height of 4.00 m is exceeded when folding the machine in and out, the machine must not be folded in the vicinity of conducting overhead power lines! Danger of electrocution! Should the machine come into contact with a live overhead power line:

- Do not attempt to exit the tractor cabin
- Do not touch any metal parts on the tractor
- Ensure that there is no conductive contact with the ground
- Warn all persons in the area not to approach the tractor or the machine
- Wait for help from professional emergency service personnel as power in the overhead line must first be switched off

Never climb onto the machine beneath live overhead power lines. Electrocution does not require direct contact.

Working during a storm
Never work on the machine outdoors during a storm. This poses the risk of being struck by lightning.

Check the immediate vicinity
Before driving off, folding out, and operating the machine, check its immediate vicinity. Ensure sufficient visibility. Do not begin work until the immediate vicinity is cleared of any persons or objects. Any use of the machine without first checking the surrounding area can cause accidents.

Re-tighten all nuts and bolts
Nuts and bolts should be checked for firm seating after the first hours of operation and at regular intervals thereafter and tightened if necessary. bolts can come loose unnoticed while operating. This can result in damage to the machine or accidents.

The PTO shaft continues turning after it has been switched off
After the PTO stub shaft drive on the tractor has been switched off, the machine continues to run due to the moment of inertia. Maintain a sufficiently safe distance until all moving parts have come to a complete standstill. Damage to the machine and serious or fatal injury may be caused as a result.

Cornering and turning manoeuvres
Centrifugal forces are active during cornering. The machine's centre of gravity at the rear of the tractor is displaced. Be aware of the turning radius and the moment of inertia. A driving style which is not adapted to conditions can cause accidents. Accidents with serious or fatal injuries may be caused as a result.

Uncoupling

Increased risk of injury
Uncoupling the machine creates an increased risk of injury. Therefore:

- Secure the tractor against rolling away
- Never stand between the tractor and the machine during uncoupling.
- Actuate the three-point power lift system slowly and carefully
- Ensure the machine is standing on a secure and even ground
- Place the PTO shaft in the holder provided
- Secure the machine against rolling away (use wheel chocks)
- Ensure that the sustainers provided are securely locked
- Only uncouple the hydraulic hoses if the tractor and machine hydraulic system is depressurised
- Disconnect the electrical connections

Failure to observe these instructions may result in serious or fatal injuries.

Care and maintenance

Observe the care and maintenance intervals
Observe the prescribed intervals for maintenance checks and inspections specified in the operating manual. Failure to observe the time periods can result in damage to the machine, poor work quality and accidents.

Replacement parts and accessories
Only use original parts or parts that meet the manufacturer's requirements. In case of doubt, confirm the suitability of the parts with the dealer or manufacturer. Using unsuitable replacement parts and accessories compromises the safety of the machine. Damage to the machine and serious accidents may occur.

When performing care and maintenance work:

- Switch off the PTO stub shaft
- Take the pressure from the hydraulic system
- Ensure that the machine is standing securely. Provide additional support as required
- Whenever possible, uncouple the tractor
- Do not use parts of the machine as climbing aids; use only proper safety climbing aids
- Secure the machine against rolling away
- Do not reach into drives when they are running

It is only possible to guarantee safety during care or maintenance work if these regulations are observed.

Turn off the power supply
Before carrying out work on the electrical system, disconnect it from the power supply. Systems being supplied with electrical power can cause damage to equipment and personal injury.

Replacing hydraulic hoses
Replace hydraulic hoses every six years. Hydraulic hoses can age without any externally visible signs. Defective hydraulic lines can cause serious or fatal injuries.

Disconnect the battery and dynamo before carrying out welding work
Before carrying out electrical welding work on the attached machine, disconnect the tractor's battery and dynamo. This prevents damage to the electrical system.

Tighten screw connections firmly
Retighten screw connections that have been loosened during care and maintenance work. If screwed connections are loose, machine parts may become detached. Serious injury or damage to equipment can result.

Further regulations

Observe the regulations
In addition to the safety instructions listed above, observe the following:

- Regional and national accident prevention regulations
- Generally recognised safety regulations, occupational health and road traffic requirements and national road traffic regulations
- Information in this operating manual
- Regulations relating to operation, maintenance and repair

This chapter contains general information on the machine and information on:

- Range of application
- Definitions
- Proper use
- Characteristics
- Assemblies
- Technical data

Proper use

This machine is a precision seeding machine designed for the application of suitable seed with simultaneous application of fluid fertiliser and microgranules. For the various seeds different seed discs are available. The machine carries out the seeding after completion of the seedbed preparation. Mulch seeding is also possible with mulch seeding equipment on the sowing units.

Any application other than or beyond this, e.g. for transporting objects or transmitting power, for instance towing the tractor using the machine, is considered improper use. The manufacturer and dealer are not liable for damage caused by improper use. The risk is borne solely by the user.

Definitions

There are different interpretations and definitions for some agronomic terms. The terms used in this operating manual are defined as follows.

Seeding after ploughing

Seeding after completion of turning the soil with the plough.

Seeding after seedbed preparation

Seeding after completion of seedbed preparation or secondary cultivation after turning the soil. The aim of seedbed preparation is to prepare the top soil layer for seeding. By cultivating at a constant depth, clods are crushed, the ground surface levelled and the ground below the grain deposit is recompacted to achieve the required soil contact.

Mulch seeding

Seeding after mixing the soil. The soil must be worked deeper than the required deposit depth.

Direct seeding

Seeding without any soil preparation. Residue from the previous crop is chaffed or in a condition which allows direct seeding.

Characteristics

Various seeds
The machine can be universally utilised. Using various different seed discs, which are installed in the seeding heart, maize, sunflowers, broad beans, turnips, dwarf beans, soy beans, peas and similar seed can be applied.

Long life
For the manufacturing of the machine only materials of high quality are used, which in conjunction with a careful treatment warrant a long life of the machine.

Easy operation
A few movements allow the setting of the precision drill according to the relevant requirements.

Low maintenance costs
Rotating parts are supported in a ball bearing, drive chains are nickel-plated and the parallelograms are supported in special sleeves. The maintenance and wearing is minimal.

Exact observance of deposit depth
The deposit depth can be adjusted infinitely variable. The distance between the cutting disc and coulter is very short in order to ensure exact depth control.

Suitable for nearly all kinds of soil
The pressure of the sowing unit on the ground can be increased for each sowing unit up to 100 kg. Therefore, the precision drill is suitable for nearly all kinds of soil. The follow-on rubber V press wheel can be set in 3 steps.

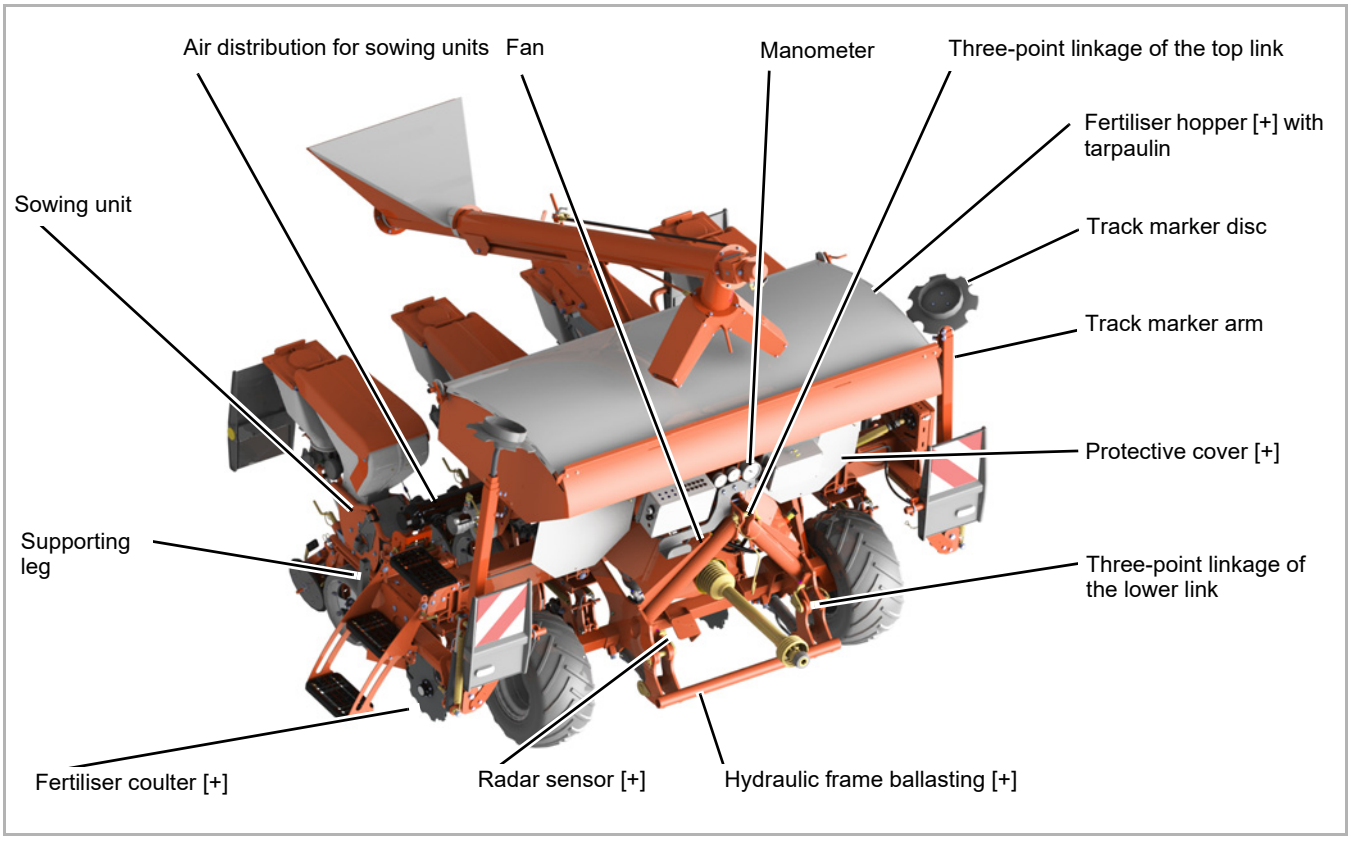
Highly economic efficiency
The machine can be used for mulch seeding and, under certain conditions, also for seeding after ploughing.

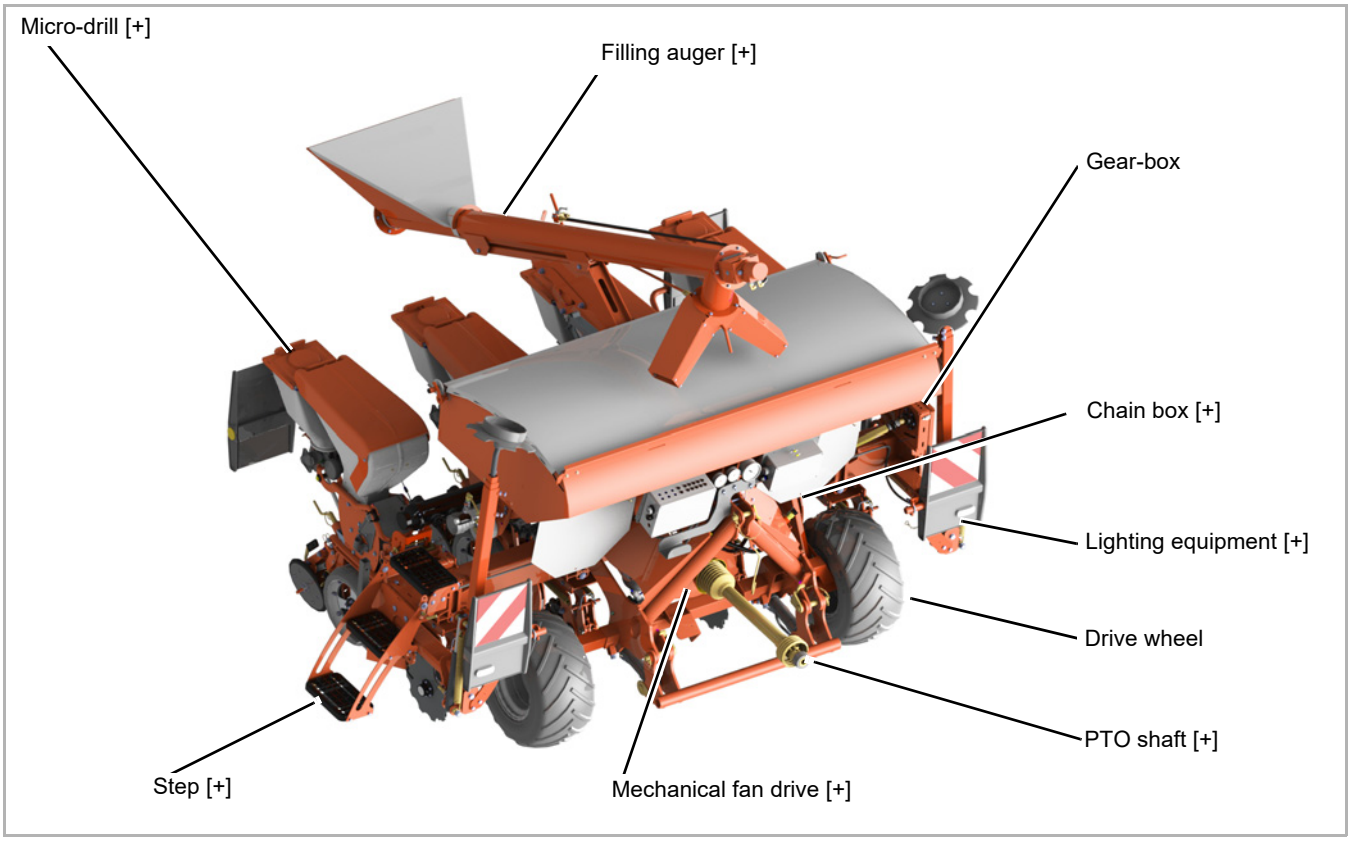
Trailed equipment
Through a wide range of trailed equipment, the machine application range is universal.

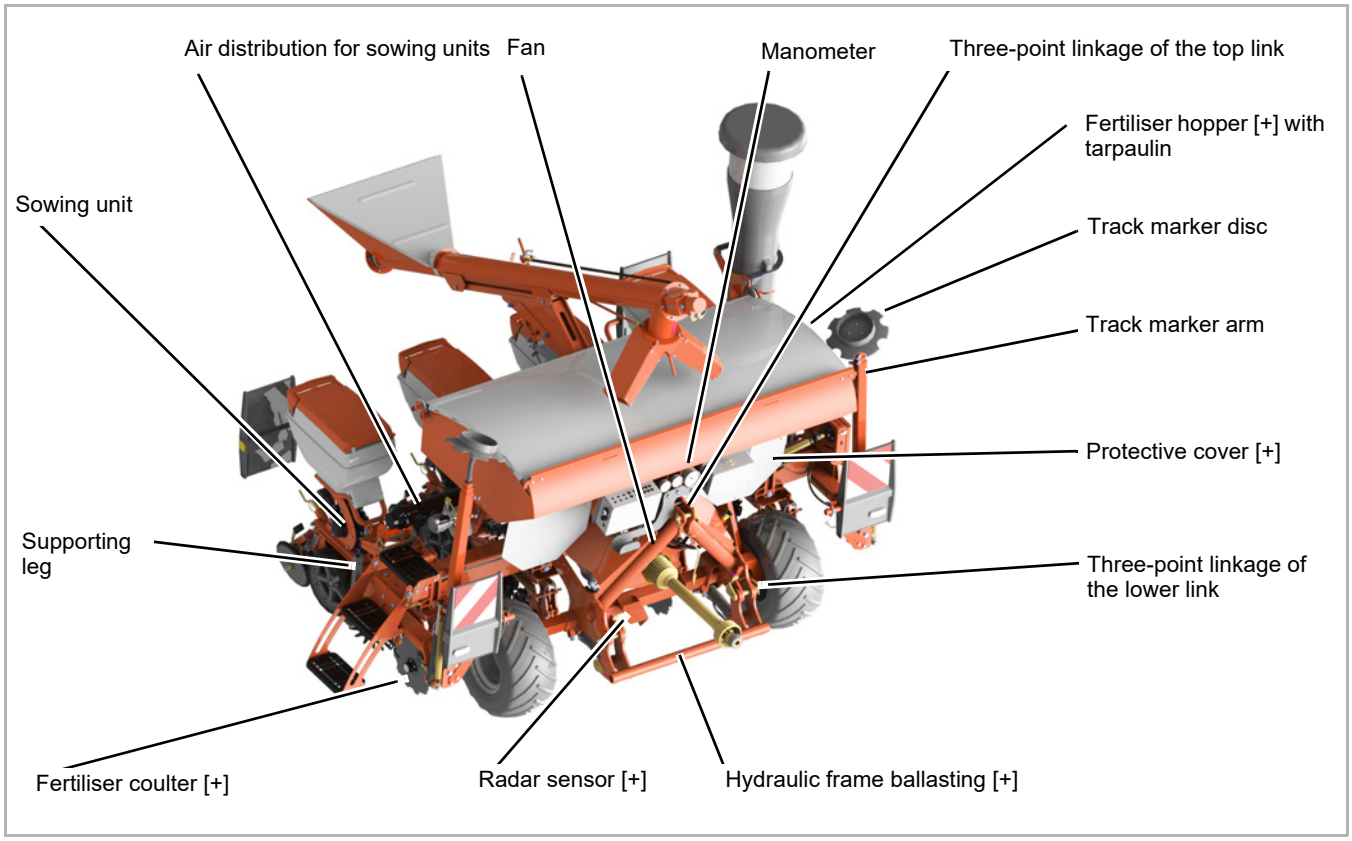
Safety
The machine is constructed in accordance with EU regulations for maximum possible safety of operation. The machine bears the CE mark.

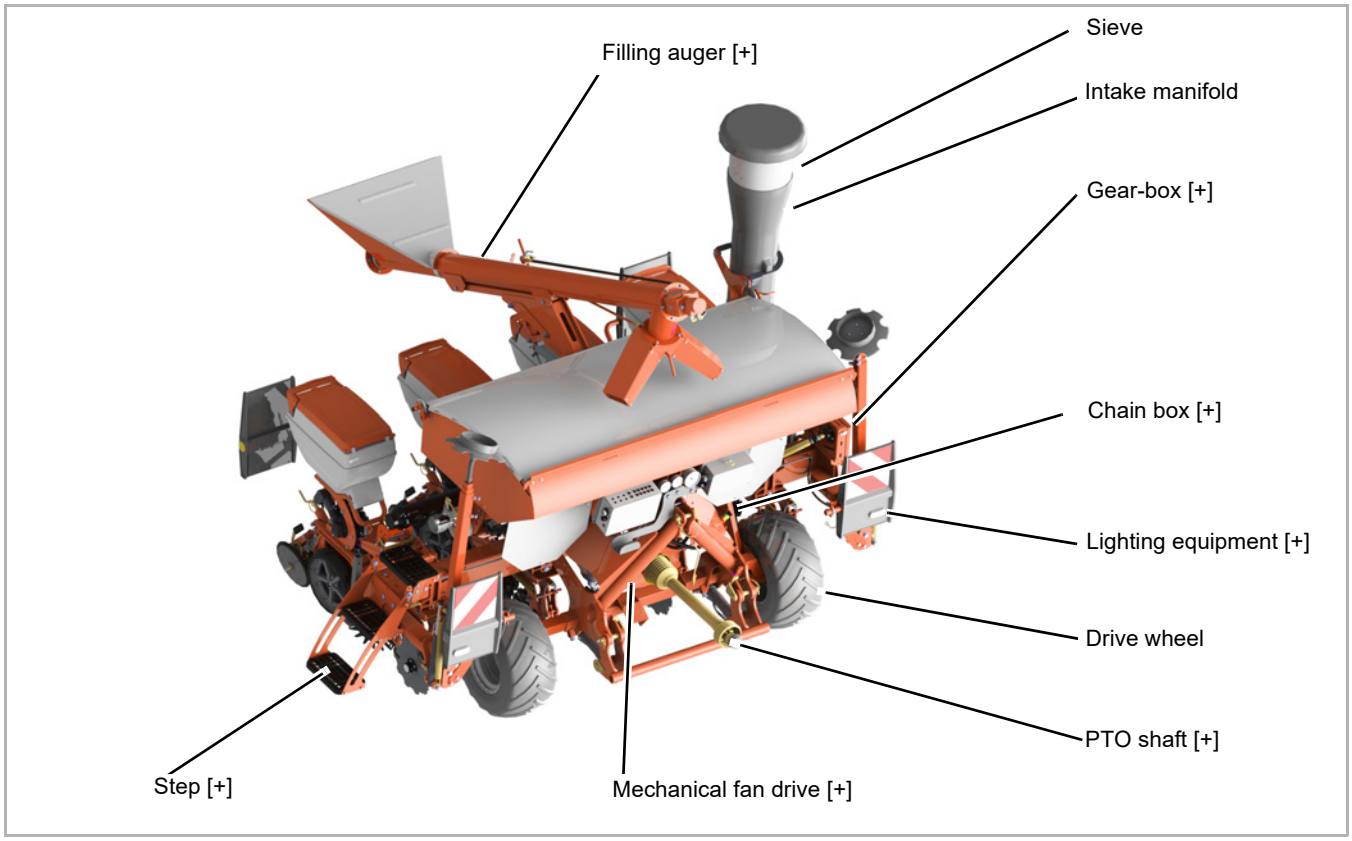
Assemblies

Frame






Air distribution for sowing units
Fan
Manometer
Three-point linkage of the top link
Fertiliser hopper [+] with tarpaulin
Sowing unit
Track marker disc
Track marker arm
Protective cover [+]
Supporting leg
Three-point linkage of the lower link
Fertiliser coulter [+]
Radar sensor [+]
Hydraulic frame ballasting [+]


Filling auger [+]
Sieve
Intake manifold
Gear-box [+]
Chain box [+]
Lighting equipment [+]
Drive wheel
PTO shaft [+]
Step [+]
Mechanical fan drive [+]

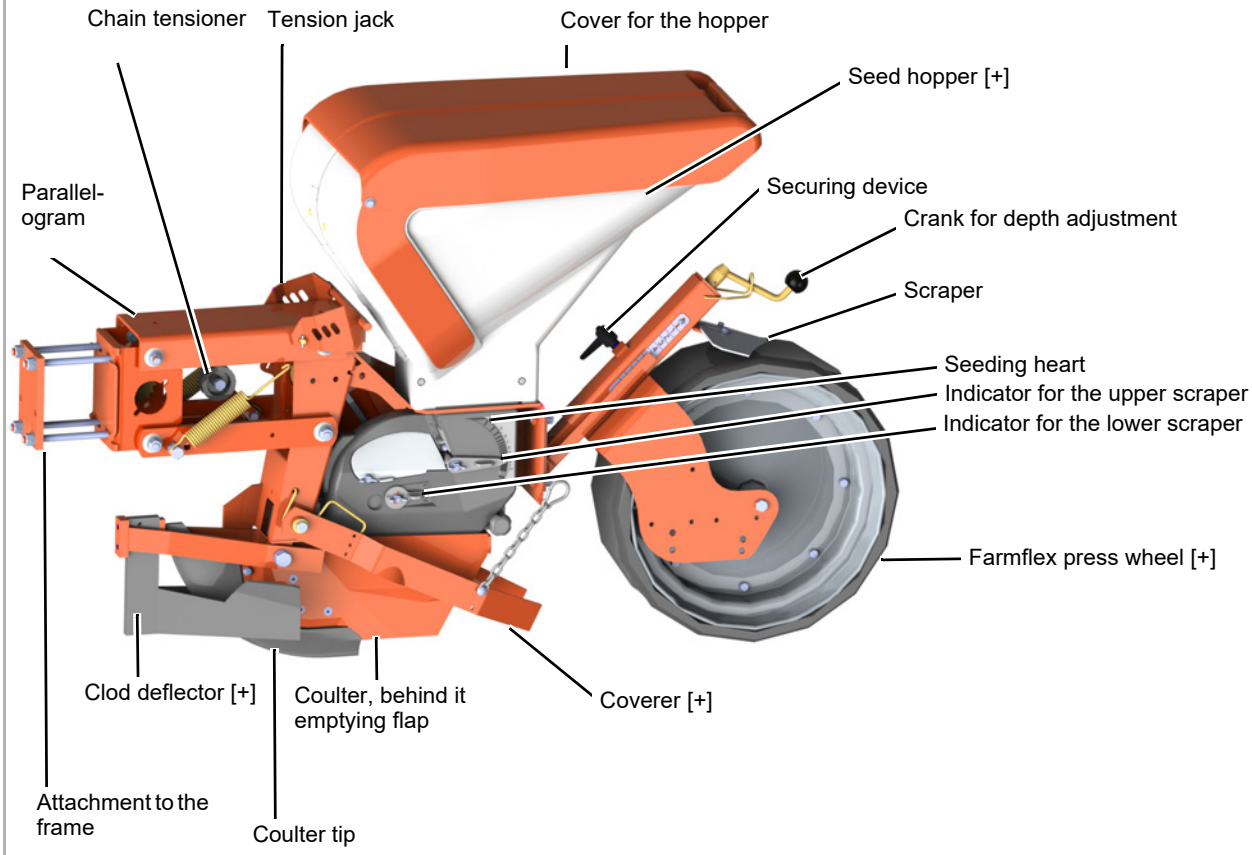
Separating systems

The separating system can be set up to use either negative pressure or overpressure.

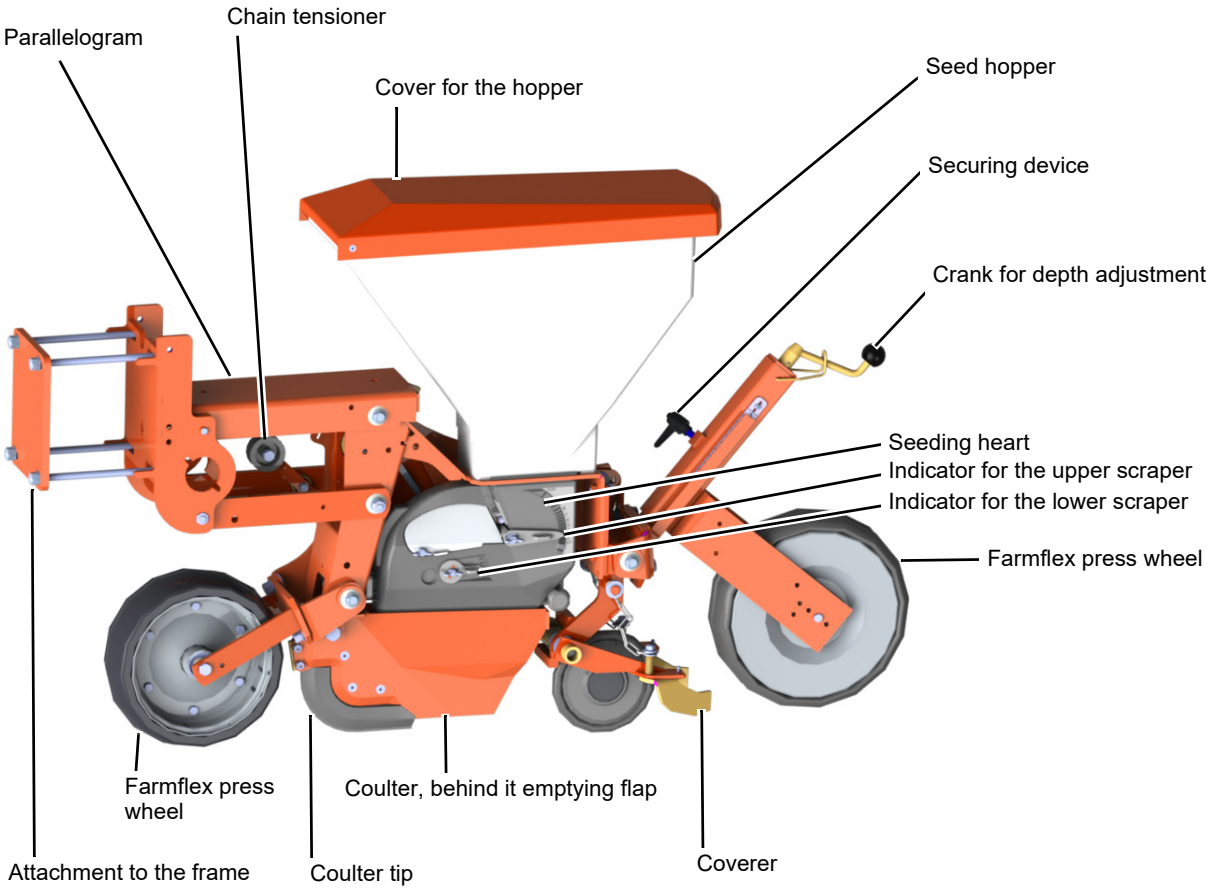
- In the separating system using negative pressure, the individual seeds are drawn onto the seed disc.
- In the separating system using overpressure, the individual seeds are pressed onto the seed disc.

System using negative pressure

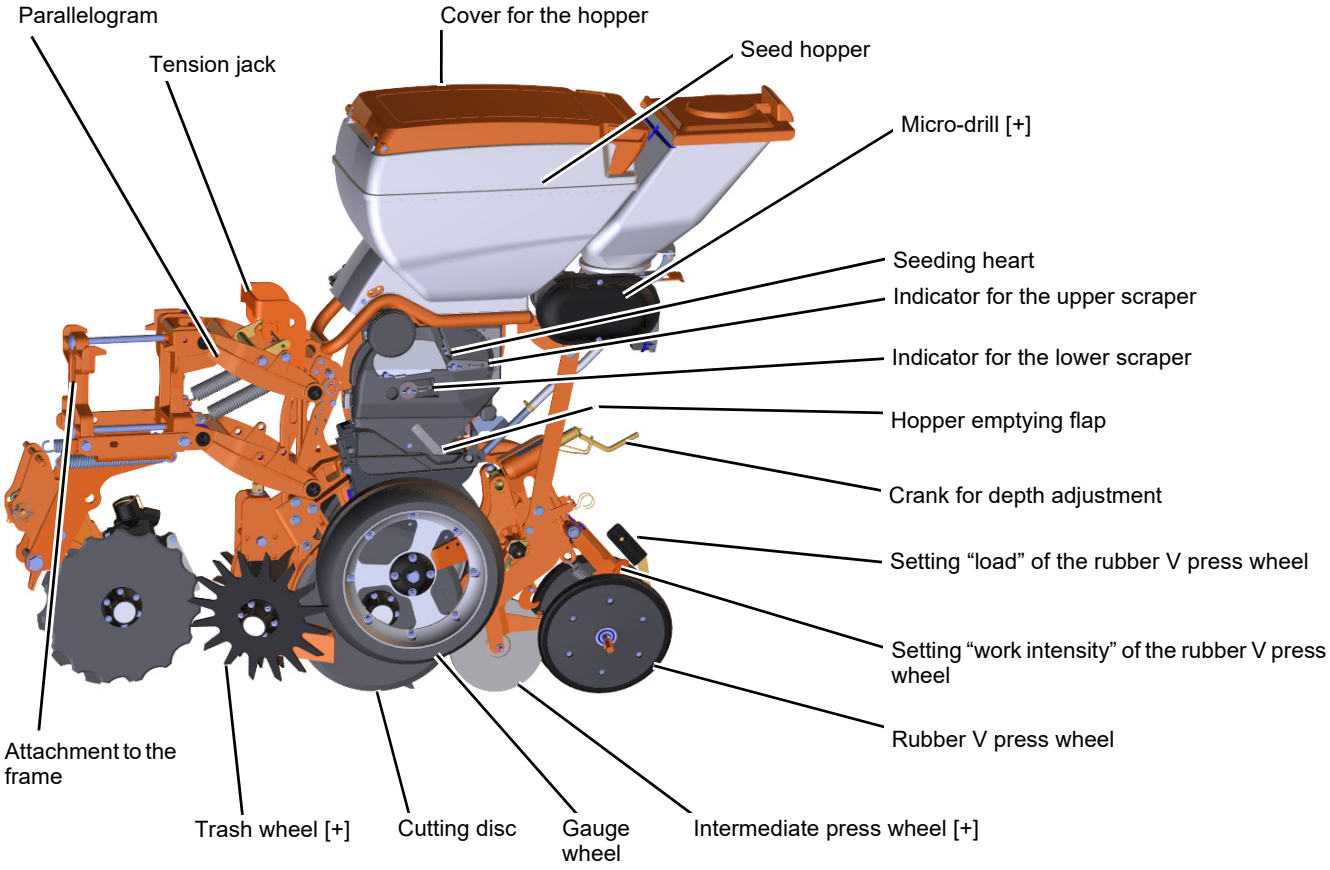
Normal seeding sowing unit



Sowing unit – Tandem

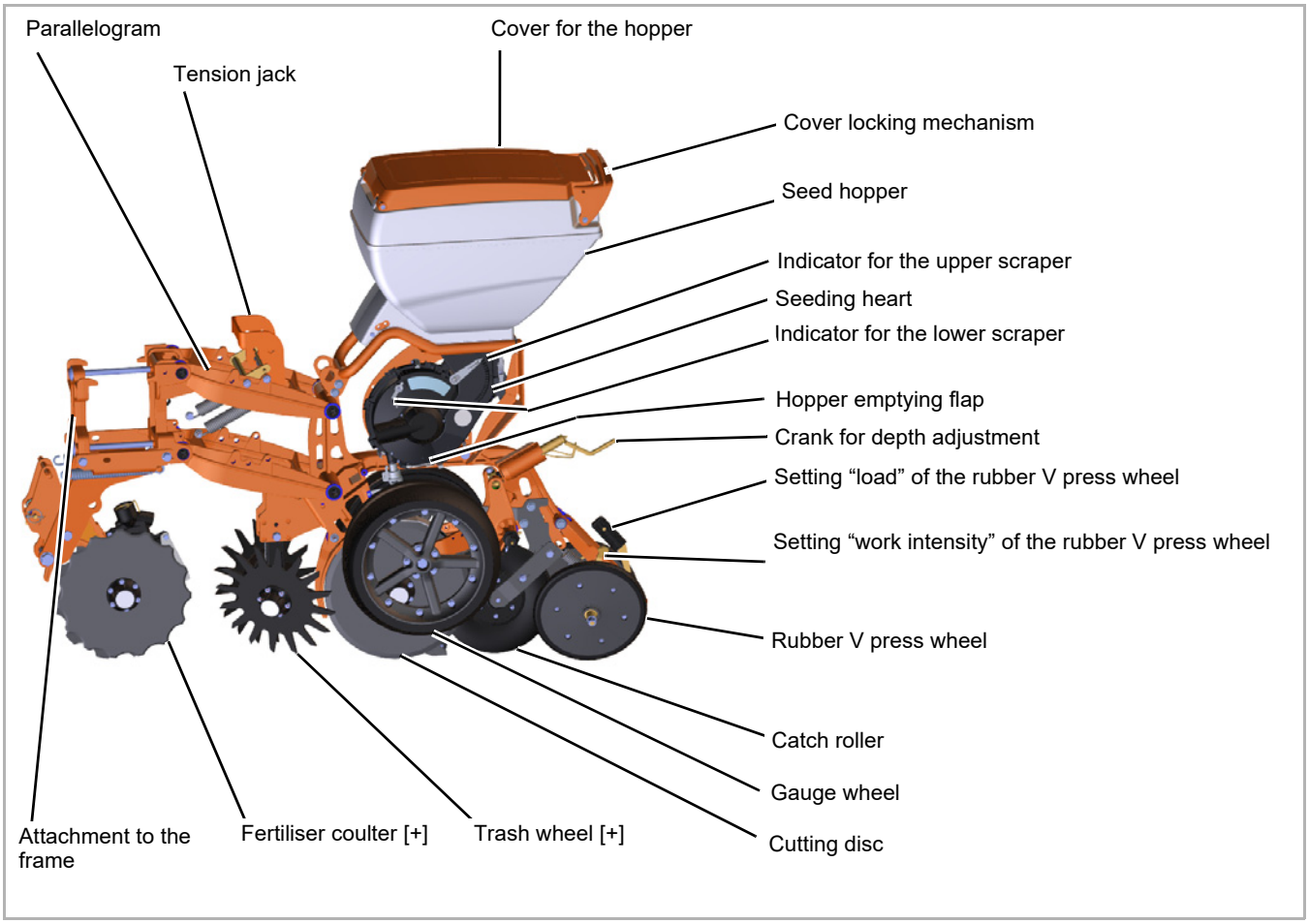


HD-II sowing unit



System using overpressure

SX sowing unit



Technical data

Frame

Frame type	Frames rigid					
Frame width [m]	**3.00**	**3.50**	**4.00**	**4.50**	**5.00**	**6.00**
Height [m]						
Transport position, with track marker	2.20 - 3.80					
Width [m]						
Transport position	3.00	3.50	4.00	4.50	5.00	6.00
Work position, without track marker	3.00	3.50	4.00	4.50	5.00	6.00
Depth [m]						
Transport position	2.34 - 3.10					
Total weight [kg], without sowing units						
Frame	590	605	620	635	695	725
Total weight [kg], with x/HD-II sowing units						
Frame Minimum with 4 units Maximum with 8 units	1135 1795					
Frames with fertiliser spreaders and fertiliser coulters Minimum with 4 units Maximum with 8 units	1470 2235					
Centre of gravity [m] dimension “G”						
Depending on the equipment, for example	1.00					
Tyre pressure [bar]						
7.00 – 12 AS	2.0					
26.00 x 12	1.4					
Tightening torque of the wheel nuts [Nm]						
7.00 – 12 AS 26.00 x 12	125 - 150					
Hitch						
Three-point suspension	CAT 2					
PTO shaft model						
Between tractor and machine	W2200 1 3/8" 6 teeth					
PTO speed [rpm]	800 1000					

Frame type	Frames rigid					
Frame width [m]	**3.00**	**3.50**	**4.00**	**4.50**	**5.00**	**6.00**
Fertiliser hopper [+]						
Fill level [m]	1.68					
Hopper volume [l]	1000					
Physical condition of the fertilisers	dry, granulated					
Calibration of the fertiliser	1-6 mm					
Filling auger [+]						
Fill level at the funnel [m]	0.70					
Filling time [min]	Around 5					
Micro-drill [+]						
Hopper volume [l]	17					
Number of outlets	1					
Fill level • Maximum	Roughly 1 cm below the edge of the hopper					

Sowing unit

System using negative pressure

Normal seed

Weight [kg]	
Without seed The weight depends on the equipment of the sowing unit	Around 60
Volume [l]	
Seed hopper	30

Tandem

Weight [kg]	
Without seed The weight depends on the equipment of the sowing unit	Around 80
Volume [l]	
Seed hopper	30

HD-II

Weight [kg]	
Without seed The weight depends on the equipment of the sowing unit	Around 130
Volume [l]	
Seed hopper	60

System using overpressure

SX

Weight [kg]	
Without seed The weight depends on the equipment of the sowing unit	Around 130
Volume [l]	
Seed hopper	60

Other

Hydraulics	
Maximum permitted operating pressure [bar]	200
Control valves	
Track marker	1x single acting
Hydraulic frame ballasting [+]	1x double acting
Hydraulic ballasting of the sowing units [+]	1x single acting
Hydraulic fan drive [+]	1x single acting 1x pressureless return line
Hydraulic fertiliser spreader drive [+]	1x double acting
Filling auger [+]	1x double acting
Hydraulic fan drive [+]	
Maximum return line pressure [bar]	10
Capacity of the hydraulic motor [ccm]	6
Volume flow rate at 5400 rpm* [l/min]	37
Maximum operating pressure [bar]	140
Hydraulic fertiliser spreader drive with one engine [+]	
Maximum return line pressure [bar]	35
Capacity of the hydraulic motor [ccm] with/without gear-box	50 / 80
Volume flow rate [l/min] with/without gear-box	1 - 30 / 1 - 16
Maximum operating pressure [bar] with/without gear-box	110 / 180
Filling auger [+]	
Maximum return line pressure [bar]	35
Capacity of the hydraulic motor [ccm]	80
Volume flow rate at 350 rpm* [l/min]	30
Maximum operating pressure [bar]	140

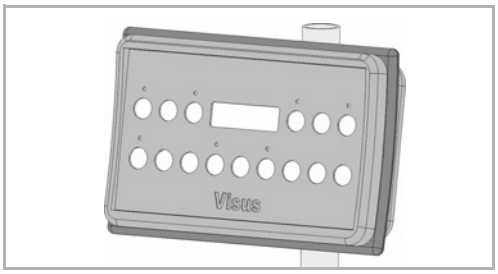
*The speed has a fluctuating range of ± 50 rpm if the speed has been set with a constant oil temperature.

Electronic control system	
Power supply [V]	12
Fuse [A]	30
Protection class	IP 65
Terminal	
→ Operating manual for the terminal	
Power consumption of various electrical consumers	
Sowing unit drive [W/unit]	50
Drive for the micro-drill [W/unit]	50
Electrically actuated hydraulic valve controls [W/unit]	25
Working lights with LEDs [W/set]	18
Noise level [dBA]	
Fan at 4200 rpm Driven by electric motor. Maximum value, measured on the enveloping curve. The noise level may change due to the tractor.	98

Terminals

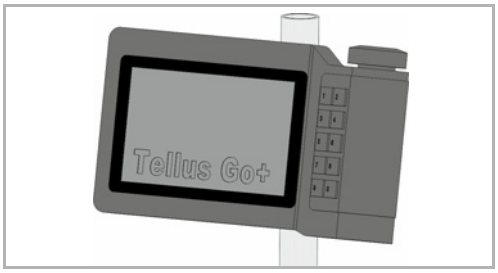
For display purposes, either ISOBUS-compatible terminals or terminals specially developed for data display can be used.

VISUS



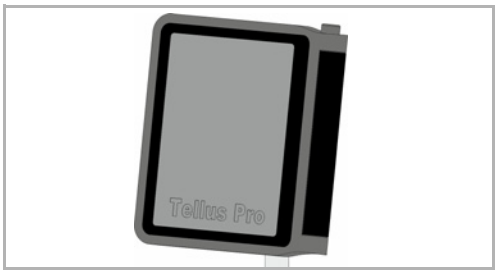
Terminal with colour display
→ "VISUS" operating manual

IsoMatch Tellus GO+



ISOBUS-compatible terminal with colour display
→ “IsoMatch Tellus GO+” operating manual

IsoMatch Tellus Pro



ISOBUS-compatible terminal with colour display
→ “IsoMatch Tellus Pro” operating manual

External terminals

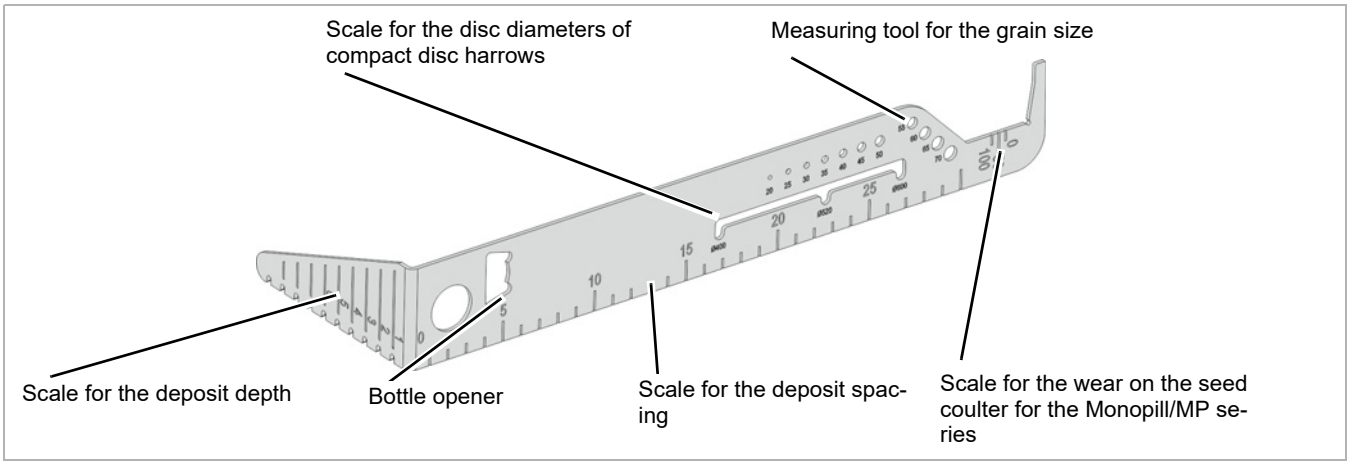
Other ISOBUS-compatible terminals can also be used.
→ Operating manual for individual manufacturers

Software

All functions of the software are described in a separate operating manual.
→ Operating manual for the software, section »Other applicable documents«, page 5

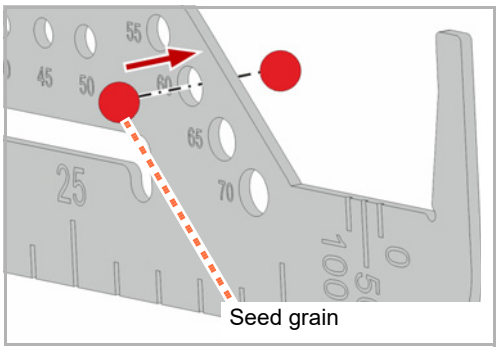
Test template

- Determining the grain size
- Exposing the seed furrow
- Measuring the seed deposit depth
- Measuring the deposit spacing in the row
- Checking the wear on the seed coulter (Monopill/MP series)
- Determining the disc diameter of compact disc harrows
- Opening bottles



Grain size

In order to select the correct seed coulter for a precision seeding machine, you need to determine the size of the seed grains.



- Select a representative number of seed grains.
- Use the holes labelled from 20 mm to 70 mm on the test template to determine the size of the seed grains.
- Use the value found to select the correct seed coulter.

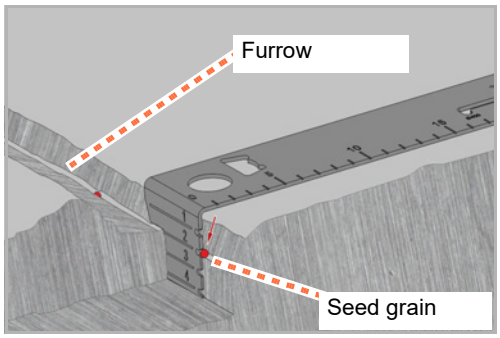
Exposing the seed furrow

Carefully open the seed furrow to check the deposit depth and the deposit spacing of the seed.

- Hold the long side of the test template with both hands.
- Align the long side of the test template in the direction of the seed furrow.
- Remove the soil above the seed in several thin layers until the seed is exposed.

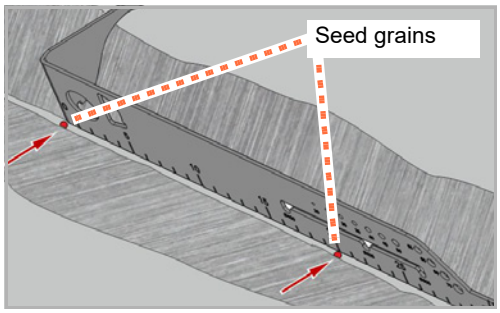
To allow for an accurate measurement, remove the soil perpendicular to the direction of travel so that the seed is not displaced.

Deposit depth



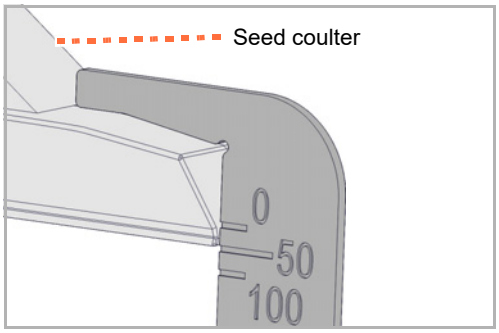
- Remove the soil that has been cleared away from the seed furrow in the measurement area to make the field surface level again.
- Position the test template's deposit depth scale next to a seed grain in the seed furrow.
- Read the deposit depth off the scale.

Deposit spacing



- Place the scale for measuring the deposit spacing of the seed grains lengthways in the furrow so that the zero is positioned next to a seed grain.
- Use the scale to read off the seed grin spacing in the row.

Wear on the seed coulter

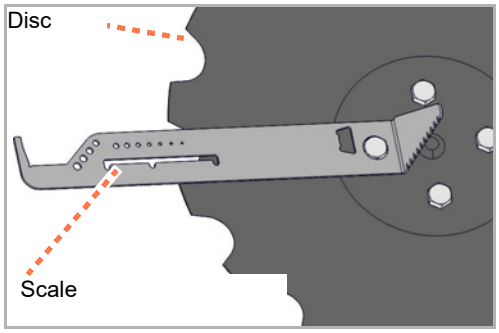


For the Monopill/MP series:

- Place the test template on the seed coulter.
- Read off the remaining value in per cent from the scale, in this example 50%.

Disc harrow

Measure the disc diameter of compact disc harrows.



- Position a large hole on the test template on a bolt head on the compact disc harrow. Align the top of the test template with the centre.
- Read off the disc diameter on the opposite side of the test template.

Scope of delivery

The machine is fully assembled on delivery. If parts of the machine have not been assembled, please contact your dealer.



Do not assemble the machine yourself
Do not do assembly work yourself because prerequisites for an orderly condition of the machine are:

- The observance of a sequence of workshops
- Compliance with tolerances and torques
- Safe handling of the electronics

Assembly carried out by persons without specialist knowledge may result in damage to the machine or poor performance.

Electronic control system
If the machine is equipped with an electronic control system, the dealer carries out the configuration.



If parts are missing or have been damaged during transportation, submit a claim immediately to your dealer, importer or the manufacturer.

Coupling



Increased risk of injury
Coupling the machine to the tractor creates an increased risk of injury.

- Check the tractor and machine categories. The categories must match.
- Secure the tractor against rolling away
- Never stand between the tractor and the machine during coupling
- Actuate the three-point power lift system slowly and carefully

Failure to observe these instructions may result in serious or fatal injuries.



Check the hitch pins
Hitch pins must be in perfect condition. Hitch pins must show no signs of wear and be properly secured.
If the hitch pins are not secured, the machine can come loose. This could result in damage to the machine or tractor, or personal injury.

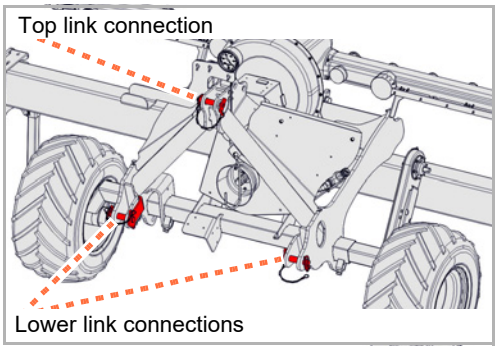
Check the machine's equipment and the tractor's equipment prior to coupling.

Three-point suspension

The machine is fitted with a CAT. 2 three-point suspension for the work position. The tractor must have lower link balls with corresponding dimensions.

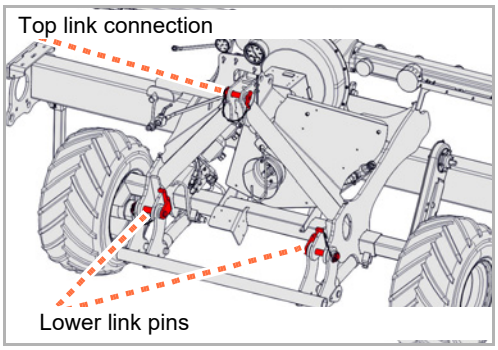
Ensure the lower links lock into place
Both lower links must engage.
If they do not, the machine could detach itself from the lower links. This could result in damage to the machine or tractor, or personal injury.

To ensure that the connections for your tractor fit, as a rule, you will need to fit balls to the pins in the lower link connections.



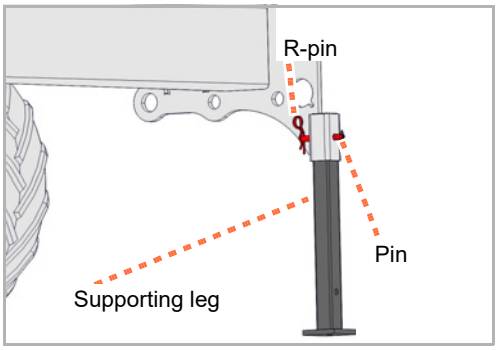
- Attach balls for the lower link onto the pin for the lower link connections, and secure these using a linchpin.
- Set both lower link balls on the tractor to the same height.
- Align the tractor centrally in front of the machine.
- Reverse slowly. The lower link balls from the tractor must be located below the lower link connections on the machine.
- Slightly raise the lower link and ensure the arrester hooks are securely locked in place.
- Attach a ball for the top link to the pin for the top link connection.
- Secure the pins with a split pin.
- Attach the top link and ensure the arrester hooks are securely locked in place.
- Set the lower links so that they have little play to the left or right.

Three-point suspension with hydraulic frame ballasting



- Move the hydraulic frame ballasting to the lowest position and depressurise the hydraulics.
- Remove the split pin and pull out the lower link pin until the ball fits into the opening.
- Slide the lower link pins back in and secure them with the split pin.
- Set both lower link balls on the tractor to the same height.
- Align the tractor centrally in front of the machine.
- Reverse slowly. The lower link balls from the tractor must be located below the lower link connections on the machine.
- Slightly raise the lower link and ensure the arrester hooks are securely locked in place.
- Attach a ball for the top link to the pin for the top link connection.
- Secure the pins with a split pin.
- Attach the top link and ensure the arrester hooks are securely locked in place.
- Set the lower links so that they have little play to the left or right.

Supporting legs



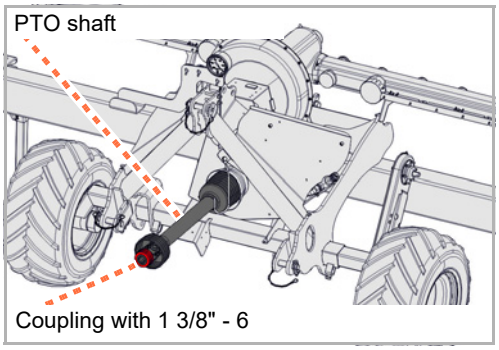
- Remove the R-pin and pull out the pin.
- Slide the supporting leg upwards and secure with the pin.
- Implement the same settings for the second supporting leg.

PTO shaft

The machine is equipped with a PTO shaft (1 3/8" - 6) for the fan drive. The tractor must have a corresponding PTO.

Checking the PTO speed
Connect the PTO shaft to a PTO with the rotational speed specified on the machine.
Connecting with an incorrect speed could result in damage to the machine, the tractor or personal injury.

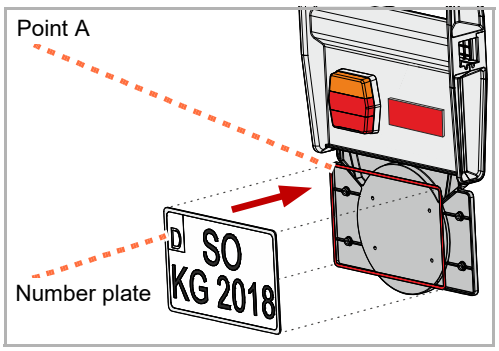
- Switch off the tractor's PTO.
- Switch off the tractor engine.
- Secure the tractor against starting up accidentally. In a clearly visible location, attach an information label stating that the tractor must not be put into operation.
- Secure the tractor against rolling away.
- Secure the machine against rolling away.
- Unlock the coupling on the PTO shaft on the side of the tractor.
- Slide the coupling onto the PTO on the tractor.
- Ensure that the coupling locks.
- Fix the safety chain for the PTO shaft guard to the tractor.
- Check whether the safety chain on the side of the machine is correctly secured.
- Set the drive speed for the tractor PTO. The maximum PTO speed stated on the fan must not be exceeded.



Coupling with 1 3/8" - 6

Attaching the number plate

The number plate is attached to the rear lighting equipment so that it is correctly illuminated by the rear registration plate light.
Attach the top left corner of the number plate to point A.



- Transfer the position of the fixing points to the number plate. The top left corner of the number plate is positioned against point A.
- Insert the holes for securing the plate into the number plate.
- Fasten the number plate with bolts.

Connecting

After coupling, make the following connections:

- Electrics
- Hydraulics

Electrics

Attach the following electrical cables to the tractor, if installed, for:

- The machine's electronic control system
- The lighting of the machine

▶ Check whether all of the connections are working properly.

Hydraulics

→ Chapter »Hydraulic system«, section , page49

Hydraulic system



Only connect the hydraulics when depressurised
Only connect the hydraulic hoses to the tractor hydraulic system if the tractor and machine hydraulic system is depressurised.
A hydraulic system under pressure can trigger unpredictable movements of the machine and cause personal injury.

Check the hydraulic hoses and hydraulic couplings
Before making connections, check all hydraulic hoses for damage. Check all hydraulic couplings for firm seating after connecting them.
Defective hydraulic hoses or incorrectly seated hydraulic couplings can trigger unpredictable machine movements and cause injuries.

Securing the control units
In the transport position, secure the control units on the tractor to prevent accidental operation.
Accidental actuation of the control units can trigger unpredictable movements on the machine and cause accidents.



Avoid mixtures of different oils
If the machine is used with different tractors, incompatible types of oil may become mixed.
Mixtures of incompatible oils can result in the destruction of tractor components.

Familiarising yourself with the hydraulic system

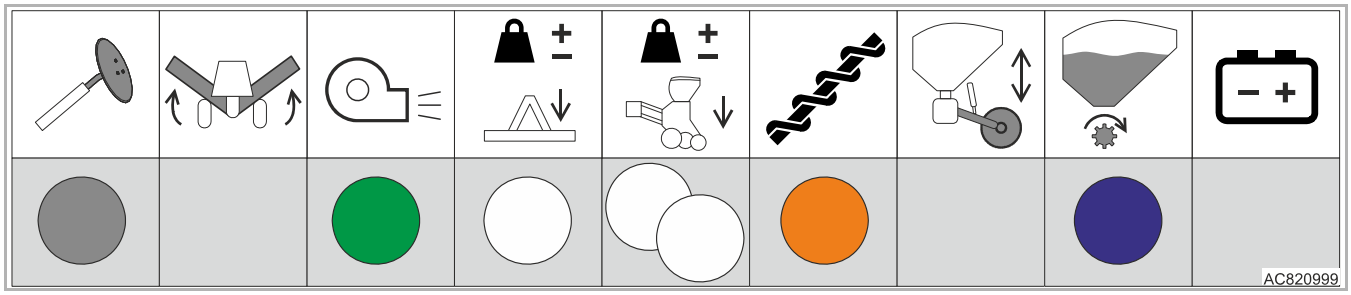
Connection to the tractor

The machine must be connected to the tractor's hydraulic system.

For tractors with a control valve with a high-priority supply:

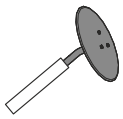
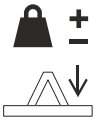
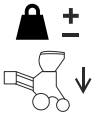
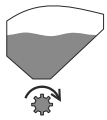
The hydraulic fan drive should be connected to a control valve with a high-priority supply on the tractor. The fan drive speed does not drop when the control unit is activated to raise or lower the machine.

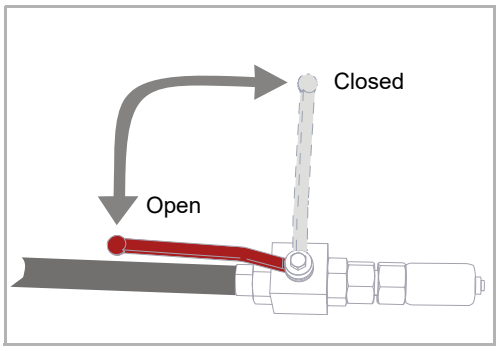
The hydraulic hoses are colour-coded so that you can assign the functions to the individual hydraulic hoses more easily. The functions available on your machine are labelled on the label with coloured dots.



Control valves

- Close the hydraulic hoses in accordance with the information in the following table:

Symbol	Function	Control valves		Colour coding
		Single-acting	Double-acting	
	Track marker		x	Grey
	Hydraulic fan drive with pressureless return line [+]	x		Green
	Hydraulic frame ballasting [+]		x	White
	Hydraulic ballasting of the sowing units [+]		x	2 x white
	Filling auger [+]		x	Orange
	Fertiliser spreader electro-hydraulic drive [+]		x	Blue



If ball valves are present:

- Open the ball valves on the hydraulic hoses to the tractor.

Working with the hydraulics



Checking the hydraulic connections
Prior to operation, carefully check the hydraulic hose connections and the hoses themselves.
Hot hydraulic fluid under pressure can squirt from insufficiently tightened or damaged hydraulic hoses, resulting in serious injury.

Hydraulic fan drive [+]

The hydraulic fan drive is supplied by the tractor hydraulic system.
Technical data for the hydraulic fan drive:
→ Chapter »Familiarising yourself with the machine«, section »Technical data«, page33

Line diameters



Do not alter cross sections
If cross sections are altered, the pressure conditions in the hydraulic system are changed. Also check plugs and connections for the correct cross section.
Altering a cross section may cause damage to the components in the hydraulic system. Hydraulic motors may be damaged, for example.

Connection line	Dimensions		
	Nominal size	Diameter Inner/outer [mm]	Thread
Feed line (P)	DN 12 / 18L	12 / 15	M26 x 1.5
Return line (T)	DN 12 / 18L	12 / 15	M26 x 1.5
Control line (LS)	DN 6 / 12L	6 / 9	M18 x 1.5
Leak-off oil line (D)	DN 6 / 12L	6 / 9	M18 x 1.5

Prerequisites

- Sufficient oil supply by the tractor
- Corresponding number of control valves
- Parallel activation of the control valves
- Oil cooler
- Pressureless return line

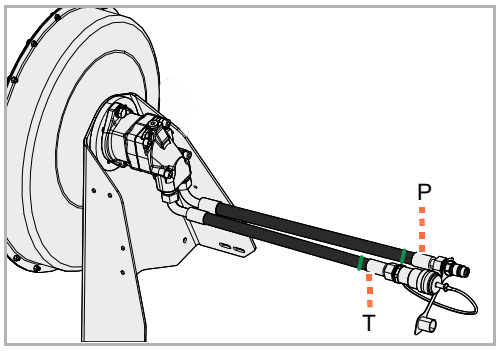
Fan speed

Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

Adjustment of rotational speed only with fan turned off
Adjustments to the rotational speed may only be made when the fan is stationary.
Otherwise, the machine can be damaged.

The basic settings for the flow control valve must be made only during initial operation or when changing tractors. The settings may only be performed when the tractor engine is switched off.

With flow control valve on the tractor

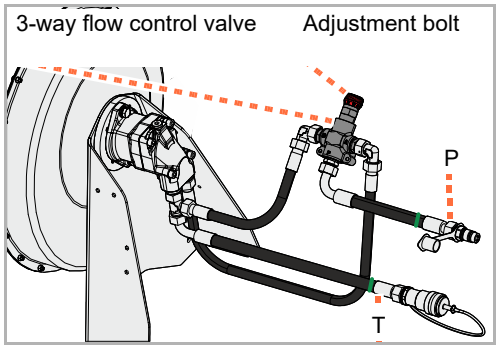


Without 3-way flow control valve on the machine

- Actuate the control unit on the tractor.
- Set the quantity of oil at the tractor such that the required negative pressure or overpressure is reached on the seed disc.

→ Chapter »Preparing for operation«, section »Fan«, page93

With a 3-way flow control valve on the machine



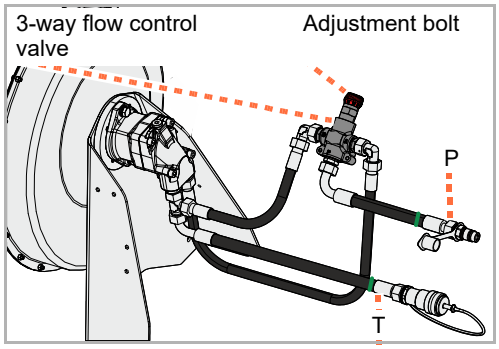
- Fully open the 3-way flow control valve.

The 3-way flow control valve is fully open when the adjustment screw has been fully unscrewed.

- Actuate the control unit on the tractor.
- Set the quantity of oil at the tractor such that the required negative pressure or overpressure is reached on the seed disc.

→ Chapter »Preparing for operation«, section »Fan«, page93

No flow control valve on the tractor



- Set the 3-way flow control valve to a medium value
- Actuate the control unit on the tractor.
- Set the quantity of oil at the tractor such that the required negative pressure or overpressure is reached on the seed disc.

→ Chapter »Preparing for operation«, section »Fan«, page93

Operation

Initial commissioning

For the initial commissioning with cold oil the following applies:

- The fan speed adjusts itself automatically until the hydraulic oil has reached operating temperature.
- Only when the fan speed remains constant is the adjustment complete

▸ Constantly check the fan speed during the settings at the electronic control system.

→ Operating manual for the electronic control system

Repeated commissioning

For the repeated commissioning with cold oil the following applies:

- The fan speed is slightly higher in the warming up process
- After a short period of time, the fan speed settles down to the value set during initial operation

Depending on the machine configuration, prepare the following for sowing:

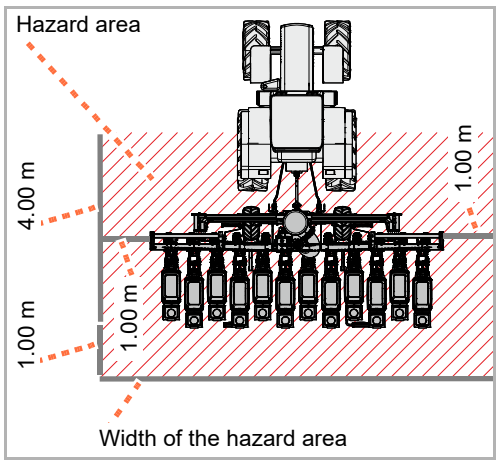
- Track marker
- Sowing units

Prerequisites:

- Machine is coupled to the tractor and all connections are properly made.
- The machine has been lowered to the work position.
- The machine frame is parallel to the ground.
- The tractor's PTO is deactivated.
- All driven components are stationary.
- Tractor motor is switched off.
- Tractor is secured against rolling away and being restarted without authorisation.
- The machine is secured against rolling away using wheel chocks.

Hazard area

Checking the hazard area
No persons, animals or any objects should remain in the hazard area while travelling or when folding in or out. If children are in the vicinity, check the hazard area particularly carefully.
Persons who are in the hazard area while travelling or during folding in or out may be seriously or fatally injured.



Frame width of the machine [m]	Width of the hazard area [m]
3.00	5.00
3.50	5.50
4.00	6.00
4.50	6.50
5.00	7.00
6.00	8.00

Track marker [+]

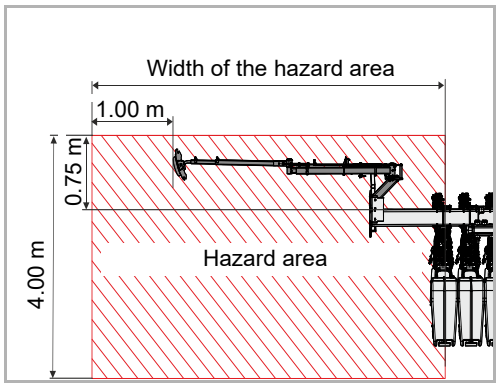
Unfold the track markers before making settings.

Folding out

Depending on the equipment fitted, folding the track markers in and out is either controlled via the electronic control system or directly at the tractor's control unit.

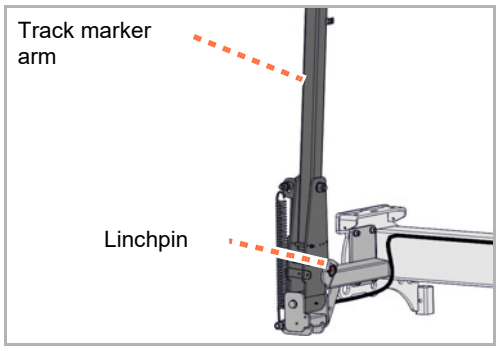
Hazard area

Checking the hazard area
No persons, animals or any objects should remain in the hazard area while travelling or when folding in or out. If children are in the vicinity, check the hazard area particularly carefully.
Persons who are in the hazard area while travelling or during folding in or out may be seriously or fatally injured.



The working width of the machine [m]	Width of the hazard area [m]
< 3.00	4.20
< 3.50	4.60
< 4.00	5.20
< 4.50	6.00
< 5.00	6.40
< 5.50	6.90
< 6.00	7.30
< 6.50	8.20
< 7.00	8.70
< 7.50	9.10
< 8.00	9.60

Transport locking device



- Press against the track marker arm with one hand.
- Open the linchpin and place it into parking position for the work position.

Without electronic control system

- Actuate the control unit on the tractor until the track markers are completely folded out.

With an electronic control system

- Activate folding the track markers in and out at the electronic control system.

→ Operating manual for the electronic control system

- Actuate the control unit on the tractor until the track markers are completely folded out.

During the forward pass, the track markers mark a path in the seed bed for the return pass. To enable this, set the track markers as follows:

- To the centre of the tractor:
  The centre of the tractor travels over the mark.



At high speeds, we recommend a setting to the middle of the tractor. If set to the tractor front wheels, track deviations are more likely.

Setting to tractor centre

You will need the following information:

- Row spacing of the seeding machine
  (= distance between coulters)
- Working width of the seeding machine

- Fold the machine into its work position.
- Lower the track marker.

Calculation

Length of the track markers for tractor centre =

$$\frac{\text{Row distance + working width}}{2}$$

Example



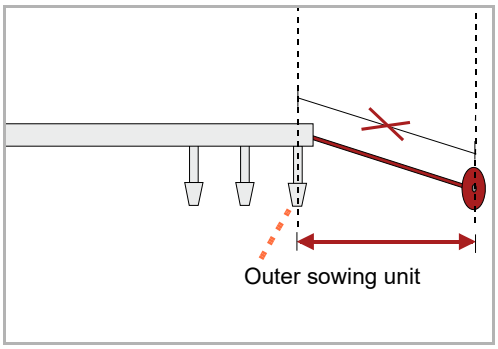
Row distance of seeding machine	75.0 cm
Working width of the seeding machine	900.0 cm

Example:

In this example, the calculated length of the track markers is 487.50 cm.

Setting the length

Sharp edges on the track marker disc
The edge of the track marker disc can be very sharp. Cover the track marker disc if working in the vicinity of the track marker disc.
People could be injured if they come into contact with the track marker disc.



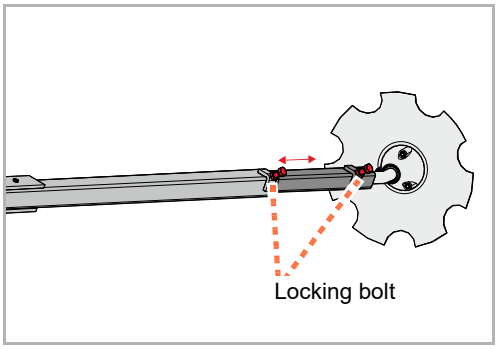
Measure out the calculated track marker length on the ground, never directly on the track marker arm. That would introduce inaccuracies.

Right track marker arm:
Begin the measurement in the centre of the outer right coulter.

Left track marker arm:
Begin the measurement in the centre of the outer left coulter.

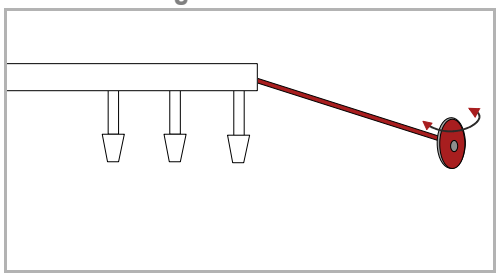
You can set the length of the track markers at the inner or outer track marker arm.

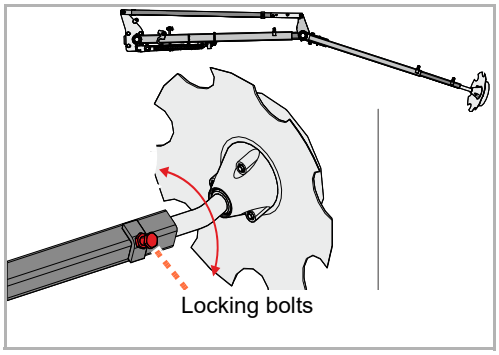
When the outer track marker arm is folded in, it must not protrude above the inner track marker arm.



- Release the clamping bolts.
- Set the track marker arm as required.
- Retighten the locking bolts fully.

Inclination angle





The setting for the inclination angle of the marker disc depends on the soil conditions.

Heavy soils	=	Disc angled, set the inclination angle as required
Light soil	=	Disc vertical, set no or only small inclination angle

Set the track marker disc so that the tracks of the track markers can later be clearly seen in the field. The track markers must not dig.

- Release the clamping bolts.
- Set the inclination angle as required.
- Retighten the locking bolts fully.

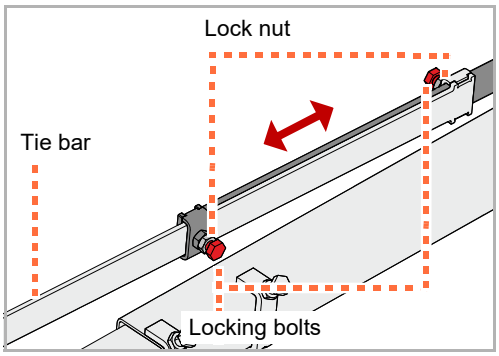
If necessary, a correction of the length of the track marker is required. Therefore, check the length after setting the inclination angle.

Working width

The track markers should be able to follow the soil structure. To do so, the working width can be adjusted via the length of the tie bar. The working width is too large if the track marker digs the soil during folding-in.

Correct adjustment:

- After lowering, the track markers are no longer held by the rope or chain
- After lifting, the track markers are held high enough above the ground



- Undo the two lock nuts.
- Release the clamping bolts.
- Adjust the tie bar to a new length.
- Tighten the locking bolts and secure with lock nuts.

Row distance

If different row spacings need to be set, please contact your dealer.

Sowing units

Before carrying out work on the sowing units, the machine must be parked securely.
→ Chapter »Maintenance«, section »Securing the machine«, page178

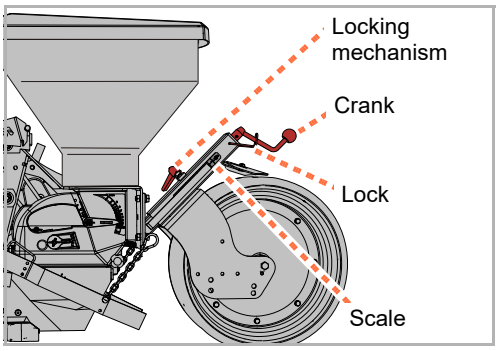
Working depth

The working depth for each sowing unit is set with a crank. The values in the scale correspond to the working depth in cm. Use the same setting for all sowing units.

Prerequisites:

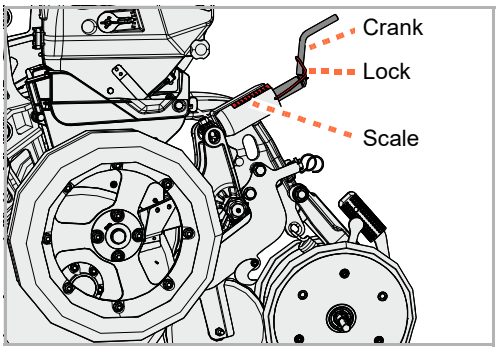
- The machine is coupled to the tractor
- Machine is completely extended, lifted and secured
- Handbrake in tractor is applied
- Tractor and machine are secured against rolling away

Normal seed, Tandem



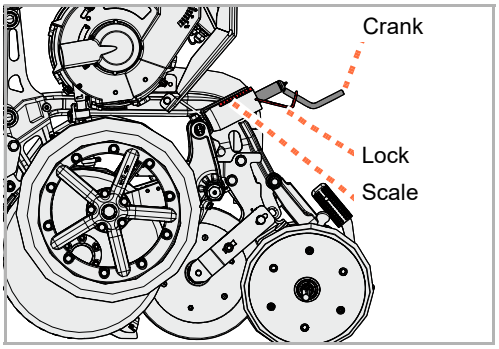
- Releasing the locking mechanism.
- Flip up the latch.
- Set the required working depth at the crank.
- Secure the crank with the latch.
- Tighten the locking mechanism.

HD-II



- Flip up the latch.
- Set the required working depth at the crank.
- Secure the crank with the latch.

SX



- Flip up the latch.
- Set the required working depth at the crank.
- Secure the crank with the latch.

Normal seed, Tandem

Load [+]

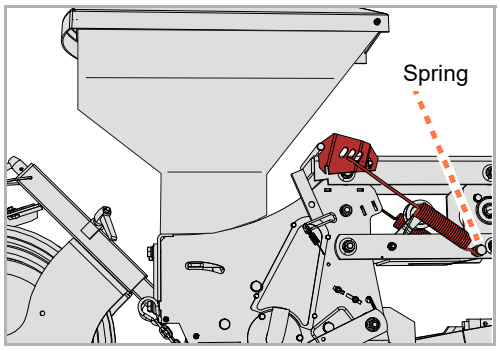
In addition to its own weight an individual sowing unit can be loaded via the springs with up to 100 kg.

If full loading has been applied, additional frame ballasting may be required.

Springs

It is possible that the springs are not fitted upon delivery.

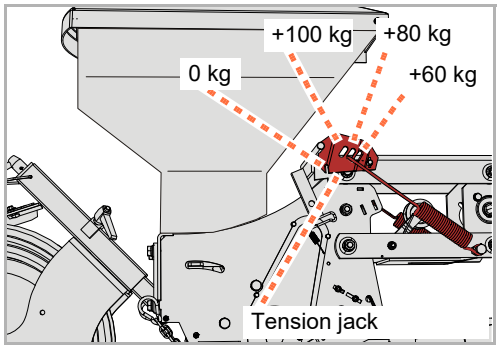
- Attach the springs if necessary.



Loading

An individual sowing unit can be loaded via the springs with 60, 80 or 100 kg in addition to its own weight.

- Lift the machine.
- Fold the tension jack forwards and hook on the spring, if required.
- Fold the tension jack backwards.

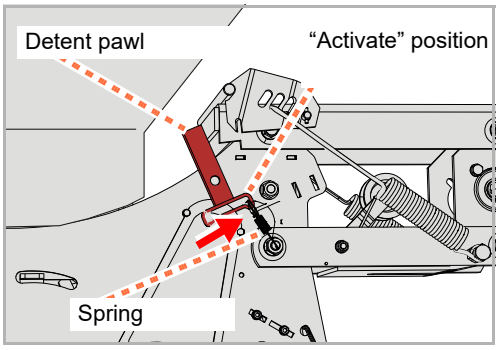


Lifting device [+]

You can lift individual sowing units. The sowing unit then does not operate.

The sowing units must be lowered again for road transport. The lifting device may be damaged under the weight of the sowing units.

Activate



- Push the spring on the detent pawl forwards, to the "Activate" position.

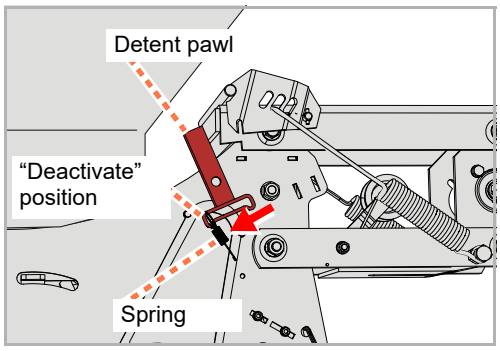
Avoid additional loading
When a load is set, it places an additional burden on the sowing units.
When a load is set, the lifting device may be damaged.

Emptying the seed hopper
The seed hopper and the seeding heart must be emptied before lifting.
If there is seed in the seed hopper, seed falls uncontrolled to the ground.

Lift the sowing unit with an auxiliary aid
The sowing unit weighs over 100 kg. Only lift the sowing unit using an auxiliary aid or suitable lifting gear.
If a person is overstrained when lifting heavy loads, injuries may be sustained.

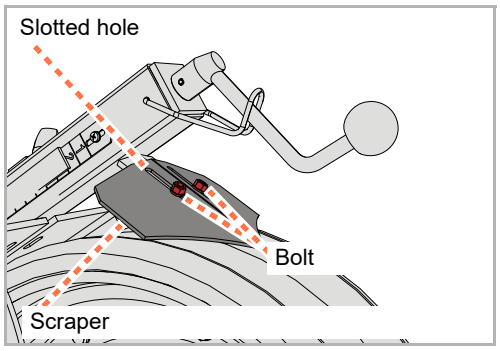
- Lift the machine.
- As an auxiliary aid, place a suitable timber measuring approx. 20 – 25 cm in height underneath the sowing units which are to be lifted.
- Lower the machine until the detent pawl locks.

Deactivate



- Push the spring on the detent pawl backwards to the “Deactivate” position.
- Raise the detent pawl.
- As an auxiliary aid, place a suitable timber measuring approx. 20 – 25 cm in height underneath the sowing units which are to be lowered.
- Lower the machine until the detent pawl disengages.

Scraper

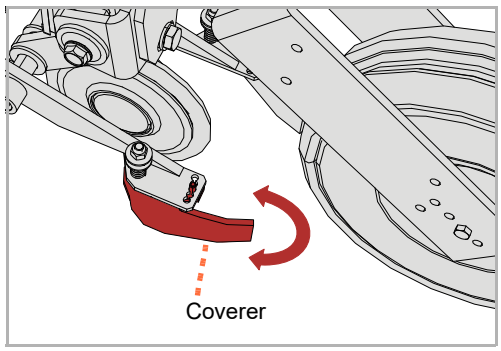


- Release the nuts and bolts.
- Shift the scraper in the slotted hole.
- Tighten bolts and nuts securely.

Tandem

Intermediate press wheel

The intermediate pressure roller provides for the bedding of the seed on the soil horizon. Coverers which also guide earth onto the seed are located at the sides.



- Press the coverer down and adjust as required.

HD-II

Load

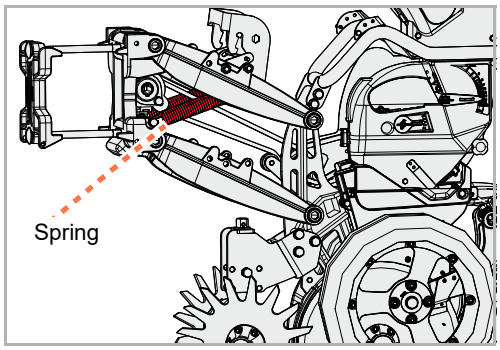
An individual sowing unit can be loaded via the springs with up to 100 kg in addition to its own weight.

If full loading has been applied, additional frame ballasting may be required.

Springs

It is possible that the springs are not fitted upon delivery.

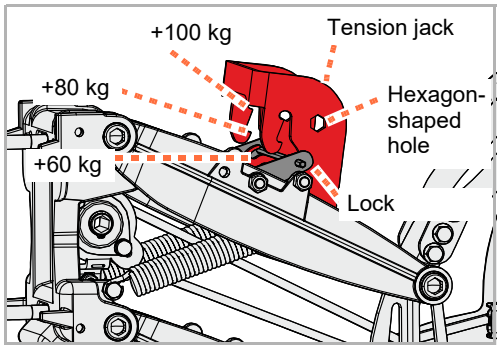
- Attach the springs if necessary.



Loading

An individual sowing unit can be loaded via the springs with 60, 80 or 100 kg in addition to its own weight.

- Lift the machine.
- Briefly press down on the tension jack, release the lock and then secure it with the lock according to the required load.



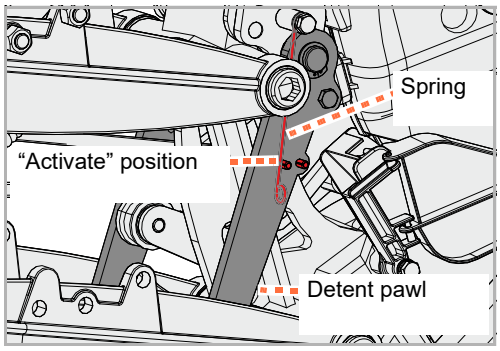
You can place a hex key in the hexagon-shaped hole to help you move the tension jack with less force.

Lifting device [+]

You can lift individual sowing units. The sowing unit then does not operate.

The sowing units must be lowered again for road transport. The lifting device may be damaged under the weight of the sowing units.

Activate



- Push the spring on the detent pawl forward, to the "Activate" position.

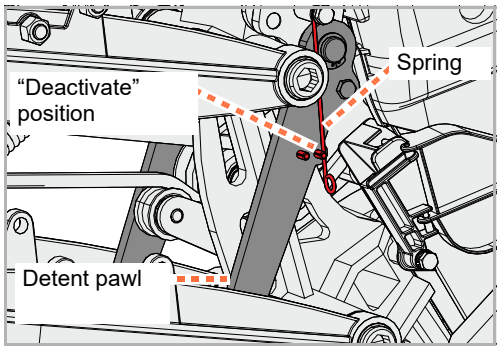
Deactivating additional ballast
When a ballast load is activated, it places an additional burden on the sowing units.
When a ballast load is activated, the lifting device may be damaged.

Emptying the seed hopper
The seed hopper and the seeding heart must be emptied before lifting.
If there is seed in the seed hopper, seed falls uncontrolled to the ground.

Lift the sowing unit with an auxiliary aid
The sowing unit weighs over 100 kg. Only lift the sowing unit using an auxiliary aid or suitable lifting gear.
If a person is overstrained when lifting heavy loads, injuries may be sustained.

- Lift the machine.
- As an auxiliary aid, place a suitable timber measuring approx. 20 – 25 cm in height underneath the sowing units which are to be lifted.
- Lower the machine until the detent pawl locks.

Deactivate



- Push the spring on the detent pawl backwards to the "Deactivate" position.
- As an auxiliary aid, place a suitable timber measuring approx. 20 – 25 cm in height underneath the sowing units which are to be lowered.
- Lower the machine until the detent pawl disengages.

Rubber V press wheel

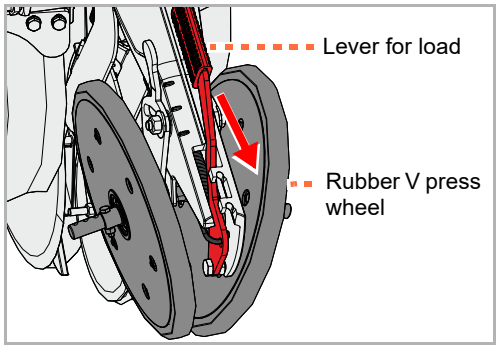
The rubber V press wheel closes the furrow and presses on the grain. The aim is an optimum connection of the seeds to the water supply of the soil. The necessary pressure depends on the ground type.

You can make various settings to the rubber V press wheels:

- Setting the load
- Setting the distance
- Setting the inclination angle

Load

The load can be set in three stages. For the maximum load, set the lever to the rearmost stage.



- Move the rubber V press wheels to the required position using the lever.
- Let the lever catch.
- Adjust the settings for all rubber V press wheels in the same way.

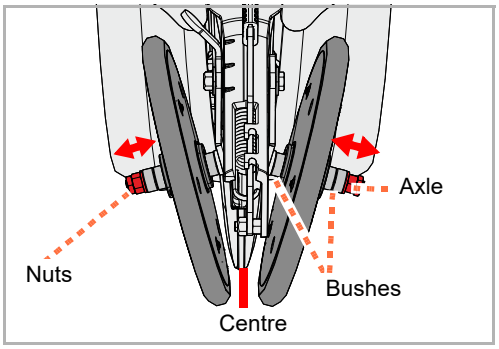
Distance

This adjustment is only possible with the narrow rubber V press wheels.

In addition, with the narrow rubber V press wheels, you can determine how the press wheels work by the distance on the axle. The effect is dependent on the ground type and deposit depth.

Ground type	Deposit depth	Distance to the centre
Heavy soils	Flatter	Closer
Light soil	Deeper	Further apart

Make the same setting on both sides and all sowing units.

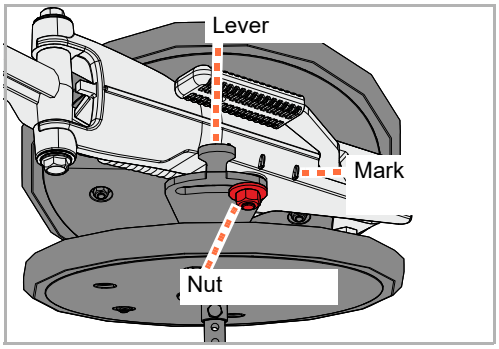


- Remove the nuts from each rubber V press wheel.
- Shift the rubber V press wheel by inserting the bushes on the axle as required.
- Secure the rubber V press wheel with nuts. Tighten the first nut to a maximum tightening torque of 60 Nm.

Inclination angle

Setting of the inclination angle of the rubber V press wheel is infinitely variable:

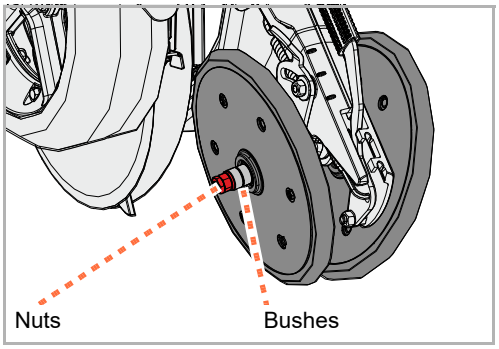
Lever position	Rubber V press wheel position	Effect
Front	Further apart	Intense stopping up of the furrow
Rear	Closer together	Minimal covering of the furrow



- Release nut.
- Move the lever to the required position. Use the markings for orientation.
- Re tighten the nut.
- Adjust the settings for all rubber V press wheels in the same way.

Replacement

Depending on the soil conditions, a wide or narrow rubber V press wheel is of advantage. Use the same type of rubber V press wheels for all sowing units.



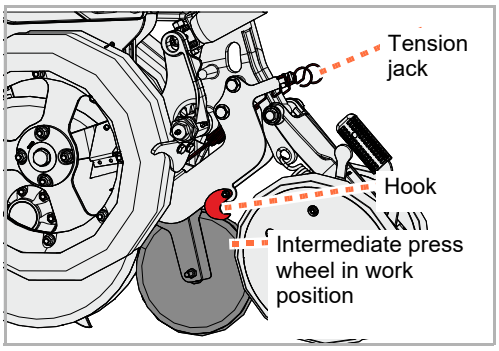
- Remove the nuts from each rubber V press wheel.
- Replace the rubber V press wheel and position by inserting the bushes on the axle.
- Secure the rubber V press wheel with nuts. Tighten the first nut to a maximum tightening torque of 60 Nm.

Intermediate press wheel [+]

The intermediate pressure roller provides for the bedding of the seed on the soil horizon. Depending on the soil conditions, it may be advisable to use heavy or light pressure on the ground. In special cases the intermediate press wheel can also be completely lifted out.

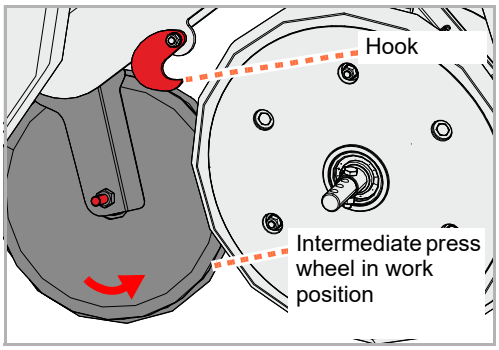
At greater working depths from approximately 6 cm, the intermediate press wheel, depending on the ground type, can no longer be used. The intermediate press wheel bearing then runs in the soil, and throws the soil up. In this case, the intermediate press wheel has to be raised.

Printing



- Push the hook forwards and move the intermediate press wheel into the work position.
- Set the required pressure on the tension jack. The further the tension jack is pulled out, the greater the pressure that the intermediate press wheel exerts on the ground.

Lifting



If the intermediate press wheel is not required, it can be lifted.

- Lift the intermediate press wheel and secure with the hook.

The intermediate press wheel must be lifted when the ground is wet and sticky.

SX

Load

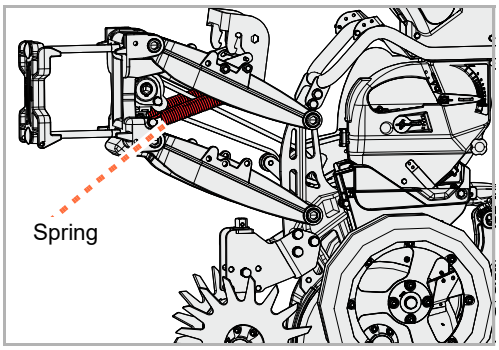
An individual sowing unit can be loaded via the springs with up to 100 kg in addition to its own weight.

If full loading has been applied, additional frame ballasting may be required.

Springs

It is possible that the springs are not fitted upon delivery.

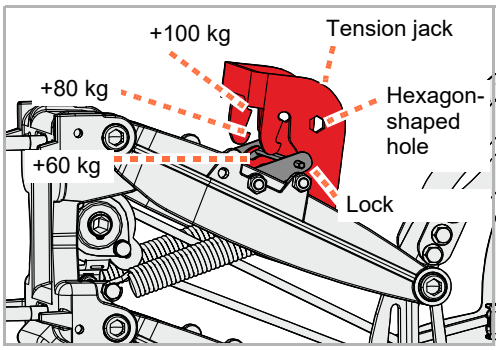
- Attach the springs if necessary.



Loading

An individual sowing unit can be loaded via the springs with 60, 80 or 100 kg in addition to its own weight.

- Lift the machine.
- Briefly press down on the tension jack, release the lock and then secure it with the lock according to the required load.



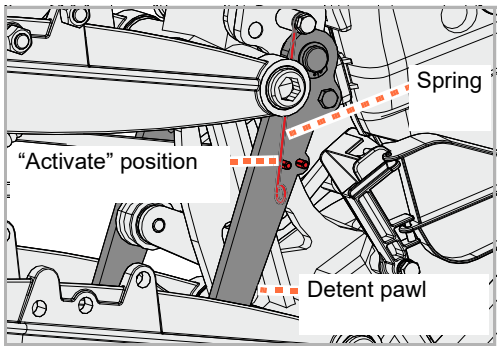
You can place a hex key in the hexagon-shaped hole to help you move the tension jack with less force.

Lifting device [+]

You can lift individual sowing units. The sowing unit then does not operate.

The sowing units must be lowered again for road transport. The lifting device may be damaged under the weight of the sowing units.

Activate



- Push the spring on the detent pawl forwards, to the "Activate" position.

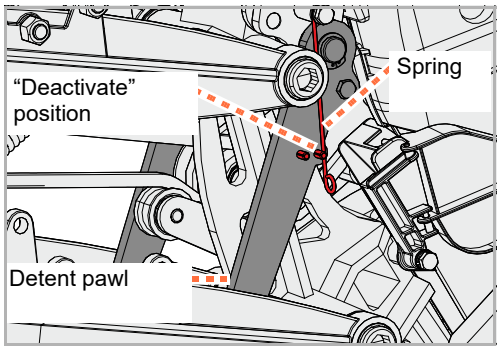
Deactivating additional ballast
When a ballast load is activated, it places an additional burden on the sowing units.
When a ballast load is activated, the lifting device may be damaged.

Emptying the seed hopper
The seed hopper and the seeding heart must be emptied before lifting.
If there is seed in the seed hopper, seed falls uncontrolled to the ground.

Lift the sowing unit with an auxiliary aid
The sowing unit weighs over 100 kg. Only lift the sowing unit using an auxiliary aid or suitable lifting gear.
If a person is overstrained when lifting heavy loads, injuries may be sustained.

- Lift the machine.
- As an auxiliary aid, place a suitable timber measuring approx. 20 – 25 cm in height underneath the sowing units which are to be lifted.
- Lower the machine until the detent pawl locks.

Deactivate



- Push the spring on the detent pawl backwards to the "Deactivate" position.
- As an auxiliary aid, place a suitable timber measuring approx. 20 – 25 cm in height underneath the sowing units which are to be lowered.
- Lower the machine until the detent pawl disengages.

Rubber V press wheel

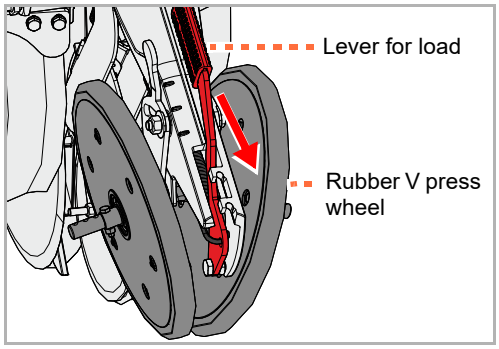
The rubber V press wheel closes the furrow and presses on the grain. The aim is an optimum connection of the seeds to the water supply of the soil. The necessary pressure depends on the ground type.

You can make various settings to the rubber V press wheels:

- Setting the load
- Setting the distance
- Setting the inclination angle

Load

The load can be set in three stages. For the maximum load, set the lever to the rearmost stage.



- Move the rubber V press wheels to the required position using the lever.
- Let the lever catch.
- Adjust the settings for all rubber V press wheels in the same way.

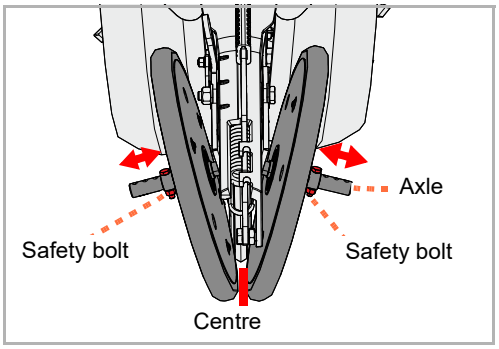
Distance

This adjustment is only possible with the narrow rubber V press wheels.

In addition, with the narrow rubber V press wheels, you can determine how the press wheels work by the distance on the axle. The effect is dependent on the ground type and deposit depth.

Ground type	Deposit depth	Distance to the centre
Heavy soils	Flatter	Closer
Light soil	Deeper	Further apart

Make the same setting on both sides.

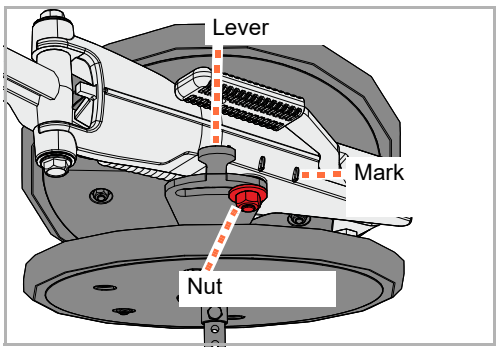


- Remove the safety bolt from each rubber V press wheel.
- Shift the rubber V press wheel on the axle as required.
- Secure the rubber V press wheel again with the safety bolt.

Inclination angle

Setting of the inclination angle is infinitely variable:

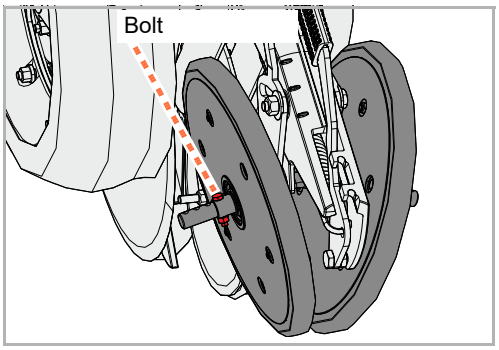
Lever position	Rubber V press wheel position	Effect
Front	Further apart	Intense stopping up of the furrow
Rear	Closer together	Minimal covering of the furrow



- Release nut.
- Move the lever to the required position. Use the markings for orientation.
- Re tighten the nut.
- Adjust the settings for all rubber V press wheels in the same way.

Replacement

Depending on the soil conditions, a wide or narrow rubber V press wheel is of advantage. Use the same type of rubber V press wheels for all sowing units.



- Remove the safety bolt from each rubber V press wheel.
- Replace the rubber V press wheel and secure it with the safety bolt.

Electronic control system

If the machine is equipped with an electronic control system, such as e-drive II, functions of the machine are activated and deactivated via the electronic control system.

- ▸ Before starting the seeding work on the tractor's terminal, implement the settings and input.

→ Operating manual for the electronic control system

Working with area maps

For automated work with area maps and variable application rate, the quality of the seeding depends on various factors:

- Working speed
- Quality of the GPS signal
- Type of sowing unit
- The working width of the machine



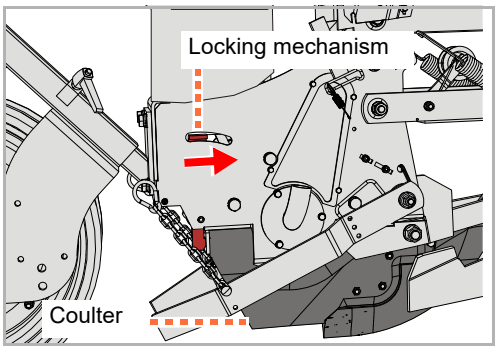
- To ensure that the application rate varies, as planned via the area map, drive at a constant working speed.
- Select a grid size that at least corresponds to the machine's working width.
- For seeding variable application rates, set the grains per hectare [s/ha] format at the terminal.

Seed disc

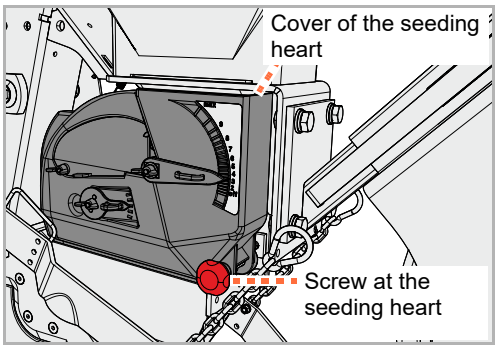
Appropriate seed discs are available for the different seeds. Check before starting to sow, whether the correct seed disc is installed.
The systems using negative pressure or overpressure must be set accordingly.

System using negative pressure

Normal seed

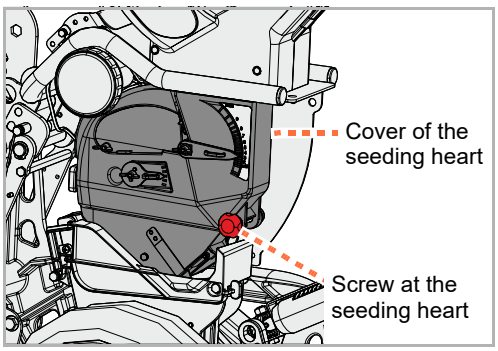


- Release the locking mechanism for the coulter.
- Fold down the coulter.



- Loosen the bolt and remove the cover of the seeding heart.

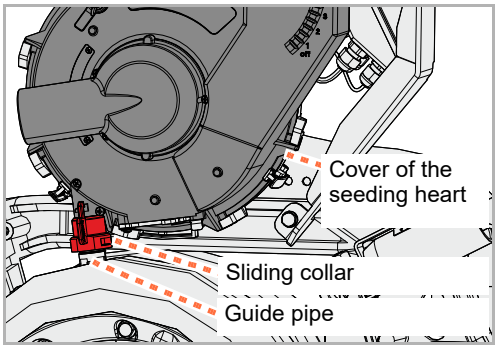
HD-II



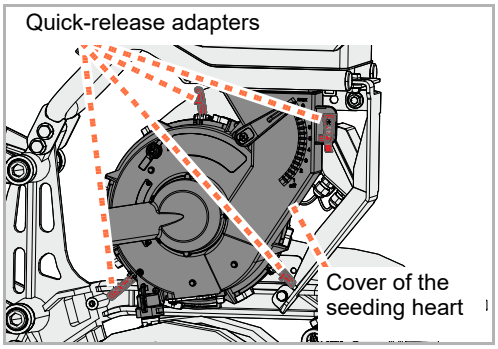
- Loosen the bolt and remove the cover of the seeding heart.

System using overpressure

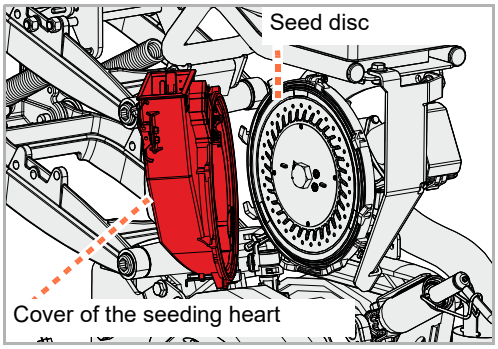
SX



- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart.



- Loosen the quick-release adapters on the cover of the seeding heart.

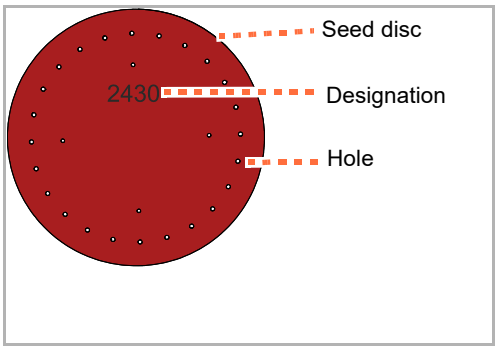


- Turn the cover of the seeding heart clockwise and unlock it.
- Remove the cover of the seeding heart and place it to one side.

There is a four-digit number on the seed disc. It consists of:

- Number of holes
  (digits 1 and 2)
- Bore diameter [mm]
  (digits 3 and 4)

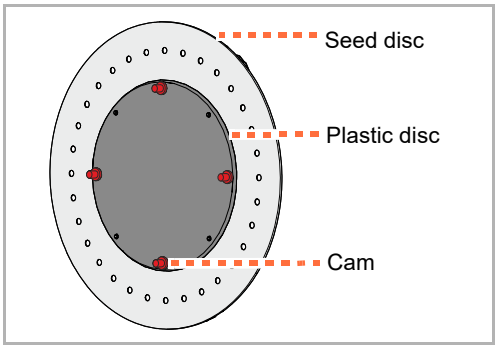
Example



Seed disc 2430 =
Seed disc with 24 holes and a diameter of 3.0 mm per hole

Deliverable seed discs

System using negative pressure



The seed discs for the system using negative pressure can be identified by the plastic disc with the driving pins.

- Only measure the negative pressure when the seed disc is filled.
- Set it to a high value, if possible.

→ Setting the pressure, »Pressure setting for system using negative pressure« section, page 92

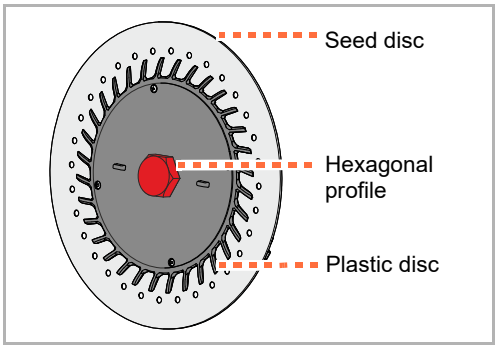
Seed disc	Seed	Negative pressure [mbar]
0840	Pumpkin	40 – 50
1215	Turnips, naked seed	40 – 50
1250	Maize narrow sowing	70 – 90
1225	Small sunflowers	40 – 50
1275	Broad beans	90 – 100
2420	Beet	40 – 50
2420	Chicory	30
2430	Sunflowers	40 – 50
2435	Sunflowers	40 – 50
2450	Maize	70 – 90
2465	Big Beans	100
3220	Beet	40 – 50
3220	Chicory	30
3225	Beet	40 – 50
3230	Sunflowers and others	40 – 50

Seed disc	Seed	Negative pressure [mbar]
3245	Maize up to TGW 220	50 – 80
3250	Maize up to TGW 320	70 – 90
3255	Maize from TGW 280, broad beans	70 – 100
4040	Maize	50 – 80
4050	Maize up to TGW 320	70 – 90
4820	Beet	40 – 50
4835	Dwarf beans	80
4855	Broad beans with narrow sowing distance	90 – 100
6420	Beet	40 – 50
6430	Soybeans	80
6440	Peas, soybeans	50 – 90
8020	Sorghum/turnips	40 – 50
9612	Rape	20 – 40
9620	Sorghum	20 – 30
9625	Sorghum	40 – 50

Replacement

→ Chapter »Refitting«, section »Replacing the seed discs«, page219

System using overpressure



The seed discs for the system using overpressure can be identified by the hexagonal head bolt on the plastic disc.

- Only measure the overpressure when the seed disc is filled with seed.
- Select the bold value from the table as the initial value when starting to set the pressure.

→ Setting the pressure, »Pressure setting for system using overpressure« section, page 98

Seed disc	Seed	Cover of the seeding heart	Overpressure [mbar]
2430	Sunflowers	Maize	**50** - 65
2435	Sunflowers	Maize	**50** - 65
2440	Sunflowers	Maize	**50** - 65
2445	Maize up to TGW 220	Maize	60 - **65**
2450	Maize up to TGW 280	Maize	60 - **65**
2455	Maize TGW 280 or above	Maize	60 - **65**
3225	Turnips	Turnips	**40** - 60
3230	Sunflowers	Maize	**60** - 65
3235	Sunflowers	Maize	**50** - 65
3245	Maize up to TGW 220	Maize	60 - **65**
3250	Maize up to TGW 280	Maize	60 - **65**
3255	Maize TGW 280 or above	Maize	60 - **65**
6440	Soybeans	Maize	60 - **65**
7240	Soybeans	Maize	60 - **65**
8045	Soybeans	Maize	60 - **65**
9612	Rape	Rape	**30** - 65
9620	Sorghum	Turnips/rape	**40** - 60
9625	Sorghum	Turnips/rape	**40** - 60

Replacement

→ Chapter »Refitting«, section »System using overpressure«, page227

Setting the sowing distance

The sowing distance can be changed by:

- The type of seed disc (number of holes)
- The gear-box setting
- The settings in the electronic control system

→ Operating manual for the electronic control system

The required sowing distance must be known for the settings.

Calculating the sowing distance

The sowing distance in the row is the distance between the seeds sown in the row. The number of seeds sown per hectare depends on the row spacing.

If you want to have a certain number of seeds sown per hectare, you can calculate the sowing distance with the aid of a formula, which you can then set on the seeding machine.

Formula for calculating the sowing distance in the row

$$\text{Sowing distance} = \frac{10.000}{\text{Seeds/hectare x row spacing [m]}}$$



Example:
You wish to sow 100,000 individual seeds per hectare:

Seeds/hectare	= 100.000
Row distance	= 75 cm
Sowing distance	= ?

$$\frac{10.000}{100{,}000 \times 0.75} = 0,133\text{m} = 13.3\text{ cm}$$

The following table lists some sowing distances for the number of grains/ha and the row spacing.

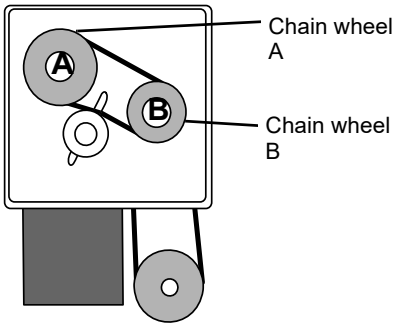
Row distance / Sowing distance [cm]	30 cm	35 cm	37.5 cm	40 cm	45 cm	50 cm	60 cm	70 cm	75 cm	80 cm
5	666.700	571.400	533.300	500.000	444.400	400.000	333.300	285.700	266.700	250.000
6	555.600	476.200	444.400	416.700	370.400	333.300	277.800	238.100	222.200	208.300
7	476.200	408.200	381.000	357.100	317.500	285.700	238.100	204.100	190.500	178.600
8	416.700	357.100	333.300	312.500	277.800	250.000	208.300	178.600	166.700	156.300
9	370.400	317.500	296.300	277.800	246.900	222.200	185.200	158.700	148.100	138.900
10	333.300	285.700	266.700	250.000	222.200	200.000	166.700	142.900	133.300	125.000
11	303.000	259.700	242.400	227.300	202.000	181.800	151.500	129.900	121.200	113.600
12	277.800	238.100	222.200	208.300	185.200	166.700	138.900	119.000	111.100	104.200
13	256.400	219.800	205.100	192.300	170.900	153.800	128.200	109.900	102.600	96.200
14	238.100	204.100	190.500	178.600	158.700	142.900	119.000	102.000	95.200	89.300
15	222.200	190.500	177.800	166.700	148.100	133.300	111.100	95.200	88.900	83.300
16	208.300	178.600	166.700	156.300	138.900	125.000	104.200	89.300	83.300	78.100
17	196.100	168.100	156.900	147.100	130.700	117.600	98.000	84.000	78.400	73.500
18	185.200	158.700	148.100	138.900	123.500	111.100	92.600	79.400	74.100	69.400
19	175.400	150.400	140.400	131.600	117.000	105.300	87.700	75.200	70.200	65.800
20	166.700	142.900	133.300	125.000	111.100	100.000	83.300	71.400	66.700	62.500
21	158.700	136.100	127.000	119.000	105.800	95.200	79.400	68.000	63.500	59.500
22	151.500	129.900	121.200	113.600	101.000	90.900	75.800	64.900	60.600	56.800
23	144.900	124.200	115.900	108.700	96.600	87.000	72.500	62.100	58.000	54.300
24	138.900	119.000	111.100	104.200	92.600	83.300	69.400	59.500	55.600	52.100
25	133.300	114.300	106.700	100.000	88.900	80.000	66.700	57.100	53.300	50.000
26	128.200	109.900	102.600	96.200	85.500	76.900	64.100	54.900	51.300	48.100
30	111.100	95.200	88.900	83.300	74.100	66.700	55.600	47.600	44.400	41.700
36	92.600	79.400	74.100	69.400	61.700	55.600	46.300	39.700	37.000	34.700
46	72.500	62.100	58.000	54.300	48.300	43.500	36.200	31.100	29.000	27.200

Settings at the transmission

Two types of drives can be used on the machine:

- Standard gearbox
- e-drive II [+]

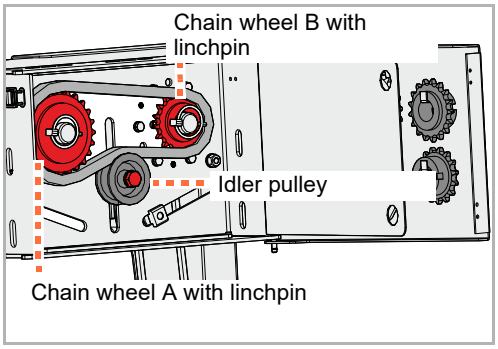
Standard gearbox



The sowing distance is set with chain wheels. The table shows which combination in conjunction with the seed disc produces the required sowing distance.

Chain wheel		Sowing distance [cm]									
		Number of holes in the seed disc									
A	B	8	12	24	32	40	48	64	72	80	96
24	13*	24.0	16.0	8.0	6.0	4.8	4.0	3.0	2.7	2.4	2.0
25*	15	26.5	17.7	8.8	6.6	5.3	4.4	3.3	2.9	2.7	2.2
24	15	27.6	18.4	9.2	6.9	5.5	4.6	3.5	3.1	2.8	2.3
24	17	31.3	20.9	10.4	7.8	6.3	5.2	3.9	3.5	3.1	2.6
19	15	34.9	23.3	11.6	8.7	7.0	5.8	4.4	3.9	3.5	2.9
19	16	37.2	24.8	12.4	9.3	7.4	6.2	4.7	4.1	3.7	3.1
19	17	39.6	26.4	13.2	9.9	7.9	6.6	4.9	4.4	4.0	3.3
19	18	41.9	27.9	14.0	10.5	8.4	7.0	5.2	4.7	4.2	3.5
18	19	46.7	31.1	15.6	11.7	9.3	7.8	5.8	5.2	4.7	3.9
17	19	49.4	32.9	16.5	12.4	9.9	8.2	6.2	5.5	4.9	4.1
16	19	52.5	35.0	17.5	13.1	10.5	8.8	6.6	5.8	5.3	4.4
15	19	56.0	37.3	18.7	14.0	11.2	9.3	7.0	6.2	5.6	4.7
18	24	59.0	39.3	19.7	14.7	11.8	9.8	7.4	6.6	5.9	4.9
17	24	62.4	41.6	20.8	15.6	12.5	10.4	7.8	6.9	6.2	5.2
16	24	66.3	44.2	22.1	16.6	13.3	11.1	8.3	7.4	6.6	5.5
15	24	70.7	47.2	23.6	17.7	14.1	11.8	8.8	7.9	7.1	5.9
13*	22*	74.8	49.9	24.9	18.7	15.0	12.5	9.4	8.3	7.5	6.2
13*	24	81.6	54.4	27.2	20.4	16.3	13.6	10.2	9.1	8.2	6.8
13*	25*	85.0	56.7	28.3	21.3	17.0	14.2	10.6	9.4	8.5	7.1
13*	27*	91.8	61.2	30.6	23.0	18.4	15.3	11.5	10.2	9.2	7.7
13*	28*	95.2	63.5	31.7	23.8	19.0	15.9	11.9	10.6	9.5	7.9
13*	30*	105.0	68.0	34.0	25.5	21.0	17.0	12.8	11.7	10.5	8.5

* = These chain wheels are an accessory



- Remove the linchpins.
- Release the idler pulley with the crank or the 17 mm spanner. The chain is now relieved of tension.
- Remove the chain.
- Replacing the chain wheels.
- Secure the chain wheels with the linchpins.
- Put on the chain, but do not tension the idler pulley too tight.

Filling with seed



Observe the notes
When working with crop protection chemicals, all relevant information on the handling of crop protection chemicals and the specific safety instructions of the crop protection chemicals manufacturer must be observed.
Improper handling of crop protection chemicals is harmful to your health.

Protection against fine dust
When working in an environment contaminated with dust and other fine particles from crop protection chemicals, it may be necessary to wear a breathing mask and latex gloves. Observe the specific safety instructions issued by the crop protection chemicals manufacturer.
Improper handling of crop protection chemicals is harmful to your health.



Use only suitable seed
Use only appropriate and clean seed.
Objects like stones or metal cause significant damage to the seed discs and incorrect seeding results.

Checking the seed hopper
Before filling, check the seed hopper for foreign bodies.
Foreign bodies can cause significant damage to the seed discs and incorrect seeding results.

Do not allow any dust to enter
Do not fill the seed hopper with dust or other fine particles from the seed bag.
This can cause serious wear to the seed discs.

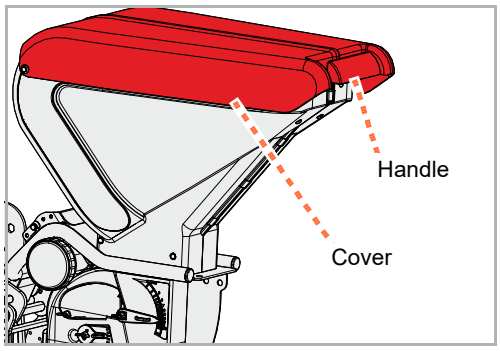
Observe the fill level
Minimum and maximum fill levels must be observed. For the minimum fill level: The seeding heart inlet must be filled.
Exceeding or falling short of the permitted fill level will lead to incorrect grain deposit.

At first fill in only the seed hopper of the first sowing unit.

The other sowing units are only filled later on the field, as transport with full seed hoppers is not permitted. The permissible total weight is exceeded if the seed hoppers are full.

System using negative pressure

Normal seed, Tandem, HD-II



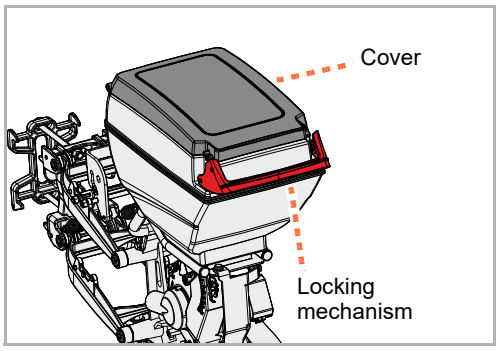
- Open cover at handle.
- Inspect the seed hopper for foreign bodies and remove them.
- Fill the seed above the minimum fill level.
- Close the cover.

Fill the seed hopper up to no further than 2 cm below the edge of the hopper.

System using overpressure

SX

Switch off drive
The seed hopper is pressurised; opening it can cause the sudden release of harmful dressing agent dusts.
Only open the cover of the seed hopper when the fan is deactivated.



- Switch off drive.
- Open the locking mechanism.
- Open the cover.
- Inspect the seed hopper for foreign bodies and remove them.
- Fill the seed above the minimum fill level.
- Check the seal. There must be no seed on the seal.
- Close the cover and secure using the locking mechanism.

Fill the seed hopper up to no further than 2 cm below the edge of the hopper.

Pressure setting for system using negative pressure

The fan produces a negative pressure to separate the grains in the seeding heart and pull them onto the holes in the seed disc. The negative pressure at the fan must be set such that all holes on the seed disc are always filled.



Selecting the correct pressure setting
The correct negative pressure setting has a significant influence on the seeding quality.
Misses on the seed disc caused by an incorrect negative pressure setting cannot be compensated by subsequent settings.

Influencing factors

The following factors influence the negative pressure setting:

Seed

- The grain size and the dimensions of the holes in the seed disc must match each other.
- The surface roughness, e.g. for dressed seeds, influences the required negative pressure. Rough dressing agents require more negative pressure to deposit the grains on the seed disc.

Thousand grain weight:

- Seed with a high thousand grain weight requires more negative pressure than seed with a low thousand grain weight.

Velocity

- The filling process needs to be faster at higher driving speeds. This requires more negative pressure.

Fan

A manometer indicates the negative pressure on the fan.

The indicator of the manometer must be at "0" if the fan is deactivated. If this is not the case, the manometer must be recalibrated
→ See manometer, »Maintenance« chapter, »Manometer« section, page 199

A regulating flap on the back of the fan regulates the inflow of air. A sliding cover on the front regulates the outflow of air. This air outflow is used for the delivery of fertiliser.

Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

Setting the negative pressure

The negative pressure is set via the fan speed if the seed disc is filled. The speed of the fan is controlled by the rotation of the PTO stub shaft.

→ Chapter »Coupling the machine«, section »Hydraulic system«, page48

- To start, select the fan speed such that the higher value in the pressure table is achieved.
- Check the filling process and adjust the upper and lower scrapers.

→ Chapter »Preparing for operation«, section »Seeding heart«, page103

- If doubles cannot be eliminated with the scraper setting, gradually lower the fan speed to reduce the negative pressure until no more doubles occur.

The negative pressure values are listed in the table for the seed discs. They are approximations. The exact setting can only be performed on the field.
→ Chapter »Preparing for operation«, section »Deliverable seed discs«, page82

The negative pressure needs to be set precisely, otherwise there will be misses.
If you are working with large seed, such as broad beans, opt for a higher negative pressure setting.

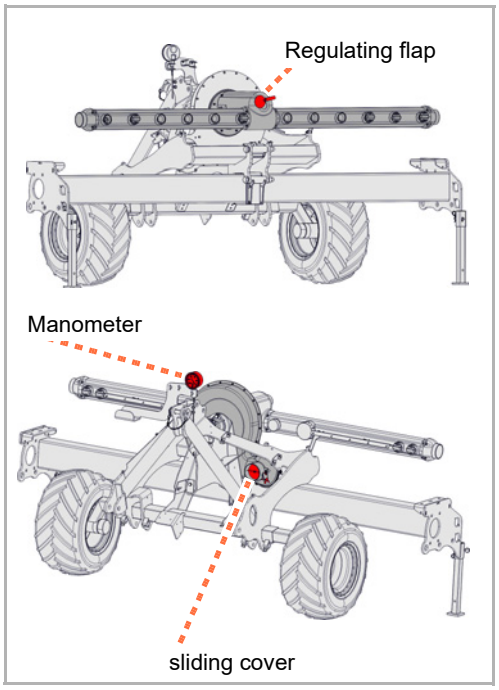
In doing so, ensure that the maximum PTO speed that is indicated on the fan is not exceeded. A lower fan speed reduces the fuel consumption and noise.

Without fertiliser spreader

Mechanical fan drive

If the machine is fitted with a mechanical fan drive, the negative pressure is set via the fan speed and sliding cover.

→ Pressure values table, »System using negative pressure« section, page 82



- Fully close the regulating flap.
- Increase the PTO speed until the correct negative pressure is reached on the manometer with the seed disc filled. Never exceed the permitted rotational speed while doing so.

If the required value is not reached:

- Open the sliding cover until the correct negative pressure is reached.

If the required value is exceeded:

- Reduce the tractor's PTO speed

Or

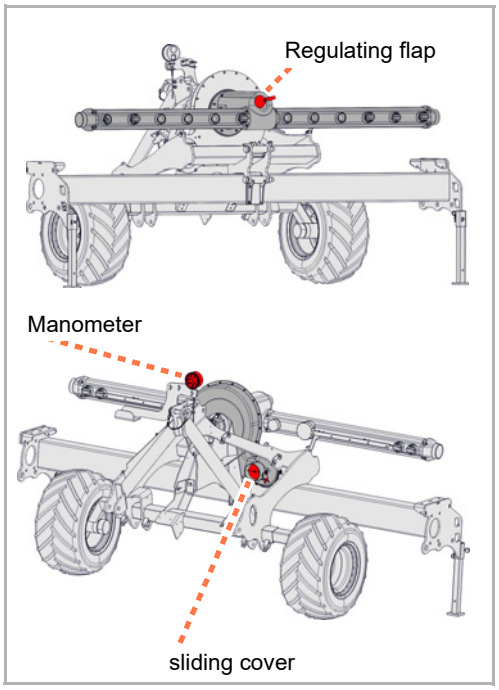
- Open the regulating flap further.

The setting can be further optimised by opening the sliding cover and/or regulating flap in order to reduce fuel consumption and noise emissions. If this increases the negative pressure, reduce the PTO speed until the manometer shows the correct negative pressure again.

Hydraulic fan drive

If the machine is fitted with a hydraulic fan drive, the negative pressure is set via the fan speed and sliding cover.

→ Pressure values table, »System using negative pressure« section, page 82



- Fully close the regulating flap.
- Open the sliding cover halfway.
- Switch on the tractor's oil supply.
- Set the oil flow for the required negative pressure.

If the required value is still not reached:

- Open the sliding cover further.

If the required value is exceeded:

- Close the sliding cover further.

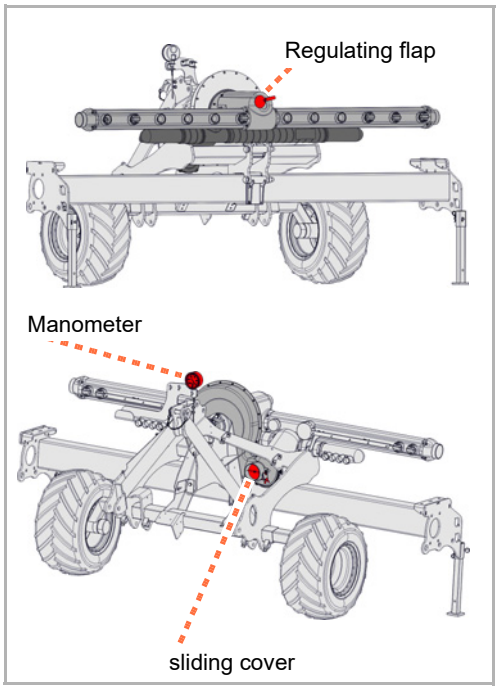
Set the tractor's oil flow so that the hydraulic motor runs evenly. Readjust the negative pressure using the sliding cover if required.

With fertiliser spreader

Mechanical fan drive

If the machine is fitted with a mechanical fan drive, the negative pressure is set via the fan speed and sliding cover.

→ Pressure values table, »System using negative pressure« section, page 82



- Open the regulating flap halfway.
- Increase the PTO speed until the correct negative pressure is reached on the manometer with the seed disc filled. Never exceed the permitted rotational speed while doing so.

If the required value is not reached:

- Open the sliding cover until the correct negative pressure is reached.

If the required value is exceeded:

- Reduce the tractor's PTO speed

Or

- Open the regulating flap further.

The setting can be further optimised by opening the sliding cover and/or regulating flap in order to reduce fuel consumption and noise emissions. If this increases the negative pressure, reduce the PTO speed until the manometer shows the correct negative pressure again.

- Check the fertiliser delivery

If the fertiliser hoses become clogged:

- Increase the tractor's PTO speed and adjust the negative pressure using the sliding cover

Or

- Open the regulating flap further

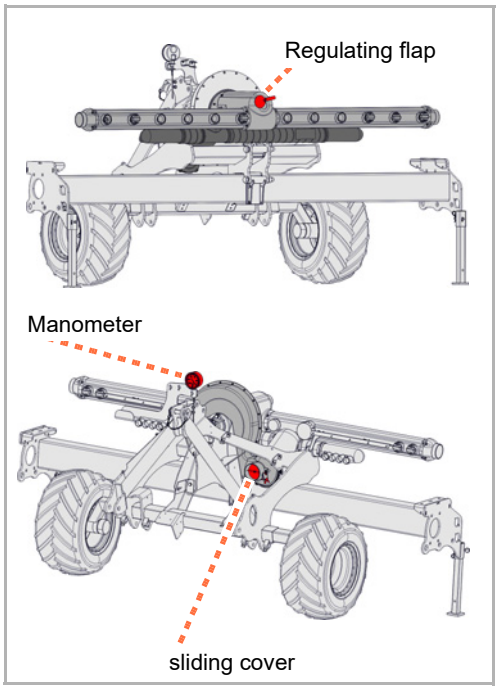
Or

- Reduce the working speed.

Hydraulic fan drive

If the machine is fitted with a hydraulic fan drive, the negative pressure is set via the fan speed and sliding cover.

→ Pressure values table, »System using negative pressure« section, page 82



- Open the regulating flap halfway.
- Open the sliding cover halfway.
- Switch on the tractor's oil supply.
- Set the oil flow for the required negative pressure.

If the required value is not reached:

- Open the sliding cover further.

If the required value is exceeded:

- Close the sliding cover further.

- Check the fertiliser delivery.

If the fertiliser hoses become clogged:

- Increase the tractor's oil flow and adjust the negative pressure using the sliding cover

Or

- Open the regulating flap further

Or

- Reduce the working speed.

Set the tractor's oil flow so that the hydraulic motor runs evenly. Readjust the negative pressure using the sliding cover if required.

Pressure setting for system using overpressure

The fan produces an overpressure to separate the grains in the seeding heart and press them into the holes in the seed disc. The overpressure at the fan must be set such that all holes on the seed disc are always filled.

Influencing factors

The following factors influence the overpressure setting:

Seed

- The grain size and the dimensions of the holes in the seed disc must match each other.
- The surface roughness, e.g. for dressed seeds, influences the required overpressure. Rough dressing agents require more overpressure to deposit the grains on the seed disc.

Thousand grain weight:

- Seed with a high thousand grain weight requires more overpressure than seed with a low thousand grain weight.

Velocity

- The filling process needs to be faster at higher driving speeds. This requires more overpressure.

Fan

A manometer indicates the overpressure on the fan.
A regulating flap regulates the inflow of air between the separating system and the fertiliser delivery.

The indicator of the manometer must be at "0" if the fan is deactivated. If this is not the case, the manometer must be recalibrated
→ See manometer, »Maintenance« chapter, »Manometer« section, page 199

Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

Setting the overpressure

The overpressure is set via the fan speed if the seed disc is filled. The speed of the fan is controlled by the rotation of the PTO stub shaft.

→ Chapter »Coupling the machine«, section »Hydraulic system«, page48

- To start, select the fan speed such that the bold initial value in the pressure table is achieved for the relevant seed disc and seed.

The values are listed in the table for the seed discs. They are approximations. The exact setting can only be performed on the field.
→ Chapter »Preparing for operation«, section »Deliverable seed discs«, page84

- Check the filling process and adjust the upper and lower scrapers.

→ Chapter »Preparing for operation«, section »Seeding heart«, page103

- If doubles cannot be eliminated with the scraper setting, gradually lower the fan speed to reduce the overpressure until no more doubles occur.

The overpressure needs to be set precisely, otherwise there will be misses.
If you are working with large seed, such as broad beans, opt for a higher overpressure setting.

In doing so, ensure that the PTO speed that is indicated on the fan is not exceeded. A lower fan speed reduces the fuel consumption and noise.

If the pressure is too high, seed with a low weight may be blown out of the furrow.

The fault table provides further information on the pressure setting
→ Chapter »Eliminating faults«, section »SX seeding technology«, page239

Without fertiliser spreader

Mechanical fan drive

On a machine which has a mechanical fan drive and is driven via the tractor's PTO, set the overpressure by means of the fan speed.

- Set the tractor's PTO to the required rotational speed.

If the required value is not reached:

- Increase the tractor's PTO speed.

If the required value is exceeded:

- Reduce the tractor's PTO speed.

Hydraulic fan drive

On a machine which has a hydraulic fan drive and is driven via the tractor's oil supply, set the overpressure by means of the fan speed.

- Switch on the tractor's oil supply.
- Set the oil flow for the required overpressure.

If the required value is not reached:

- Increase the oil flow.

If the required value is exceeded:

- Reduce the oil flow.

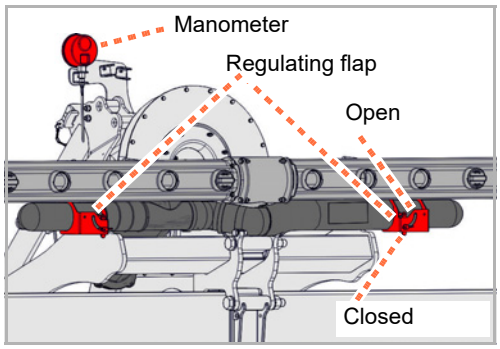


Set the tractor's oil flow so that the hydraulic motor runs evenly.

With fertiliser spreader

Mechanical fan drive

On a machine which has a mechanical fan drive and is driven via the tractor's PTO, set the overpressure by means of the fan speed and the regulating flap.



- Open both regulating flaps halfway.
- Set the tractor's PTO to 800 rpm.
- Set the required overpressure using the regulating flaps.

If the required value is not reached:

- Increase the tractor's PTO speed.

If the required value is exceeded:

- Reduce the tractor's PTO speed

Or

- Open the regulating flaps further.

- Check the fertiliser delivery.

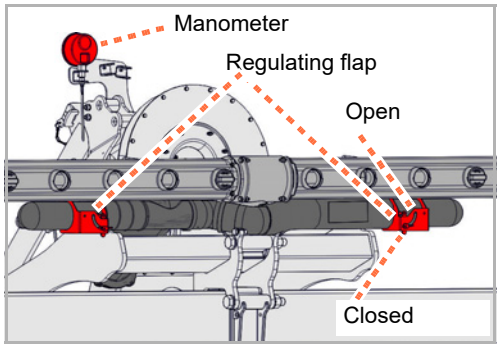
If the fertiliser hoses become clogged:

- Increase the tractor's PTO rotational speed and adjust the overpressure using the regulating flaps.

If the fertiliser spreader provided is not being used, set the overpressure as you would for a machine without a fertiliser spreader.
→ Chapter »Preparing for operation«, section »Without fertiliser spreader«, page94

Hydraulic fan drive

On a machine which has a hydraulic fan drive and is driven via the tractor's oil supply, set the overpressure by means of the fan speed and the regulating flap.



- Open both regulating flaps halfway.
- Switch on the tractor's oil supply.
- Set the oil flow for the required overpressure.

If the required value is not reached:

- Increase the oil flow.

If the required value is exceeded:

- Reduce the oil flow.

- Check the fertiliser delivery.

If the fertiliser hoses become clogged:

- Increase the tractor's oil flow and adjust the overpressure using the regulating flaps.

Set the tractor's oil flow so that the hydraulic motor runs evenly. Readjust the overpressure using the sliding cover if required.

If the fertiliser spreader provided is not being used, set the overpressure as you would for a machine without a fertiliser spreader.
→ Chapter »Preparing for operation«, section »Without fertiliser spreader«, page94

Seeding heart

Make the following settings only at the first sowing unit, at first. The correct setting is then transferred to the other sowing units.

Adjust the settings for the following:

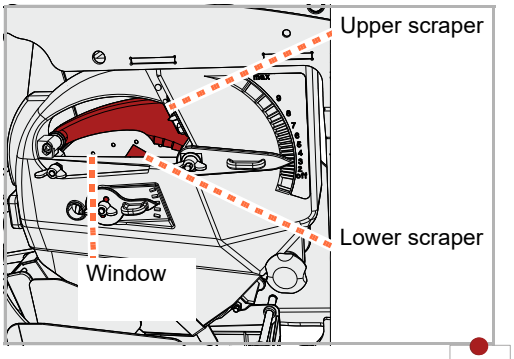
- Scraper
- Baffle plate

Preparations

- ▸ Let the fan run with the corresponding PTO shaft rpm.
- ▸ Place a catch pan under the first sowing unit.

System using negative pressure

Scraper



You can observe the seed on the seed disc through a window. Each hole in the seed disc must be occupied by exactly one grain.

The setting is made with:

- One upper scraper
- One lower scraper

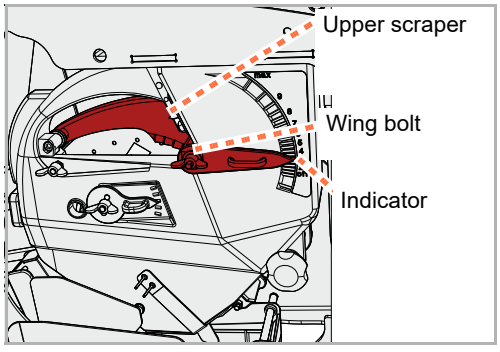
Doubles and misses can even result from an incorrectly set negative pressure.

Selecting the correct pressure setting
The correct negative pressure setting has a significant influence on the seeding quality.
Misses on the seed disc caused by an incorrect negative pressure setting cannot be compensated by subsequent settings.

Upper scraper

The correct position of the scraper needs to be found depending on the seed.

Higher scale value	=	More doubles
Lower scale value	=	More misses

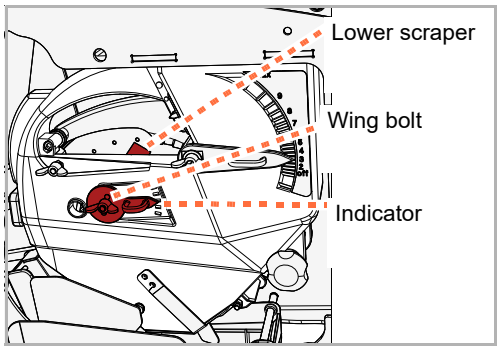


- ▸ Release wing bolt.
- ▸ Lift the indicator and determine the correct setting.
- ▸ Let the indicator engage.
- ▸ Tighten the wing bolt.

Lower scraper

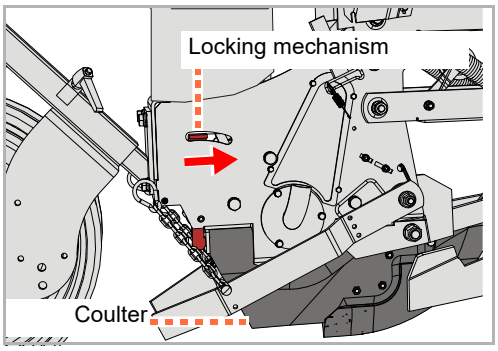
The lower scraper removes doubles that have not been detected by the upper scraper.

If the lower scraper removes seed from correctly occupied holes in the seed disc, the lower scraper must be moved down further.



- Release wing bolt.
- Lift the indicator and determine the correct setting. Adjust the lower scraper so that it is positioned against the bottom edge of the holes in the seed disc.
- Let the indicator engage.
- Tighten the wing bolt.

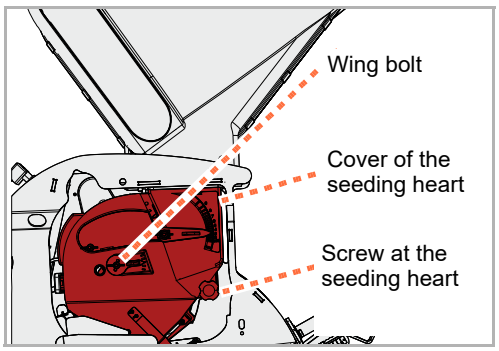
Normal seed



- Release the locking mechanism for the coulter.
- Fold down the coulter.

For broad beans or even larger seed:

For larger seed, the lower scraper can be removed:

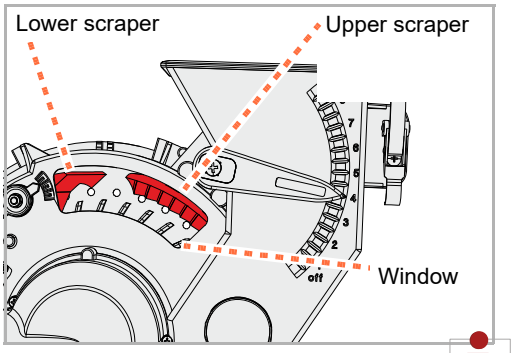


- Loosen the bolt and remove the cover of the seeding heart.
- Release the wing bolt and pull out the lower scraper.
- Replace the cover of the seeding heart correctly.

The remaining hole has no influence on the quality of the sowing.

System using overpressure

Scraper



You can observe the seed on the seed disc through a window. Each hole in the seed disc must be occupied by exactly one grain.

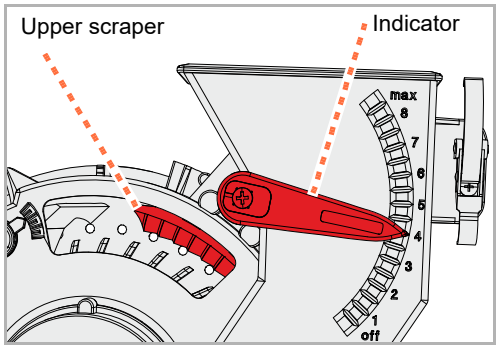
The setting is made with:

- The upper scraper
- The lower scraper

Doubles and misses can even result from an incorrectly set negative pressure.

Selecting the correct pressure setting
The correct negative pressure setting has a significant influence on the seeding quality.
Misses on the seed disc caused by an incorrect negative pressure setting cannot be compensated by subsequent settings.

Upper scraper

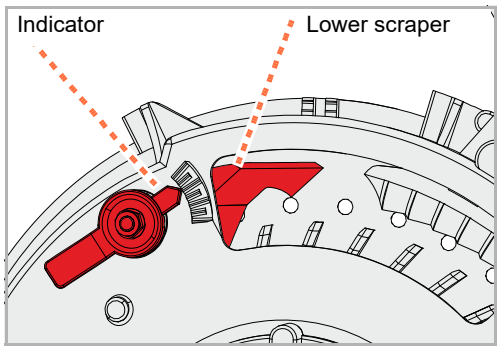


First, implement the basic setting on the upper scraper. The following example value apply for adjusting the indicator:

Coarse seed, such as maize, soya	4
Fine seed, such as rape, sorghum, turnip	3.5

- Lift the indicator and search for the correct basic setting.
- Let the indicator engage.

Lower scraper



The lower scraper removes doubles that have not been detected by the upper scraper. The lower scraper must be at the upper edge of the holes in the seed disc.

- Rotate the indicator and determine the correct setting.

To test the assignment, allow the seed disc to run at 8–10 km/h and check the assignment on the seed disc through the window.
→ Operating manual for the electronic control system, chapter »Preliminary information«, section »Other applicable documents«, page 5

For doubles or misses, readjust the upper scraper:

Doubles	Indicator value is too high	Set the scraper one detent lower
Misses	Indicator value is too low	Set the scraper one detent higher

If the lower scraper removes seed from correctly occupied holes in the seed disc, turn the lower scraper further upwards.

At higher driving speeds, the assignment on the seed disc can no longer be precisely identified through the window. In this case, the display on the electronic control system terminal needs to be observed carefully. In case of assignment faults:

- Correct the scraper setting accordingly.
- Expose the furrow and check the placement of the seeds.

Baffle plate

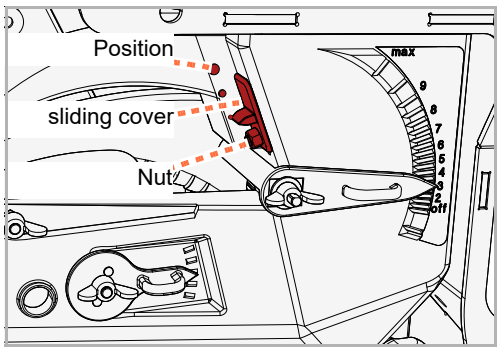
The baffle plate regulates the seed quantity which runs out of the seed hopper into the seeding heart. An incorrectly set baffle plate can result in too much seed in the seeding heart and therefore lead to the following problems:

- Faults during seed separation
- Damage to the seed
- Excessive seed can cause uncontrolled flow of seed out of the seeding heart and cause incorrect seed results.

System using negative pressure

The following settings serve as reference values:

Position 1	o	Turnips and small seed
Position 2	o	Standard
Position 3	O	Beans with high TGW and seed with large calibration

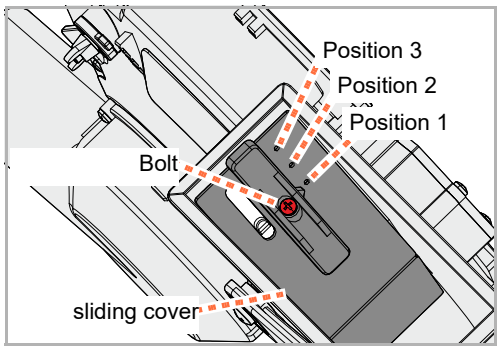


- Release nut.
- Shift the sliding cover as required.
- Re tighten the nut.

System using overpressure

The following settings serve as reference values:

Position 1	Standard
Position 2	Beet
Position 3	Rape



- Release the bolt.
- Shift the sliding cover as required.
- Retighten the bolt.

Checks

During a check, all settings at the seeding heart are checked. The sowing distance and the depth setting of the sowing unit will be checked later in the field.

Prerequisites:

☑ The seed disc is adapted to the seed

☑ Upper and lower scraper are set

☑ The baffle plate is set

☑ The seed hopper of the first sowing unit is filled with enough seed

☑ There is a sufficiently large catch pan below the seeding heart of the first sowing unit

☑ The machine is lifted

- Start up the sowing units using the calibration handle or the electronic control system.

If the seed is properly singled and the seed disc is free of patchy seeding or doubles:

- The values of the first sowing unit can be transferred to all other sowing units.

For safety reasons, perform the check once again after setting all the sowing units:

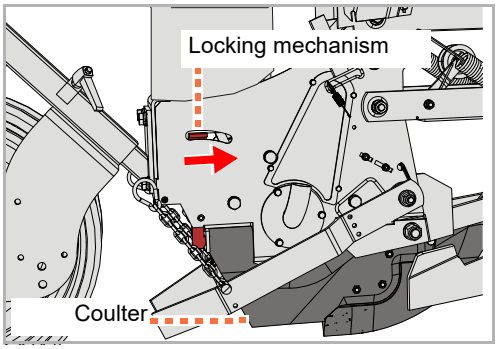
- Fill sufficient seed into all seed hoppers.
- Check each sowing unit.

Emptying the seed hopper

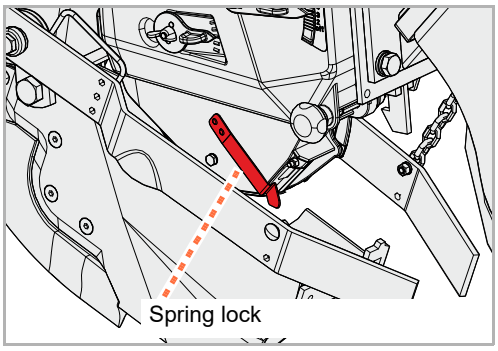
After a change of seed or after completing the seeding work, the seed has to be removed completely from the seed hoppers.

System using negative pressure

Normal seed
Tandem



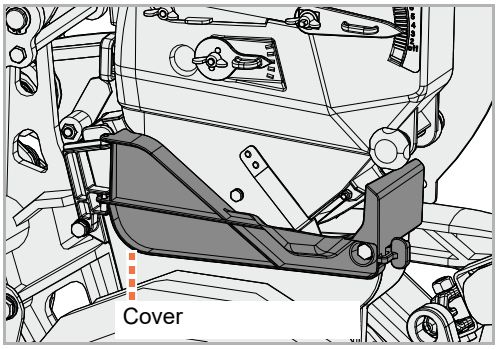
- Release the locking mechanism for the coulter.
- Fold down the coulter.



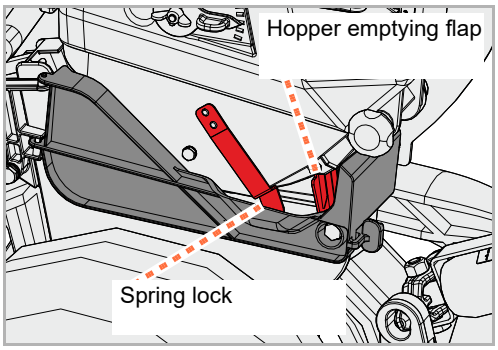
- Place a catch pan under the sowing unit.
- Pull the spring lock. The emptying flap folds downwards.
- Empty all of the seed.
- Close the emptying flap.

The emptying flap and spring lock must securely lock into place.

HD-II



Do not open the cover. This ensures that all the seed is conveyed to the catch pan.

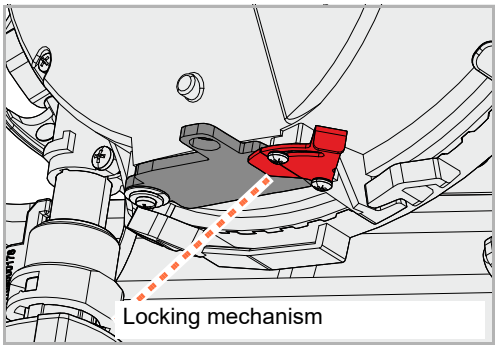


- Place a catch pan under the sowing unit.
- Pull the spring lock. The emptying flap folds downwards.
- Empty all of the seed.
- Close the emptying flap.

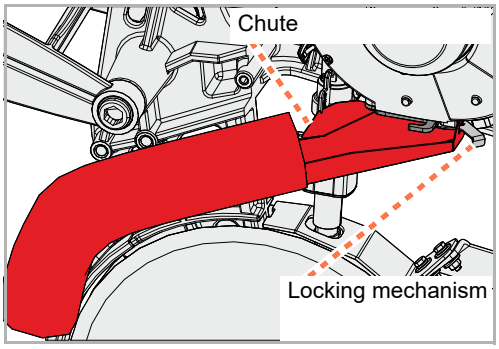
The emptying flap and spring lock must securely lock into place.

System using overpressure

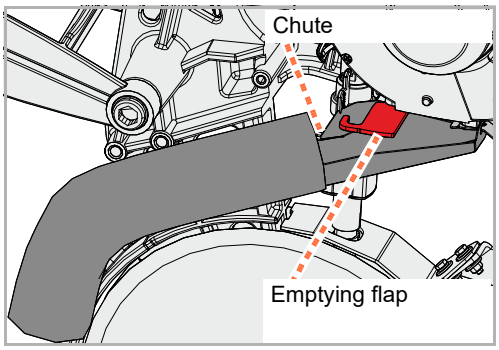
SX



- Set the locking mechanism to the "Empty" position.



- Insert the chute into the slit below the discharge opening and lock it into the locking mechanism.



- Place a catch pan under the chute.
- Open the emptying gate.
- Empty all of the seed.
- Close the emptying flap.
- Remove the chute.
- Move the locking mechanism to the "Close" position.

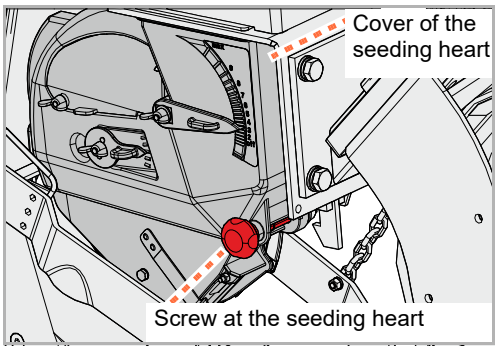
Changing the seed type

If you change the seed, the seed hopper has to be emptied completely. You can remove the cover of the seeding heart for checking.

- Empty the seed hopper as described above.

System using negative pressure

Normal seed
Tandem

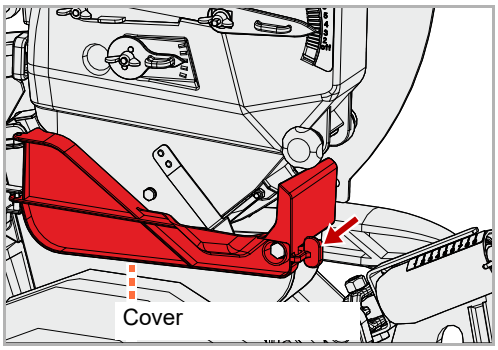


- Release bolt at the seeding heart.
- Take off the cover of the seeding heart and remove the remaining seed.

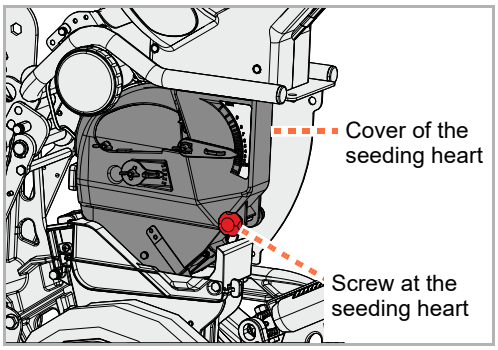
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.

- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

HD-II



- Unlock and open the cover.



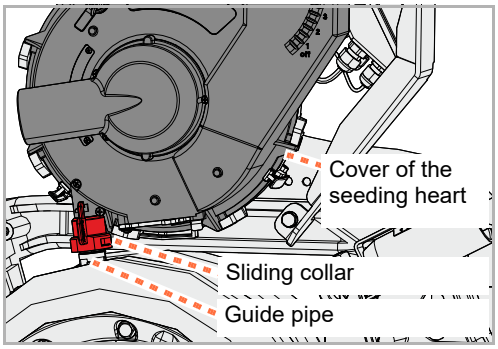
- Release bolt at the seeding heart.
- Remove the cover of the seeding heart and check for remaining seed.

Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.

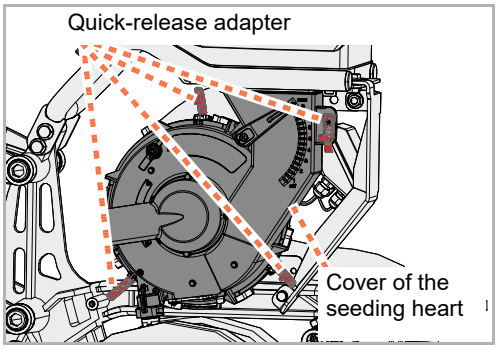
- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.
- Close and lock the cover.

System using overpressure

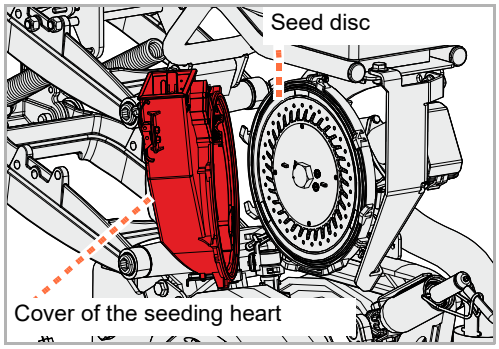
SX



- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart.



- Loosen the quick-release adapters on the cover of the seeding heart.



- Turn the cover of the seeding heart clockwise and unlock it.
- Take off the cover of the seeding heart and remove the remaining seed.

Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.

- Fit the cover of the seeding heart and turn it counter clockwise to lock it. Ensure proper position of the cover of the seeding heart.
- Close the quick-release adapters.
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it.

Ground clearance

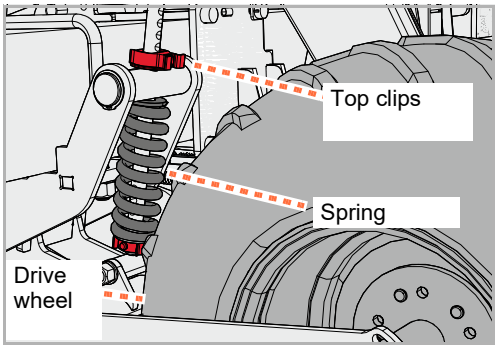
The machine is either equipped with drive wheels on rigid axles, or with axles for which the distance to the ground can be adjusted.
The distance from the frame to the ground should be approx. 50 cm.
You can adjust the distance using clips on the springs of the drive wheels.

Adjustable axles [+]

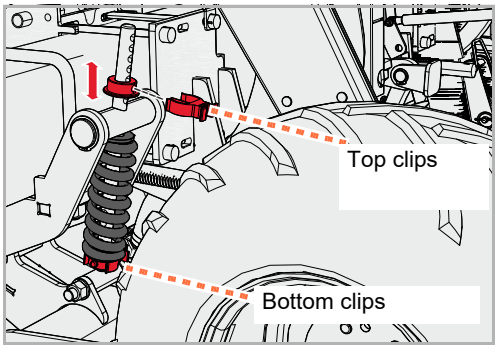
You must check the distance on the field since the soil conditions on the field have a significant effect on the ground clearance.

- Park the attached machine on solid ground.
- Switch off the hydraulic frame ballasting [+].

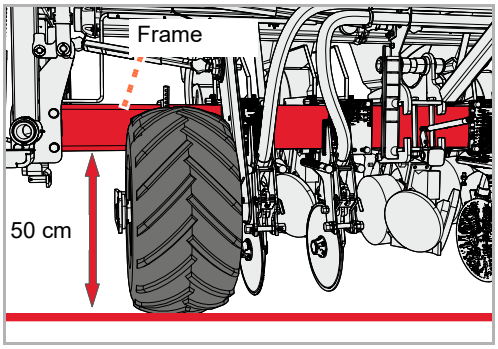
→ Chapter »Preparing for operation«, section »Hydraulic frame ballasting [+]«, page151



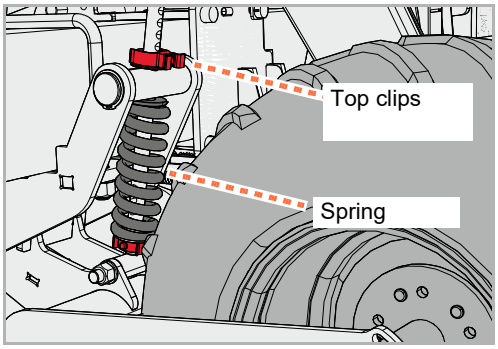
- Lift or lower the machine until the springs on the drive wheels no longer press against the clips at the top.



- Remove the upper clips from the resilient rod.



- Raise or lower the machine until the clearance between the ground and the bottom edge of the frame is 50 cm.



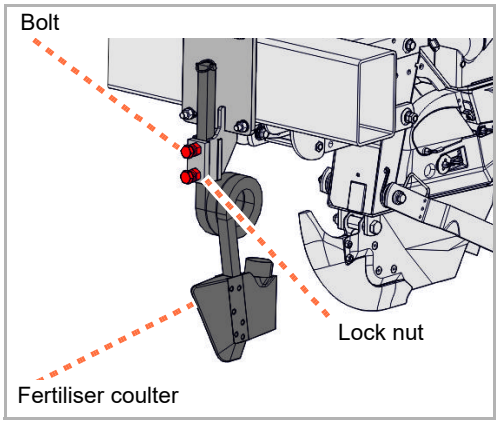
- Fit the top clips such that the spring has no play.
- If the change to the distance above the upper clips is not sufficient, also remove and move the lower clips.

Fertiliser coulters [+]

The fertiliser coulters are used to apply fertiliser to the roots of the plants. The fertiliser is deposited approximately 6 cm next to the seed row and 5 to 7 cm below the seed level directly during seeding. The fertiliser must be granulated and dry.

Deposit depth

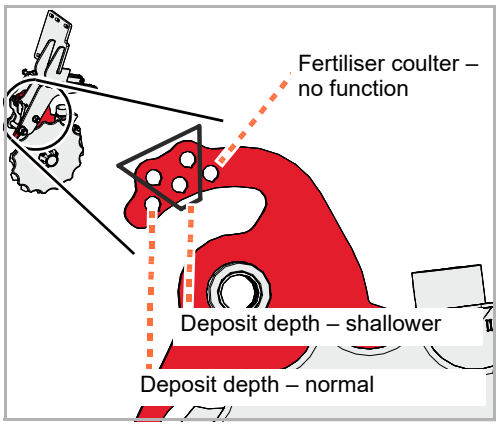
Standard fertiliser coulter



- Loosen the lock nuts.
- Loosen the bolts.
- Move the fertiliser coulter to the required deposit depth and secure in place with bolts.
- Tighten lock nuts.

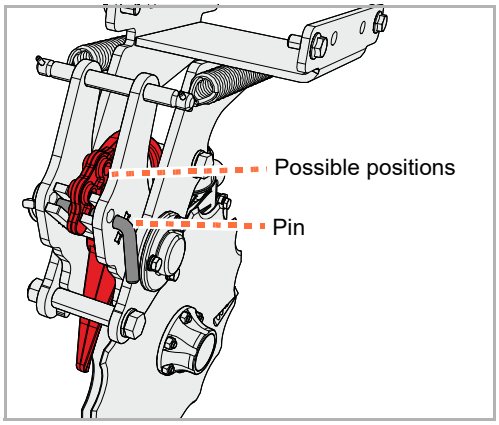
Fertiliser coulter with cutting discs [+]

The deposit depth of the fertiliser coulters can be adjusted in five positions.



Position	Selection
Fertiliser coulter – no function	No fertiliser is applied and the fertiliser coulters do not run in the ground
Deposit depth – normal	For light soil or flat application of the fertiliser
Deposit depth – deep	For medium to heavy soil

Sharp-edged fertiliser coulters
Risk of injury from sharp-edged fertiliser coulters.
Never make contact with the area below the coulters when setting the deposit depth.



- Remove pin.
- Set the working depth as required.
- Re-fit the pin and secure it using the split pin.

Fertiliser hopper [+]

No manual filling
Do not carry any loads when climbing onto the machine as you have to hold on with both hands.
Climbing on without the ladder or with a load can cause accidents.

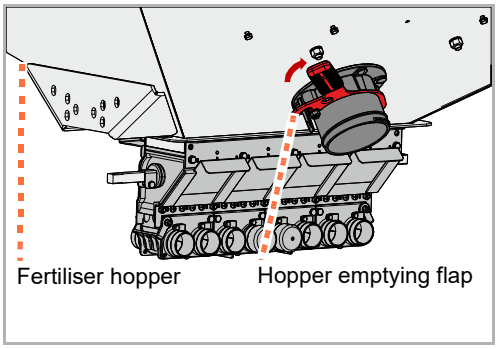
Observe maximum fill level
In the field, the fertiliser hopper can be filled up to the rim. The hopper cover must be able to close.
If the fill level is exceeded, the machine will be overloaded and the metering devices will wear considerably faster.

Closing the hopper

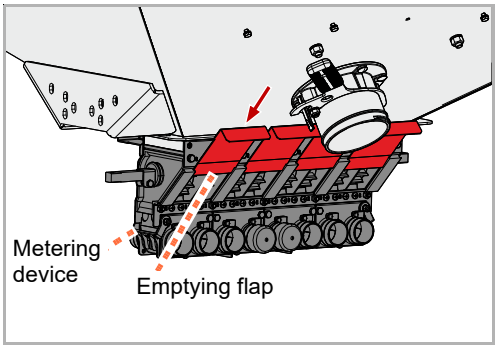
For each sowing unit, a metering wheel is installed on the metering device below the fertiliser hopper. The metering wheels have emptying gates and stoppers. Two additional emptying flaps are also installed on the fertiliser hopper.

Before pouring in the fertiliser, the emptying gates and emptying flaps must be closed.

Emptying flaps and emptying gates



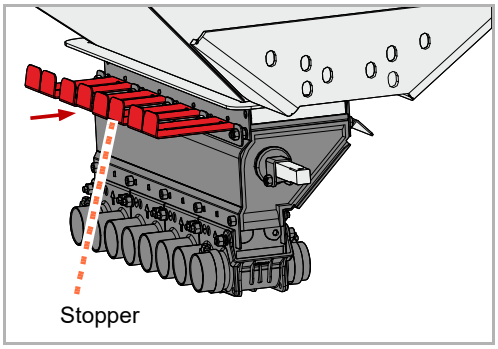
- Close the emptying flaps on the fertiliser hopper.



- Close the emptying gates on all metering wheels.

Stopper

The metering wheels on the metering devices have stoppers. Before pouring in the fertiliser, the stoppers must be closed.



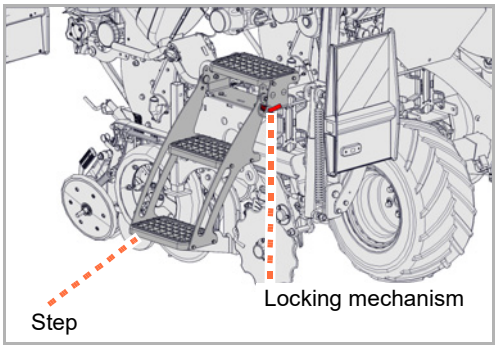
- Close the stoppers on all metering wheels.

Step

Do not enter the control platform when the machine is lifted
Entering and using the control platform when the machine is lifted is prohibited. When the machine is lifted, the climb to the first step is extremely high and the steps and the control platform are on an incline. This poses the risk of slipping.
This could result in injuries.

Control platform [+]

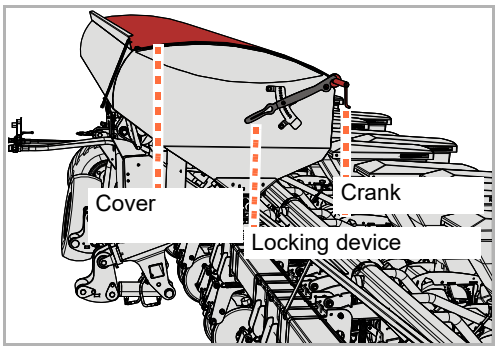
A control platform is located on the side of the machine.



- Open the locking mechanism.
- Unfold the step.

Cover

The fertiliser hopper is protected by a cover.



- Release the lock.
- Roll up the cover using the crank.

Checking

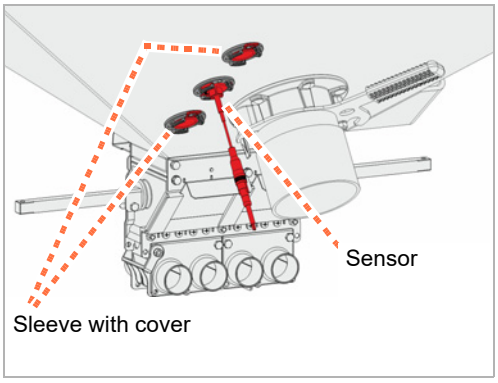
- Inspect the fertiliser hopper for foreign bodies and remove them.

Level indicator [+]

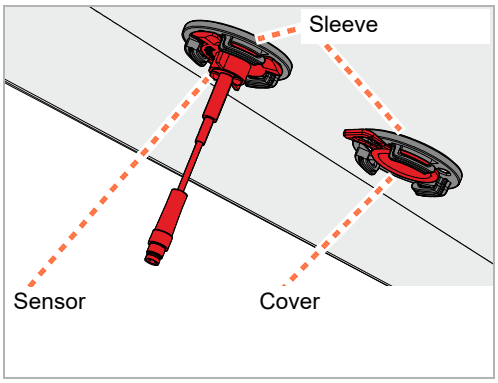
You can set the level indicator to various residues. An alarm indicates that the set residue has been reached.

The size of the residue depends on:

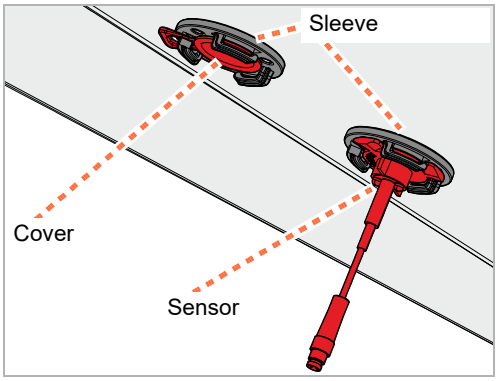
- Type of seed
- Application rate
- The working width of the machine
- The length of the field



The level indicator sensor is installed in a sleeve in the hopper. Other sleeves are provided for different fill levels.



- ▸ Turn the cover on the required sleeve clockwise and remove it.
- ▸ Turn the sensor clockwise and remove it.



- Insert the sensor into the sleeve for the appropriate fill level and turn it counter-clockwise. The sensor is secured.
- Place the cover on the sleeve that is still open and turn it counter-clockwise. The cover is secured.

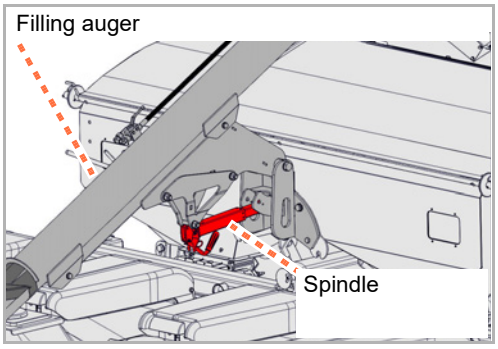
For the calibration test, the level indicator must be covered with seed or fertiliser to a depth of at least 3 cm.

At low application rates that do not cover the level indicator at its lower position, deactivate the "Seed hopper low level" alarm.
→ Operating manual for the software, section »Mitgeltende Dokumente«, page 5

Filling auger [+]

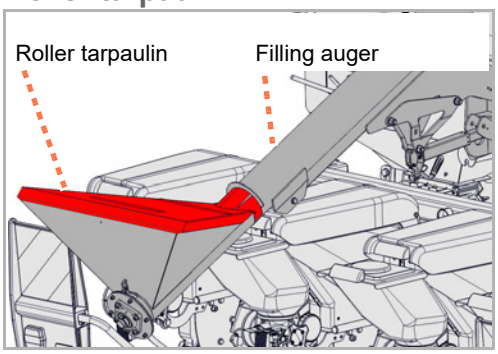
Technical data for the filling auger:
Chapter »Familiarising yourself with the machine«, section »Technical data«, page 33.

Fill level



- Use the spindle to set the feeding hopper for the filling auger to the required filling height.

Roller tarpaulin



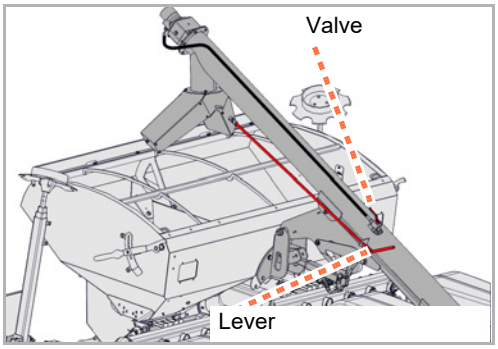
The feeding hopper of the filling auger is protected by a roller tarpaulin.

- Remove the roller tarpaulin on the filling auger.

Checking

Inspect the feeding hopper for foreign bodies and remove them

Switch on

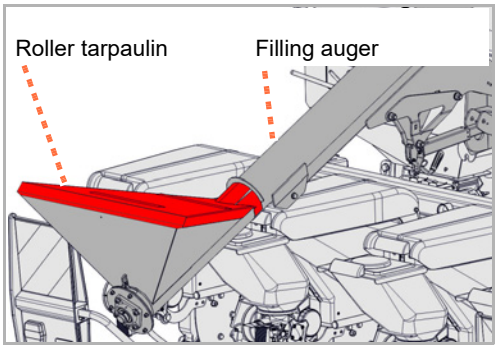


- Set the control device on the tractor to continuous operation.
- Open the valve.
- Use the lever to choose the filling side.
- Allow the fertiliser to flow into the feeding hopper. Do not overfill the fertiliser hopper.
- When sufficient fertiliser has been conveyed into the fertiliser hopper, stop the supply of fertiliser and allow the filling auger to run empty.

Switch off

- Close the valve.
- Move the control unit on the tractor to the neutral position.

Roller tarpaulin



- Close the roller tarpaulin on the filling auger.

Big Bag

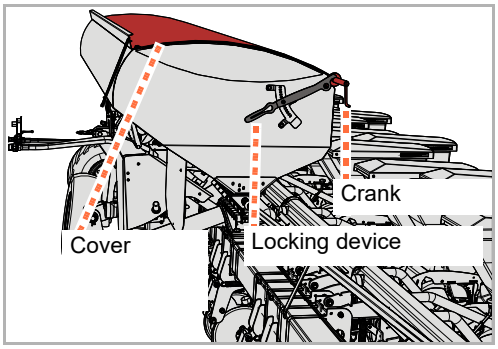
Particular risks are associated with filling a Big Bag. The load can sway; even standing underneath the raised Big Bag is dangerous.

Do not stand under or near raised Big Bags
Standing under or near raised Big Bags is dangerous. Maintain a sufficient distance and observe the behaviour of the load.
By swaying, the Big Bag could hit people and cause them to fall. This could result in injuries.

- Fill the fertiliser hopper with fertiliser. Note the fill level.

After filling

A roller tarpaulin protects the fertiliser against wind and rain. During sowing, always close the cover to keep dust and humidity away from the fertiliser.

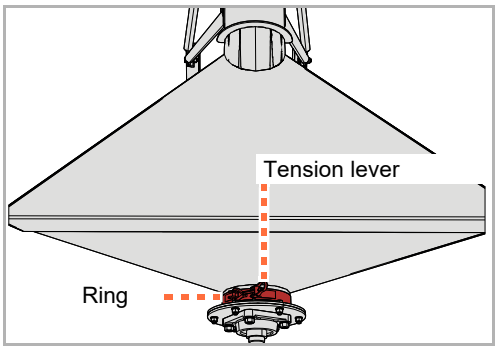


- Roll down the cover using the crank.
- Secure the cover with the securing mechanism.

Emptying the filling auger

Small quantities of fertiliser may remain in the feeding hopper of the filling auger, which may clump together even in normal air humidity and form a hard mass. Therefore, ensure that the filling auger is emptied completely.

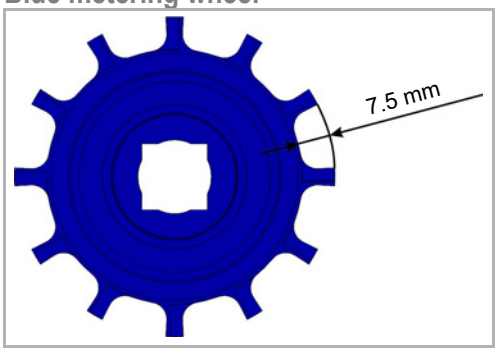
Only open the filling auger when it is deactivated
Do not run the filling auger when removing the remaining seed.
Reaching into the running filling auger would cause fingers to be caught and could lead to serious injury.



- Place a container underneath.
- Release the bolt.
- Open the tension lever.
- Slide the ring up and remove the remaining fertiliser.
- Slide the ring over the discharge opening and close the tension lever.

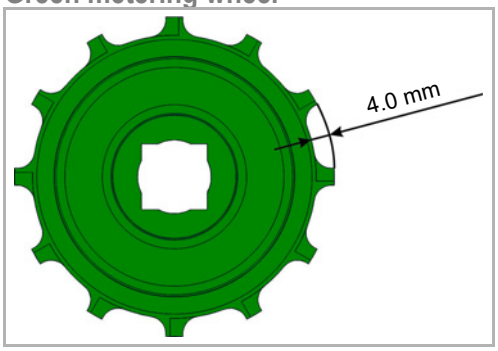
Setting the application rate

Blue metering wheel



The blue metering wheel has a cell wheel depth of 7.5 mm.

Green metering wheel

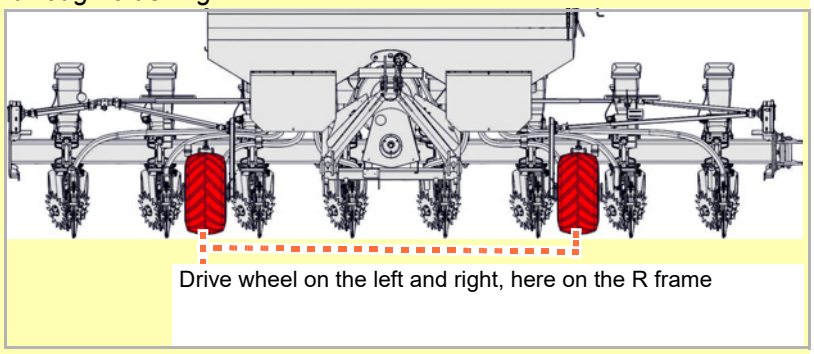


The green metering wheel has a cell wheel depth of 4.0 mm.

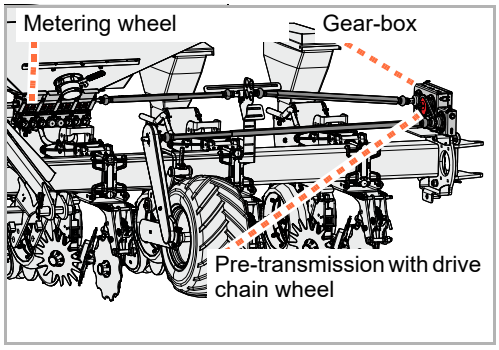
Mechanical fertiliser spreader drive

The application rate is set for the mechanical fertiliser spreader drive with chain wheels. Refer to the table to determine which combination yields the required application rate. The details are for reference only and may deviate from the actual values, depending on the type of fertiliser. Always perform a calibration test.

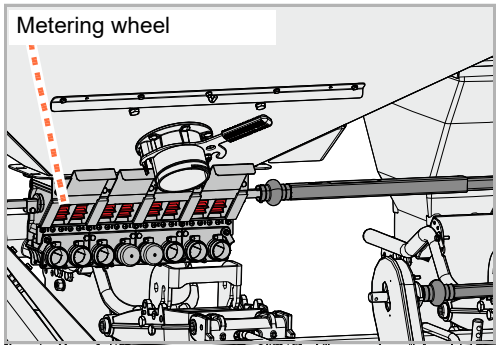
Secure against accidental switching on
Ensure that nobody turns the drive wheel while the settings are being made.
Turning the drive wheel may cause injury to fingers or hands through crushing.



Drive wheel on the left and right, here on the R frame



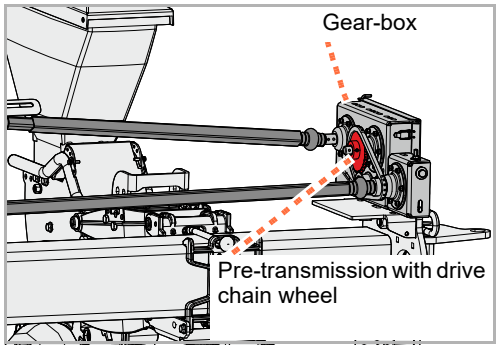
The mechanical fertiliser spreader is driven via the drive wheels on the frame. In doing so, use a drive chain wheel to transfer the power via the pre-transmission to the metering wheels on the fertiliser spreader.



The metering wheels are available in two versions:

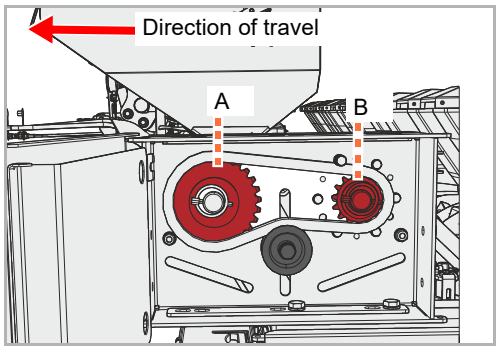
- Metering wheel with a depth of 4.0 mm
- Metering wheel with a depth of 7.5 mm [+] for increased application rates

→ Chapter »Maintenance«, section »Metering wheels«, page 214.



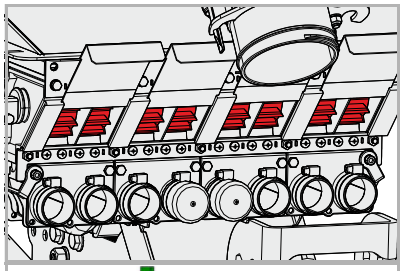
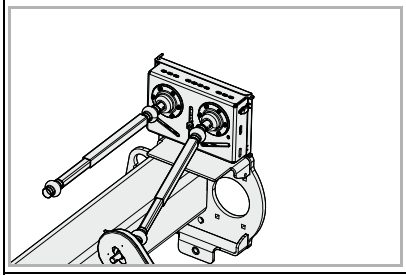
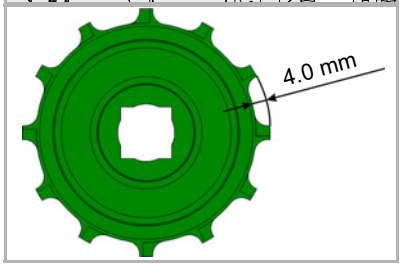
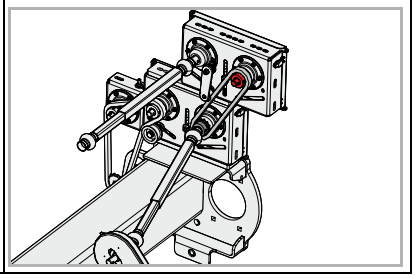
Two different chain wheels are installed in the pre-transmission:

- Chain wheel 15 for normal application rates
- Chain wheel 28 [+] for reduced application rates



A pair of chain wheels from chain wheels A and B is located in the gear-box. Chain wheel A is the first chain wheel in relation to the direction of travel.
The possible pairings are contained in the following tables.

Normal application rate

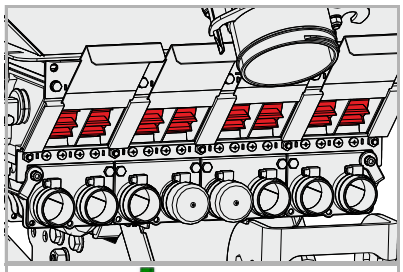
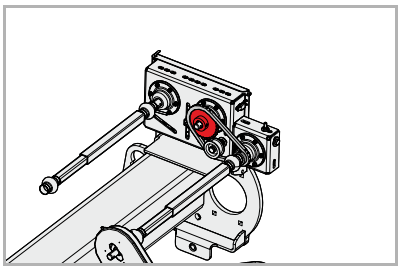
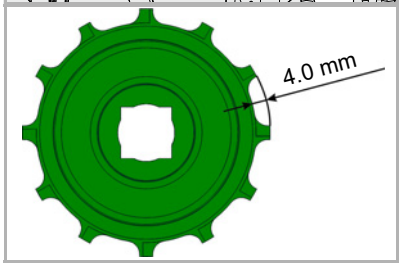
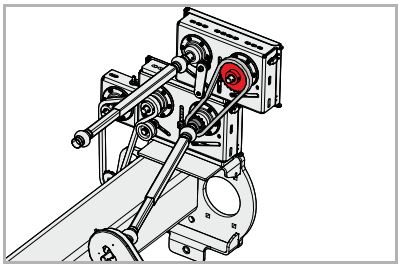
Metering wheel	Drive chain wheel
4.0 mm	Direct drive
	
	15 

Application rate [kg/ha]

Chain wheel		Row spacing [cm]										[kg/10 m]
A	B	37.5	40	45	50	55	60	65	70	75	80	
13	30*	180	169	150	135	123	113	104	97	90	85	0.068
13	25	217	203	180	162	148	135	125	116	108	102	0.081
15	25	250	234	208	187	170	156	144	134	125	117	0.094
15	22	284	266	237	213	194	177	164	152	142	133	0.106
18	22	341	319	284	256	232	213	197	183	170	160	0.128
18	20	375	351	312	281	256	234	216	201	187	176	0.141
20	20	416	390	347	312	284	260	240	223	208	195	0.156
20	18	463	434	386	347	316	289	267	248	231	217	0.174
22	18	509	477	424	382	347	318	294	273	255	239	0.191
25	18	578	542	482	434	394	362	334	310	289	271	0.217
22	15	611	573	509	458	416	382	352	327	305	286	0.229
25	15	694	651	578	521	473	434	400	372	347	325	0.260
27*	15	750	703	625	562	511	469	432	402	375	351	0.281
25	13	801	751	667	601	546	501	462	429	400	375	0.300
30*	15	833	781	694	625	568	521	481	446	416	390	0.312
28*	13	897	841	748	673	612	561	518	481	449	420	0.336
30*	13	961	901	801	721	655	601	554	515	481	451	0.360

* = These chain wheels are an accessory

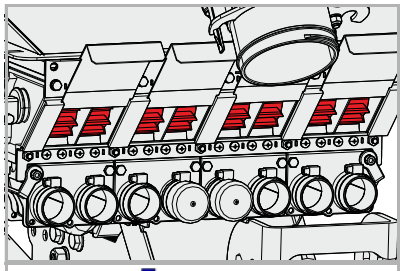
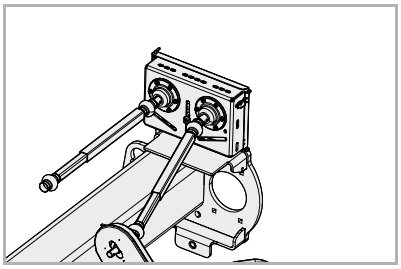
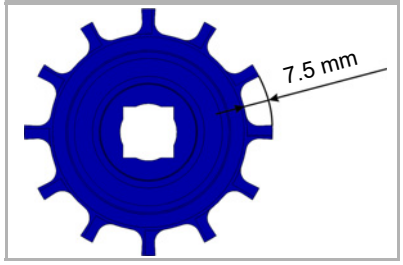
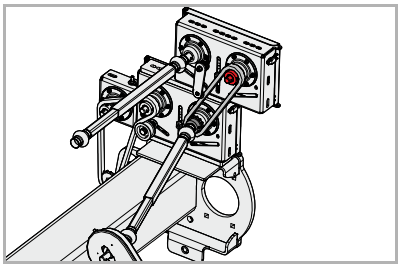
Reduced application rate

Metering wheel	Drive chain wheel
4.0 mm	28
	
	28
	

Application rate [kg/ha]

Chain wheel		Row spacing [cm]										[kg/10 m]
A	B	37.5	40	45	50	55	60	65	70	75	80	
13	30*	110	103	91	82	75	68	63	59	55	51	0.04
13	25	131	123	110	99	90	82	76	70	66	62	0.05
15	25	152	142	126	114	103	95	88	81	76	71	0.06
15	22	172	162	144	129	118	108	99	92	86	81	0.06
18	22	207	194	172	155	141	129	119	111	103	97	0.08
18	20	228	213	190	171	155	142	131	122	114	107	0.09
20	20	253	237	211	190	172	158	146	135	126	119	0.09
20	18	281	263	234	211	192	176	162	151	140	132	0.11
22	18	309	290	258	232	211	193	178	166	155	145	0.12
25	18	351	329	293	263	239	219	203	188	176	165	0.13
22	15	371	348	309	278	253	232	214	199	185	174	0.14
25	15	421	395	351	316	287	263	243	226	211	198	0.16
25	13	486	456	405	365	332	304	281	260	243	228	0.18

Increased application rate

Metering wheel	Drive chain wheel
7.5 mm	Direct drive
	
	15
	

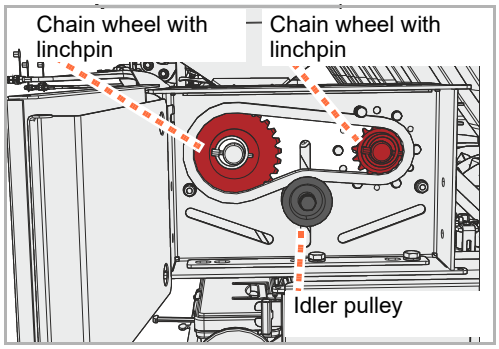
Application rate [kg/ha]

Chain wheel		Row distance										[kg/10 m]
A	B	37.5	40.5	45.0	50	55	60	65	70	75	80	
13	30*	312	293	260	234	213	195	180	167	156	146	0.117
13	25	374	351	312	281	255	234	216	201	187	176	0.140
15	25	432	405	360	324	295	270	249	231	216	203	0.162
15	22	491	460	409	368	335	307	283	263	245	230	0.184
18	22	589	552	491	442	402	368	340	316	295	276	0.221
18	20	648	608	540	486	442	405	374	347	324	304	0.243
20	20	720	675	600	540	491	450	415	386	360	338	0.270
20	18	800	750	667	600	545	500	462	429	400	375	0.300
22	18	880	825	733	660	600	550	508	471	440	413	0.330
25	18	1000	938	833	750	682	625	577	536	500	469	0.375
22	15	1056	990	880	792	720	660	609	566	528	495	0.396
25	15	1200	1125	1000	900	818	750	692	643	600	563	0.450
27	15	1296	1215	1080	972	884	810	748	694	648	608	0.486
25	13	1385	1298	1154	1038	944	865	799	742	692	649	0.519
30*	15	1440	1350	1200	1080	982	900	831	771	720	675	0.540
28*	13	1551	1454	1292	1163	1057	969	895	831	775	727	0.582
30*	13	1662	1558	1385	1246	1133	1038	959	890	830	779	0.623

* = These chain wheels are an accessory

Replacing the chain wheels

In the gear-box



- Remove the linchpins.
- Release the idler pulley with the crank or the 17 mm spanner. The chain is now relieved of tension.
- Remove the chain.
- Replacing the chain wheels.
- Secure the chain wheels with the linchpins.
- Put on the chain, but do not tension the idler pulley too tight.

Hydraulic fertiliser spreader drive

The application rate is entered for the hydraulic fertiliser spreader drive via the software and a calibration test is then carried out.
→ Operating manual for the electronic control system

Technical data for the hydraulic fertiliser spreader drive:
→ Chapter »Familiarising yourself with the machine«, section »Technical data«, page 36.

Calibration test

The actual application rate can only be determined with a calibration test.

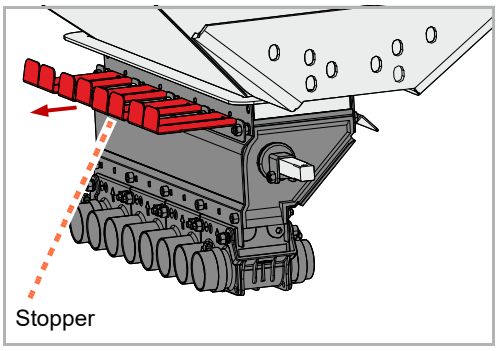
Collecting at the fertiliser coulter

Prerequisites:

- Fertiliser has been filled into the fertiliser hopper
- A sufficiently large catch pan is positioned under every fertiliser coulter
- The application rate is set through an appropriate combination of the chain wheels
- The machine is lifted

▸ Put a catch pan under every fertiliser coulter.

▸ Open the stoppers on all metering wheels.



Stopper

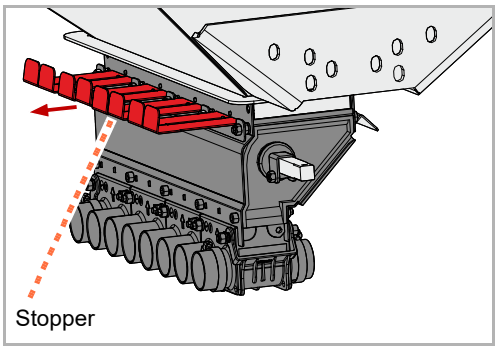
Wear ear protection
During tasks near where a fan is running, high noise volumes may be reached. Therefore, always wear ear protection when working close to where a fan is running.
High sound volumes can lead to temporary or permanent damage to hearing.

▸ Switch on the fan.

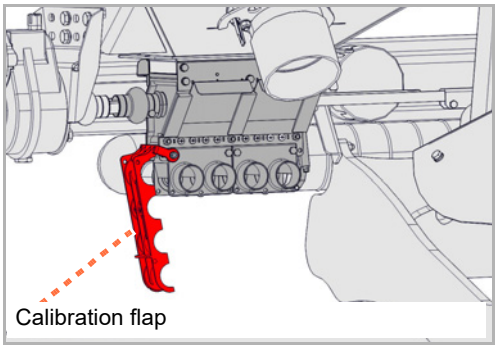
Collecting at the metering device

Prerequisites:

- Fertiliser has been filled into the fertiliser hopper
- The application rate is set through an appropriate combination of the chain wheels

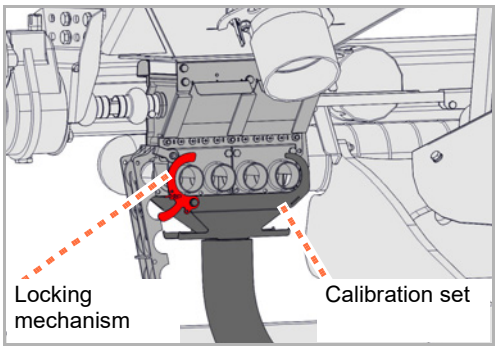


▸ Open the stoppers on all metering wheels.



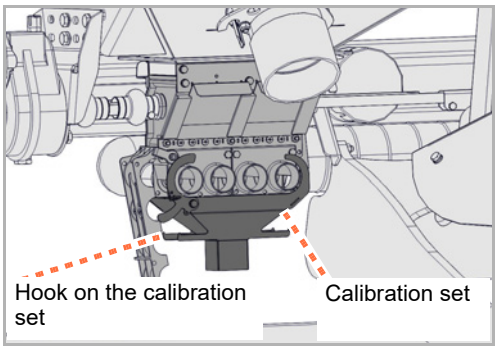
▸ Open the calibration flap.

Version 1: Via a hose into a catch pan



▸ Hook the calibration set on below the metering devices and use the locking mechanism to secure it.

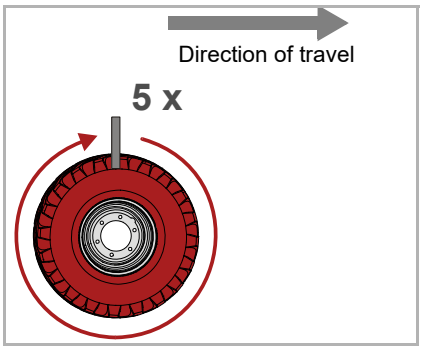
▸ Place a catch pan below the hose for the calibration set.



Version 2: In dispensing sack

- Remove the hose from the calibration set.
- Hook the calibration set on below the metering devices and use the locking mechanism to secure it.
- Hook the dispensing sack onto the hook for the calibration set.

Performing a calibration test



Mechanical fertiliser spreader drive

- Turn drive wheel slightly until the fertiliser trickles out of the fertiliser coulters
- Empty catch pan and place back under the fertiliser coulters
- Mark a point on a tyre with chalk to assist counting the revolutions.
- Turn the drive wheel five times. This corresponds to a travelled distance of approximately 10 m.
- Weigh the caught fertiliser quantity of each fertiliser coulter separately and compare with the reading “kg/10 m” in the table

If there are deviations from the required application rate, make the corresponding correction at the gear-box for fertiliser application.

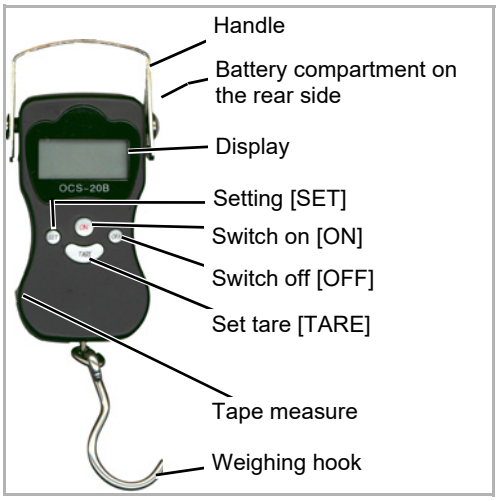
Hydraulic fertiliser spreader drive

- Carry out a calibration test as described in the operating manual for the electronic control system.
- Weigh the collected amount of fertiliser and enter this in the terminal of the electronic control system.

→ Operating manual for the electronic control system

Electronic scales

The machine is supplied with electronic scales, which are provided for the purpose of weighing the seed or fertiliser for the calibration test. Observe the tolerances and weighing range. The scales are not suitable for weighing fine seed such as rape.



Technical data

Storage temperature	-25 – +50 °C
Operating temperature	0 – +40 °C
Maximum length	19 cm
Maximum width	6.5 cm
Weight	200g
Battery	2 x CR2032, 3 V
Weighing range	400 g – 50 kg
Tolerance	20 kg / 20 g
	30 kg / 20 g
	50 kg / 50 g

The scales cannot be calibrated and are not subject to compulsory calibration. Therefore, they must not be used for the sale of goods by weight.

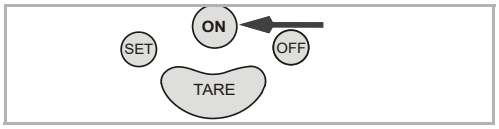
Weighing the calibration test

Observe the load-bearing capacity
When suspending the weight from the scales or fastening the scales to the handle, ensure that the means of fastening have sufficient load-bearing capacity. Do not exceed a weight of roughly 50 kg.
Injuries can occur if the weight breaks off.

Replace the battery in good time
If a prompt to change the battery is indicated on the display, the battery must be replaced.
Empty batteries can leak, cause health impairments and damage the device.

Observe the range of use
The scales are envisaged only for the weighing of goods within the specified weighing range.
Deviations from the actual weight can occur within the specified tolerances.

Switch on

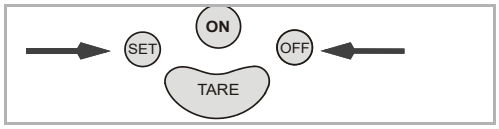


- Hold the implement vertical.
- Press the "ON" key.

The scales are calibrated and ready to operate if “0.00 kg”, “0.0 lb” or “0 oz” is displayed.

Settings

You can switch the weight display from kg to lbs or oz. The conversion is retained after switching off.



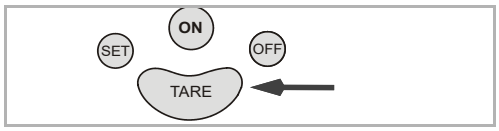
- Press the "SET" key until the required unit appears in the display.
- Press the "OFF" key.

The next time the device is switched on the unit required is displayed.

By pressing and holding the "SET" key, you can display the temperature in °C.

Tare setting

Tare is required if you want to weigh just the content without the container.



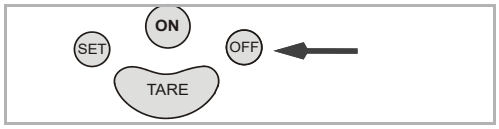
- Suspend the hopper from the weighing hook and wait until an arrow appears at the bottom of the display.
- Press the "TARE" key.

- Suspend the weight from the weighing hook and wait until an arrow appears at the bottom of the display.

The weight is displayed.

If tare is set, the value set is automatically deducted, i.e. the weight without the container is displayed.

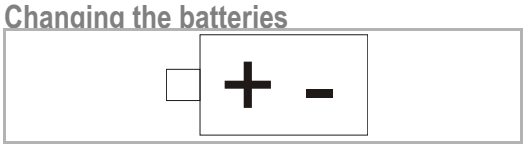
Switch off



- Press the "OFF" key.

After roughly 60 seconds of no activity, the device switches off automatically.

Changing the batteries



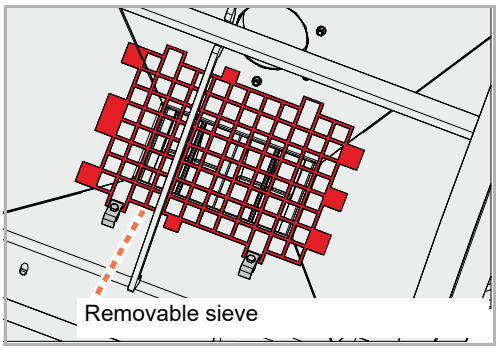
The device indicates when the batteries are low. You must then replace the batteries. Battery type CR2032, 3 V. Take any used batteries to a special disposal point for batteries. Under no circumstances should you put them in the normal household waste.

- Open the battery compartment with the Phillips screwdriver.
- Remove the batteries, taking careful note of the installation position.
- Insert the new batteries, ensuring the correct installation position.

Emptying the fertiliser hopper

Large or small residues may be present in the fertiliser hopper.

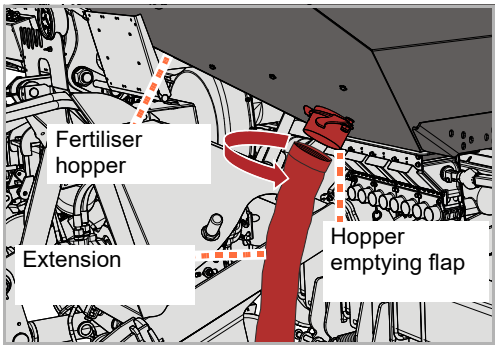
You can reach residues underneath the removable sieve by lifting the removable sieve up.



- Lift up the removable sieve.
- Convey the residue to the metering device using a brush.

Large residues

There are emptying flaps on the fertiliser hopper.



- Turn the extension hose onto the connecting piece for the emptying flap.
- Place a catch pan under the opening.
- Open the emptying flap on the fertiliser hopper.
- After emptying, close the emptying flap on the fertiliser hopper and remove the extension hose.

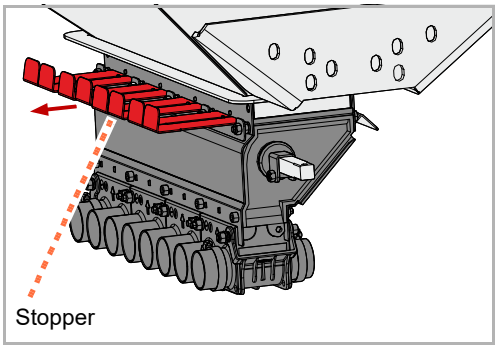
Some residue remains below the emptying flap, and this can be removed using the emptying gate on the metering wheels.

Small residues

Small residues below the emptying flaps can be removed using the emptying gates on the metering wheels.

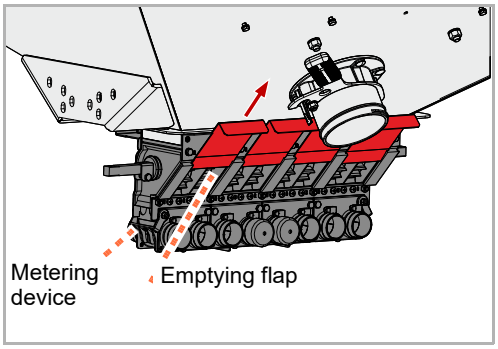
Stopper

Every metering wheel has stoppers.



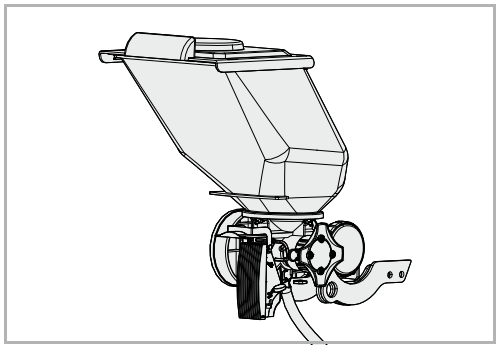
- Open the stoppers on all metering wheels.

Emptying flap



- Place a catch pan under the opening.
- Open the emptying flap on metering wheels.
- After emptying, close the emptying flap on the metering wheels.

Micro-drill [+]



A separate operating manual outlines how to safely operate the micro-drill and the accompanying software.

→ Operating manual for the micro-drill, chapter »Preliminary information«, section »Other applicable documents«, page 5

Observe the notes
When working with crop protection chemicals, all relevant information on the handling of crop protection chemicals and the specific safety instructions of the crop protection chemicals manufacturer must be observed.
Improper handling of crop protection chemicals is harmful to your health.

Protection against fine dust
When working in an environment contaminated with dust and other fine particles from crop protection chemicals, it may be necessary to wear a breathing mask and latex gloves. Observe the specific safety instructions issued by the crop protection chemicals manufacturer.
Improper handling of crop protection chemicals is harmful to your health.

Safety

Before transporting the machine on public roads, read the following safety information. Compliance is mandatory and will help you avoid accidents.

General

Ensure that the condition of the machine conforms to traffic regulations

The machine must conform to current road traffic regulations if you intend to drive with it on public roads. This includes, for example:

- Lighting, warning and protective devices must be fitted
- With the machine folded, all brake, reversing, and turn indicator lights as well as the number plate must be clearly visible. If this is not possible, the lighting equipment and the number plate must be attached to the fitted seeding technology.
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- Transport with a full fertiliser hopper is not permitted. You may only carry the previously calculated load. Please take the weight of the seed in the sowing unit seed hoppers into consideration.

→ Possible load: Chapter »Familiarising yourself with the machine«, section »Technical data«, page 33

- The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
- Close the hopper with the cover

The driver and keeper of the vehicle are liable should the road traffic regulations not be observed.

Before road transport



Remove soiling
Remove crop residue, stones and large clumps of earth.
During road transport, these foreign bodies can fall off the machine and cause accidents.

Switch off the electronic control system
Prior to road transport, you must switch off the electronic control system.
Otherwise, activating functions in the electronic control system by mistake may cause the machine to move. This can result in damage to the machine or accidents.

Close the ball valves
If there are ball valves on the hydraulic lines or chassis cylinders, the ball valves must be closed for driving on the road.
Otherwise, accidental actuation of control units in the tractor could trigger machine movements. This can result in damage to the machine or accidents.

Securing the track markers
Mechanical securing mechanisms are located on the track markers. The mechanical securing mechanisms prevent the undesirable folding out of the track markers.
Accidents may result from the folding out of track markers while travelling by road.

Check the lighting equipment for road transport
The lighting equipment for road transport must be clean and in good working order.
Dirty or faulty lighting equipment for road transport may lead to serious accidents.



Observe transport width
Observe permissible transport widths and, if necessary, fold the machine into the transport position and lock it securely, install lighting equipment, alarms, and protective devices. The driver and keeper of the vehicle are liable should the road traffic regulations not be observed.
Failure to comply with these instructions may result in accidents or damage to the machine.

Observe steering capability
The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
Reduced steering capability can lead to accidents.

Check locking mechanisms
Check all locks for firm seating. Loose locking mechanisms can open during road transport and cause unintended reactions of the machine.
This can result in damage to the machine or accidents.

Trip ropes must hang loose
Trip ropes for quick-release couplings must hang loose and must not, when in their lowered position, release the couplings of their own accord.
Unintended tripping can cause serious accidents.



Comply with permissible axle loads
Road transport must only take place up to the maximum permissible axle load of the machine.
A filled seed hopper or fertiliser hopper influences the driving performance of the machine if overloaded and can cause accidents during road transport.
→ Maximum permissible weights: Chapter »Familiarising yourself with the machine«, section »Technical data«, page 33

Transport position

If the machine is in the work position, it must be folded into the transport position.

Micro-drill [+]

Instructions for road transport with the micro-drill and the accompanying software can be found in a separate operating manual.

→ Operating manual for the micro-drill, chapter »Preliminary information«, section »Other applicable documents«, page 5.

Three-point suspension with hydraulic frame ballasting [+]

The hydraulic frame ballasting must be relieved for road transport.

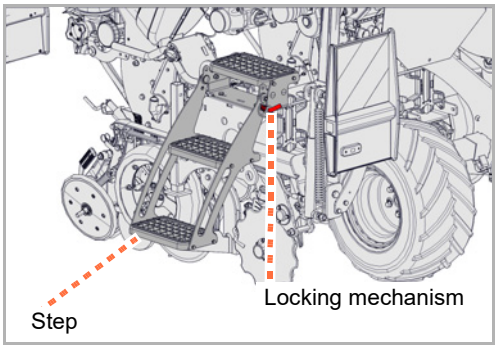
- Use the hydraulic valve on the tractor to relieve the hydraulic frame ballasting.

Filling auger [+]

Check filling auger for remains of seed or fertiliser
Before folding it in, check whether any seed or fertiliser remains in the filling auger.
A filling auger with remaining seed or fertiliser may be damaged due to the increased weight.

Control platform [+]

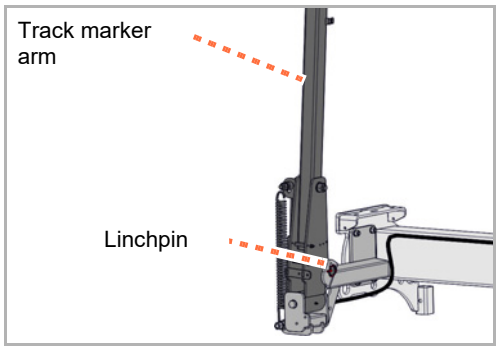
The control platform steps must be moved into the transport position.



- Open the locking mechanism.
- Fold the step up and ensure that the locking mechanism locks securely.

Track marker [+]

For travelling by road, you will have to fold and secure the track markers.
Depending on the equipment fitted, folding the track markers in and out is either activated via the electronic control system or directly at the tractor's control unit.



- Press against the track marker arm with one hand.
- Move the linchpin out of the parking position and secure the track marker.

Road transport



Lock the control units
Lock all control units on the tractor when driving on the road and close the shut-off valves on the hydraulic couplings.
Accidentally actuated control units can cause accidents.

Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

Adapted driving speed
Always adapt the driving speed to the ambient conditions.
An excessive driving speed, on uneven terrain for example, can result in damage to the machine or accidents.

No sudden load changes
Avoid sudden load changes. Sudden load changes result from sudden movements to the right or left.
Sudden load changes can cause accidents.

Ensure clear visibility
Check the immediate vicinity before driving off. Always ensure an unimpeded view and pay particular attention to any children within the working area of the machine.
Persons who could be struck when the machine starts up can be seriously or fatally injured.

Before travelling on the road, check the following in particular:

- ☑ When hitching to the lower link balls, these are locked against sideways movement
- ☑ The side sections are retracted and secured
- ☑ The track markers are folded in and secured
- ☑ The filling auger is in the transport position
- ☑ The steps and control platform are folded up
- ☑ The support leg is in its transport position
- ☑ The emptying flaps on the metering wheels and hoppers are closed
- ☑ The lighting equipment and warning signs are attached and operational
- ☑ All functions of the software are not active
- ☑ The operating terminal is deactivated
- ☑ The fertiliser hopper is empty
- ☑ The seed hoppers on the sowing units are empty
- ☑ The micro-drill hoppers are empty
- ☑ The PTO shaft is deactivated
- ☑ The control units on the tractor are locked

Work position

You must move the machine from the transport position to the work position.

- Fold the machine into its work position.

→ Chapter »Preparing for operation«, section »Hazard area«, page55

- Set the machine using the top link so that the frame and the cover of the seed hopper are parallel to the ground surface.

Track marker

Release the track markers and fold them out before sowing.

→ Chapter »Preparing for operation«, section »Control platform [+]«, page146

Seed hopper

- Fill the seed hopper with seed.

→ Chapter »Preparing for operation«, section »Seed hopper«, page150

Fertiliser hopper [+]

- Fill the fertiliser hopper with fertiliser.

→ Chapter »Preparing for operation«, section »Fertiliser hopper [+]«, page120

Micro-drill [+]

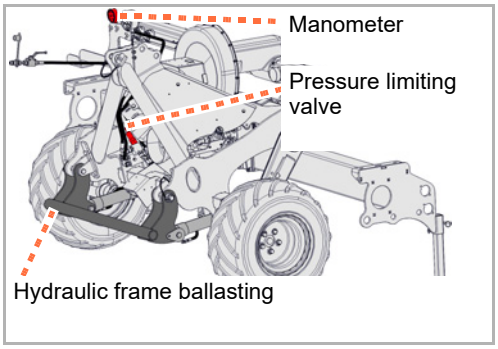
- Fill the tank with granules.

→ Operating manual for the micro-drill, chapter »Preliminary information«, section »Other applicable documents«, page 5

Hydraulic frame ballasting [+]

By using the hydraulic frame ballasting, the machine behaves as if it were heavier.

Switch on the hydraulic frame ballasting when work starts.



Hydraulic frame ballasting

- Lower the machine to its work position.
- Actuate the control device on the tractor for the hydraulic frame ballasting until 130 bar is displayed on the manometer.

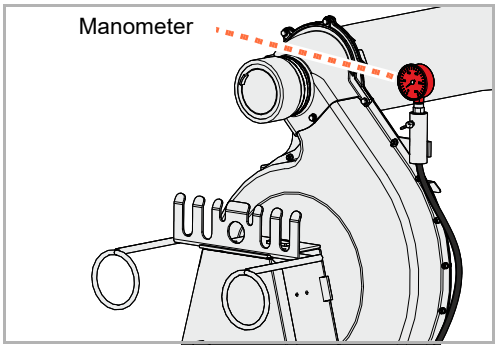
When raising the machine, the pressure rises to approximately 180 bar. When lowering the machine, the pressure drops back to the set value. The pressure may also fluctuate while you work.

Do not change the adjusted level of the pressure limiting valve
The adjusted level of the pressure limiting valve is set ex works.
A pressure limiting valve set to too high a pressure causes damage to the machine.

Hydraulic ballasting of the sowing unit [+]

An individual sowing unit can be loaded via the hydraulic ballasting with up to 120 kg in addition to its own weight.

Ground type	Pressure range [bar]
Light soil	0 - 40
Medium soil	40 - 75
Heavy soils	75 - 100



Switch on the hydraulic ballasting when work starts.

- Lower the machine to its work position.
- Open the ball valve at the hydraulic line.
- Actuate the control unit on the tractor for the hydraulic ballasting of the sowing units until the required pressure as shown in the table is displayed on the manometer.
- Close the ball valve on the hydraulic line or make a further adjustment to the pressure.

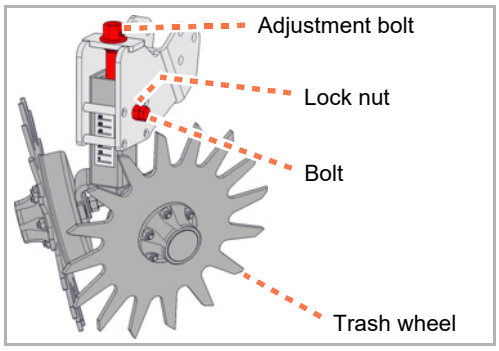
The pressure can be changed during the journey so that it can be adjusted to suit different ground conditions.

When lifting the machine, the pressure of the hydraulic ballasting drops slightly. When lowering the machine, the pressure rises back to the set value.

To keep the pressure of the hydraulic ballasting constant, close the ball valve on the hydraulic line.

Trash wheel [+]

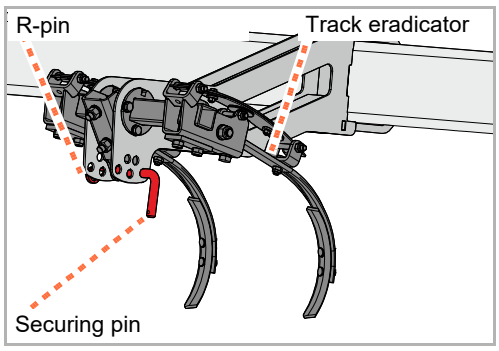
Set the working depth on the trash wheel in such a way that the plant residues are cleared to the side.



- Release the lock nut.
- Release the bolt
- Use the adjustment screw to set the trash wheel to the required depth.
- Tighten the bolt and secure with the lock nut.

Track eradicator [+]

You can set the working depth of the track eradicator to loosen the tracks from the transport wheels.



- Remove the R-pin and securing pin.
- Set the track eradicator to the required depth.
- Secure using the securing pin and R-pin.

Test drive

Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

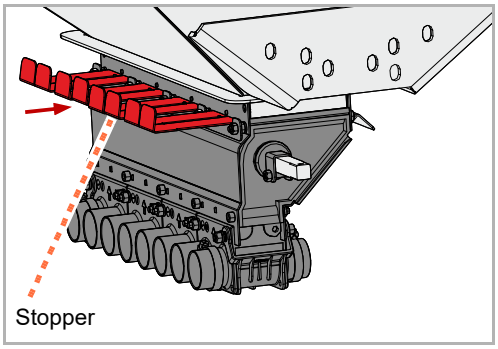
Checking the hazard area
No persons, animals or any objects should remain in the hazard area while travelling or when folding in or out. If children are in the vicinity, check the hazard area particularly carefully.
Persons who are in the hazard area while travelling or during folding in or out may be seriously or fatally injured.

After completing all preparatory work, take a test drive. Lower the machine to its work position.

On machines with a mechanical fertiliser spreader:

If no fertiliser is to be applied during the test drive, you can close the stopper.

- Close the stoppers on all metering wheels.
- Reopen the stopper after the test drive.



Stopper

On machines with a hydraulically driven fertiliser spreader:

If no fertiliser is to be applied during the test drive, you can close the stopper.

- Switch off the fertiliser spreader drive via the electronic control system.
  → Operating manual for the electronic control system
- Switch the fertiliser spreader drive back on after carrying out the test drive.

On machines with micro-drill:

If no granules are to be applied during the test drive, you can switch off the electric drive.

- Switch off the micro-drill drive using the electronic control system.
  → Operating manual for the electronic control system
- Reactivate the micro-drill drive after the test drive.

Test drive

- First perform a test drive in the work position at working speed (5–10 km/h, 5–15 km/h for SX).

→ Operating manual for the electronic control system



Make the test drive first, without sowing, over a typical section of the field. The headland or areas with obstacles are not suited for the test drive.

- Readjust the deposit depth and the soil preparation tools if necessary.
- Now perform a test drive with seeding.
- Readjust the deposit depth and the soil preparation tools again if necessary.

After the test drive

After the check drive, verify that the seeding is done at the proper sowing distance, deposit depth and with correct soil coverage. Readjust if necessary to take soil conditions into account:

- Sowing distance

→ Chapter »Preparing for operation«, page85

- Scraper

→ Chapter »Preparing for operation«, page103

- Seed deposit depth

→ Chapter »Preparing for operation«, page62

- Fertiliser deposit depth

→ Chapter »Preparing for operation«, page118



Do not remove the protective devices
The protective devices must not be removed or by-passed. Check all protective devices before starting the machine.
Unprotected machine components can cause serious or fatal injury.

Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

Check the immediate vicinity
Before driving off, folding out, and operating the machine, check its immediate vicinity. Ensure sufficient visibility. Do not begin work until the immediate vicinity is cleared of any persons or objects.
Any use of the machine without first checking the surrounding area can cause accidents.

Height of machine and overhead power lines
If a height of 4.00 m is exceeded when folding the machine in and out, the machine must not be folded in the vicinity of conducting overhead power lines! Danger of electrocution!
Should the machine come into contact with a live overhead power line:

- Do not attempt to exit the tractor cabin
- Do not touch any metal parts on the tractor
- Ensure that there is no conductive contact with the ground
- Warn all persons in the area not to approach the tractor or the machine
- Wait for help from professional emergency service personnel as power in the overhead line must first be switched off

Never climb onto the machine beneath live overhead power lines.
Electrocution does not require direct contact.

Sowing

Drive at a speed appropriate for the seed and the soil conditions.

The following speeds are recommended:

Sowing units	Recommended speed
Normal seed, Tandem, HD-II	6–8.5 km/h
SX	6–16 km/h

The optimum working speed is dependent on the seed and the distances between deposits.

When using the electronic control system, an alarm warns if the working speed is too high for particular seed types.

→ Operating manual for the electronic control system



Only drive forwards
Avoid driving backwards and rolling backwards when sowing.
This could lead to the seed coulters becoming clogged or damaged.

Work position and cultivation

- Switch on the terminal.
- Switch on the fan.
- Begin seeding work.

Working lights [+]



Avoiding dazzle
Traffic in the distance can be dazzled by the work lights. Also be aware of traffic near the field when using the work lights.
Dazzling other vehicles can cause accidents.

- Switch on the working lights via the electronic control system.

Turning

The machine must be lifted at the headland.

Lift the machine prior to turning
You need to lift the machine over the lower link balls of the tractor prior to turning.
Turning with a lowered machine in its work position can damage the machine.

Shortly before field border:

- Slow down.
- Leave the fan running.
- While still driving, or when stationary, lift the machine and turn it around.

After turning

- While still driving or when stationary, re-engage the machine.

The clogging of the coulters can be avoided if the machine is activated or lifted whilst driving.

Checks

During sowing, use the checklist to examine the following:

General

From time-to-time, climb down and check the following:

☑ Are the negative pressure and overpressure set correctly?

→ Chapter »Preparing for operation«, section »Pressure setting for system using negative pressure«, page 92

☑ Sowing depth OK?

☑ Placing accuracy OK?

☑ Are all coulters unobstructed?

☑ Is seed consumption in all hoppers uniform?

☑ Is fertiliser being applied?

☑ Is the consumption of fertiliser uniform?

☑ Have the microgranules been applied?

☑ Is the consumption of microgranules uniform?

☑ Are the furrows covered as well as possible?

Blocking

Foreign objects such as stones or iron particles can inhibit the function of the machine while working.



Do not continue working with a blockage
Work must not be continued before the cause of the blockage has been eliminated.
Failure to observe these instructions may result in severe or fatal accidents.

Only remove foreign bodies using a tool
Do not use your hands to remove foreign bodies.
Failure to observe these instructions may result in severe or fatal accidents.

- Immediately switch off all drives between the tractor and the machine.
- Stop the tractor.
- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor.
- Secure the tractor against rolling away.
- Wear personal protective gear.
- Remove foreign bodies with a suitable tool.
- Continue with the work.

Vibrations and unusual noises



Stop working if vibrations and conspicuous noises occur
Work must not be continued before the cause of the fault has been eliminated.
Failure to observe these instructions may result in severe or fatal accidents.

If unusual noises or vibrations occur during work:

- Stop the machine immediately.
- Eliminate the cause of the fault.

Observe the safety instructions on the previous pages or, if relevant, contact an authorised dealer.

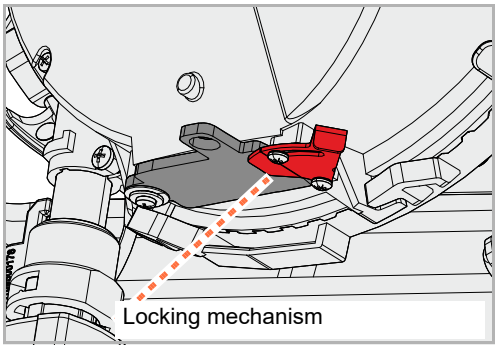
Fault

SX

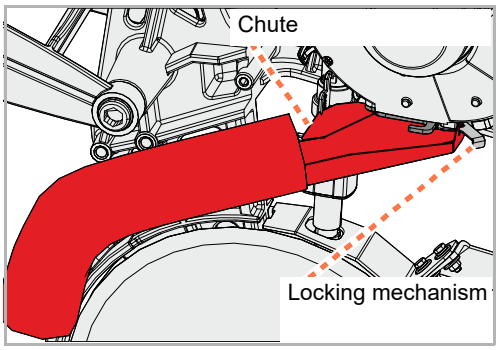
Opto-sensor

If the opto-sensor in the sowing unit's guide pipe is dirty, the grains/ha display fluctuates and the LED on the opto-sensor lights up red. To eliminate this fault, clean the opto-sensor with a brush and cleaning fluid.

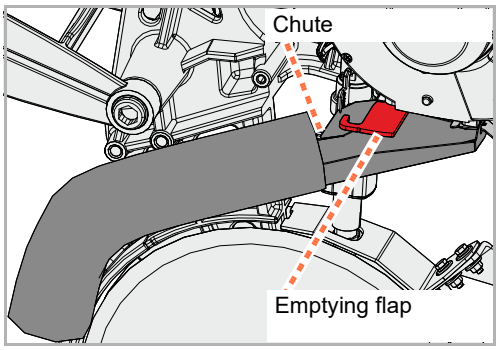
Preparation:
Empty the seed from the affected sowing unit.



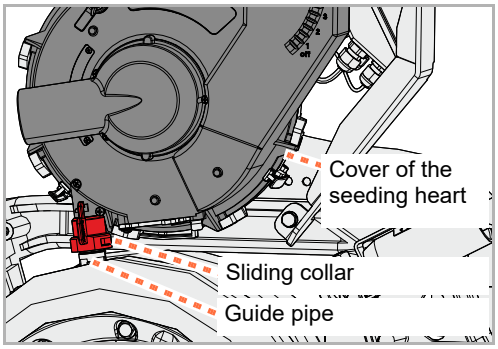
- Set the locking mechanism to the "Empty" position.



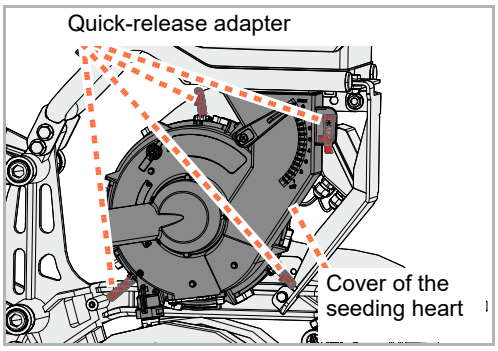
- Insert the chute into the slit below the discharge opening and lock it into the locking mechanism.



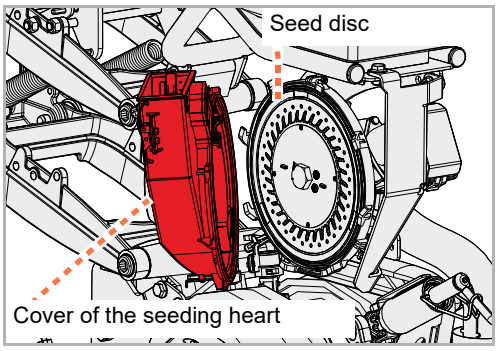
- Place a catch pan under the chute.
- Open the emptying gate.
- Empty all of the seed.
- Close the emptying flap.
- Remove the chute.
- Move the locking mechanism to the "Close" position.



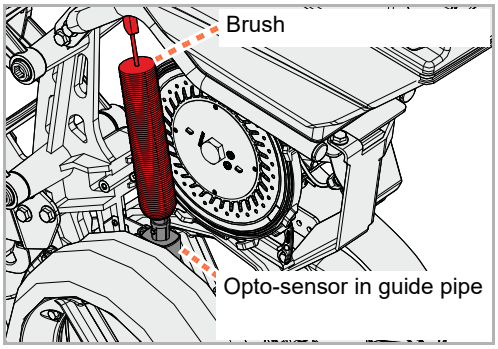
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart.



- Loosen the quick-release adapters on the cover of the seeding heart.



- Turn the cover of the seeding heart clockwise and unlock it.
- Take off the cover of the seeding heart and remove the remaining seed.



- Clean the opto-sensor in the guide pipe with the brush included in the on-board tools of the machine.
- For stubborn dirt, use a cleaning fluid.
- Check whether the LED on the opto-sensor lights up green.
- Use a cloth to remove the humidity from the cleaning fluid.

Soapy water or multifunctional oil are suitable as cleaning fluids.

Do not use brake cleaner
Do not use any cleaning fluids like brake cleaner.
Such cleaning fluids cause irreparable damage to the surface of the opto-sensor.

Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.

- Fit the cover of the seeding heart and turn it counter clockwise to lock it. Ensure proper position of the cover of the seeding heart.
- Close the quick-release adapters.
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it.
- Fill in seed again.

After sowing

Emptying the seed hopper
→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page109

Emptying the fertiliser hopper
→ Chapter »Preparing for operation«, section »Emptying the fertiliser hopper«, page140

Emptying the micro-drill's hopper
→ Operating manual for the micro-drill, chapter »Preliminary information«, section »Other applicable documents«, page 5.

Parking the machine
→ Chapter »Parking and storage«, page170

Moving the machine into transport position
→ Chapter »Driving on the road«, page143

Cleaning

- Before cleaning, remove the seed from the seed hopper via the emptying gates on the metering devices' metering wheels and via the emptying flaps.

→ Chapter »Operation«, section »After sowing«, page163

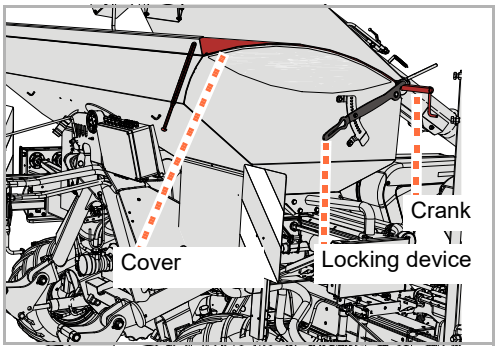
Do not direct the water jet at the bearings
Clean the bearings in such a way that the water jet does not directly hit the bearings. Housings, signal distribution boxes, electric drive motors, screw-on connections, and ball bearings are not waterproof.
The ingress of water shortens the service life of the bearings.

A high-pressure cleaner, for example, can be used for cleaning. Never point the water jet directly at the stickers or type plate.

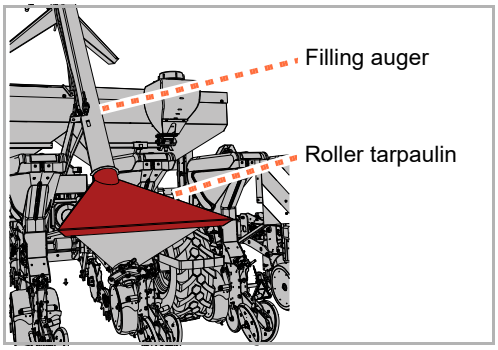
In combination with air humidity, fertiliser accelerates the corrosion of machine components. Thoroughly clean the machine with water, especially after applying fertiliser, so that no fertiliser remnants remain on machine components.

Prior to cleaning

Cover



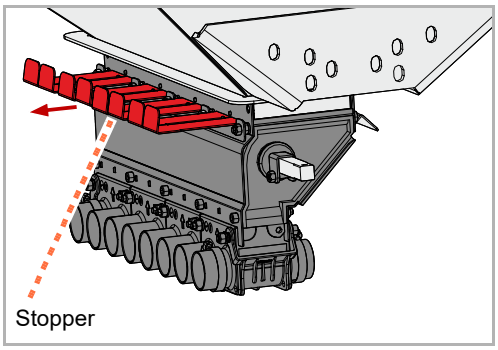
- Roll down the roller tarpaulin using the crank.
- Close the cover and secure it with the securing mechanism.



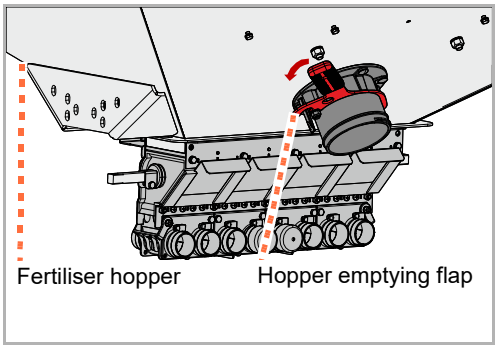
- Close the roller tarpaulin on the filling auger.

Metering device

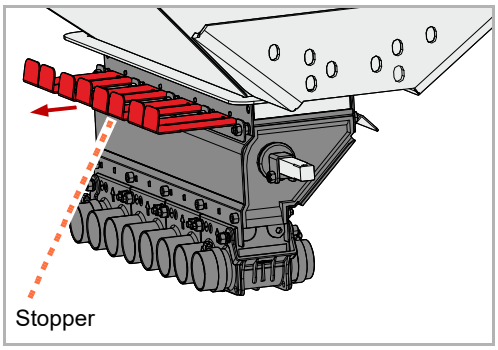
Open the emptying gates and stoppers on the metering device and emptying flaps on the fertiliser hopper to allow water to drain off unhindered if it accidentally enters the fertiliser hopper.



- Open the stoppers on all metering wheels.



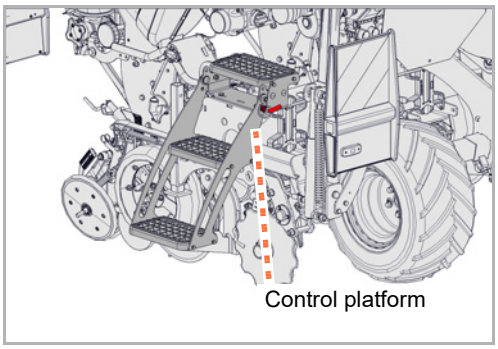
- Open the emptying flap on the fertiliser hopper.



- Open the emptying flap on all metering wheels.

Control platform, machine

Cleaning the control platform
After each field operation, the control platform has to be carefully cleaned.
Dirt build-up presents an increased risk of accidents and injury.


Control platform

- Clean the control platform and step.

Only clean the machine from the outside and only with water
Do not clean the inside of the fertiliser hopper or the metering device with water.
Water can result in caking.

Do not use hot water
For cleaning, only use water up to a maximum temperature of 40 °C.
If hot water is used, the plastic parts on the machine may become deformed.

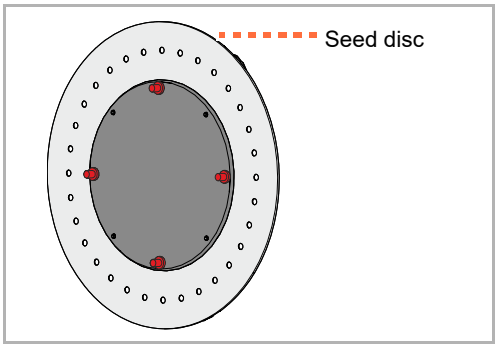
- Only clean the machine from the outside and only with water.

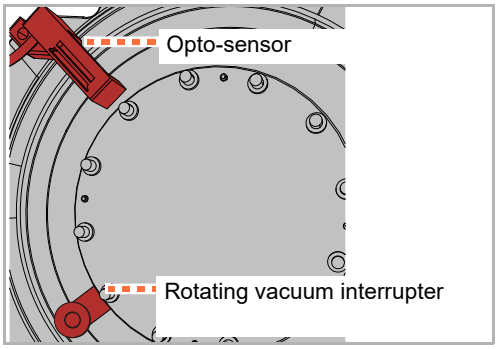
Sowing units

Harmful dust
Fine particles of seed can cause harmful dust to settle inside the seeding heart. Please note the seed producer's instructions, particularly when using dressed seeds. It may be necessary to use respiratory masks in certain circumstances.
Breathing in harmful dust could cause acute illness or trigger illnesses which manifest themselves at a later time.

System using negative pressure

- Blow out the seeding hearts, seed hoses and the fan with compressed air.
- Clean the seed disc with a cloth.

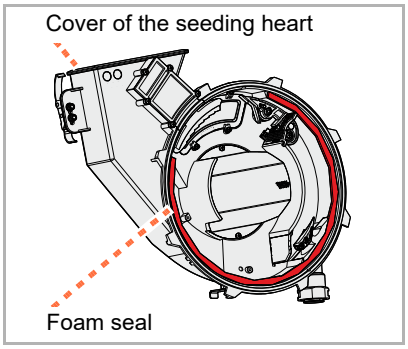




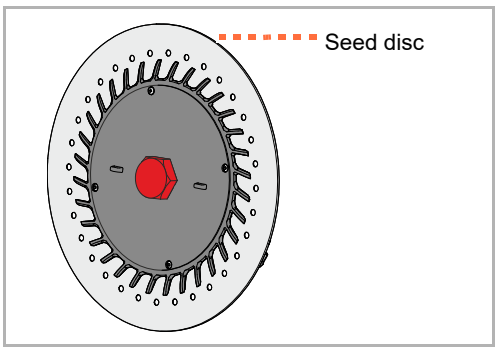
- Clean the disc of the rotating vacuum interrupter, the ball bearing of the rotating vacuum interrupter and the opto-sensor with a cloth.

System using overpressure

- Blow out the seeding hearts, seed hoses and the fan with compressed air.



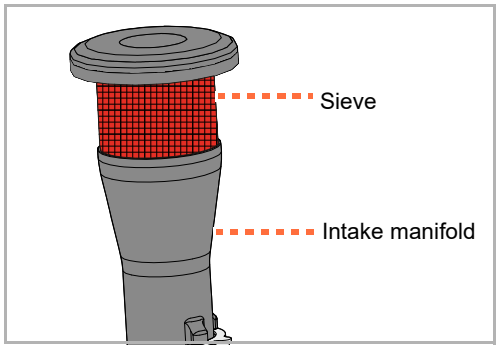
Only clean the cover of the seeding heart and the foam seal attached to it using a low pressure.



- Clean the seed disc with a cloth.

Intake manifold on the fan

An intake manifold is attached to the fan for equipping the machine with SX sowing units. The upper end of the intake manifold has a sieve that filters coarse particles out of the air that is drawn in.



- Clean the sieve.

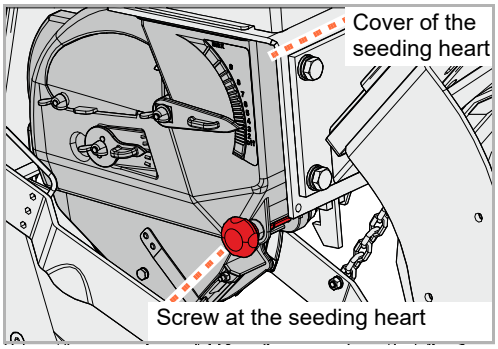
After cleaning

- Provide all lubrication points with grease.

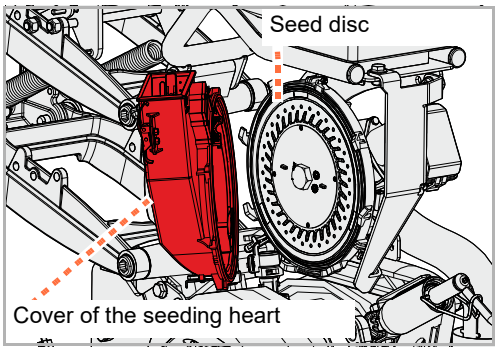
→ Chapter »Maintenance«, section »Lubricating the bearings«, page185

- Check the fertiliser hopper for moisture. Wipe dry if necessary.
- Leave the stoppers and emptying gates on the cell wheels open.
- Leave the emptying flap on the fertiliser hopper open.
- Check the seed hoppers for moisture.

If water has entered the seed hoppers:



- Remove the cover of the seeding heart. The water can drain off unhindered.



- Remove the cover of the seeding heart. The water can drain off unhindered. The foam seal of the SX sowing unit dries out.

Care

To ensure the machine's long service life, we recommend applying a protective coating of oil after the end of the season and during storage.

Use only approved and biodegradable oil, e.g. rapeseed oil.

Before oiling, cover the wheels. The oil can damage the tyres.

Parking and securing the machine

Machines are always parked in the work position in order to preserve the tyres.

Secure surface

- Ensure that the machine is parked on a level and stable surface
- After uncoupling, chock the machine to prevent the vehicle from rolling

If the machine is not securely parked, it may be damaged.

Seed hopper

▸ Emptying the seed hopper.

→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page109

▸ Close the seed hopper of the sowing unit, but do not lock it on the SX sowing unit.

Make sure that the cover of the seed hopper is not locked on the SX sowing unit, so that the seal is not placed under tension.

Fertiliser hopper [+]

▸ Emptying the fertiliser hopper.

→ Chapter »Operation«, section »Emptying the fertiliser hopper«, page140

▸ Leave the emptying gate and stopper on the metering wheels of the metering devices open.

Filling auger [+]

▸ Emptying the filling auger.

→ Chapter »Preparing for operation«, section »Emptying the filling auger«, page127

▸ Close the roller tarpaulin over the funnel.

Micro-drill [+]

▸ Emptying the tank.

→ Operating manual for the micro-drill, chapter »Preliminary information«, section »Other applicable documents«, page 5

Uncoupling

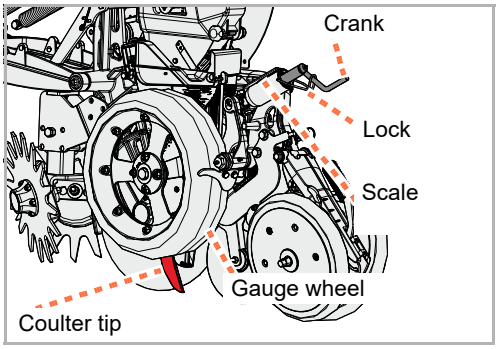
Increased risk of injury
Uncoupling the machine creates an increased risk of injury.

- Ensure that the machine is lowered onto a level and stable surface
- Use the supporting leg for setting down the machine

Failure to observe these instructions may result in serious or fatal injuries.

Coulter tip for HD-II and SX

To prevent damage to the coulter tips, set down machines with HD-II and SX sowing units on solid ground in accordance with the procedure set out below:



- Read off the settings on the scale and note them down to restore them when you continue the seeding work.
- Flip up the latch.
- Set a very shallow working depth on the crank so that the gauge wheel is deeper than the coulter tip.
- Secure the crank with the latch.
- Make the same adjustments to all sowing units.

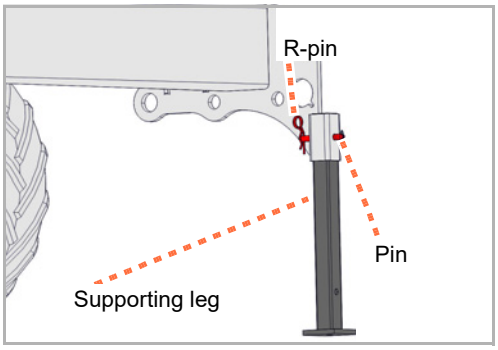
Protect coulter tips against damage
Do not set the machine down on the coulter tips on solid ground.
Seeding work with damaged coulter tips results in incorrect seed results.

Hydraulic ballasting of the sowing unit [+]

To ensure that the machine can be safely uncoupled, the load on the hydraulic ballasting of the sowing units must be relieved.

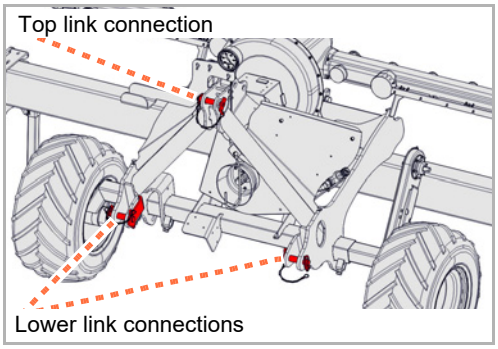
- Open the ball valve at the hydraulic line.
- Actuate the control unit on the tractor for the hydraulic ballasting of the sowing units in order to release the pressure.
- Close the ball valve at the hydraulic line.

Supporting legs



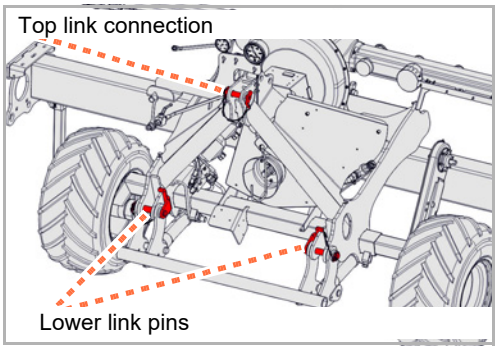
- Remove the R-pin and pull out the pin.
- Slide the supporting leg downwards and secure with the pin.
- Implement the same settings for the second supporting leg.

Three-point suspension



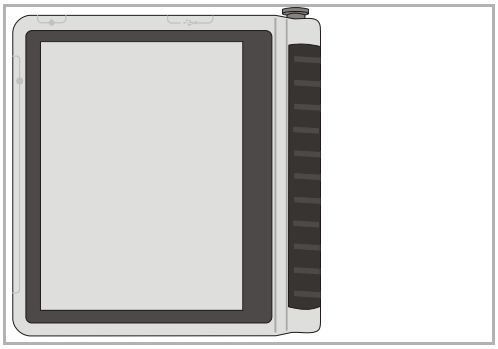
- Lower the tractor lower link ball until the machine rests on the supporting legs.
- Disconnect hydraulic hoses from the tractor.
- Protect the couplings with cover caps and stow them in the stowage compartment.
- Disconnect the electrical cables and stow them in the stowage compartment.
- Disconnect any other lines to the tractor.
- Uncouple the machine from the tractor.

Three-point suspension with hydraulic frame ballasting



- Release the hydraulic frame ballasting.
- Lower the tractor lower link ball until the machine rests on the supporting legs.
- Disconnect hydraulic hoses from the tractor.
- Protect the couplings with cover caps and stow them in the stowage compartment.
- Disconnect the electrical cables and stow them in the stowage compartment.
- Disconnect any other lines to the tractor.
- Uncouple the machine from the tractor.

Terminal [+]



- Switch off the terminal.
- Disconnect the external terminal from the connection lines and remove from the bracket on the tractor.
- Store in a dry location. The set values are preserved.

Storing the machine

After cleaning, the machine should be stored in transport position in a dry location and on a level and stable surface.
→ Section »Parking and securing the machine«, page 170

Apply a protective coating of oil during storage. Use only approved and biodegradable oil, e.g. rapeseed oil.

Before oiling, cover the tyres of the transport wheels. The oil can damage the tyres.
→ Chapter »Cleaning and care«, page164

Sowing units with mechanical drive:

- Oil the drive chains using suitable oil.

For your safety

Special safety information



Prerequisites for maintenance work
Only perform the maintenance operations if you have the required expert knowledge and suitable tools.
Insufficient technical knowledge or the use of unsuitable tools can cause accidents.

Protect the machine against accidental activation
Only carry out repair and maintenance work and only rectify faults on the coupled machine if:

- Deactivated PTO shaft
- Engine switched off
- Ignition key removed
- Electronic control switched off

Serious accidents can result if the device starts inadvertently.

Replacement parts and accessories
Only use original parts or parts that meet the manufacturer's requirements. In case of doubt, confirm the suitability of the parts with the dealer or manufacturer.
Using unsuitable replacement parts and accessories compromises the safety of the machine. Damage to the machine and serious accidents may occur.



Welding work
Before welding work on the tractor or machine, always disconnect the voltage supply to the electronic control system.
Otherwise, damage to the electronics cannot be excluded.

Do not use pneumatic grease guns
Never use a pneumatic grease gun to lubricate bearings.
The high pressure damages the bearings.

Protective measures for handling oils or lubricants

Additives in oils and lubricants may have adverse health effects. Since the hazardous material code does not require any special identification, please always observe the following:



Avoid skin contact
Avoid skin contact with oils or lubricants.
Contact can result in skin damage.

Protect your skin
When handling oils and lubricants, protect your skin with lotion or wear oil-resistant gloves.
Oils can be harmful to health.

Do not use oils for cleaning
Do not use oils or lubricants to clean your hands.
Burrs and fine particles in these materials can result in injuries.

Change contaminated clothing
Change any clothing that is heavily contaminated with oil as soon as possible.
Oils can be harmful to health.



- Collect waste oil and dispose of in accordance with legal conditions
- If your skin becomes irritated by oil or lubricants, contact a doctor immediately

General information

This information relates to general maintenance work. For all maintenance work, the machine must be folded out and secured in its work position. If it is necessary to put the machine in its transport position for maintenance work, an appropriate reference will appear in the maintenance instructions.



Working with the grease gun:
One to two strokes of the grease gun handle are sufficient for lubrication. If you feel resistance during the second stroke, do not complete it.
Too much grease will force the bearings apart. This could allow dust and dirt to enter the bearing, resulting in premature wear.

Fundamentals

The following table contains a brief explanation of the most important terms used for maintenance.

Task	Model
Greasing	• Apply grease to sliding surfaces with a brush
Lubrication	• Unless otherwise specified, 1 – 2 pumps with a grease gun are generally sufficient
Oiling	• Unless otherwise specified, use only vegetable-based oil such as rapeseed oil • Mineral oils are not suitable • The use of waste oil represents a health hazard and is strictly prohibited
Replacement	• Replace the component in question according to the instructions in the »Maintenance« chapter
Checking	• An inspection may be required in conjunction with the replacement of the component in question
Observe the maintenance intervals	• All information is based on average machine usage • In the case of heavy usage (e.g. contract work), shorten the maintenance intervals accordingly • Shorter maintenance intervals may also be required under extreme operating conditions (e.g. heavy dust generation)

Securing the machine

Before any tasks are carried out directly on the machine, by you or by other persons, you must secure the machine.



Hazard due to an unsecured machine
An unsecured machine can cause hazards which are not immediately obvious. Secure the machine before carrying out any tasks directly on the machine.
If the machine is not secured, persons may be injured or killed.

- Lower the machine to its work position.
- Switch off the machine's electronic control system.
- Switch off the tractor's PTO.
- Switch off the tractor engine.
- Secure the tractor against starting up accidentally. In a clearly visible location, attach an information label stating that the tractor must not be put into operation.
- Secure the tractor against rolling away.
- Secure the machine against rolling away.

Working under the machine



Hazard due to an unsecured machine
An unsecured machine can cause hazards which are not immediately obvious. Secure the machine before carrying out any tasks directly on the machine.
If the machine is not secured, persons may be injured or killed.

- Mechanically secure the machine against lowering.

Maintenance intervals and setting work

	After the first hours of operation	Daily	Once a week	Once per season	After heavy use	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Tensioning	Cleaning	Page
General														
Retighten all bolts	•					•								183
Visual inspection	•	•												
Bearing			•			•		•						
Hose connections				•					•					
Pivot points (frame, track markers)			•					•						
		•							•					
Hydraulics														
Hydraulic hoses every 6 years										•				196
Hydraulic hoses in general						•	•			•				196
Hydraulic cylinder				•		•	•		•	•				
Hydraulic fan drive				•		•	•		•	•				
Electronic control system														
All sensors		•							•					

	After the first hours of operation	Daily	Once a week	Once per season	After heavy use	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Normal seed seeding heart, tandem, HD-II														
General		•							•				•	
Seed disc				•					•					209
							•			•				
Scraper							•			•				209
						•					•			
Rotating vacuum interrupter							•			•				209
				•					•					
						•					•			
Vacuum interrupter							•			•				209
SX seeding heart														
General		•							•				•	
Seed disc				•					•					209
							•			•				
Scraper							•			•				209
						•					•			
Rotating interrupter							•			•				209
				•					•					
						•					•			

	After the first hours of operation	Daily	Once a week	Once per season	After heavy use	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Sowing unit														
Coulter, general							•			•				
						•			•					
Coulter flank distance					•				•					
Coverer				•					•					
						•					•			
Scraper				•					•					
						•					•			
Rubber V press wheel				•					•					
Gauge wheel			•					•						
				•					•					
						•					•			
Double cutting disc				•					•					
							•			•				

	After the first hours of operation	Daily	Once a week	Once per season	After heavy use	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Fan														
Tension jack			•					•						
Fan drive wheel							•			•				
Fertiliser spreader														
Metering device				•		•							•	
Metering device sealing lip							•			•				213
Metering wheels							•			•				214
Drive shafts			•					•						
Filling auger			•						•	•				
Other														
Tyres				•					•					193
Tyre pressure				•					•					193
Wheel nuts First of all after first laden journey				•					•					184
Tractor hitch		•		•				•	•	•				194
Drive shafts						•		•						
Clean Air				•		•			•	•				216

Screw connections

Retightening bolts

All bolts must be retightened:

- After the first hours of operation
- Depending on the frequency of use
- But at least once per season

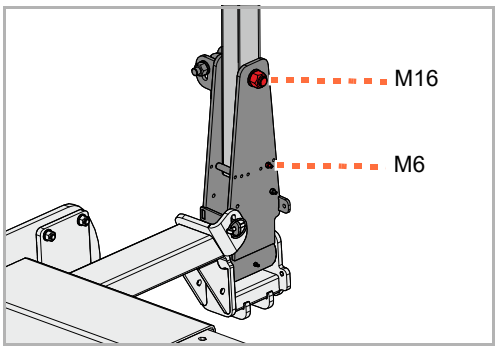
Tightening torques, general

Tighten all screw connections using the information provided in the table. If other tightening torques are necessary, they are specified in the chapter »Maintenance«. The minimum quality of the bolts is “8.8”.

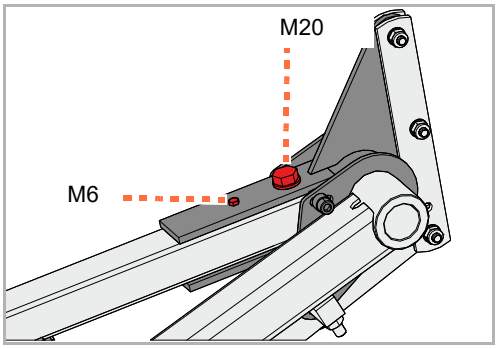
Bolt size	Bolt quality		
	„8.8“	„10.9“	„12.9“
	Tightening torques in Nm		
M6	11.3	16.5	19.3
M8	27.3	40.1	46.9
M10	54	79	93
M12	93	137	160
M16	230	338	395
M20	464	661	773
M24	798	1136	1329
M27	1176	1674	1959
M30	1597	2274	2662
M12x1.5	97	143	167
M14x1.5	159	234	274
M16x1.5	244	359	420
M18x1.5	368	523	613
M20x1.5	511	728	852
M22x1.5	692	985	1153
M24x2.0	865	1232	1442
M27x2.0	1262	1797	2103

Tightening torques, special

Track marker arm

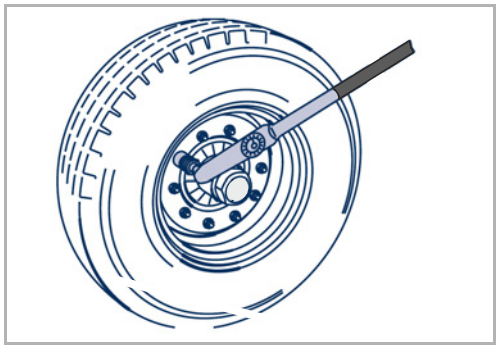


Bolt	Tightening torque
M16	90 Nm
M6	Tightened slightly



Bolt	Tightening torque
M20	90 Nm
M6	Tightened slightly

Wheel nuts



Nut size	Wheel nut surface protection		
	"Dacromet" "Geomet" "Geopett"	"Galvanised "	"Black"
	Tightening torques in Nm		
M18x1.5	270	320	290
M20x1.5	380	420	380
M22x1.5	510	560	510
M22x2.0	-	505	460

Lubricating the bearings

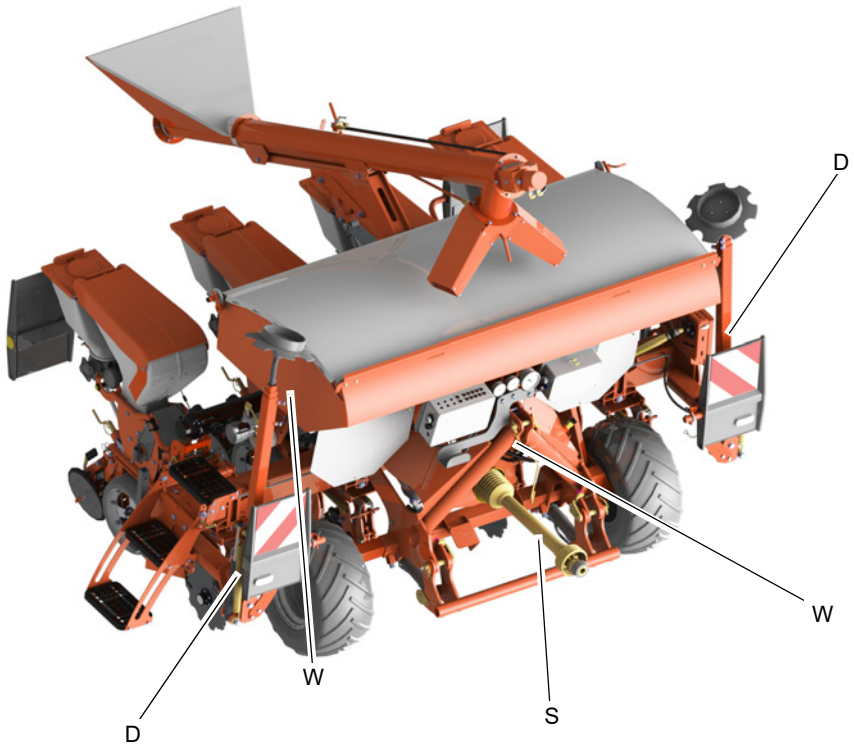
The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

- According to the maintenance chart
- After heavy use
- At least once per season

Do not lubricate maintenance-free bearings.

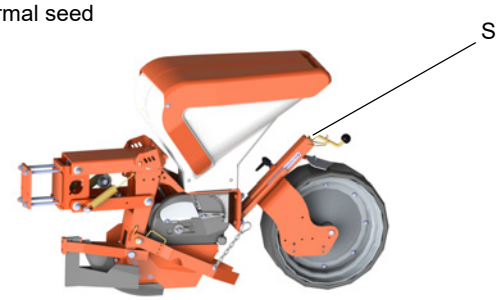
Overview of lubrication points

 Lubrication point	Daily	D
	Once a week	W
	Once per season	S

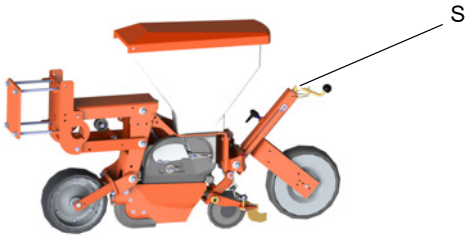


Sowing units

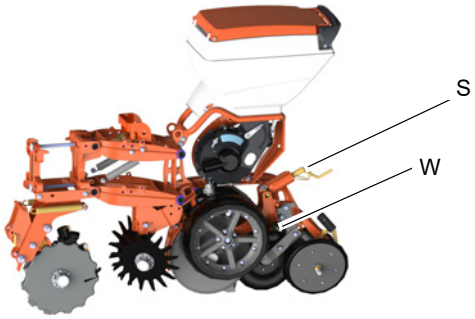
Normal seed



Tandem



HD-II/SX



Lubrication point	Daily	D
	Once a week	W
	Once per season	S

Prerequisites for work:

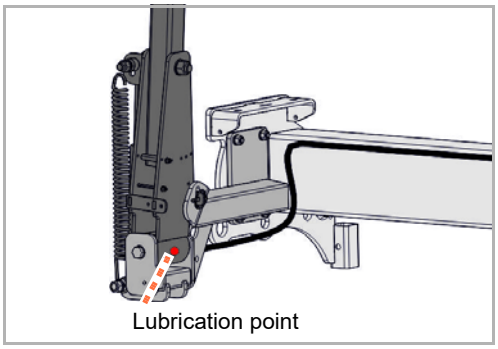
- Machine is coupled to the tractor and all connections are properly made
- The machine is in work position
- Handbrake in tractor is applied
- Machine is secured with wheel chocks against rolling away

When folding out and bringing it to the work position, ensure that the pivot points are not tensioned.
This allows the grease to press into the pivot points more easily.

Daily

Track marker that folds at one point

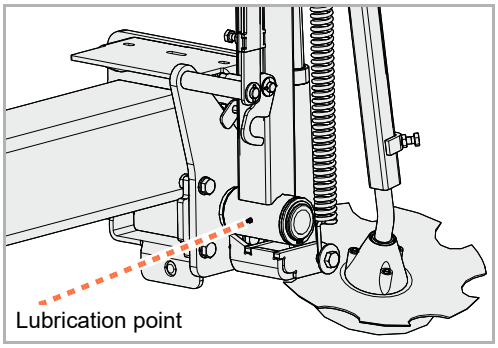
There is one lubrication point on each side of the track marker's folding joints.



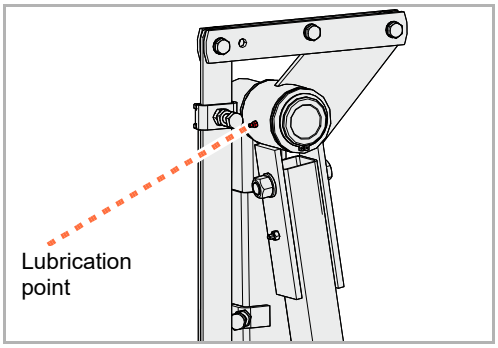
Lubrication point

Track marker that folds at two points

There are two lubrication points on each side of the track marker's folding joints.



- Lubricate with one to two pumps of the grease gun.



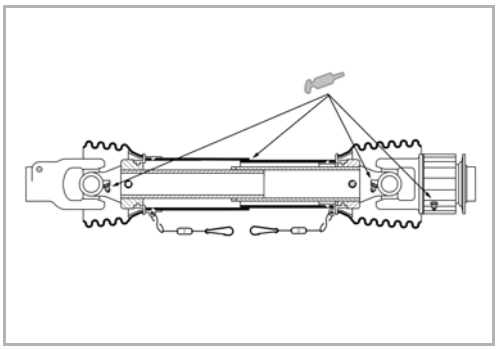
- Lubricate with one to two pumps of the grease gun.

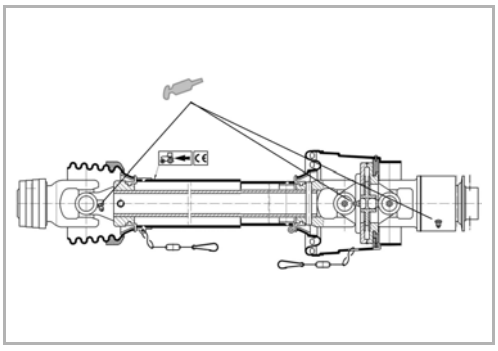
Lubricating the PTO shaft

The manufacturer's own operating manual is included with each PTO shaft. This includes detailed information on the relevant version of the PTO shaft.

Check the guard components
Check all guard components of the PTO shafts for wear or damage (visual inspection). Replace any defective guard components.
An unguarded PTO shaft or damaged guard components can cause very serious injuries during operation.

- Switch off the tractor's PTO.
- Switch off the tractor engine.
- Secure the tractor against starting up accidentally. In a clearly visible location, attach an information label stating that the tractor must not be put into operation.
- Secure the tractor against rolling away.
- Secure the machine against rolling away.
- Release the safety chain for the PTO shaft guard on the tractor.
- Unlock the coupling on the PTO shaft on the side of the tractor.
- Remove the coupling from the PTO on the tractor.
- To lubricate the PTO shaft, remove it on the coupling side and slide the profile section tubes fully together.



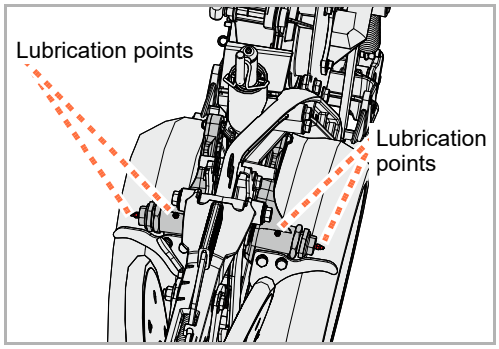


- Unlock the coupling on the PTO shaft on the side of the tractor.
- Slide the coupling onto the PTO on the tractor.
- Ensure that the coupling locks.
- Fix the safety chain for the PTO shaft guard to the tractor.

Once a week

Sowing units

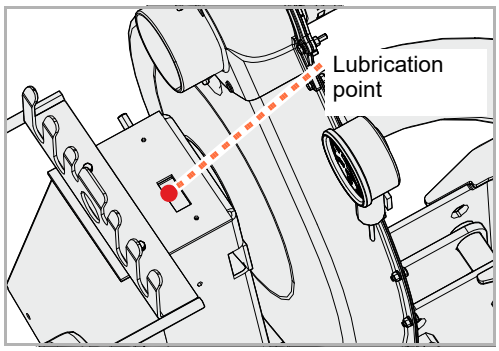
Each sowing unit has two lubrication points.



- Lubricate with one to two pumps of the grease gun.

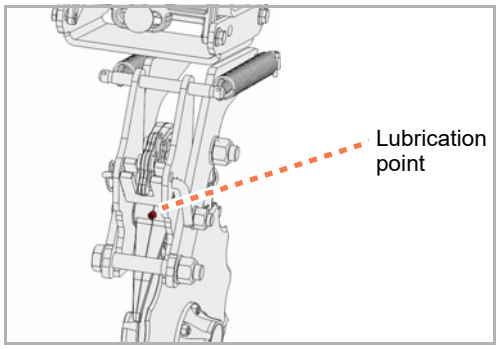
Fan

The mechanical fan drive has one lubrication point.



- Remove the cover.
- Lubricate with one to two pumps of the grease gun.
- Fit the cover.

Fertiliser coulter [+]



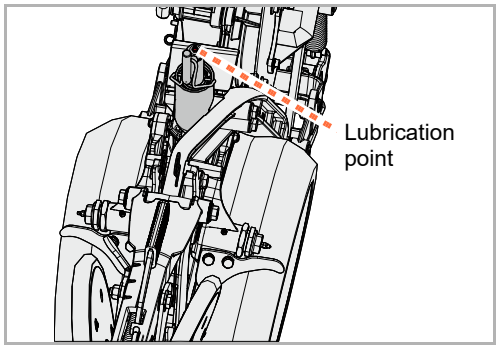
Each fertiliser coulter has one lubrication point.

- Lubricate with one to two pumps of the grease gun.

Once per season

Sowing units

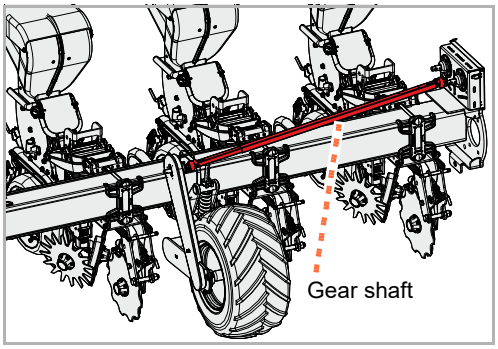
Each sowing unit has one lubrication point.



- Lubricate with one stroke out of the grease gun.

Gear shaft

The gear shafts consist of two parts. The overlapping sliding surface must be lubricated with grease.



- Remove the R-pin on both sides of the gear shaft.
- Remove the gear shaft and pull it apart.
- Apply grease to sliding surfaces with a brush.
- Reassemble both parts of the gear shaft.
- Lock the gear shaft in position again.

Other lubrication points

Generally:

- In addition to the lubrication points shown in this operating manual, your machine may have other lubrication points
- As a rule, lubrication points are located at pivots or bearings. Therefore, check the entire machine for any such lubrication points.

The position of the lubrication nipples is shown as an example for one component. If several components are available, each component's lubrication nipples have to be lubricated accordingly.

Wheels

Works:

- Check the tyres of the transport wheels
- Check the tyres of the drive wheels
- Check the tyre pressure of the transport wheels

Check tyres

Once per season

▸ Inspect the tyres once per season for proper condition.

During maintenance work, ensure that no oil gets onto the tyres. The oil can damage the tyres.

Check tyre pressures

Once per season

▸ Check the tyre pressure of the transport and support wheels once each season:

Wheels	Dimensions	Tyre pressure
Support wheels and drive wheels	7.00 – 12 AS	2.0 bar
	26.00 x 12	1.4 bar

Hitch

- Check the hitch

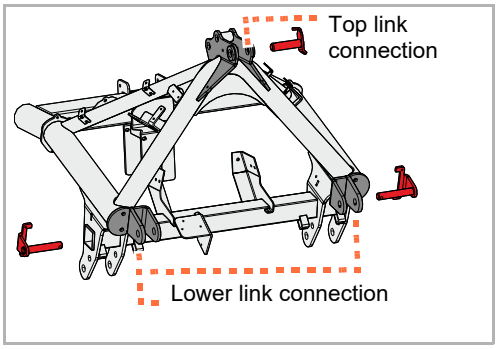
Bolted connections to the tractor

Once per season

Check all the pins and the holes for them in the pin connection to the tractor.

- The measurements must be within the specified range
- Worn parts must be replaced

	CAT 2N / CAT 2	CAT 3N / CAT 3	CAT 4N / CAT 4
Top link connection			
Bolt diameter [mm]	25.37 - 25.50	31.55 - 31.75	44.20 - 45.00
Hole diameter [mm]	25.70 - 25.90	32.00 - 32.25	45.20 - 45.50
Lower link connection			
Bolt diameter [mm]	27.80 - 28.00	36.4 - 36.60	49.70 - 50.80
Hole diameter [mm]	28.70 - 29.00	37.4 - 37.75	51.00 - 51.50



- Check all the bolts and the holes for them using the measurements given in the table.

Sensors

Setting sensors

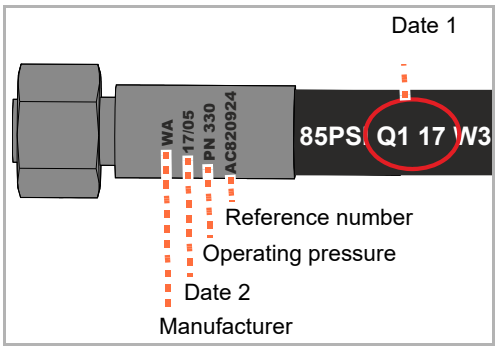
The following sensors may be connected by the electronic control system:

- Radar sensor [+]
- Sensors on the drive shafts
- Track marker sensors
- Travel sensor
- Motor encoder

All sensors must be adjusted in the workshop, if necessary.

Hydraulic hoses

Hydraulic hoses can age without any externally visible signs. In accordance with international regulations, the hydraulic hoses must be replaced every 6 years.



The hydraulic hoses have codes both on the hose and on the swage sleeve which give the production date of the hydraulic hose.

Designation	Meaning	Illustrative example
Date 1	Production date of hydraulic hose	1st quarter of 2017
Manufacturer	Abbreviation of assembly manufacturer	-
Date 2	Production date of hydraulic hose assembly	May 2017
Operating pressure	Maximum operating pressure	330 bar
Reference number	Reference number of hydraulic hose	-

The period of six years is calculated beginning on the production date of the hydraulic hose.

Replacing hydraulic hoses

Every 6 years or if required

All pressure must be released from the hoses. Only use hydraulic hoses with the same specification. The hydraulic hoses within the frame must only be replaced in a specialist workshop.

Fans with mechanical drive

Check and adjust the poly V-belt tension on fans with mechanical drive.

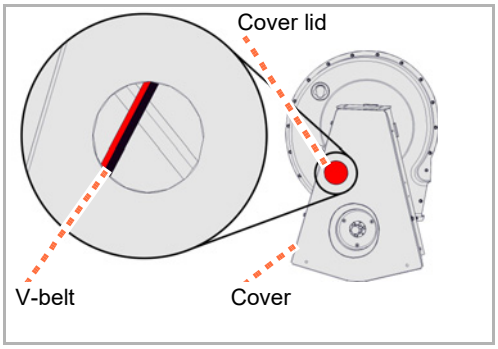
V-belt

Checking wear

Once a week

The wear of the poly V-belt can be checked through an opening in the fan drive cover.

- Lower the machine to its work position.
- Switch off the machine's electronic control system.
- Switch off the tractor's PTO.
- Secure the machine against rolling away.
- Remove the cover lid from the cover.
- Check the poly V-belt for wear.
- Insert the cover lid back into the cover.

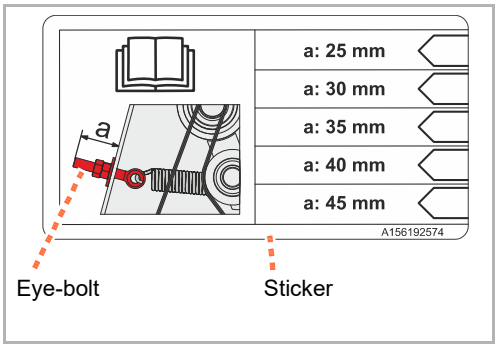


Checking the tension

Once a week

The tension specified for the poly V-belt on this machine is adjusted with the eye-bolt. You can find the adjustment dimension on the marked position on the sticker.

- Lower the machine to its work position.
- Switch off the machine's electronic control system.
- Switch off the tractor's PTO.
- Secure the machine against rolling away.
- Check the adjustment dimension at the eye-bolt and correct it as necessary.



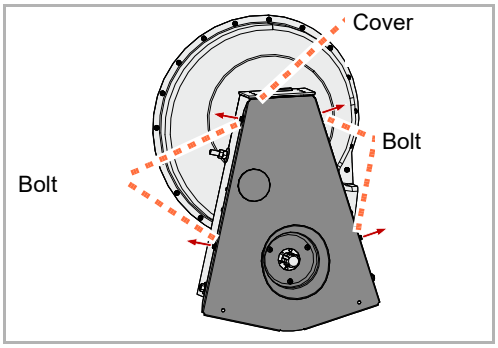
Replacement

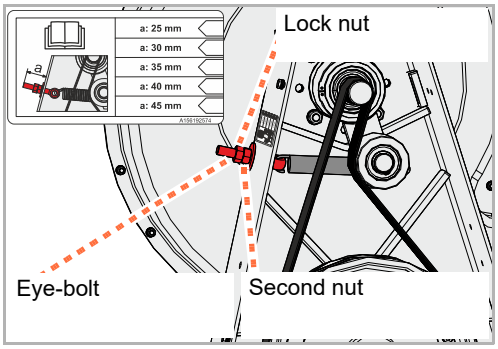
In case of wear

If the poly V-belt is worn, it must be replaced with a new original spare part. This is the only way to ensure that the specified adjustment dimension provides the required poly V-belt tension.

Use only original spare parts
When using poly V-belts that are not approved, the correct poly V-belt tension is not achieved with the adjustment dimension.
This can cause incorrect seed results.

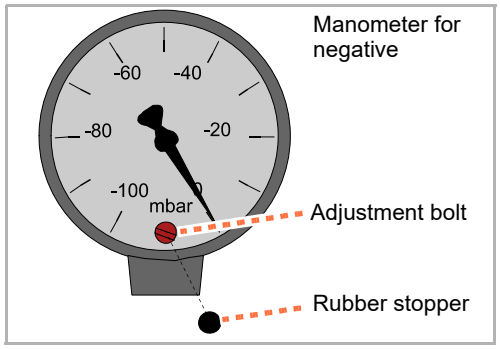
- Lower the machine to its work position.
- Switch off the machine's electronic control system.
- Switch off the tractor's PTO.
- Secure the machine against rolling away.
- Uncouple the tractor.
- Remove the PTO shaft from the machine.
- Loosen the bolts and remove them.
- Remove the cover.

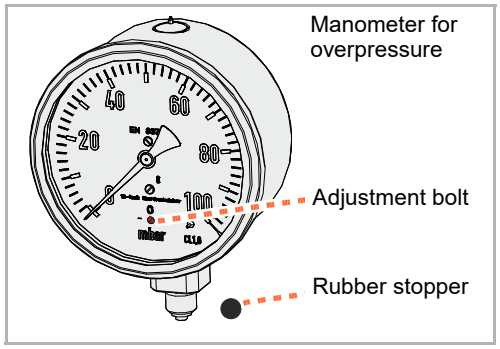




- Loosen and remove the lock nut on the eye-bolt.
- Unscrew the second nut until it is only just on the eye-bolt thread.
- Remove the worn poly V-belt.
- Fit the new poly V-belt.
- Screw on the eye-bolt with the second nut to the required adjustment dimension.
- Secure the second nut with the lock nut.
- Fit the cover.
- Secure the cover with bolts.
- Attach the PTO shaft.

Manometer





The needle of the manometer must be at "0" for a switched off fan.

If the needle is not at “0”:

- Remove the rubber stopper from the glass pane.
- Turn the adjustment bolt at the manometer with a small screw driver to the right or to the left.
- Reinsert the rubber stopper.

Seed discs

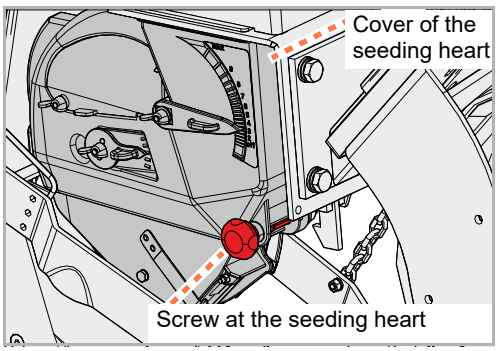
If the seed discs are worn or if a different seed is to be spread, the seed discs must be replaced.
→ Chapter »Refitting«, section »Seed discs«, page200

System using negative pressure

Vacuum interrupter

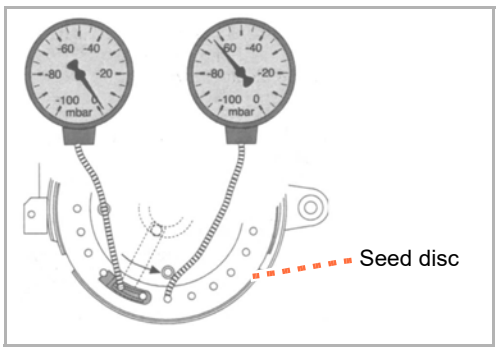
In case of wear

The vacuum interrupter can be incorporated as a fixed or rotating vacuum interrupter. Its operation must be checked before and at the end of the season.



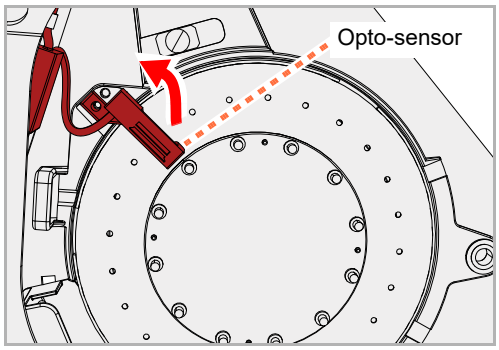
- Lift the machine.
- Release the bolt, remove the cover of the seeding heart.

Checking

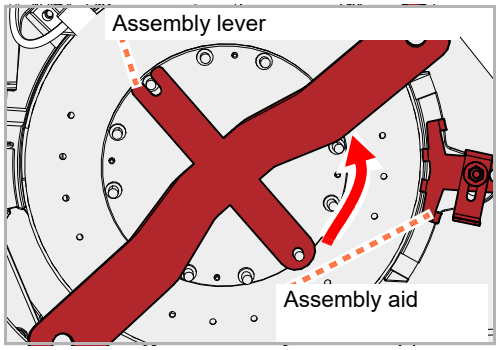


- Drive machine to working speed.
- Unplug the tube of the manometer at the fan and remove the manometer from the frame.
- Put the end of the tube on a hole on the seed disc.
- Use the electronic control system to activate the drive motor for the sowing unit, so that the seed disc rotates. Carry on the tub with the rotating hole. If the hole is above the vacuum interrupter, the negative pressure must fall to zero. Afterwards it has to raise back to the rated value.
- Carry out the procedural steps for all sowing units.

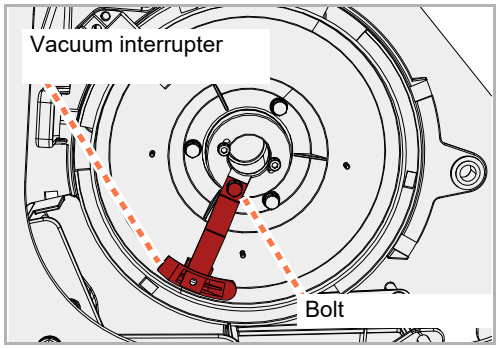
Replacement



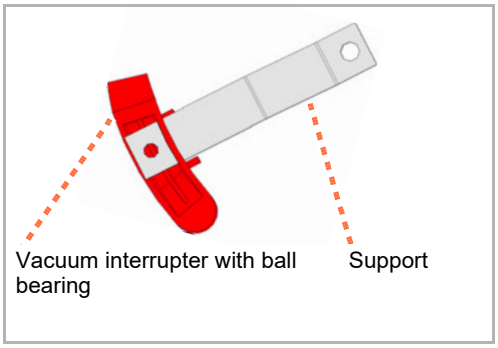
- Slightly lift the opto-sensor, turn it upwards and let it engage.



- Move the assembly aid into position. This secures the seed disc against turning.
- Turn the seed disc to the left using the assembly lever, release it and remove.

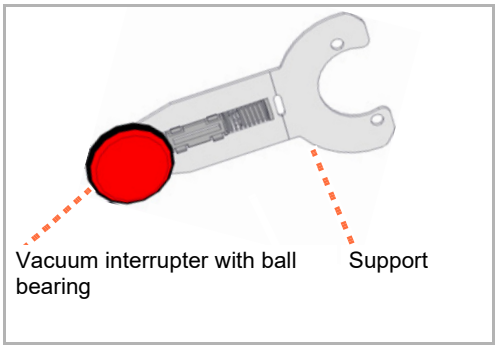


- Release the bolt and remove the support with the vacuum interrupter.



Fixed vacuum interrupter

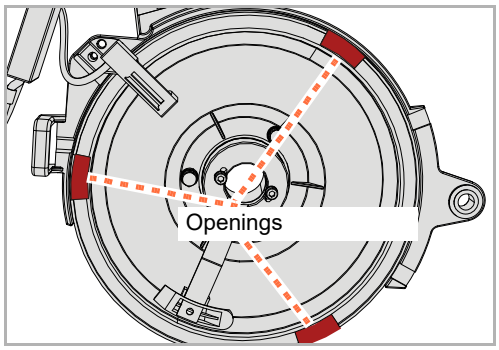
- Unplug the defective vacuum interrupter from the support.
- place new vacuum interrupter upon the support and press it down tightly.



Rotating vacuum interrupter

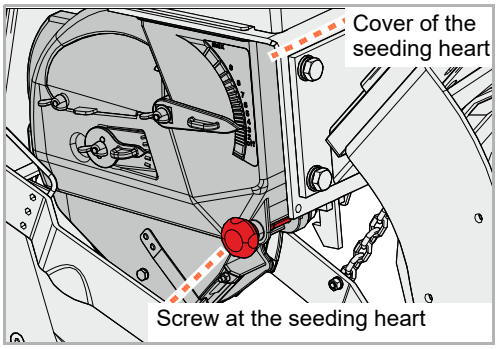
- Unplug the defective vacuum interrupter from the support
- Fit the new vacuum interrupter with ball bearing

- Screw in the support with the vacuum interrupter



- Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.
- Turn the seed disc to the right using the assembly lever and tighten.
- Slightly lift the opto-sensor, turn it downwards and let it engage.

Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.



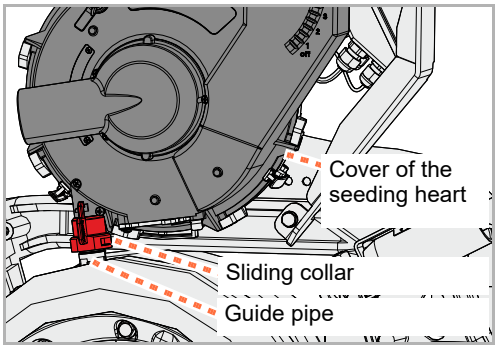
- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

System using overpressure

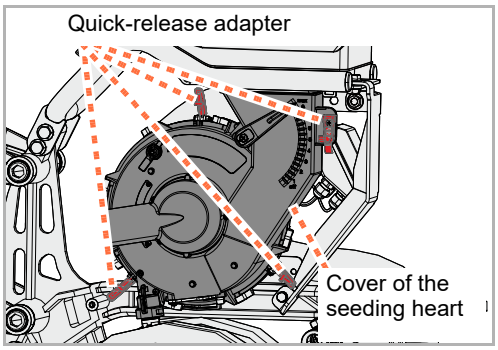
Interrupter

In case of wear

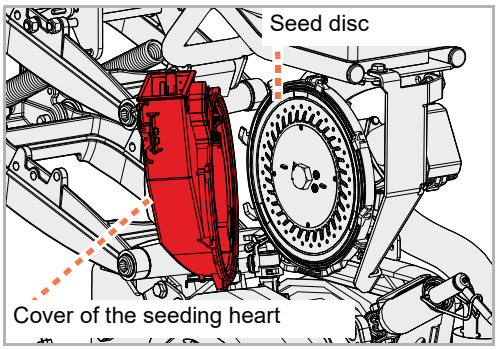
The interrupter is designed as a rotating interrupter. Its operation must be checked before and at the end of the season.



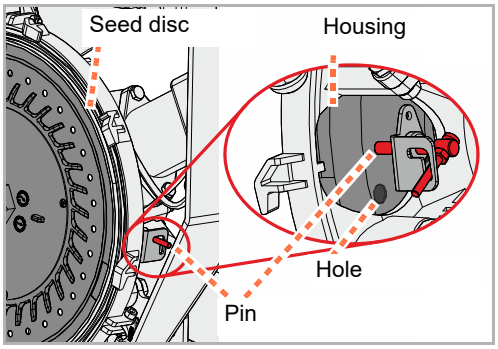
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart.



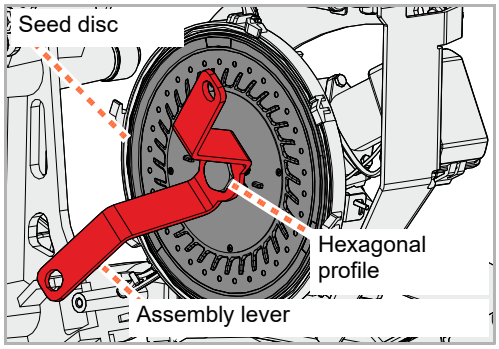
- Loosen the quick-release adapters on the cover of the seeding heart.



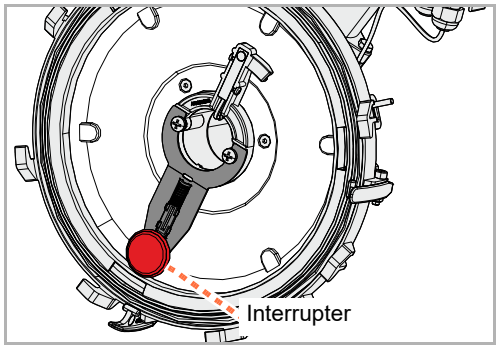
- Turn the cover of the seeding heart clockwise and unlock it.
- Move the cover of the seeding heart to one side.



- Unscrew the pin out of the parking position and press it against the housing.
- Turn the seed disc until the pin locks into one of the six holes in the housing.

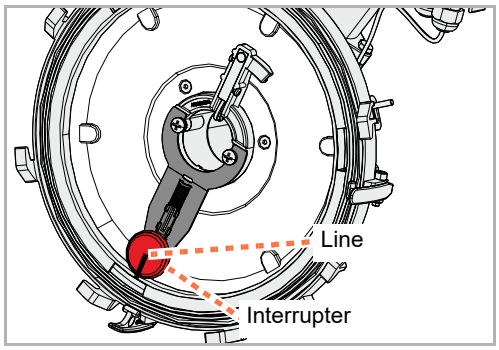


- Fit the assembly lever onto the hexagonal head bolt.
- Use the assembly lever to turn the seed disc anti-clockwise and unlock it.
- Remove the seed disc.

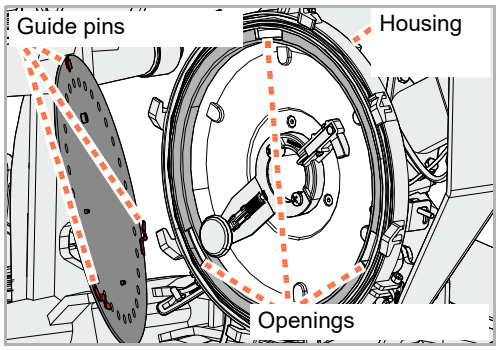


- Check whether the spring is dirty.
- Check whether the slide on the interrupter moves freely.
- Remove any soiling.
- Check the interrupter for wear and damage.

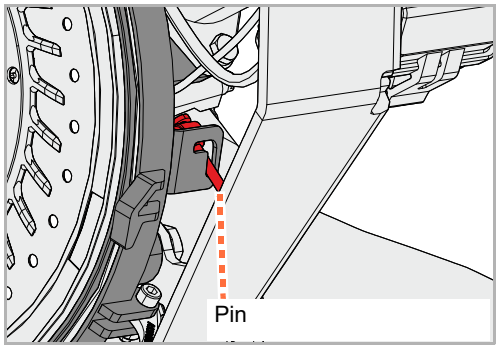
In case of wear, replace the interrupter or slide.



- Mark a line on the disc of the interrupter.



- Place the guide pins of the seed disc into the housing openings and lock as far in as possible.
- Use the assembly lever to turn the seed disc clockwise until it locks firmly.

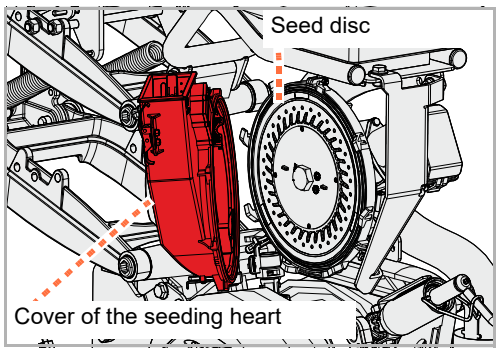


- Return the pin to the parking position.
- Turn the seed disc manually.
- Look through the seed holes to see whether the interrupter is turning.

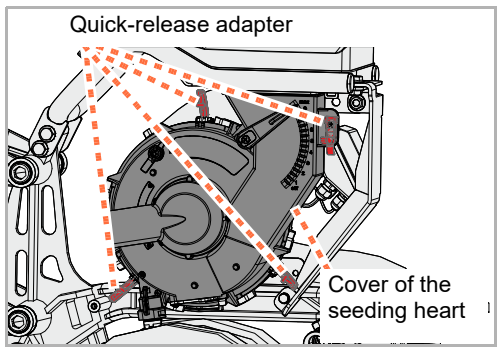
In case of wear, replace the interrupter.

If the pin remains in one of the holes, the electronic control system will issue a fault message in the drive.

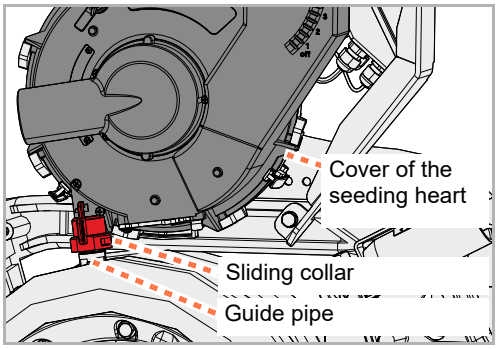
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.



- Fit the cover of the seeding heart and turn it counter clockwise to lock it. Ensure proper position of the cover of the seeding heart.



- Close the quick-release adapters.

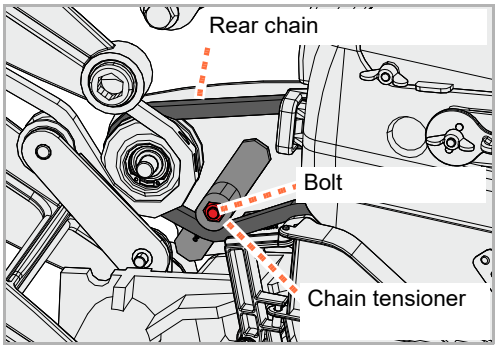


- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it.

Chain

The front chain is automatically re-tensioned.
Re-tension the rear chain if it is worn.

In case of wear



- Release the bolt.
- Re-tension the chain with a chain tensioner.
- Tighten bolt.

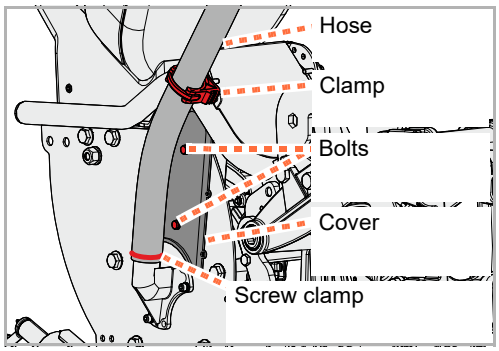
Timing belt

Once per season

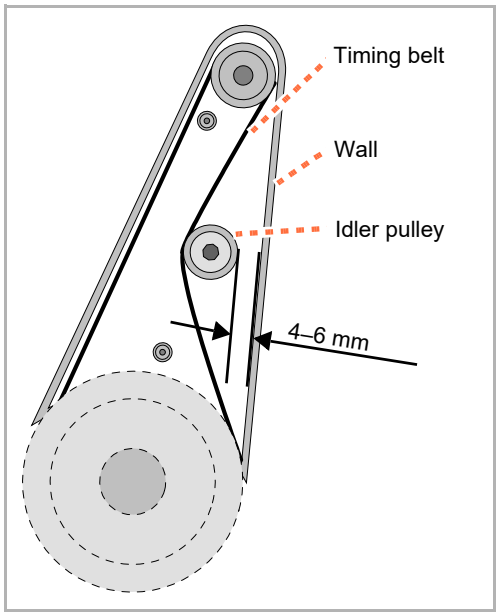
The timing belt serves to transmit the rotary motion of the electric motor onto the seed disc.

Checking

The tension of the timing belt on each sowing unit must be checked once per season.



- Undo the screw clamp and clamp on the hose, and remove the hose.
- Release bolts on the cover and take off the cover.



- Check the timing belt tension. The idler pulley should be 4–6 mm from the wall.

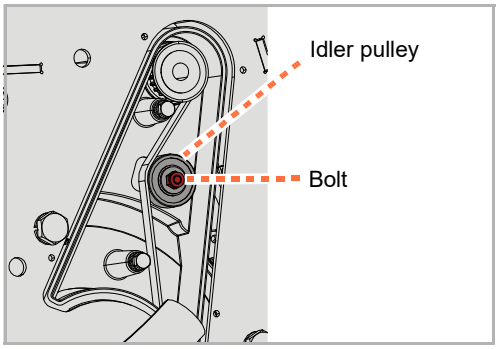
If the timing belt is sufficiently tensioned:

- Secure the cover and hose back onto the sowing unit.

Tensioning

Tension the timing belt:

- If it is not sufficiently tensioned
- After replacement of the timing belt

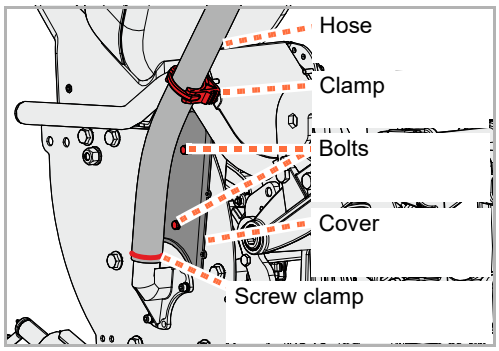


- Release bolt on the idler pulley.
- Shift the idler pulley. The idler pulley should be 4–6 mm from the wall.
- Tighten bolt on the idler pulley.
- Check the timing belt tension. If necessary, readjust the tension.
- Secure the cover and seed hose back onto the sowing unit.

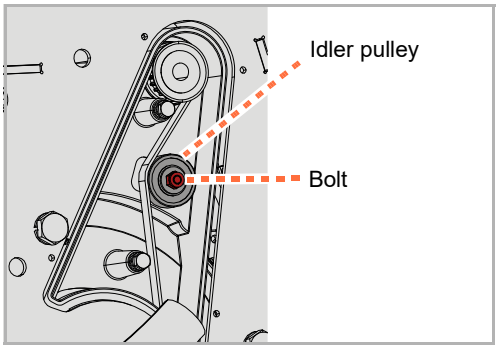
Replacement

To replace the timing belt, specific tasks have to carried out on both sides of the sowing unit. The timing belt is located behind the seeding heart. It can only be replaced if the seeding heart is completely disassembled.

Right-hand sowing unit

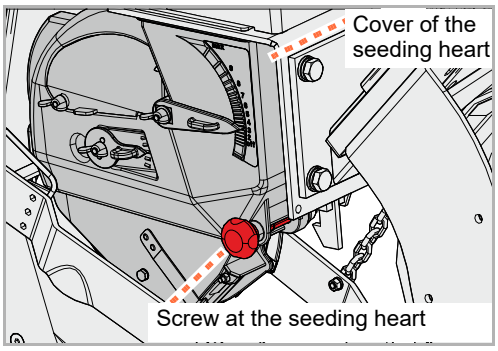


- Undo the screw clamp and clamp on the hose, and remove the hose.
- Release bolts on the cover and take off the cover.



- Release bolt on the idler pulley.

Left-hand sowing unit

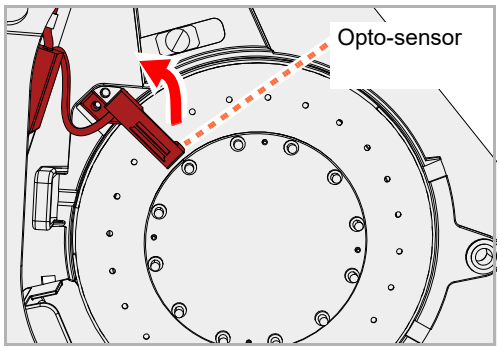


- Release the bolt, remove the cover of the seeding heart.

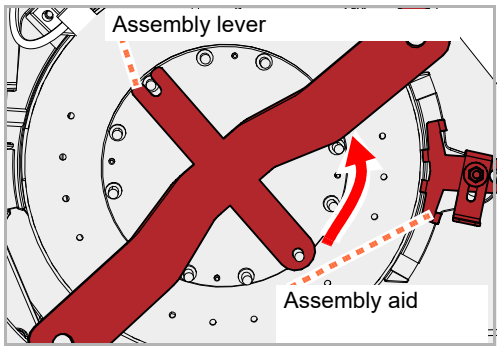
The following tools are required to disassemble the seeding heart:

- 4 mm hex key
- 10 mm spanner
- 13 mm spanner
- Assembly lever
- Assembly aid

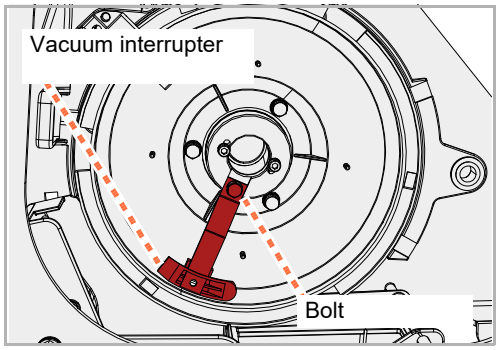
Seed disc, vacuum interrupter



- Slightly lift the opto-sensor, turn it upwards and let it engage.



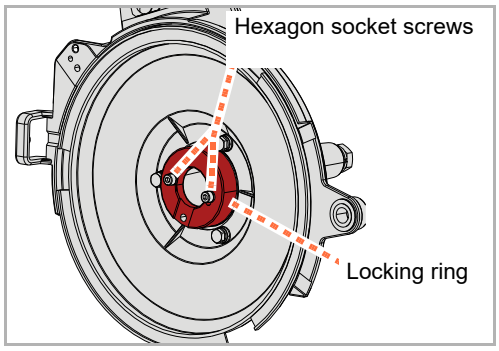
- Move the assembly aid into position. This secures the seed disc against turning.
- Turn the seed disc to the left using the assembly lever, release it and remove.



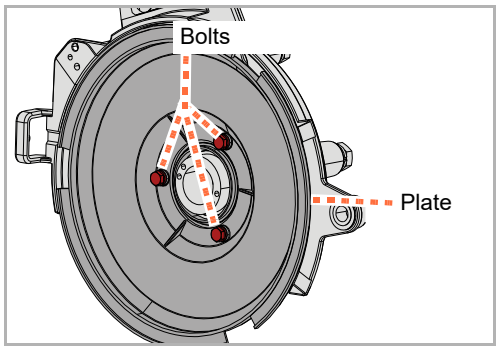
- Release the bolt and remove the support with the vacuum interrupter.

Locking ring, plate

Take a note of the position of the locking ring before removing it. The locking ring must be reinserted in this position during reassembly.

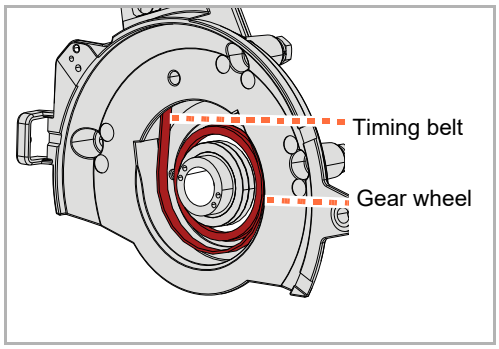


- Release and remove the hexagon socket screws.
- Remove locking ring.



- Loosen the screws and remove them.
- Remove the plate. The toothed belt is now visible.

Replacing the timing belt and tensioning

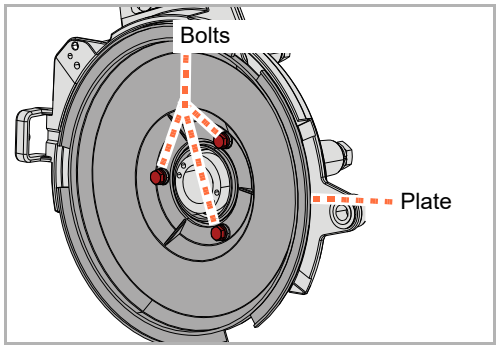


- Remove the timing belt and replace it.
- Place the timing belt under the gear wheel.
- Tensioning the timing belt.

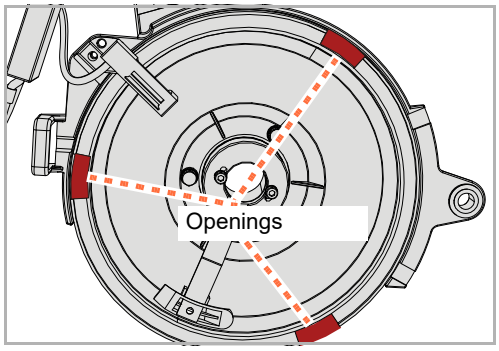
→ Section »Tensioning«, page 208

Fitting the seeding heart

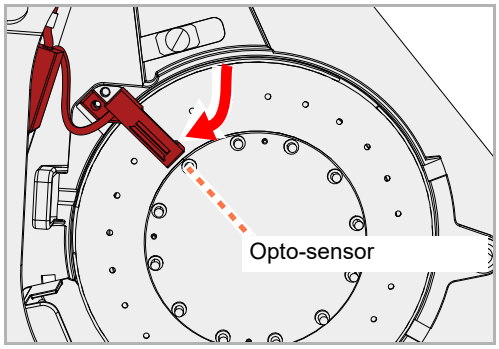
During assembly, ensure that the bolts are pre-tightened to prevent twisting of the plate.



- Insert the plate and fasten with a screw.
- Reinstall the locking ring.

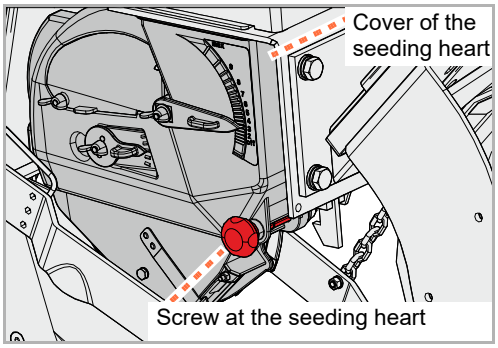


- Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.



- Turn the seed disc to the right using the assembly lever and tighten.
- Slightly lift the opto-sensor, turn it downwards and let it engage .

Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.



- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

Metering device

On the metering device there are:

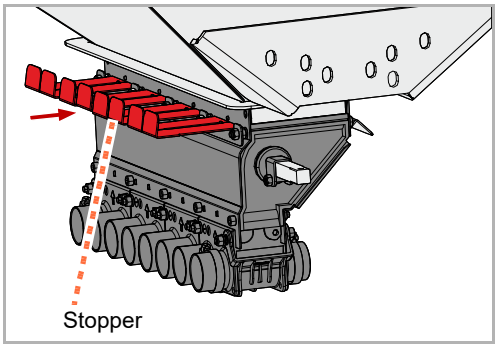
- Sealing lips
- Metering wheels

Sealing lips

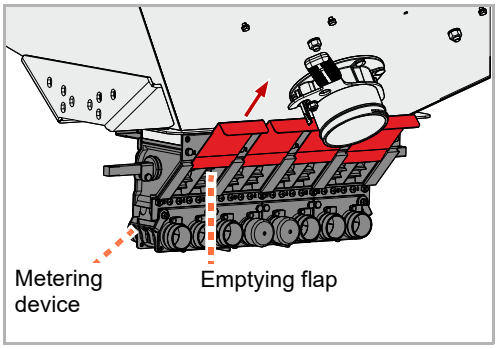
The sealing lips have to be readjusted or replaced if required.

In case of wear

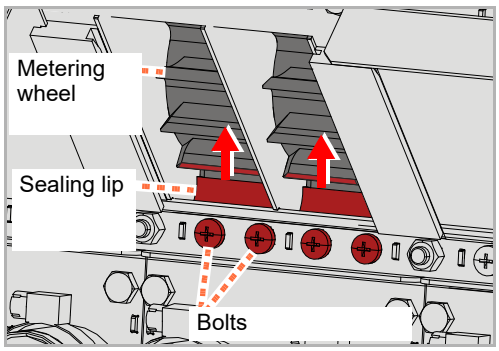
Push in the stoppers
If the fertiliser hopper is not completely empty, the stoppers on the metering wheels of the metering devices must be pushed in.
If the fertiliser hopper is not empty, the fertiliser will flow uncontrollably out of the metering device when the sliding cover is lifted up.



- Close the stoppers on all metering wheels.



- Open the emptying flap on all metering wheels.



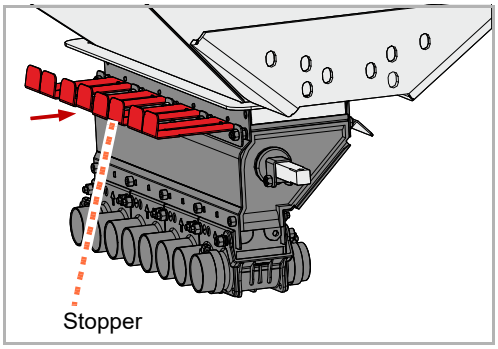
- Undo the screws with nuts.
- Turn the metering wheels that the sealing lips fit into a hollow of the metering wheels.
- Slide the sealing lip upwards. If the sealing lips are worn, replace the sealing lips.
- Tighten the bolts with nuts.
- Slide in the sliding cover.
- Pull out the stopper.

Metering wheels

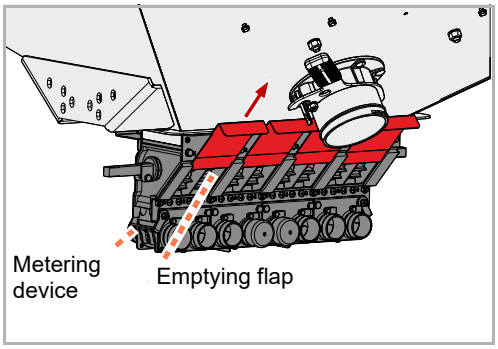
In case of wear

The metering wheels have to be replaced if worn.
The same applies for switching between the 4.0 mm metering wheel and the 7.5 mm metering wheel.

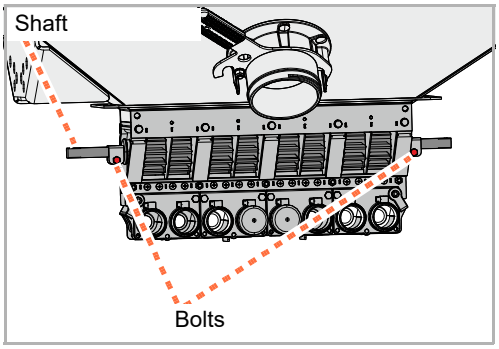
Push in the stoppers
If the fertiliser hopper is not completely empty, the stoppers on the metering wheels of the metering devices must be pushed in.
If the fertiliser hopper is not empty, the fertiliser will flow uncontrollably out of the metering device when the sliding cover is lifted up.



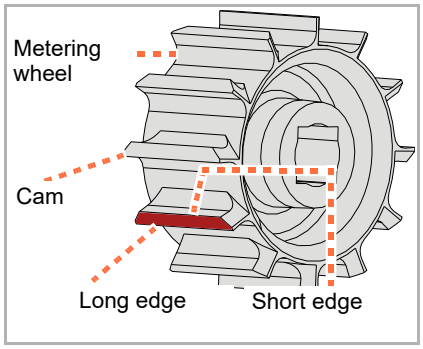
- Close the stoppers on all metering wheels.



- Open the emptying flap on all metering wheels.



- Loosen the bolts.
- Pull out the shaft.
- Remove the metering wheels.



Ensure proper installation position of the metering wheels:
The long edges at the cams have to point downwards.

- Insert new metering wheels.
- Insert the shaft and gear wheel.
- Refit the sliding cover.
- Pull out the stopper.

Micro-drill [+]

The separate operating manual contains instructions relating to maintenance of the micro-drill and the accompanying software.

Operating manual for the micro-drill, chapter »Preliminary information«, section »Other applicable documents«, page 5.

Clean Air

The clean Air is equipped with the following components:

- Air hose
- Cover
- Guide plate

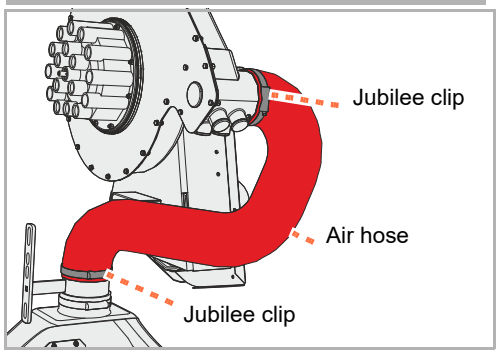
Wear breathing protection when in contact with dust which is harmful to health
For example, harmful dust could be created if dressing has been used or fertiliser has been deposited.
It is necessary to wear breathing protection with the appropriate protective classification if harmful dust could be released when blowing out with compressed air.

Conducting away dust which is harmful to health near the ground
Dressing dust which is harmful to health may enter the environment and may for example endanger insects such as bees.
Since dressing dust which is harmful to health is produced during work, this dust is conducted out of the machine near the ground.

Air hose

Check the air hose for damage and replace it if required.

Once per season

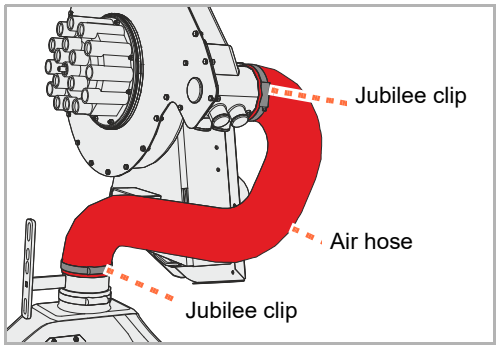


- Check the air hose for leaks.
- If leaks are discovered, replace the air hose.
- Check the transitions between the air hose and the adjacent components for leaks.
- If leaks are discovered, re-tighten the jubilee clips.

Replacement

In the event of damage or wear, replace the air hose.

In case of wear

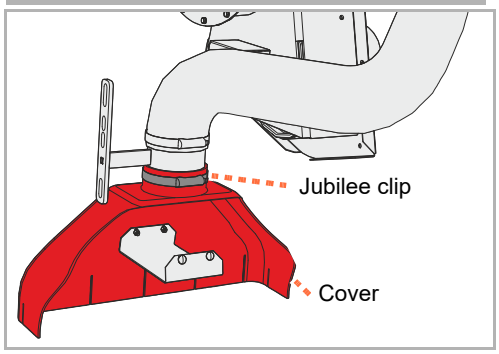


- Undo the jubilee clips.
- Remove the air hose.
- Cut the new air hose to the length of the old air hose.
- Install a new air hose and secure with the jubilee clips.

Cover

Check the cover for damage and replace it if required.

Once per season

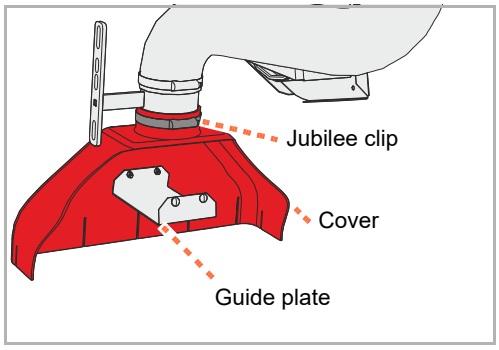


- Check the cover for damage.

Replacement

In the event of damage or wear, replace the cover.

In case of wear

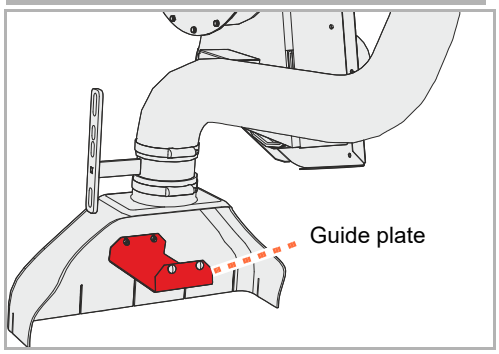


- Undo the jubilee clips.
- Remove the cover.
- Remove the guide plate from the cover.
- Install the guide plate in a new cover.
- Install a new cover and secure with the jubilee clips.

Guide plate

Check the guide plate for damage and replace it if required.

Once per season

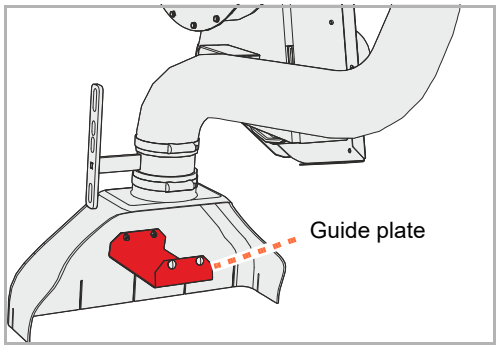


- Check the guide plate for damage.

Replacement

In the event of damage or wear, replace the guide plate.

In case of wear



- Loosen the bolts.
- Remove the guide plate.
- Install a new guide plate and secure it with the bolts.

System using negative pressure

Replacing the seed discs

In case of wear or refitting

Seed discs have to be replaced when:

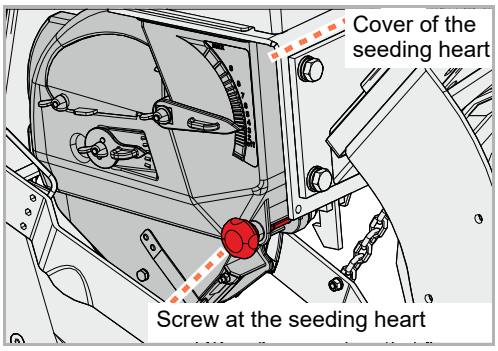
- Change of seed
- Wear of the seed disc

Before refitting, empty the seed hopper.
→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page109

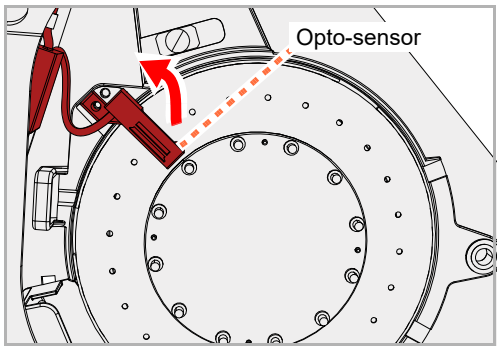
Always insert the seed discs and interrupters to be used on the same sowing unit. Mark the seed disc with the number of the sowing unit to match the seed disc to the correct sowing unit when the machine is next used. The same applies for the interrupter.

Removing the seed disc

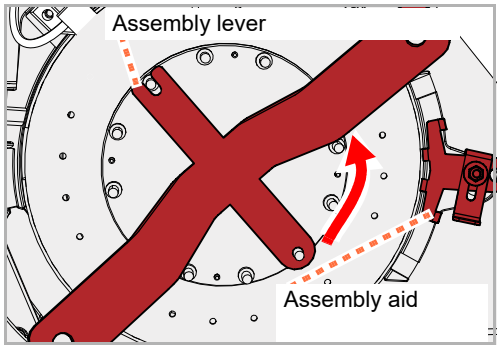
- Lift the machine.
- Release the bolt, remove the cover of the seeding heart.



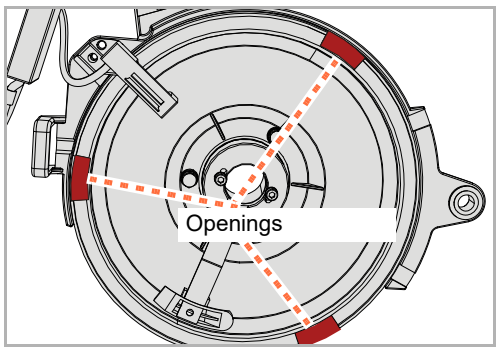
- Slightly lift the opto-sensor, turn it upwards and let it engage.



- Move the assembly aid into position. This secures the seed disc against turning.
- Turn the seed disc to the left using the assembly lever, release it and remove.
- Remove the old seed disc.

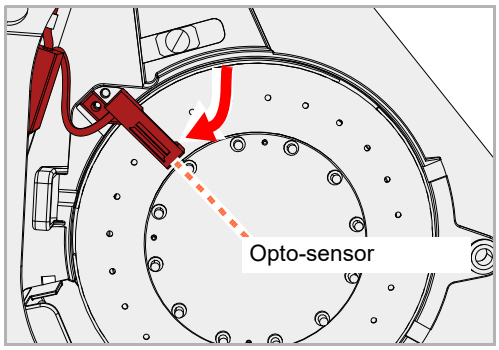


Installing the seed disc

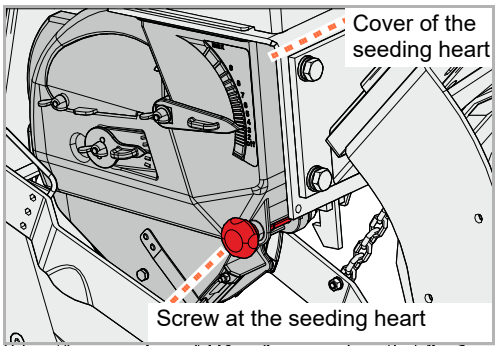


- Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.

- Turn the seed disc to the right using the assembly lever and tighten.
- Slightly lift the opto-sensor, turn it downwards and let it engage .



Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.

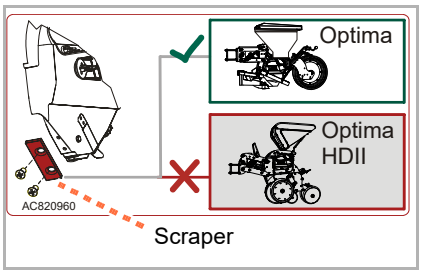


Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

Specifically for normal seed sowing unit for turnips

Turnip conversion set for normal seed sowing unit

- Seed disc for turnips
- Scraper for normal seed sowing unit

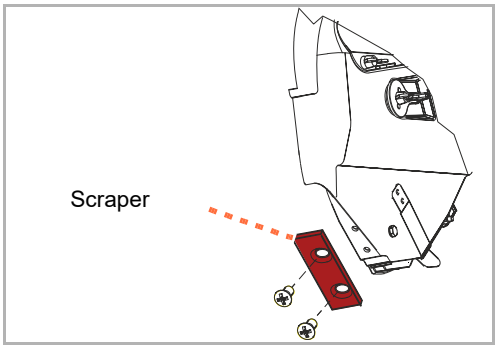


The retrofit kit contains a scraper for the normal seed sowing unit. Do not fit this scraper on HD-II sowing units.

- ▸ Remove the seed disc.

→ Section »Removing the seed disc«, page 219

- ▸ Mark the removed seed disc with the number of the sowing unit in order to be able to match it to the correct sowing unit when the machine is next used.
- ▸ Install the scraper for the normal seed sowing unit.

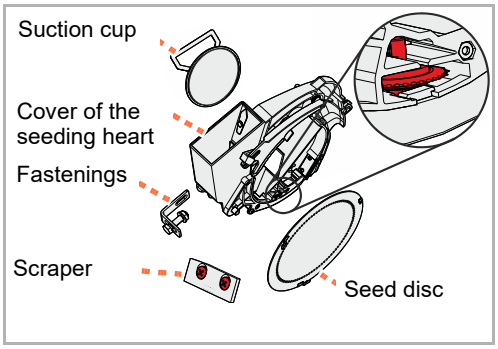


- ▸ Install the seed disc for turnips.

→ Section »Installing the seed disc«, page 220

Specifically for normal seed sowing unit for rape

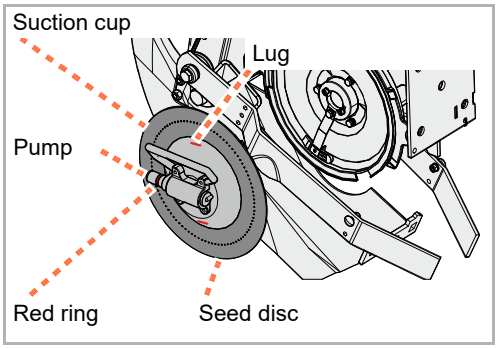
Rape conversion set for normal seed sowing unit



- Seed disc for rape
- Cover of the seeding heart for rape
- Suction cup
- Stop
- Fastenings
- Scraper for normal seed sowing unit

▸ Remove the seed disc.

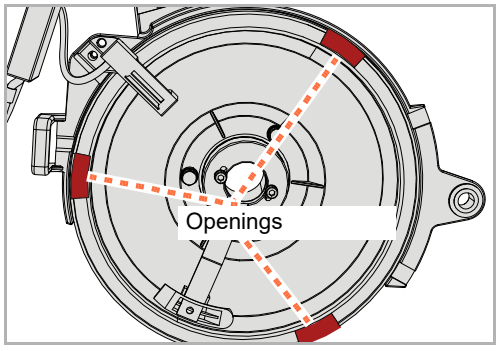
Section »Removing the seed disc«, page 219



▸ Mark the removed seed disc with the number of the sowing unit in order to be able to match it to the correct sowing unit when the machine is next used.

▸ Fit the old cover of the seeding heart and seed disc.

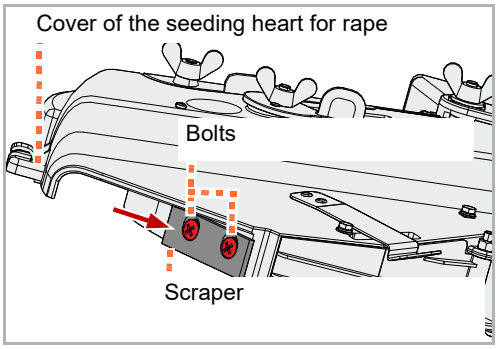
▸ Place the suction cup on the seed disc for rape and establish a negative pressure with the pump. A sufficient negative pressure has been established once the red ring is no longer visible.



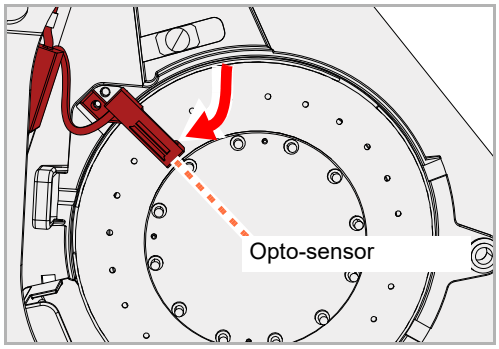
▸ Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.

▸ Actuate the lug on the suction cup to remove the negative pressure.

▸ Remove the suction cup.

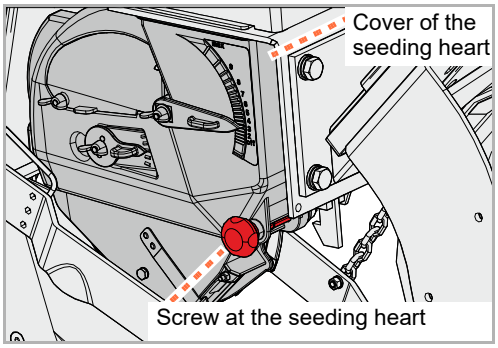


▸ Pre-fit the scraper for the normal seed sowing unit to the cover of the seeding heart for rape, but do not tighten the bolts.



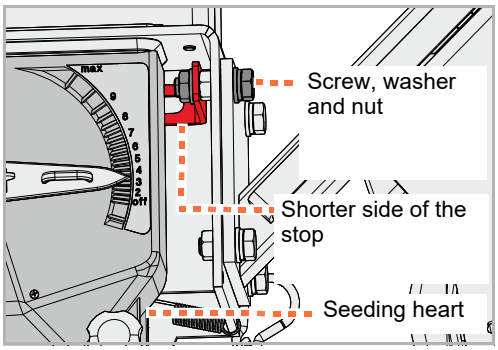
- Turn the seed disc to the right using the assembly lever and tighten.
- Slightly lift the opto-sensor, turn it downwards and let it engage.

Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.

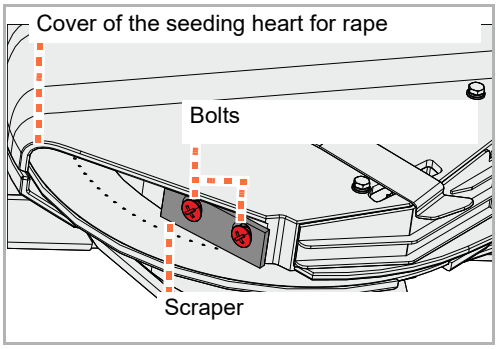


- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

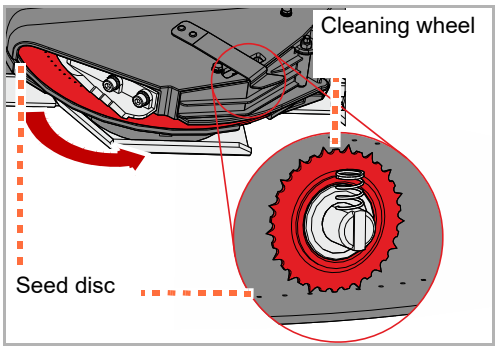
The stop must be fitted so as to prevent the seed in the lower part of the cover of the seeding heart from pressing away from the disc. The seed can be damaged in the resulting gap and lose its germination capacity.



- Align the stop with its shorter side facing the seeding heart (using the seeding heart as a support) and secure it in place with a screw, washer and nut.



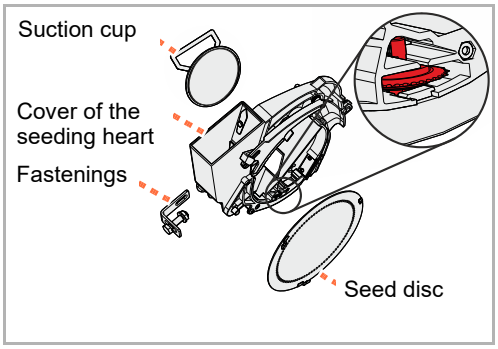
- Place the scraper for the sowing unit on the seed disc and secure it with the bolts so that it is in contact with the seed disc.



- Manually turn the seed disc in the direction of the arrow until you hear the cleaning wheel locking into the holes in the seed disc.

The cleaning wheel will then rotate along with the seed disc.

Specifically for the HD-II rape sowing unit

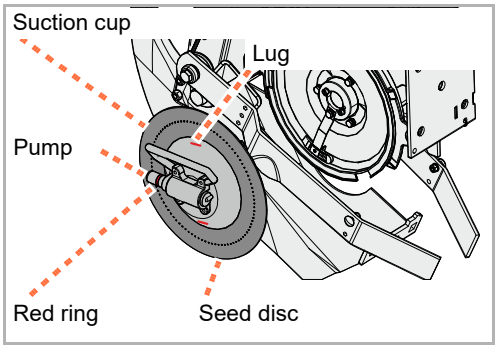


Conversion set for HD II sowing unit

- Seed disc for rape
- Cover of the seeding heart for rape
- Suction cup
- Fastenings
- HD II forced scraper

▸ Remove the seed disc.

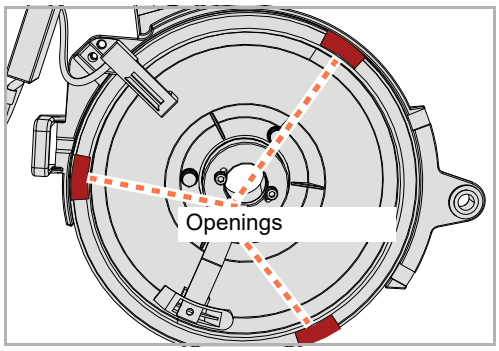
→ Section »Removing the seed disc«, page 219



▸ Mark the removed seed disc with the number of the sowing unit in order to be able to match it to the correct sowing unit when the machine is next used.

▸ Fit the old cover of the seeding heart and seed disc.

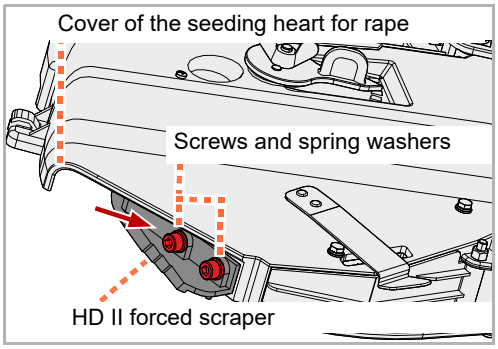
▸ Place the suction cup on the seed disc for rape and establish a negative pressure with the pump. A sufficient negative pressure has been established once the red ring is no longer visible.



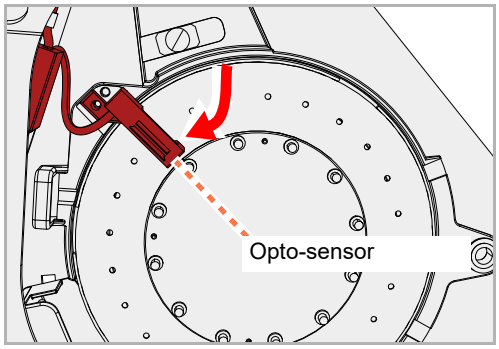
▸ Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.

▸ Actuate the lug on the suction cup to remove the negative pressure.

▸ Remove the suction cup.

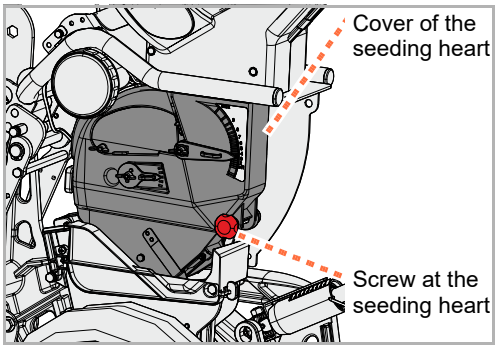


▸ Pre-fit the additional forced scraper for the HD-II sowing unit to the cover of the seeding heart for rape with the bolts and the spring washers, but do not tighten the bolts.

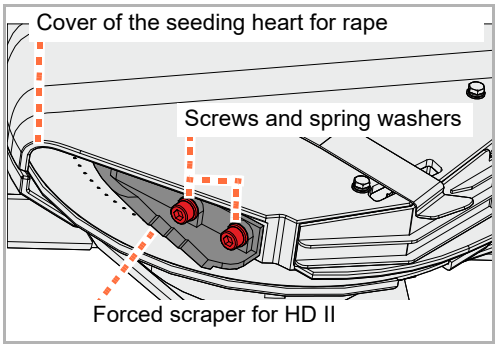


- Turn the seed disc to the right using the assembly lever and tighten.
- Slightly lift the opto-sensor, turn it downwards and let it engage.

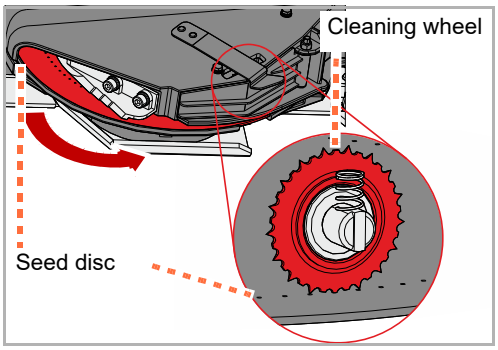
Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.



- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.



- Place the forced scraper for the HD-II sowing unit on the seed disc and secure it with the bolts so that it is in contact with the seed disc.



- Manually turn the seed disc in the direction of the arrow until you hear the cleaning wheel locking into the holes in the seed disc.

The cleaning wheel will then rotate along with the seed disc.

System using overpressure

Replacing the seed discs

In case of wear or refitting

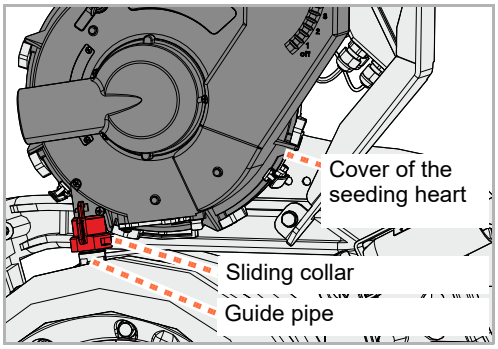
Seed discs have to be replaced when:

- Change of seed
- Wear of the seed disc

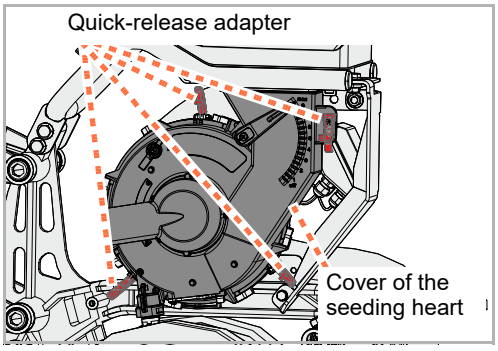
Before refitting, empty the seed hopper.
→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page109

Always insert the seed discs and interrupters to be used on the same sowing unit. Mark the seed disc with the number of the sowing unit to match the seed disc to the correct sowing unit when the machine is next used. The same applies for the interrupter.

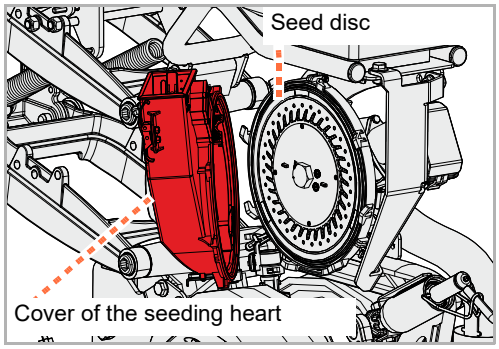
Removing the seed disc



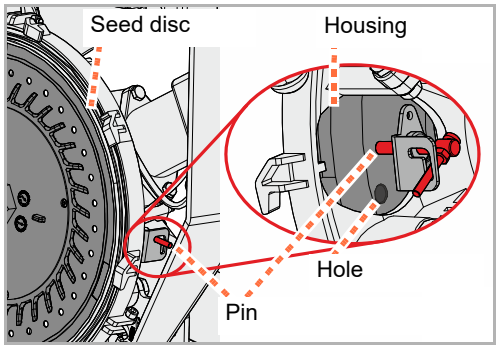
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart.



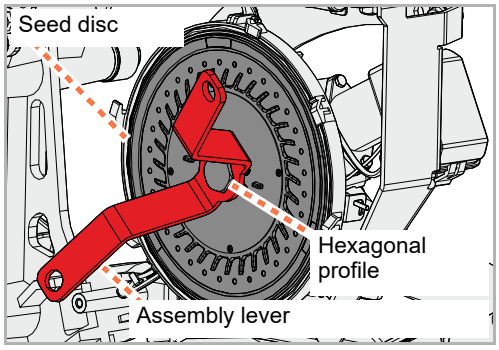
- Loosen the quick-release adapters on the cover of the seeding heart.



- Turn the cover of the seeding heart clockwise and unlock it.
- Move the cover of the seeding heart to one side.

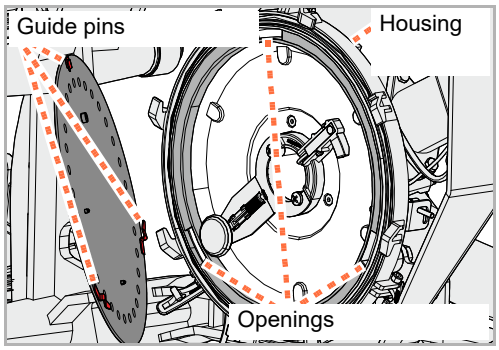


- Unscrew the pin out of the parking position and press it against the housing.
- Turn the seed disc until the pin locks into one of the six holes in the housing.

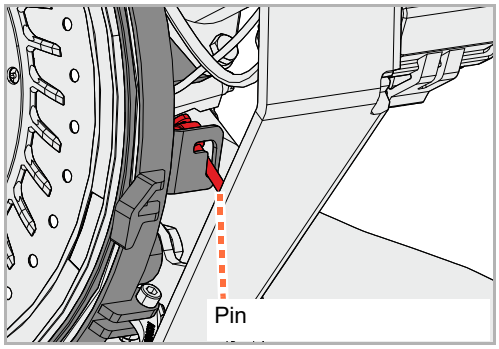


- Fit the assembly lever onto the hexagon nut.
- Use the assembly lever to turn the seed disc anti-clockwise and unlock it.
- Remove the seed disc.

Installing the seed disc



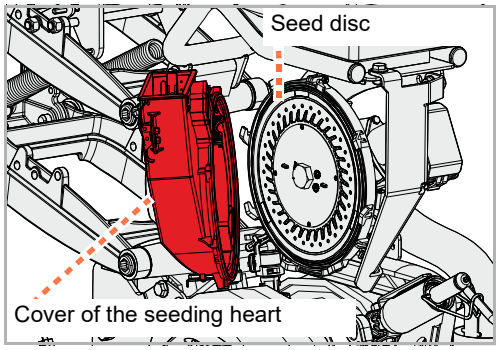
- Place the guide pins of the selected seed disc into the housing openings and lock as far in as possible.
- Use the assembly lever to turn the seed disc clockwise until it locks firmly



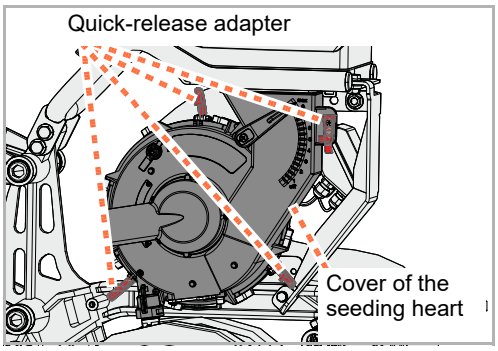
- Return the pin to the parking position.

If the pin remains in one of the holes, the electronic control system will issue a fault message in the drive.

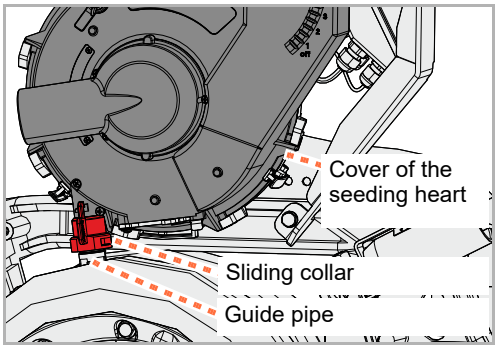
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.



- Fit the cover of the seeding heart and turn it counter clockwise to lock it. Ensure proper position of the cover of the seeding heart.



- Close the quick-release adapters.



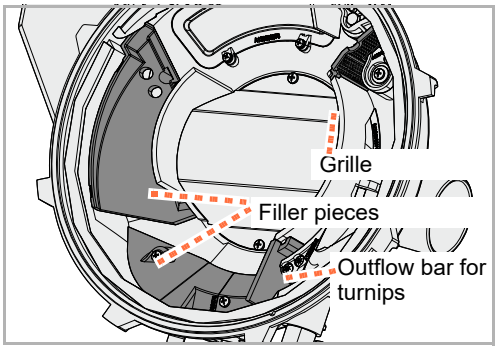
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it.

Specifically for turnips and rape

For sowing turnips and rape, replace the seed disc and insert the specific cover of the seeding heart.

The covers of the seeding heart are marked with symbols:

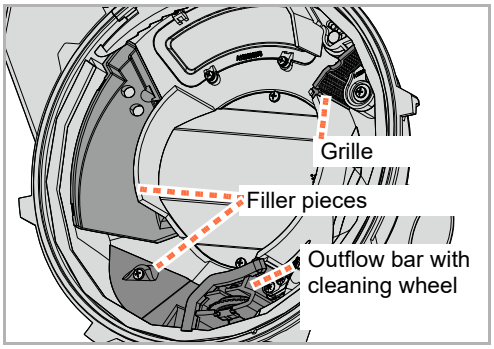
Symbol	Illustrative example
	Maize
	Rape
	Turnips



Cover of the seeding heart for turnips

Additional parts in the cover of the seeding heart for turnips:

- Filler pieces
- Grille with a small, curved outlet
- Outflow bar for turnips



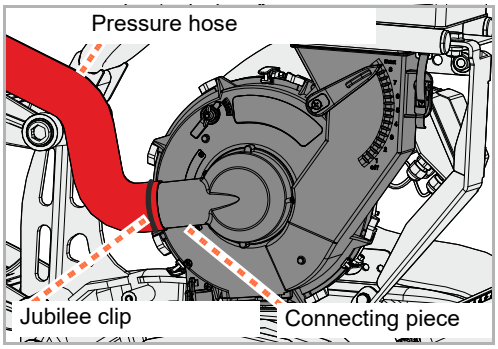
Cover of the seeding heart for rape

Additional parts in the cover of the seeding heart for rape:

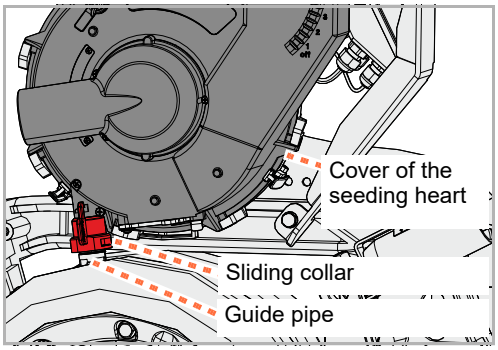
- Filler pieces
- Grille with a small, curved outlet
- Outflow bar with cleaning wheel for the holes in the seed disc

The cover of the seeding heart for rape can also be used for turnips. To do this, the outflow bar with cleaning wheel must be removed and the outflow bar for turnips must be installed. The outflow bar for turnips encloses the cover of the seeding heart for rape.

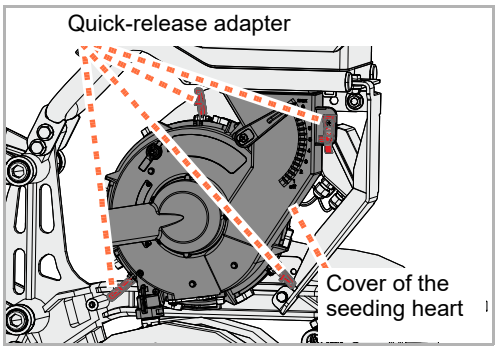
Refitting for turnips and rape



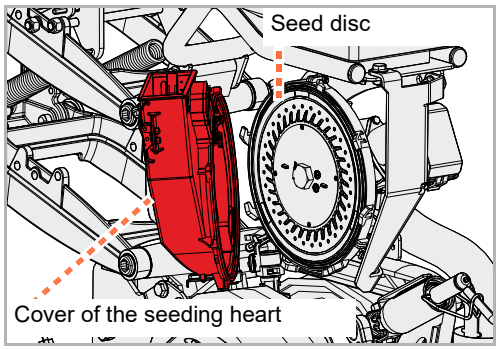
- Loosen the jubilee clip on the cover of the seeding heart and pull the pressure hose out from the connecting piece.



- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart.



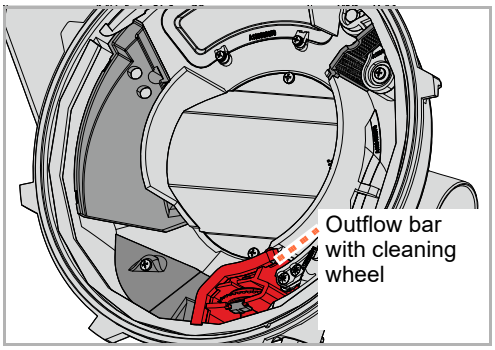
- Loosen the quick-release adapters on the cover of the seeding heart.



- Turn the cover of the seeding heart clockwise and unlock it.
- Move the cover of the seeding heart to one side.

- Remove the old seed disc.
- Mark the removed seed disc with the number of the sowing unit in order to be able to match it to the correct sowing unit when the machine is next used.
- Install the seed disc for rape or turnips.

→ Chapter »Refitting«, section »Replacing the seed discs«, page227



For the cover of the seeding heart for rape and turnips:

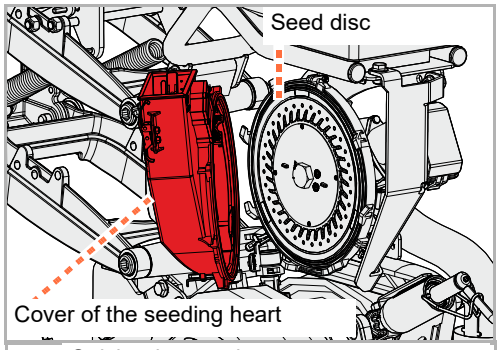
Refitting from rape to turnips:

- Remove the outflow bar with cleaning wheel.
- Fit the outflow bar for turnips.

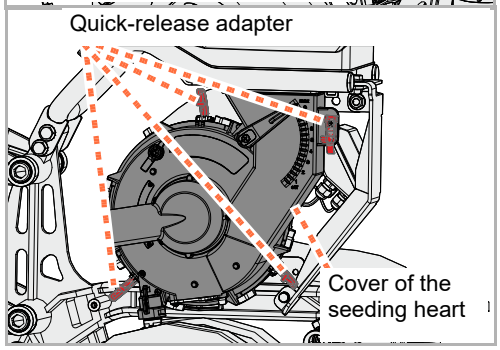
When refitting from turnips to rape:

- Fitting steps are carried out in the reverse sequence.

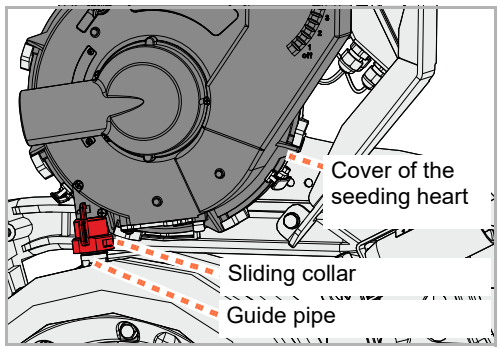
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.



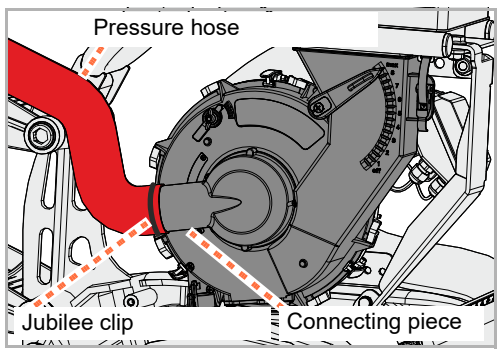
- Fit the cover of the seeding heart and turn it counter clockwise to lock it. Ensure proper position of the cover of the seeding heart.



- Close the quick-release adapters.



- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it.



- Attach the pressure hose to the connecting piece and secure with a jubilee clip.

Faults can often be eliminated in a fast and easy manner. In the event of hydraulic problems, first check:

- Are the hydraulic hoses properly connected?
- Is the control unit at the tractor defective?
  If so, contact your dealer.
- Is the hydraulic pump of the tractor defective?
  If so, contact your dealer.

Before calling Customer Service, refer to the table below to check whether you can eliminate the fault yourself.

IsoMatch Tellus

Fault	Cause	Remedy
Terminal does not receive any pulse	Power supply interrupted	Connect the power cable if the power supply was disconnected
	Supply voltage too low	Check the voltage: The supply voltage must be 12 V
	Fuse defective	Replace fuse
The drive motor sensors are receiving no pulses	Sensors or cable defective	e-drive II software: In the diagnostics menu, check the motors Notify customer services if necessary
Speed is not displayed	Input pulses / 100 m is missing	Enter pulse details
	Cable at the radar sensor defective	Check cable and replace if necessary
	Hardware is defective	Contact the Customer Service of the dealer
Correct number of sowing units is not shown	Insufficient number of units monitored	Check the number of sowing units and re-enter it
	Wrong number of sowing units stored	Correct the entry

Fault	Cause	Remedy
Opto-sensor receiving no pulses.	Opto-sensor defective.	Check the operation of the opto-sensor using the Service key on the e-drive II. If the fault cannot be eliminated, contact the dealer.
Number of grains/ha fluctuates strongly.	Irregular separation of the seeds.	Set the sowing units correctly
	Opto-sensor is dirty.	Clean the opto-sensor with a brush. → Chapter »Operation«, section »Fault«, page160
LED on opto-sensor lights up red.	Opto-sensor is dirty.	Clean the opto-sensor with a brush. → Chapter »Operation«, section »Fault«, page160

HD-II seeding technology

Fault	Cause	Remedy
Seed is not deposited.	Coulter is clogged.	Remove clogging.
Seed is not deposited.	Bend in the drop duct is blocked.	Remove clogging.
Seed is not placed correctly.		
• Miss	Seed of this size cannot be separated with the fitted seed disc.	Fit the correct seed disc.
	Negative pressure too low.	Open the sliding cover further or increase the fan speed.
	Scraper setting incorrect.	Correct the setting.
	Baffle plate set too deeply.	Correct the setting.
	Working speed is too high.	Reduce working speed.
	Hole number of the seed disc does not correspond to the selected sowing distance.	Use suitable seed discs.
	Glutinous dressing agents prevent free dropping of the seed.	• Use different dress seeds. • Add talcum.
	Connection hose to sowing unit is defective.	Replace the connection hose, lay without kinks and abrasion points.
	Inaccurate seed calibration due to seed mix	• Empty the seed hopper. • Fill in seed of one kind.
	The seed hopper contains foreign bodies.	Remove foreign bodies.

Fault	Cause	Remedy
• Doubles	Diameter of the seed holes too large, so that grains become stuck on the seed disc.	Use suitable seed discs.
	Negative pressure too high.	Close the sliding cover further or reduce the fan speed.
	Scraper setting incorrect.	Correct the setting.
	Inaccurate seed calibration due to seed mix.	• Empty the seed hopper. • Fill in seed of one kind.
Sowing distances change uncontrolled.	Vacuum interrupter worn.	Replace the vacuum interrupter.
	Seed disc damaged.	Replace the seed disc.
	Insufficient seedbed preparations.	Ensure sufficient re-compaction and select the correct deposit depth.
	Shares worn, seed scrolls in the furrow.	Replace coulters.
Sowing distances do not comply with the table readings.	The actual slippage deviates significantly from the average slippage.	Use another chain drive transmission ratio.
	Wrong chain wheels fitted.	Check the number of teeth of the gear wheels according to the spare parts list.

SX seeding technology

Fault	Cause	Remedy
Seed is not deposited.	Coulter is clogged.	Remove clogging.
Seed is not deposited.	Bend in the guide pipe is blocked.	Remove clogging.
Seed is not placed correctly.		
• Miss	Seed of this size cannot be separated with the fitted seed disc.	Fit the correct seed disc.
	Overpressure too low.	Open the sliding cover further or increase the fan speed.
	Scraper setting incorrect.	Correct the setting.
	Baffle plate set too deeply.	Correct the setting.
	Working speed is too high.	Reduce working speed.
	Hole number of the seed disc does not correspond to the selected sowing distance.	Use suitable seed discs.
	Glutinous dressing agents prevent free dropping of the seed.	• Use different dress seeds. • Add talcum.
	Connection hose to sowing unit is defective.	Replace the connection hose, lay without kinks and abrasion points.
	Inaccurate seed calibration due to seed mix	• Empty the seed hopper. • Fill in seed of one kind.
	The seed hopper contains foreign bodies.	Remove foreign bodies.

Fault	Cause	Remedy
• Doubles	Diameter of the seed holes too large, so that grains become stuck on the seed disc.	Use suitable seed discs.
	Overpressure too high.	Close the sliding cover further or reduce the fan speed.
	Scraper setting incorrect.	Correct the setting.
	Inaccurate seed calibration due to seed mix.	• Empty the seed hopper. • Fill in seed of one kind.
Sowing distances change uncontrolled.	Rotating interrupter worn.	Replace the rotating interrupter.
	Seed disc damaged.	Replace the seed disc.
	Insufficient seedbed preparations.	Ensure sufficient re-compaction and select the correct deposit depth.
	Shares worn, seed scrolls in the furrow.	Replace coulters.
Grains are visible on the ground surface	Insufficient sowing depth set.	Increase the sowing depth.
	Incorrect catch roller position.	Adjust the catch roller position.

Fertiliser application

Fault	Cause	Remedy
Fertiliser tubes clogging	Fertiliser tubes are sagging	Shorten the fertiliser tubes
Fertiliser tubes clogging with air support	Regulating flap incorrectly set at the fan	Setting the regulating flap → Chapter»Preparing for operation«
No fertiliser applied	Fertiliser too wet	Use dry fertiliser
	Fertiliser clots too much	Use a removable sieve
	Stoppers are closed too much	Fully open the stoppers
	Drive disconnected	Check drive
	The hydraulic motor is defective	Check the hydraulic motor
	The oil supply is interrupted	Check the oil supply
Applied fertiliser quantity changes uncontrolled	Sealing lips on the metering devices are worn	Replace sealing lips
	Metering device worn	Replace metering device
	Stoppers are closed too much	Fully open the stoppers
	The emptying gate is open	Close the emptying gate
	Metering wheels are stuck	Clean the metering wheels
The fertiliser spreader rotates very tight	Incorrect installation of the metering wheels	Fit metering wheels correctly

Mechanical fan drive

Fault	Cause	Remedy
V-belt of the fan drive runs off the belt pulley	Grooves of the belt pulley are contaminated	Clean upper and lower belt pulley
	Belt tension too low	Regulate the tension of the V-belt → Chapter»Maintenance«
	V-belt defective	Have the V-belt replaced → Chapter»Maintenance«

Hydraulic fan drive

Fault	Cause	Remedy
Return line pressure too high	Too small line diameter or unfavourable return path	Select lines with sufficient line diameters and large return line couplings
Hydraulic motor leakage	Shaft seal worn	Have a new shaft seal fitted or have the current one installed in the right direction.
Speed insufficient	3-way flow control valve is incorrectly set	Check the setting of the 3-way flow control valve
	Tractor does not supply enough oil or oil pressure insufficient	Have the pressure limiting valve checked
Hydraulic motor intermission	Oil reserve on the tractor too low	Have a larger oil tank fitted
	Primary additional control valve was actuated	Select a different connection point for the pressureless return line
Valve lever trips out of the catch	Shutdown pressure too low	Check the setting
Hydraulic fluid overheating	Conveying capacity too large	Set 3-way flow control valve

Loading onto a transport vehicle



Risk of death due to falling load
If the load is not sufficiently secured, there is a risk that the machine or parts of the machine may become loose and fall off the transport vehicle while travelling.
Persons who are in the hazard area while transporting the machine may be seriously or fatally injured.

Machine in three-point suspension

Prerequisite:

- The foldable machine is folded out
- The telescopic machine is retracted

Load machines in a three-point suspension onto the transport vehicle with a forklift, crane or the tractor and a sturdy loading ramp.

Hitched machine

Prerequisite:

- The machine is in the transport position for road transport

Load hitched machines onto the transport vehicle via ramps and then lower them into a low position.



Observe the national regulations for permitted dimensions and weights.

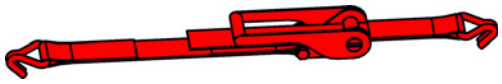
Securing the machine

- Secure the machine and all moving machine parts with lashing straps.
- Move all fasteners on the machine into a secured position.

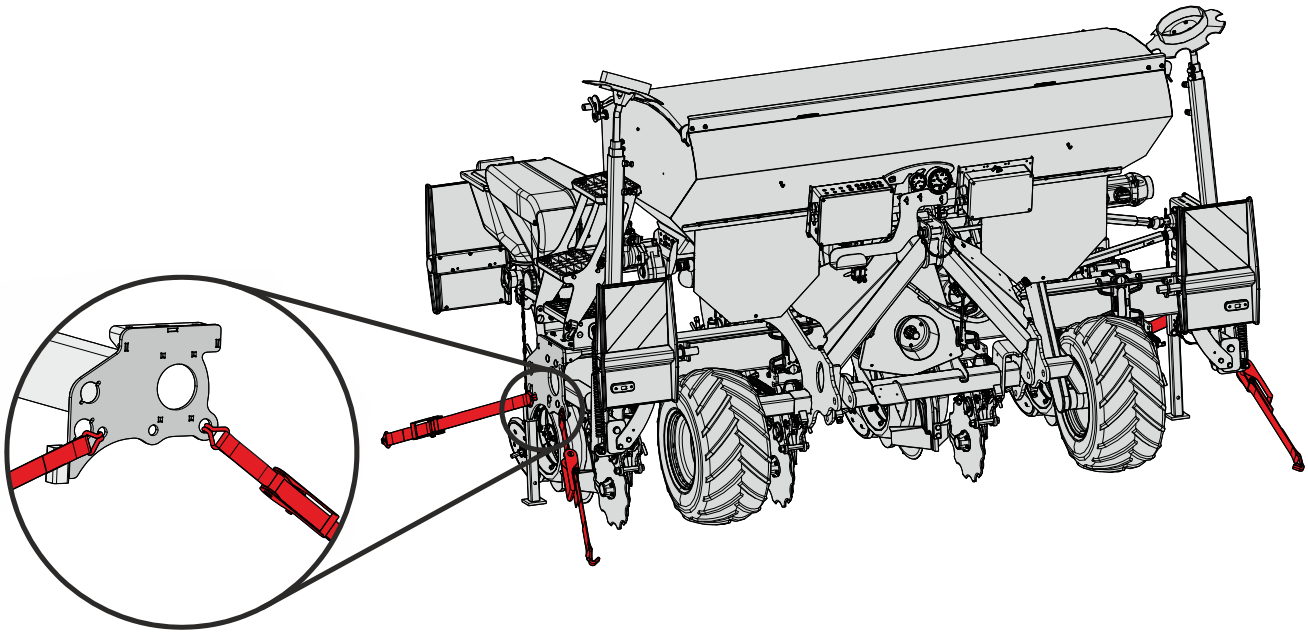


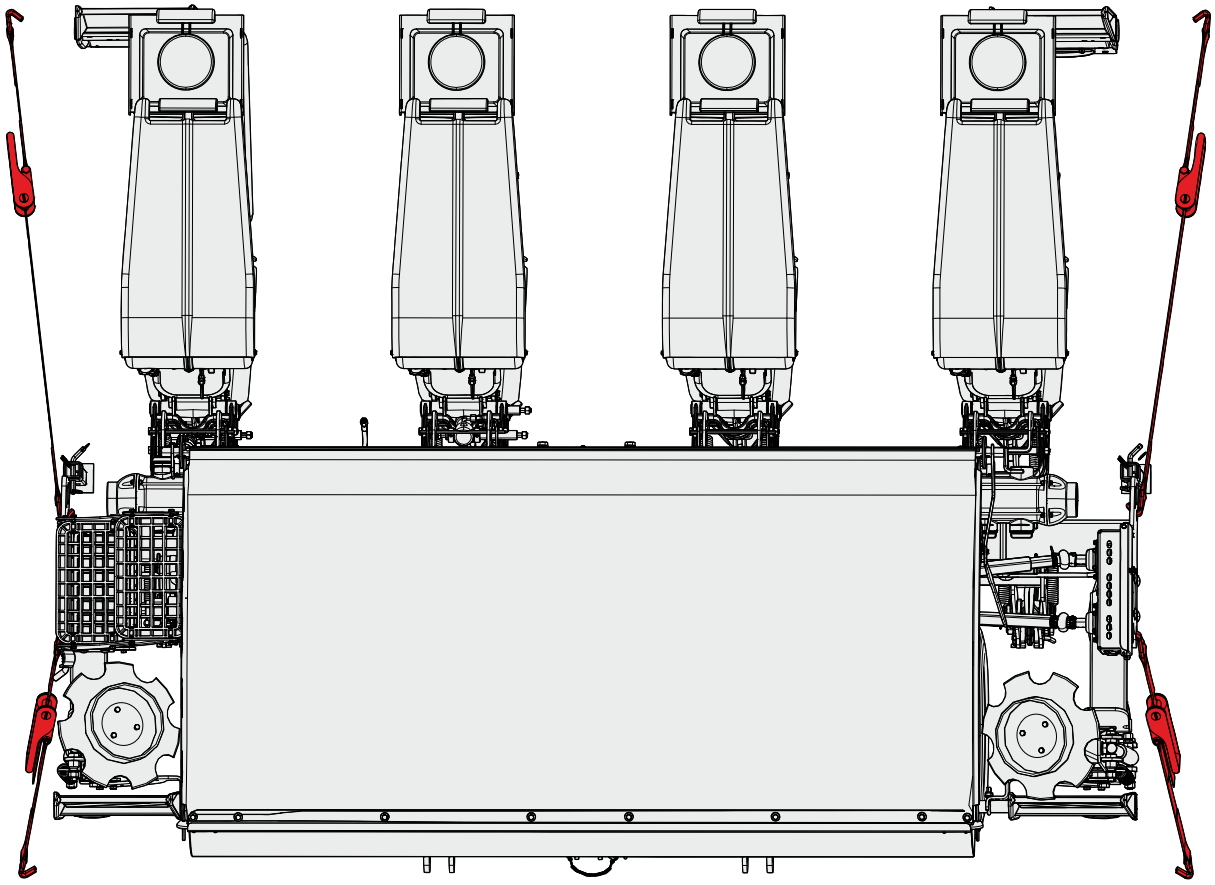
Prevent damage when securing the machine
Use edge protectors or protective sleeves. Do not lay lashing straps and tension chains over lines, hoses, cables and other delicate components. Set the lighting signs so that few areas are exposed to the wind.
Securing the machine insufficiently causes damage to the machine.

4 x LC 2500 daN



kg 1135 kg - kg 2235 kg





When the service life of your machine is over, it must be properly disposed of. Please observe the currently valid disposal regulations.

Metal parts
All machine components can be sent for scrap metal recycling.

Plastic parts
All plastic parts are marked and can be recycled.

Tyres
Tyres can be sent to tyre recycling facilities.

Oil
Collect fluid from the hydraulic system in a suitable container and dispose of it at an old oil collection point.

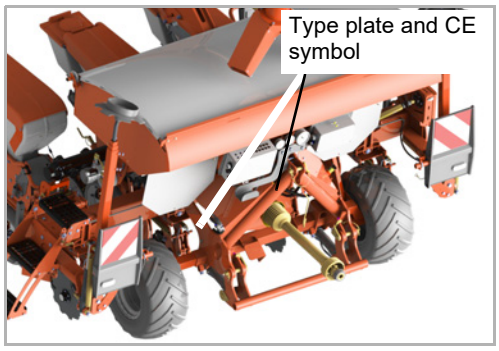
Electronics
PCBs or terminals are disposed of as electronic scrap. If there is no special waste handling facility in your area, you can return the electronic component to the manufacturer for proper disposal. It will then be disposed of in an environmentally-friendly manner.

Fertiliser
Dispose of remaining fertiliser in accordance with the applicable regulations.

Original EC Declaration of Conformity

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declare with sole responsibility that the product



PP1001
in all equipment variants
and its accessories

Type: PP1001

Valid from series number:
ACKPPxx444

complies with the following relevant EU provisions:

- Directive 2006/42/EC
- Directive 2014/30/EU

The following harmonised standards have been used:

- EN ISO 4254-1:2015
- EN ISO 4254-9:2018

Kverneland Group Soest GmbH
Soest, 11.10.2021

Hasan Kesek
Managing Director,
and authorised representative*

Copy of the type plate

* Person who is responsible for compiling the technical documentation and resides in the European Community. See address above.

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