

Series PP1450V

Operating manual

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From machine number	ACKPPxx175
Model	Telescopic
Reference number	A139155640

Identification of the machine

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

Designation	Series PP1450V
Working width	
Weight	
Machine number	
Accessories	
Address of dealer	
Address of 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. In this way, you will achieve optimum work results and operational safety.

For the employer

Provide instruction in these safety instructions for personnel working with the machine on a regular basis and provide information on statutory regulations. Untrained or unauthorised persons are not permitted 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 a 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

In addition to the operating manual, other documents also form an integral part of the machine:

EC Declaration of Conformity	Integral part of this operating manual → Chapter »EC Declaration of Conformity«, page 220
Spare parts list	Integral part of the delivery with this machine
Operating manual of the PTO shaft manufacturer	Integral part of the delivery with this machine
Operating manual for the electronic control system [+]	For example, "e-drive II" software
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 accompanies each item in a list

▸ A triangle indicates operating functions which must be performed

→ 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 have also used pictograms to help you find instructions more quickly:



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 assembly or adjustment 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:

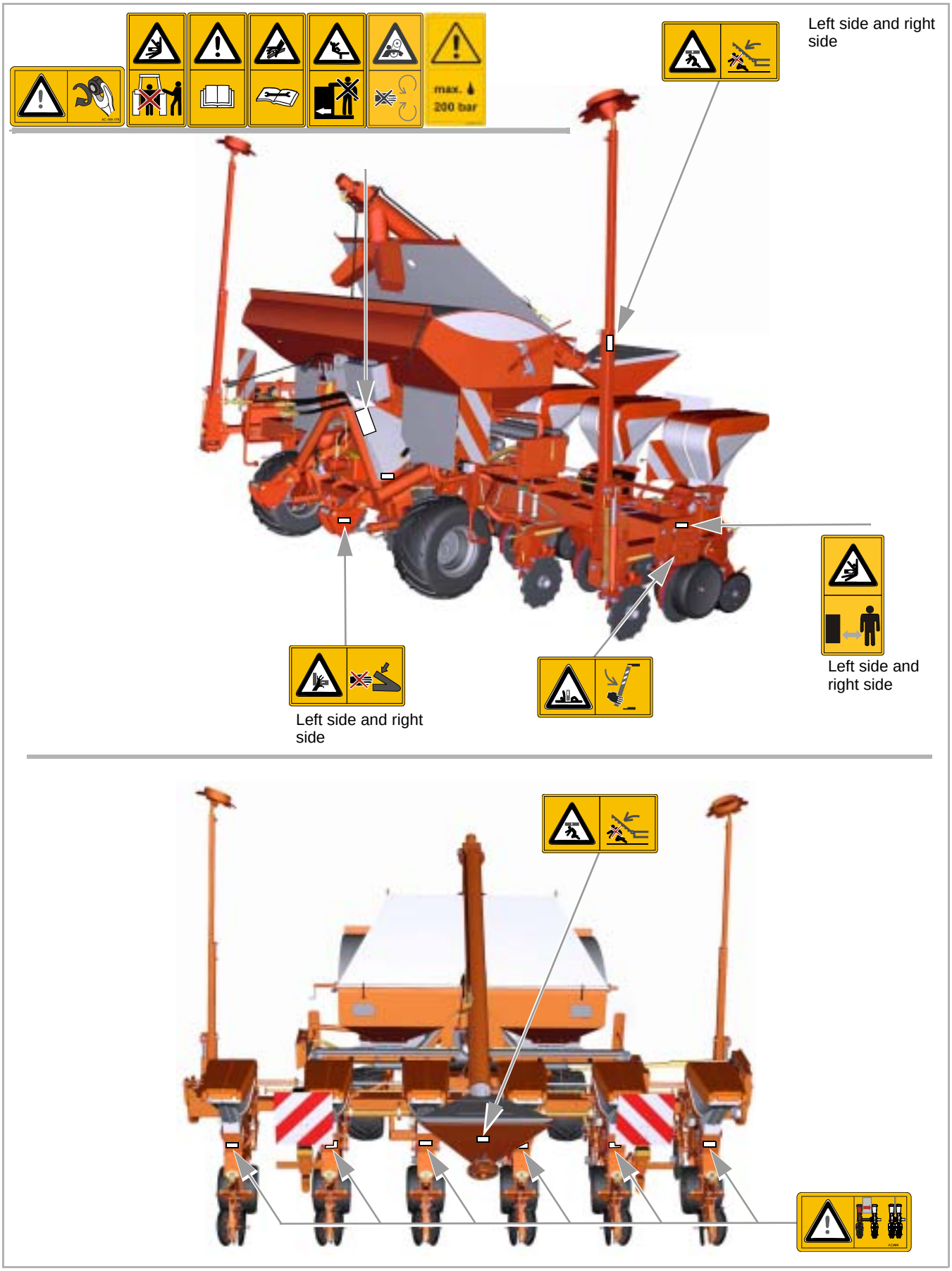
- In the interest of your own safety
- In the interest of the safety of others
- To ensure the safety of the machine

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
Provide instruction in these safety instructions for personnel working with the machine on a regular basis and provide information on 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, new stickers can be ordered and attached in the appropriate places.


max.
200 bar
Left side and right side
Left side and right side
Left side and right side

Series PP1450V 6 + 1



Meaning



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.



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.



Maintain a safe distance
Parts of the machine move. Maintain a safe distance from the parts of the machine carrying a sticker.



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 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.



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.



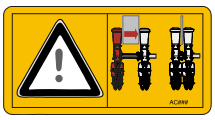
Stay clear of the slewing range
There is serious risk of injury in the slewing range due to swivelling or folding machine components.



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



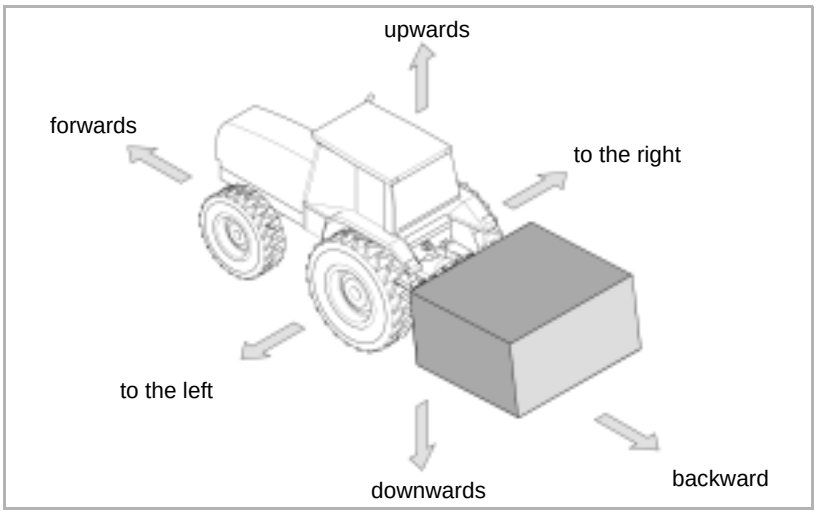
Retightening bolts
After the first hours of operation, all bolts must be checked and re-tightened if necessary. Screw connections might have come loose due to vibration.



Risk of crushing
Avoid hazard area. The distances between the marked sowing units become very small when folding in the machine.

Definitions

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



Who is authorised to operate the machine?

Only qualified personnel
Only qualified persons who have been informed of the dangers associated with handling the machine are permitted to operate, service or repair 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.

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. Therefore:

- 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. Fasten the PTO shaft guard in position by connecting the chains on the implement and the tractor. 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 movements of the machine.

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. Oil escaping under pressure may result in injuries and fires. In the event of injuries, seek medical attention immediately.

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.

Centre of gravity

Observe the total weight, axle loads, tyre load-bearing capacity and minimum added weight 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. In order for steering capability to be maintained, the front axle must bear at least 20 % of the tractor's empty weight.

The following can be easily calculated:

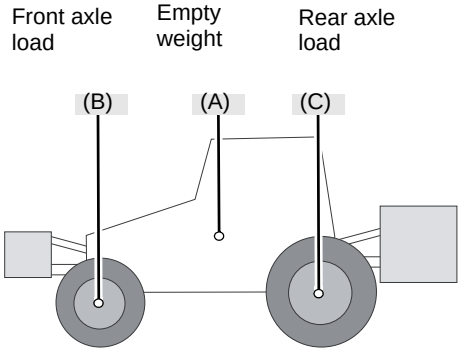
- Total weight
- Axle loads
- Tyre load-bearing capacity
- Minimum ballast

For this calculation, the following data is required:

Data from the tractor's operating manual:

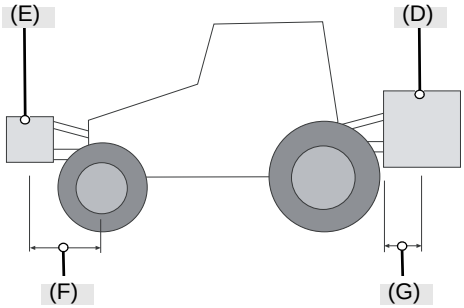
- (A)Empty weight
- (B) Front axle load
- (C) Rear axle load

Also consider the weight of water in the tyres, accessories and other additional weights.



Total weight when front-mounted

Total weight when rear-mounted

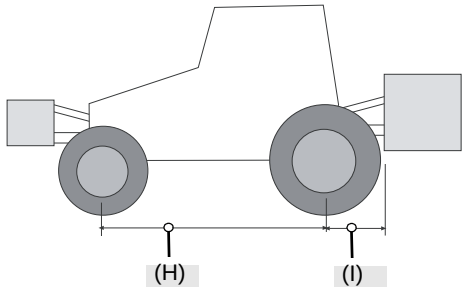


Distance:
Centre of gravity when front-mounted to the front-axle midpoint

Distance:
Lower link ball midpoint to centre of gravity of rear attachment

Data from this 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
- (F) Distance between the machine's centre of gravity when front-mounted and the front-axle midpoint
- (G) Distance between the lower link ball midpoint and the machine's centre of gravity when rear-mounted. With machines attached, G=0.



Wheel base

Distance:
Rear axle midpoint to lower link ball midpoint

Data which you can determine by measuring:

- (H) The tractor's wheel base
- (I) Distance between the rear axle midpoint and the lower link ball midpoint

Calculation

The measured values can now be inserted into the formulae.

Ballast with front weights

Calculation of the ballast with front weights
for rear-mounted machines

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

Ballast with rear weights

Calculation of the ballast with rear weights
for front-mounted machines

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

Front axle load

Calculation of the actual front axle load

$$\text{Front axle load in kg (lbs)} = \frac{E \times (F + H) + (B \times H) - D \times (I + G)}{H}$$

Total weight

Calculation of actual total weight

Total weight = E + A + D

Rear axle load

Calculation of the actual rear axle load
Rear axle load in kg (lbs) = actual total weight - actual front axle load

Tyre load-bearing capacity

Data on the tyre load-bearing capacity of the front and rear wheels can be found in the tyre manufacturer's documentation.

- The front tyre load-bearing capacity for two wheels is equal to twice the permissible tyre load-bearing capacity of a single front wheel.
- The rear tyre load-bearing capacity for two wheels is equal to twice the permissible tyre load-bearing capacity of a single rear wheel.

Summary

Check if the following conditions are met:

- The actual values for the rear axle load must be less than the permissible values given in the tractor's operating manual.
- The tyre load-bearing capacity must be greater than the values for the rear axle load given in the operating manual.
- The actual total weight must be less than the permissible total weight given in the tractor's operating manual.

If these conditions are not met, the machine must not be attached to this tractor.



If you have a sufficiently large weigh-bridge, you can determine the total weight and the rear axle load by weighing.

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 should only be towed by agricultural or forestry tractors

The driver and owner of the vehicle are liable if road traffic regulations are not 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.

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
- Make sure the machine is standing on a secure and level surface
- 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 all care work and maintenance work:

- Switch off the PTO
- Depressurise 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 work safety during care or maintenance work through observing these regulations.

Turn off the power supply
Prior to carrying out work on the electrical system, disconnect the system 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.

Before carrying out welding work, disconnect the battery and generator
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, please 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 your machine and information on:

- Range of application
- Characteristics
- Component designations
- Technical data

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.

Range of application

Machines with hydraulic frames are precision seeding machines designed for the application of suitable seed, and partly also for the simultaneous application of free-flowing fertiliser. For the various seeds different seed discs are available. The machines perform seeding after preparation of the seedbed is complete. If the machines are designed for the purpose, mulch seeding is also possible with mulch seeding equipment on the sowing units.

Proper use

Any application other than or beyond this, e.g. as a means of transport, for stump pulling, or to transfer power to other objects 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.

Characteristics

Various seeds
The machine can be universally utilised. By various seed discs, which are installed in the seeding heart, maize, sunflowers, broad beans, turnips, dwarf beans, soybeans, 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.

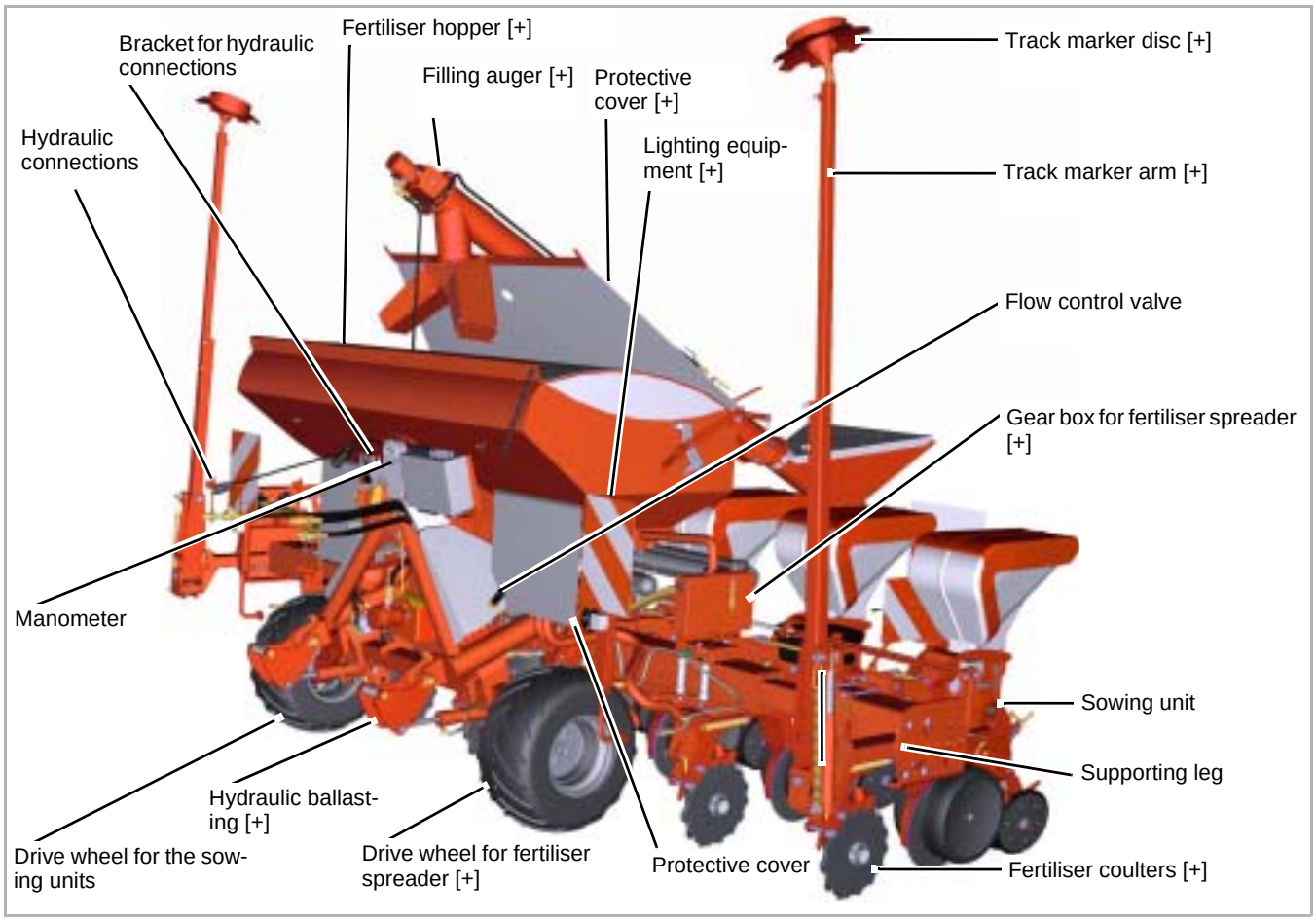
Suitable for nearly all kinds of soil
The pressure of the sowing unit onto the ground can be infinitely variable increased for each sowing unit by 50 kg or reduced by 40 kg. Therefore, the precision drill is suitable for nearly all kinds of soil. The follow-on rubber V press wheel can be set in 3 steps.

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.

Component designations



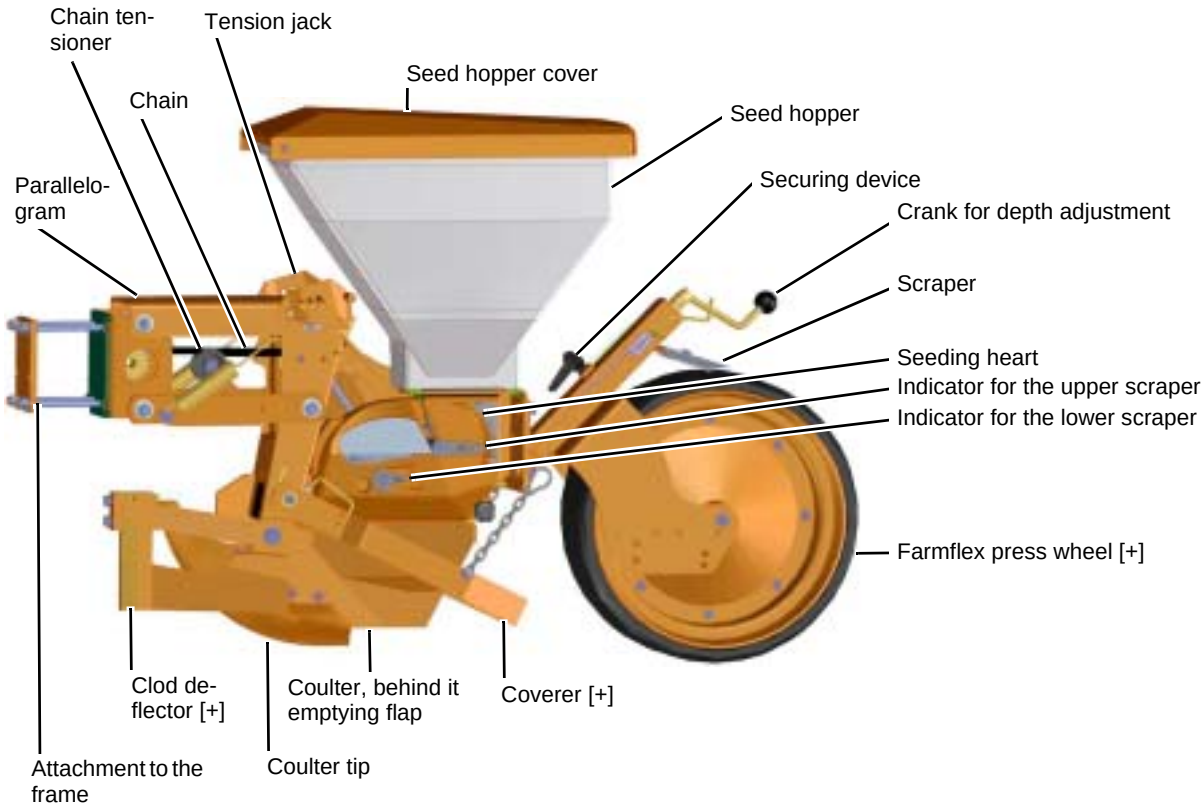
Separating systems

The separating system in the Sowing unit can be set up to use either negative pressure or overpressure.

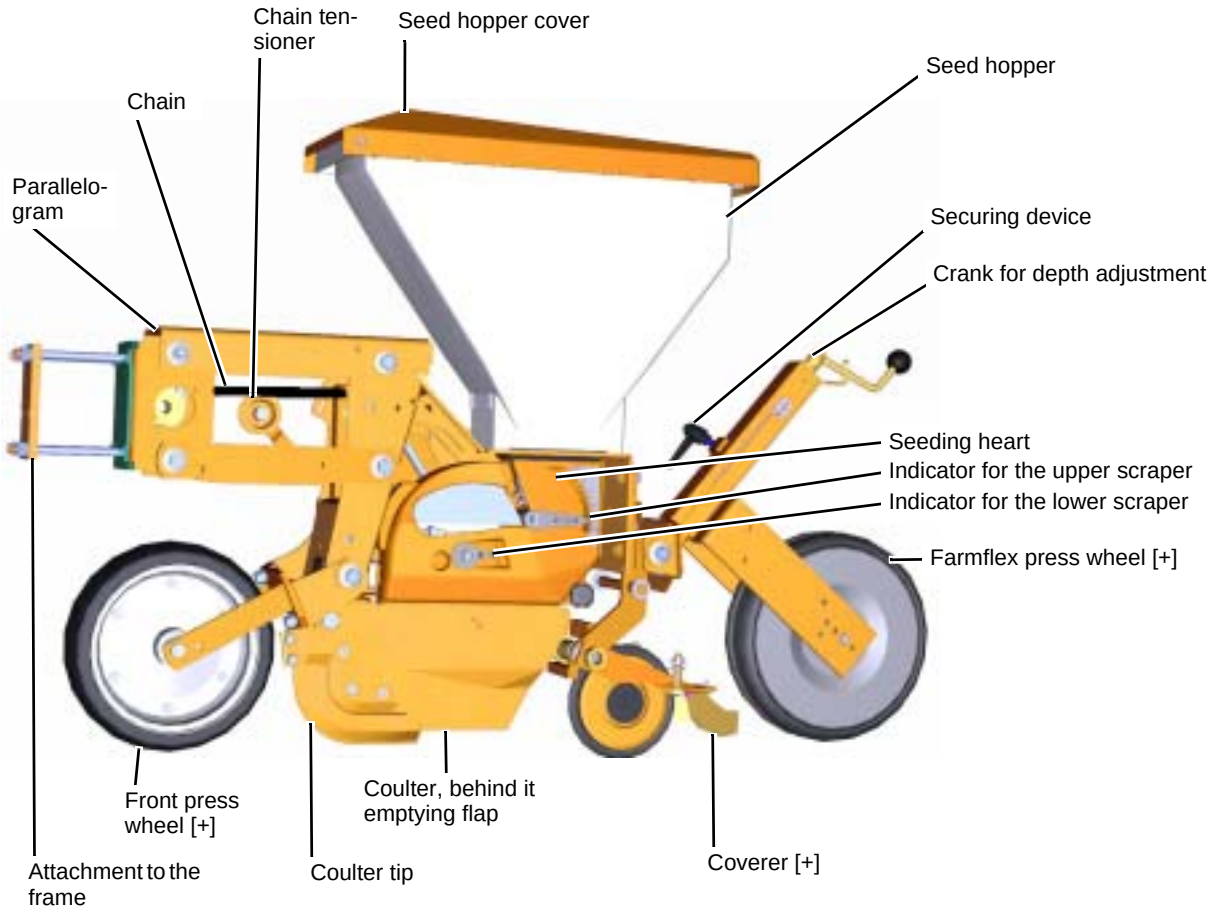
In the separating system using negative pressure, the individual seeds are drawn onto the seed disc.

In the separating system using overpressure, the individual seeds are pressed onto the seed disc.

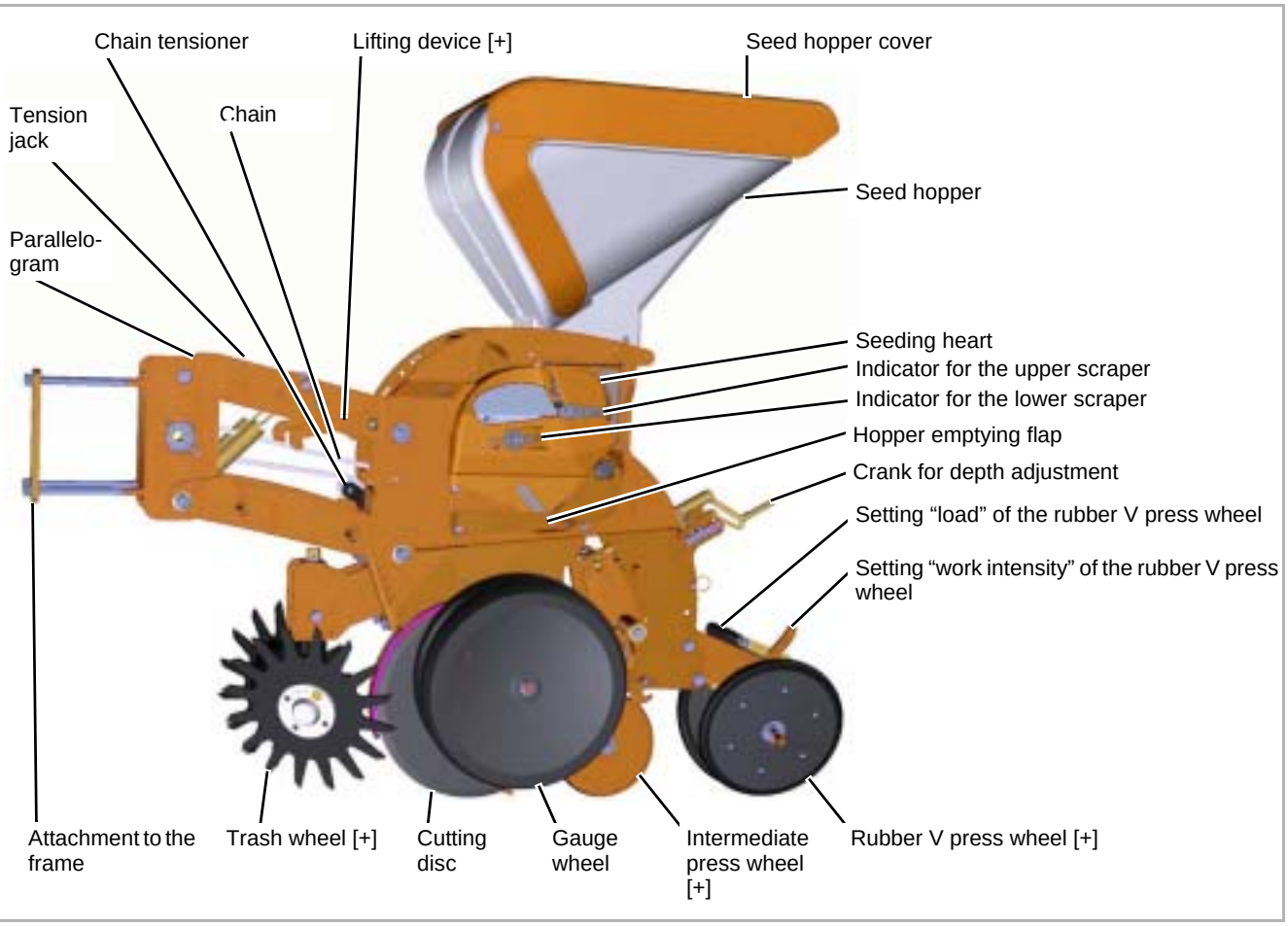
System using negative pressure sowing unit – normal seed



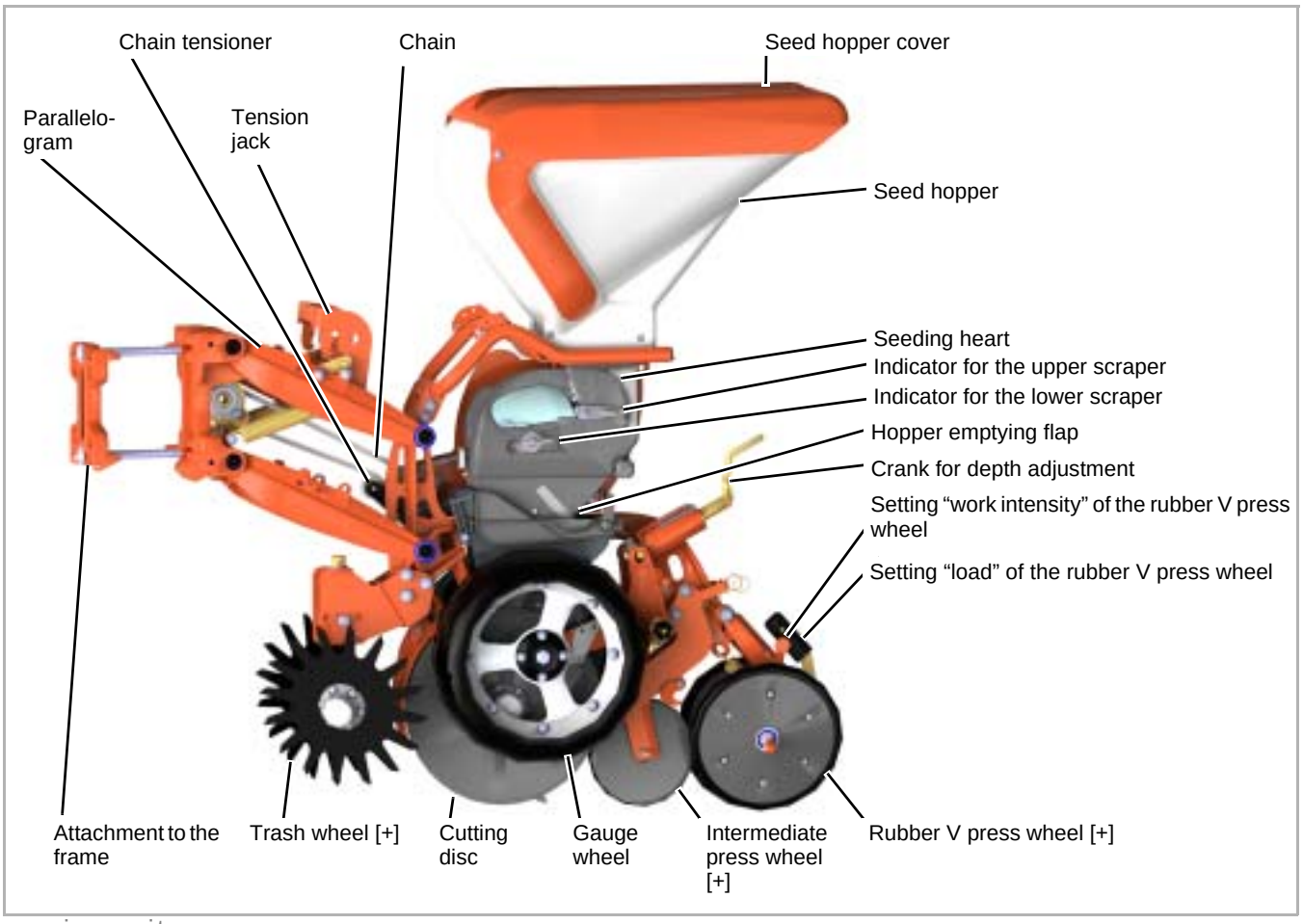
Sowing unit – Tandem



Sowing unit – HD



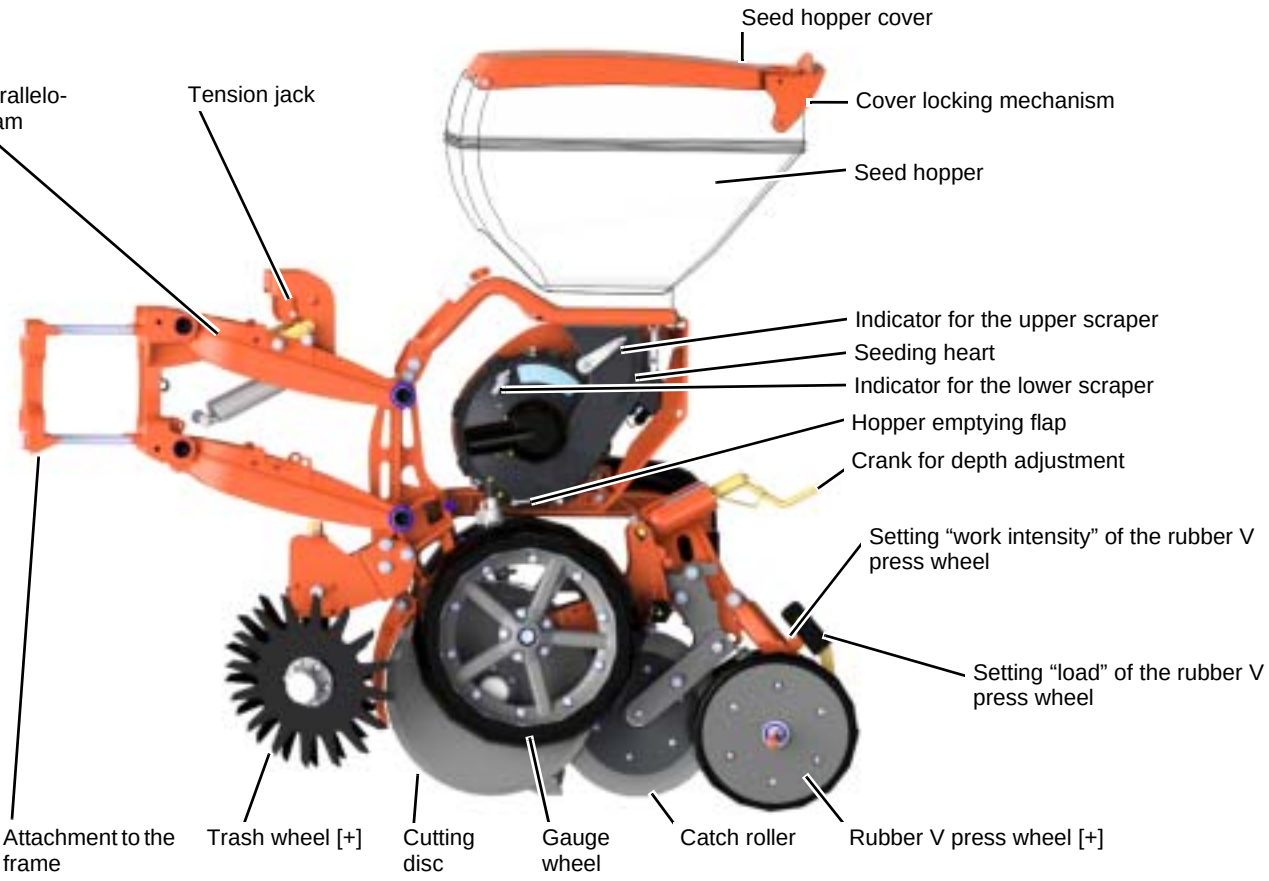
Sowing unit HD II



sowing unit

System using overpressure

Sowing unit SX



sowing unit

Technical data

Frame type	V-frame
Maximum frame width	**4.67 m**
Height [m]	
Transport position, with track marker	3,10
Width [m]	
Transport position	3,00
Work position, without track marker	4,67
Depth [m]	
Transport position	2,30
Total weight [kg], without sowing units	
Frame	700
Total weight [kg], with Sowing unit HD sowing units at 75 cm row spacing	
Frame	1475
Frame with fertiliser spreader, fertiliser coulters and filling auger	2010
Frame with microgranule distributor	1560
Centre of gravity [cm] dimension “G”	
Depending on equipment level, approximately	110
Tyre pressure [bar]	
7.00-12AS	2,0
26.00x12	1,4
Fertiliser hopper [+]	
Hopper volume [l]	1000
Hopper extension [l]	250
Physical condition of the fertilisers	dry, granulated
Calibration of the fertiliser	1-6 mm
PTO shaft type	
Between tractor and machine	W2200
PTO speed [rpm]	1000

Sowing unit

System using negative pressure

Sowing unit

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

Sowing unit HD

Weight [kg]	
Without seed The weight depends on the equipment of the sowing unit	Around 150
Volume [l]	
Seed hopper	55

Sowing unit HD II

Weight [kg]	
Without seed The weight depends on the equipment of the sowing unit	Around 130
Volume [l]	
Seed hopper	55

System using overpressure

Sowing unit SX

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

Other

Hydraulic fan drive, flow rate [l/min]	
with hydraulic motor [ccm] 6 10 50 80	 32,5 - 36,5 53,0 - 60,0 37,5 - 42,5 60,0 - 68,0
Control valves	
Folding in and out	1x double acting
Track marker	1x single acting
Filling auger	1x double acting
Hydraulic fan drive	1x single acting 1x pressureless return line
Noise level [dBA]	
Fan at 5400 rpm Driven by electric motor. Maximum value, measured on the enveloping curve. The noise level may change due to the tractor.	98
Electronic control system	
Power supply [V]	12
Fuse [A]	30
Protection class	IP 65
Terminal	
→ Operating manual for the terminal	
Filling auger [+]	
Fill level at the funnel [m]	0,70
Filling time for two fertiliser hoppers with hopper extensions [min]	Around 5
Required oil flow [l/min]	30
Granule distributor [+]	
Hopper volume [l]	33
Number of outlets	2 or 3
Fill level • Minimum • Maximum	 Up to the first mark Roughly 1 cm below the edge of the hopper

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
An electronic control system is provided as an accessory, for example, to create tramlines. Your dealer will perform the final assembly on your tractor.

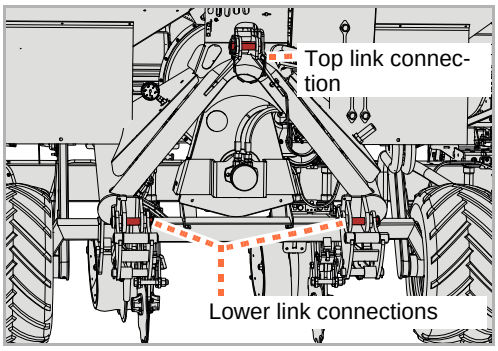
If parts are missing or have been damaged during transportation, please submit a claim immediately to your dealer, importer or the manufacturer.

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

- 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

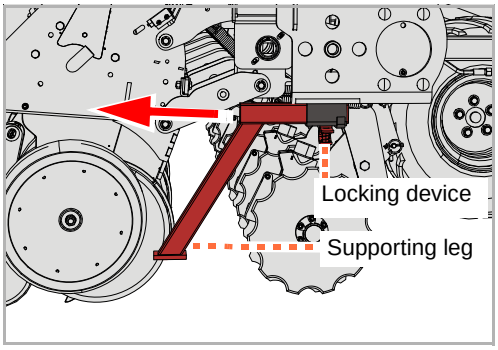
Failure to observe these instructions can result in serious or fatal injury.

Coupling

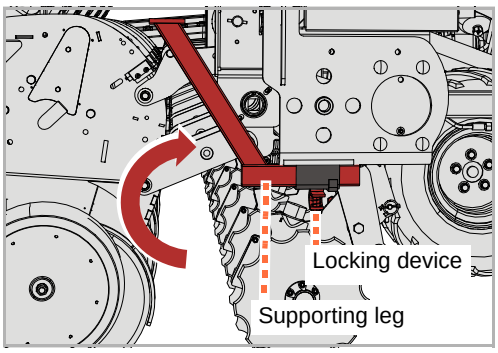


- Slide balls onto the pins on the connections for the lower links. Secure the pins with a split pin.
- Align the tractor centrally in front of the machine
- Drive slowly backwards and move the tractor's lower links beneath the lower link connections on the machine
- Slightly lift the lower link and ensure the hooks are securely engaged
- Attach the top link. Secure the pins with a split pin.
- Set the lower links so that they have little play to the left or right

Supporting leg

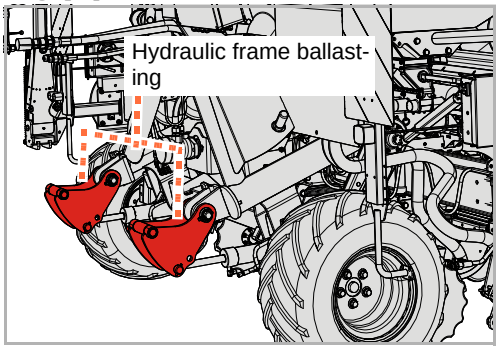


- Lift the machine
- Press the securing mechanism down and pull out the supporting leg



- Turn the supporting leg and push back in until the securing mechanism engages
- Turn the second supporting leg and push it back in

Hydraulic frame ballasting [+]

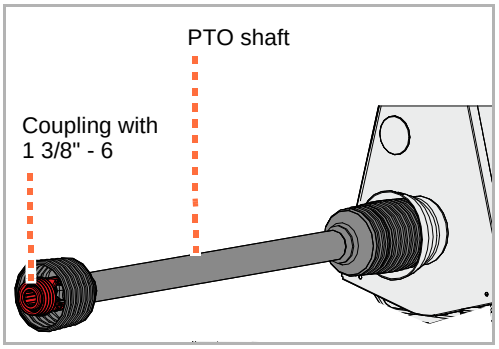


The hydraulic frame ballasting is attached later in the field. The hydraulic frame ballasting must be pressureless when coupling.

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.

Check the PTO speed
Connect the PTO shaft to a PTO with the rotational speed specified on the machine.
Failure to comply with this speed could result in damage to the machine or tractor, or personal injury.



- 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

Connecting

After coupling, make the following connections:

- Electrical connections
- Hydraulic connections

Electrics

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

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

▶ Check all connections to ensure they are working properly

Hydraulics

→ Chapter »Hydraulic system«, starting at page 36.

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.
Defect hydraulic tubes or poorly seated hydraulic couplings can initiate unforeseen movements on the machine or lead to accidents.

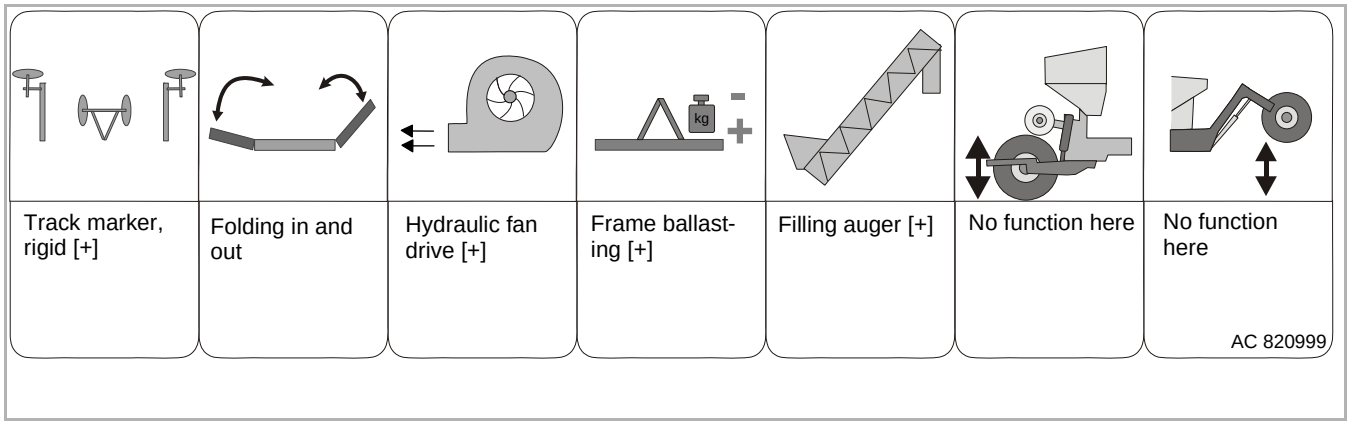
Securing the control units
In the transport position, secure the control units on the tractor to prevent accidental operation.
Accidental actuation of the control units can trigger unpredictable movements on the machine and cause accidents.

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.

Connection to the tractor

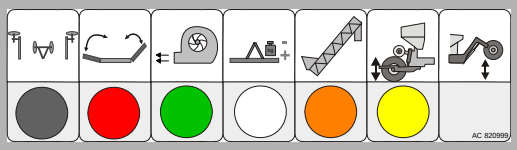
The machine must be connected to the tractor's hydraulic system.

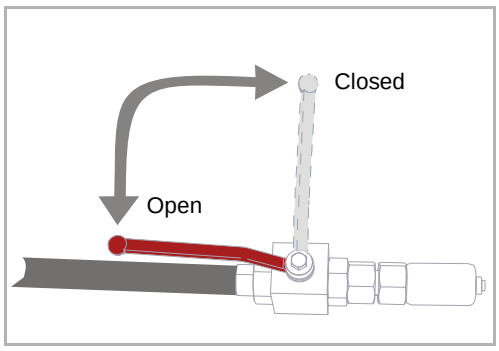
The hydraulic hoses are colour-coded so that you can assign the functions to the individual hydraulic hoses more easily. The functions available on your machine are labelled on the label with coloured dots.



Control valves

- Connect the hydraulic hoses as specified in the following table:

Function 	Control valves		Colour coding
	Single-acting	Double-acting	
Track marker	x		**Grey**
Fold the machine in or out		x	**Red**
Hydraulic fan drive pressureless return line, maximum 10 bar	x		**Green**
Filling auger maximum 180 bar		x	**Orange**
Sowing unit lifting for 6 + 1	x		**Orange**
Frame ballasting [+]		x	**Yellow**



If ball valves are present:

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

Hydraulic fan drive [+]

The hydraulic fan drive is controlled by a hydraulic pump.

Technical data

The technical specifications are for your information only. Settings or changes are not necessary.

Hydraulic motor				
Displacement [ccm]	6	10	50	80
Conveying capacity [l] at 5400 rpm on fan	32,5	53,0	37,5	60,0
Conveying capacity [l] at 6100 rpm on fan	36,5	60	42,5	68,0

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

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.

- Feed line: minimum dimension DN 12
  outer diameter = 15 mm, inner diameter = 12 mm
- Return line: Minimum dimension DN 16
  outer diameter = 18 mm, inner diameter = 15 mm
- Oil leak pipe: minimum dimension DN 06
  outer diameter = 9 mm, inner diameter = 6 mm

Prerequisites

Prerequisites for the hydraulic fan drive on the tractor:

- Sufficient oil supply by the tractor
- The appropriate number of control valves is available
- Parallel operation of the control valves is possible
- Oil cooler is available

Fan speed

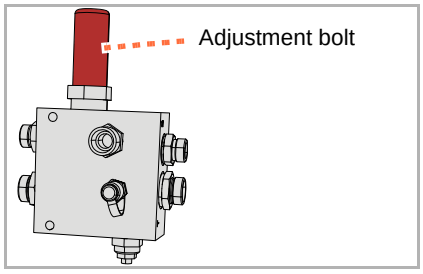
Checking the hydraulic connections
Prior to operation, carefully check the hydraulic hose connections and the hoses themselves.
Hot hydraulic fluid under pressure can squirt from insufficiently tightened or damaged hydraulic hoses, resulting in serious injury.

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

Conversions 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.

Tractors with flow control valve

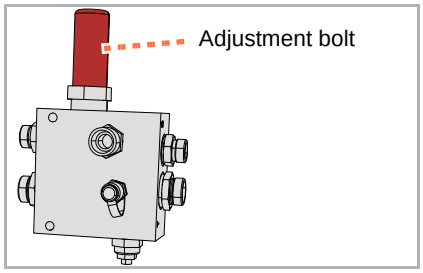


- Fully open the 3-way flow control valve

The 3-way flow control valve is completely open when the adjustment bolt is fully screwed in.

- Actuate the control unit on the tractor
- Set the desired fan speed by regulating the oil flow rate on the tractor

Tractors without flow control valves, without regulating pumps



- Use the adjustment screw on the 3-way flow control valve to set the desired speed

Power Beyond [+]

The hydraulic fan drive is a permanent consumer in the hydraulic system. This means that other power consumers often have no power. With the Power Beyond, the power loss can be minimised when using the hydraulic fan drive as a permanent power consumer. Other consumers can be operated in parallel. However, the conveying capacity of the hydraulic pump is not increased by Power Beyond.



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.

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



Installation in specialist workshop
Installation tasks must be carried out by a specialist workshop. Work on the hydraulic system requires specialist knowledge. Work carried out incorrectly can cause damage to the machine.

Conversions only with fan turned off
Conversion from a 3-way to a 2-way flow control valve, or vice versa, and the setting of speed must only be performed with the fan turned off. Otherwise, the machine can be damaged.

Switch off the PTO
Make connections only with the PTO switched off. A correct connection is otherwise impossible.

Prerequisites

Prerequisites for the use of Power Beyond:

Equipment

The tractor is equipped with:

- Regulating pump
- Load Sensing System
- Feed line (P)
- Return line (T)
- Control line (LS)
- Possibly a leak-off oil line (D)

The machine is equipped with:

- A flow control valve

Calculation of the remaining conveying capacity

The conveying capacity of the tractor's hydraulic pump determines the working speed of the consumers. The higher the conveying capacity, the faster the working speed of the consumers.
Power Beyond allows the operation of other consumers in parallel to the permanent consumer, but does not increase the conveying capacity of the hydraulic pump. The lifting speed decreases.

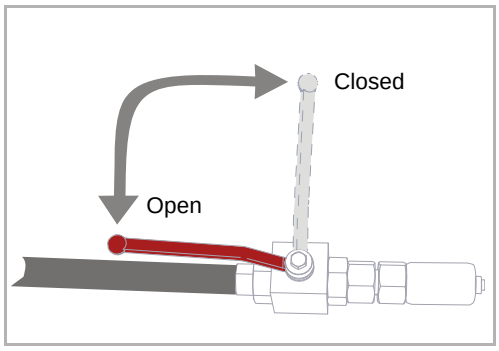
Example:

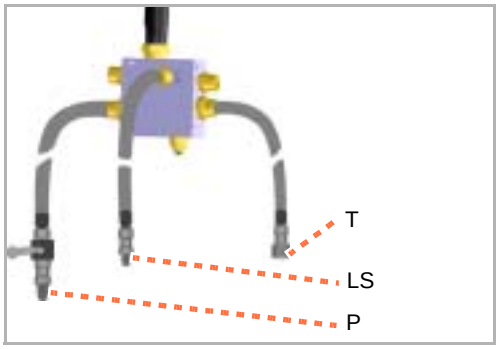
Conveying capacity of the hydraulic pump	100 l/min
Quantity of oil required for permanent consumer	40 l/min
Quantity of oil required for other consumers	70 l/min
Quantity of oil lacking	10 l/min
Reduction of the working speed to	60 %

Connection to the tractor

The couplings and connectors may vary according to tractor manufacturer. Please contact your dealer before changing the tractor. If the tractor couplings still have to be installed, ensure that components are fitted which comply with ISO 17567. The hydraulic hoses have an 18 L connector with an M26 x 1.5 union nut.

- Close the ball valve at the feed line (P)

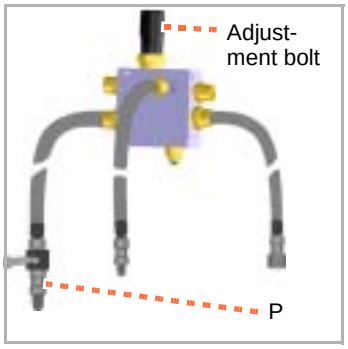




- Make connections in the following sequence:
  1. Return line (T)
  2. Control line (LS)
  3. Feed line (P)
- Activate the fan speed counter (depending on the available display unit or monitor)

Operation

The setting of the speed is usually only required during commissioning or when a tractor is changed. A check should be carried out at the start of the season – and more frequently if the work rate is high.

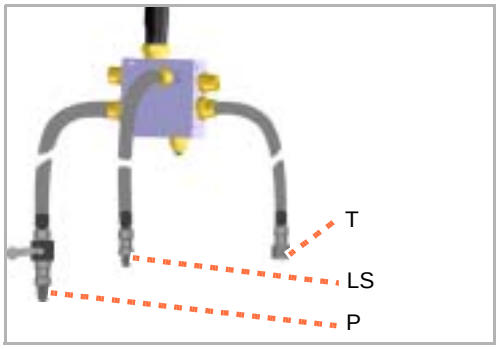


- Open the ball valve at the feed line (P)

Stopping the fan
Adjustments to the rotational speed may only be made when the fan is stationary.
Adjustment work while the fan is running may cause damage to the machine.

- Use the adjustment screw on the 2-way flow control valve to set the desired speed

Uncoupling



- Switch off the tractor motor
- Close the ball valve at the feed line (P)
- Disconnect in the following sequence:
  1. Feed line (P)
  2. Control line (LS)
  3. Return line (T)

Operation

Initial commissioning

For the initial commissioning with cold oil the following applies:

- The fan speed will continue to alter automatically until the hydraulic oil has reached the operating temperature
- Only when the fan speed persists the setting is completed

▸ 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

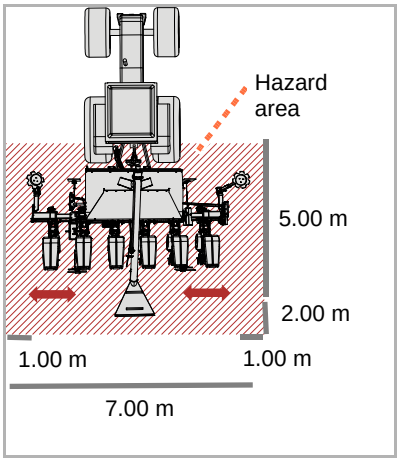
Prerequisites for the preparation work:

- Machine is coupled to the tractor and all connections are properly made
- The machine is in its work position
- The machine frame is parallel to the ground
- Handbrake in tractor is applied

Work position

Before you can prepare the machine, the machine must be folded into its work position.

Hazard area



No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when retracting or extending.
Persons who remain in the hazard area when the machine is retracted or extended can be seriously or fatally injured.

- ▸ Activate folding the machine in and out at the electronic control system

→ "e-drive II" software operating manual

- ▸ Actuate the control unit on the tractor until the machine is folded out

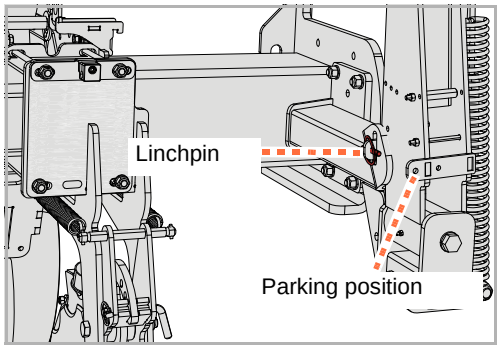
Track marker [+]

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.

Transport locking device

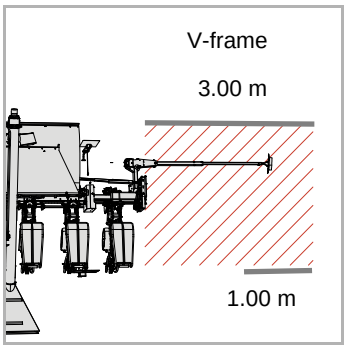
With V-frames, you must remove the transport locking device before folding out.



▸ Remove the linchpin on both track markers and insert in parking position

Folding out

Hazard area



No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.

▸ Check whether the hydraulic fan drive is connected

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

→ "e-drive II" software operating manual

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

Calculation

Length of the track markers for tractor centre =

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

Example:

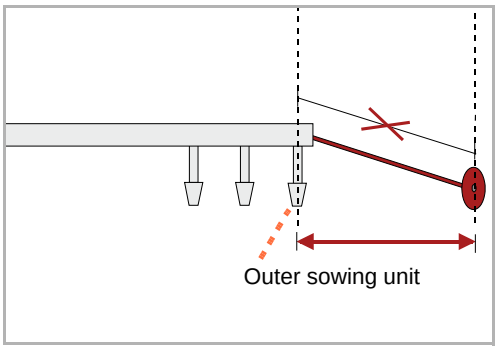
Row spacing of the seeding machine: 75.0 cm

Working width of the seeding machine: 900.0 cm

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

Setting

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.*



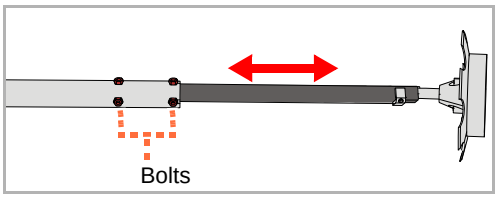
Measure out the calculated track marker length on the ground, never directly on the track marker arm. That would introduce inaccuracies.

Right track marker arm:

- Begin the measurement in the centre of the outer right coulter

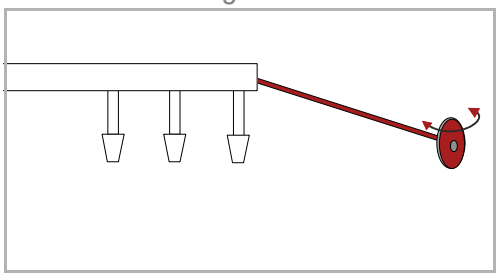
Lefttrack marker arm:

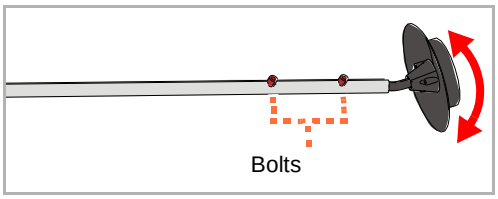
- Begin the measurement in the centre of the outer left coulter



- Release the bolts
- Set the track marker as desired
- Re-tighten bolts

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 desired
Light soil	=	Disc vertical, set no or only small inclination angle

Set the marker disc in its inclination angle so that the tracks can later be clearly seen in the field. The track markers must not “dig”.

- Release the bolt
- Set the inclination angle as desired
- Retighten the bolt

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. Therefore, some track markers allow the working width to be adjusted with the length of a rope or chain. The play is too large if the track markers "dig in" the soil at swinging.

The length of the rope or chain should be set so that:

- After lowering, the track marker is no longer held by the rope or chain
- After raising, the track marker is held high enough above the ground

Hydraulic sowing unit lifting [+]

The Series PP1450V 6 + 1 has a hydraulic sowing unit lifting system for the centre sowing unit.

Lift the centre sowing unit for sowing in six rows with a row spacing of 75 or 80 cm with the Series PP1450.

- Actuate the tractor control unit.

Road transport
Lower the centre sowing unit for road transport.
Otherwise, the machine can be damaged.

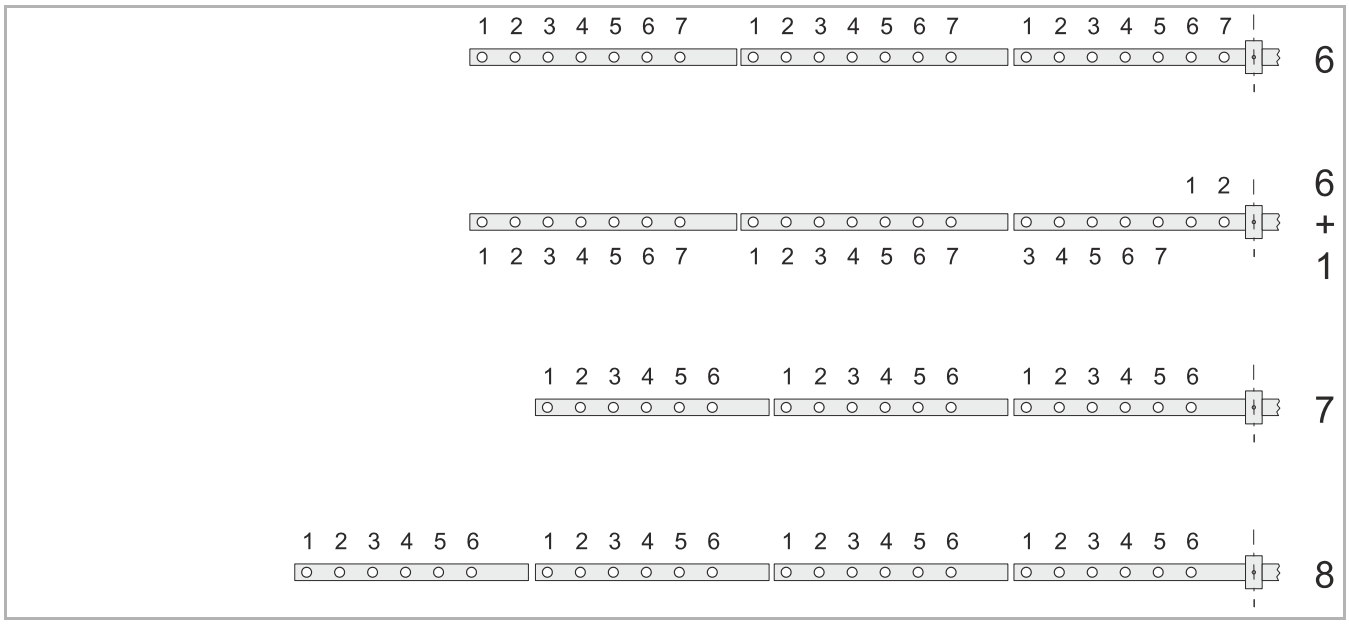
Row distance

The row spacing can be individually adapted. The following row spacings can be set depending on the number of sowing units
If you do not extend the side sections of the precision seeding machine, i.e. if you leave them in the transport position, narrower row spacings can be achieved than in the last possible position of the perforated rod.

Number of sowing units	Position on the perforated rod							Transport position
	1	2	3	4	5	6	7	
6	80	75	70	65	60	55	50	45
6 + 1	80	75	65	60	55	50	45	40
7	68	65	60	55	50	45	–	40
8	55	50	45	40	37,5	35	–	33

Example:
For a precision seeding machine with six sowing units, the row spacing will be 45 cm when sowing in the transport position.

The following illustration shows the positions on the perforated rod of various machine variants. In each case, the left side of the machine is shown. These positions are mirrored on the right side of the machine.

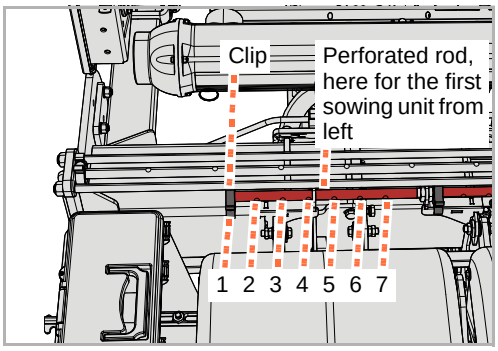


Perform the same setting for all perforated rods
The setting of the row spacing must be identical for all of the machine's sowing units if you wish to achieve uniform row spacing.
If settings are different, the row spacing of the sowing units is not uniform.

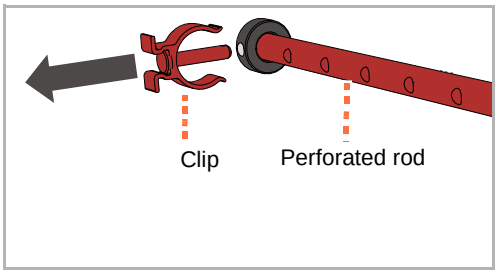
- Move machine into transport position

→ Chapter »Driving on the road«, section »Transport position«, page 129

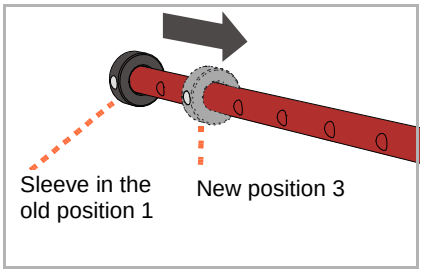
Repositioning the sowing units



- Select the desired row spacing and determine the position on the perforated rod



- Pull off the clip on the perforated rod



- Move the sleeve to the desired position

In the example, the sleeve was moved by 2 positions, from position 1 to position 3.

- Secure the sleeve with the clip
- Select the same position number for all further sowing units

Sowing units

Before carrying out work on the sowing units, the machine must be parked securely.
→ Chapter »Maintenance«, section »Secure the machine«, page 158

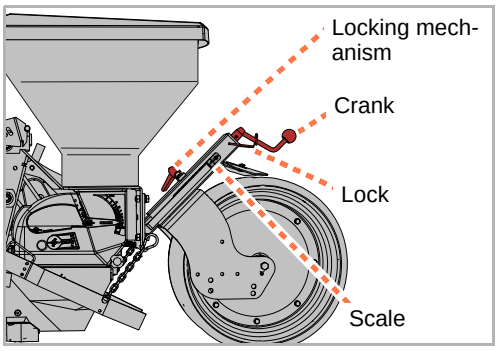
Working depth

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:

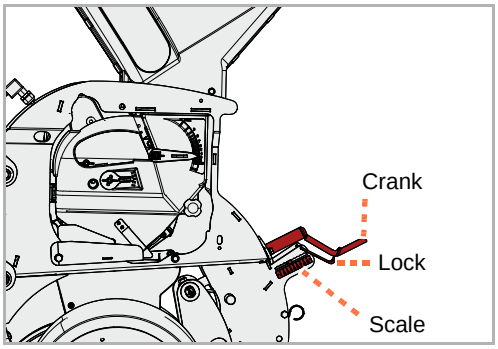
- The machine is coupled to the tractor
- Machine is completely extended, lifted and secured
- Handbrake in tractor is applied
- Tractor and machine are secured against rolling away

Sowing unit, Sowing unit Tandem



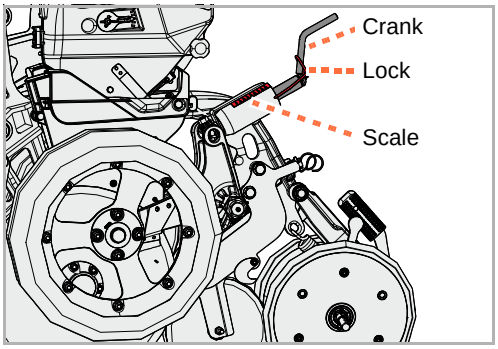
- Releasing the locking mechanism
- Flip up the latch
- Set the desired working depth at the crank
- Secure the crank with the latch
- Tighten the locking mechanism

Sowing unit HD



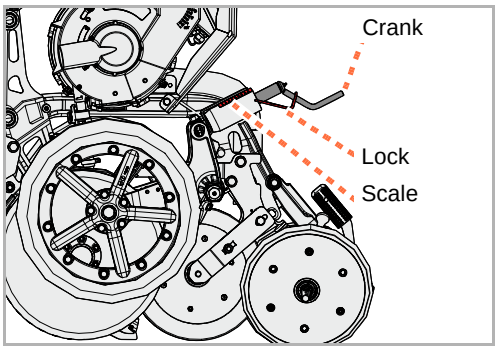
- Flip up the latch
- Set the desired working depth at the crank
- Secure the crank with the latch

Sowing unit HD II



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

Sowing unit SX



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

Sowing unit

Load [+]

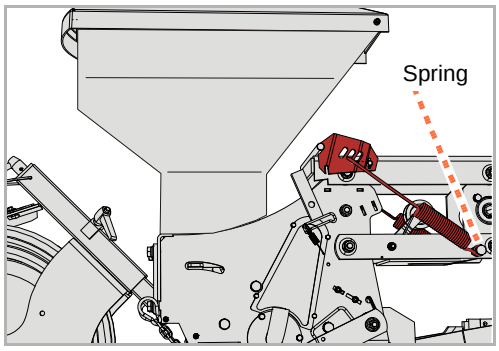
An individual sowing unit can be loaded via the springs with up to 100 kg in addition to its own weight.

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

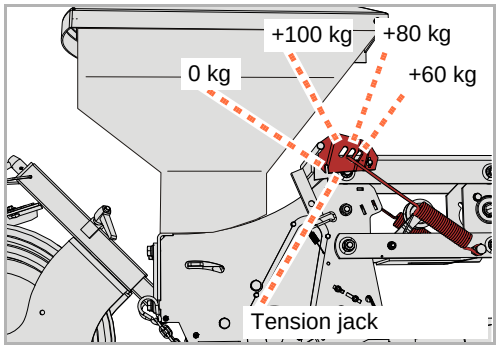


Loading

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
- Fold the tension jack forwards and hook on the spring as desired
- Fold the tension jack backwards

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

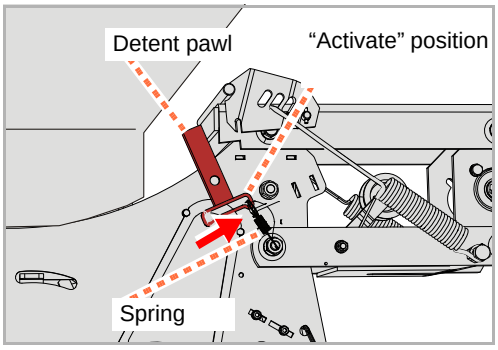


Lifting device [+]

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

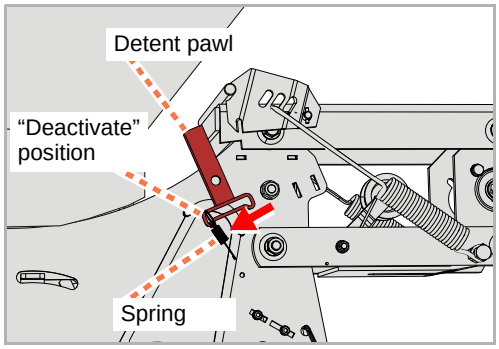
Avoid additional loading
When a load is set, it places an additional burden on the sowing units.
When a load is set, the lifting device may be damaged.

Empty 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 using 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
- Lift the sowing unit until the detent pawl engages

Deactivate

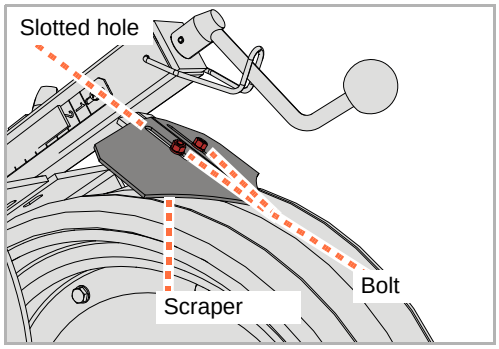


- Push the spring on the detent pawl backwards, to the "Deactivate" position
- Raise the detent pawl

Lift the sowing unit using 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.

- 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

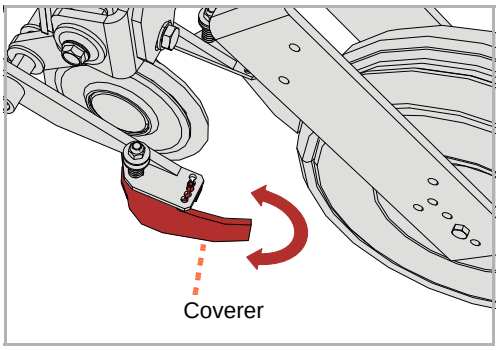


- Release the nuts and bolts
- Shift the scraper in the slotted hole
- Tighten bolts and nuts securely

Sowing unit 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 desired

Sowing unit HD

Load [+]

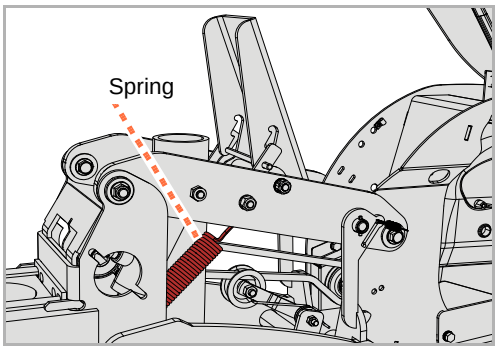
An individual sowing unit can be loaded via the springs with up to 100 kg in addition to its own weight.

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

Springs

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

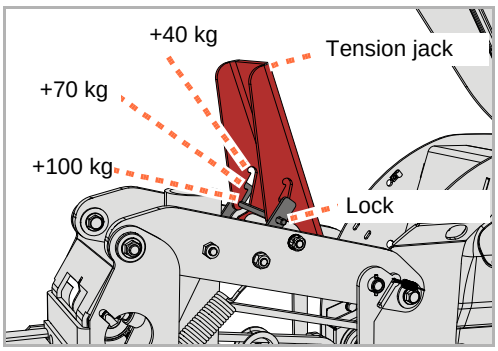
- Attach the springs if necessary



Loading

An individual sowing unit can be loaded via the springs with 40, 70 or 100 kg in addition to its own weight.

- Lift the machine
- Shortly press down the tension jack, release the lock and then fix it in the desired position

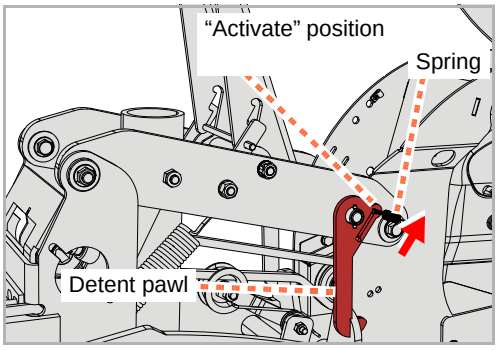


Lifting device [+]

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



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

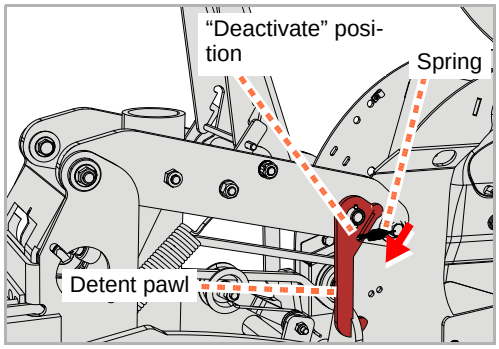
Avoid additional loading
When a load is set, it places an additional burden on the sowing units.
When a load is set, the lifting device may be damaged.

Empty 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 using 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 engages

Deactivate



- Push the spring on the detent pawl backwards, to the "Deactivate" position
- Raise the detent pawl

Lift the sowing unit using 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.

- 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 wheels and their settings determine how much the soil will be compacted. The aim is an optimum connection of the seeds to the water supply of the soil. The necessary pressure depends on the type of soil.

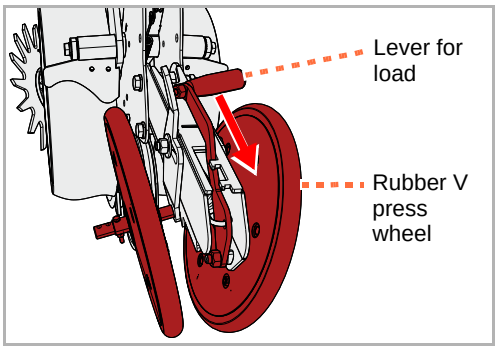
You can make various settings to the rubber V press wheels:

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

Load

The load can be set in three stages:

Less load	Push the lever forwards
More load	Push the lever rearwards



- Move the rubber V press wheels to the desired position using the lever
- Let the lever catch
- Make adjustments to all rubber V press wheels in the same way.

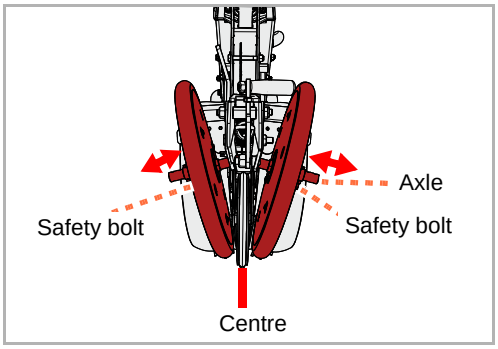
Distance

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

In addition, you can determine how the press wheels work by the distance on the axle. The effect is heavily 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.

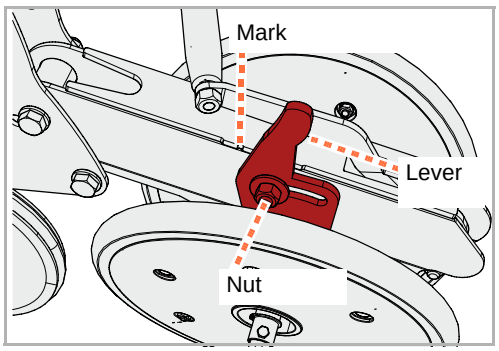


- Remove the safety bolt from each rubber V press wheel
- Shift the rubber V press wheel on the axle as required
- Secure the rubber V press wheel again with the safety bolt

Inclination angle

Setting of the inclination angle is infinitely variable:

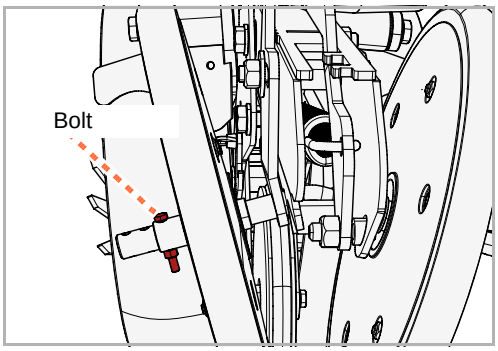
Lever position	Rubber V press wheel position	Effect
Front	Further apart	Intense stopping up of the furrow
Rear	Closer together	Less covering of the furrow



- Release nut
- Move the lever to the desired position. Use the markings for orientation.
- Re tighten the nut
- Make adjustments to 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.



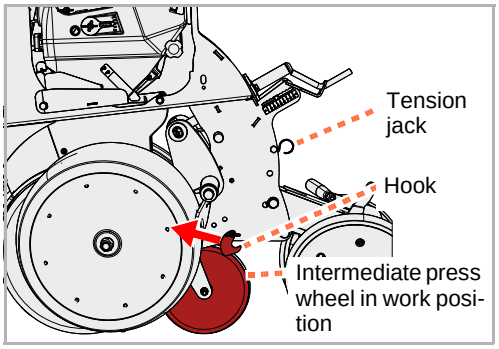
- Remove the safety bolt from each rubber V press wheel
- Replace the rubber V press wheel and secure it again with the safety bolt

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 necessary to use heavy or light pressure on the ground. In special cases the intermediate pressure roller can also be fully lifted out.

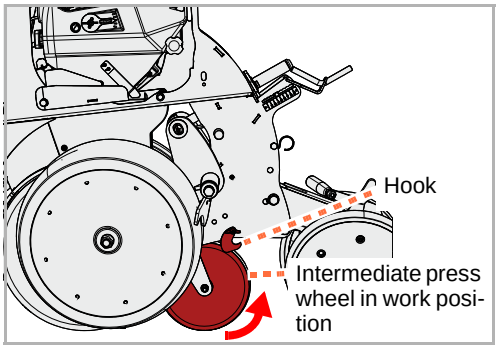
At greater working depths from approximately 6 cm, the intermediate press wheel, depending on the ground type, can no longer be used. The intermediate press wheel bearing then runs in the soil, and throws the soil up. The intermediate press wheel then has to be raised.
At working depths below 8 cm, the intermediate press wheel touches the soil even when raised and conveys earth into the gauge wheel. You will need to remove the gauge wheel completely in this case.

Printing



- Push the hook forwards and move the intermediate press wheel into the work position
- Set the desired 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

Sowing unit HD II

Load [+]

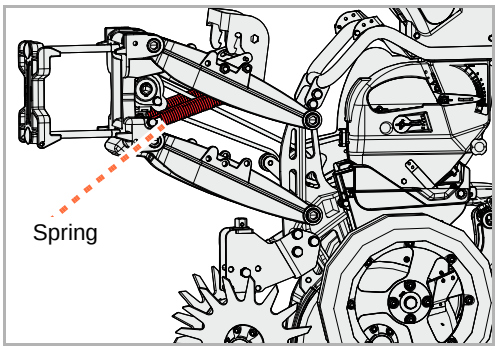
An individual sowing unit can be loaded via the springs with up to 100 kg in addition to its own weight.

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

Springs

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

- Attach the springs if necessary

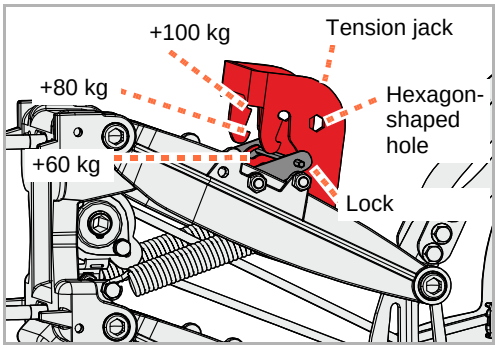


Loading

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
- Shortly press down the tension jack, release the lock and then fix it in the desired position

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

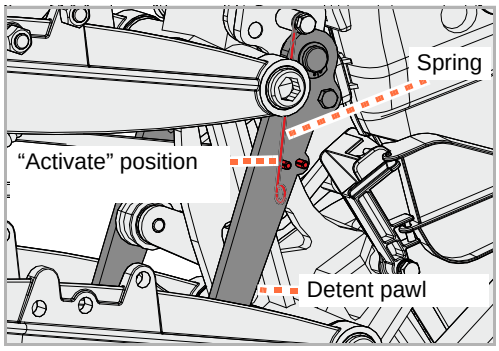


Lifting device [+]

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

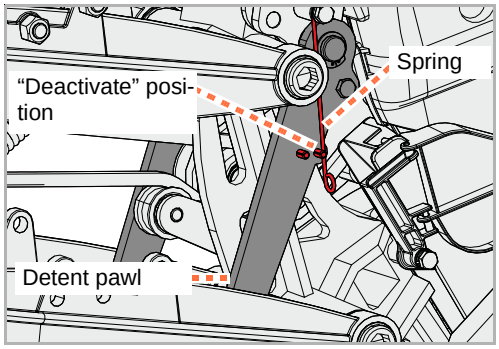
Avoid additional loading
When a load is set, it places an additional burden on the sowing units.
When a load is set, the lifting device may be damaged.

Empty 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 using 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 engages

Deactivate



- Push the spring on the detent pawl backwards to the "Deactivate" position

Lift the sowing unit using 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.

- 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 wheels and their settings determine how much the soil will be compacted. The aim is an optimum connection of the seeds to the water supply of the soil. The necessary pressure depends on the type of soil.

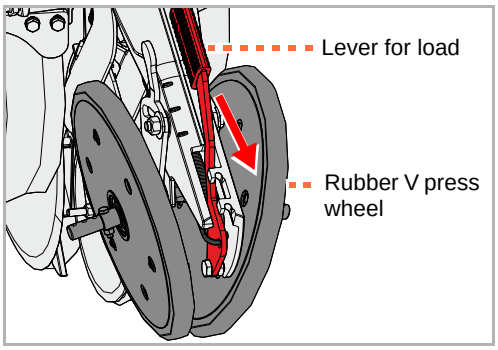
You can make various settings to the rubber V press wheels:

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

Load

The load can be set in three stages:

Less load	Push the lever forwards
More load	Push the lever rearwards



- Move the rubber V press wheels to the desired position using the lever
- Let the lever catch
- Make adjustments to all rubber V press wheels in the same way.

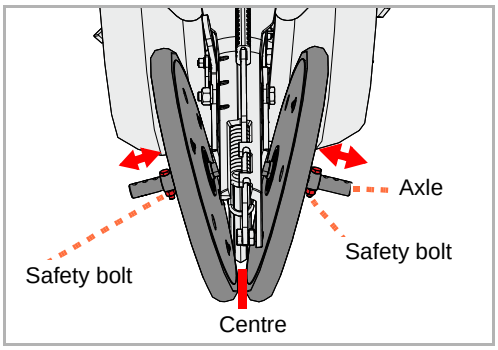
Distance

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

In addition, you can determine how the press wheels work by the distance on the axle. The effect is heavily 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.

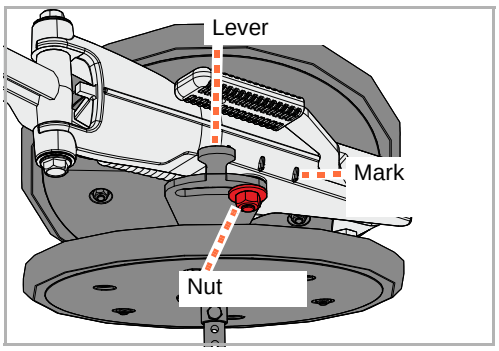


- Remove the safety bolt from each rubber V press wheel
- Shift the rubber V press wheel on the axle as required
- Secure the rubber V press wheel again with the safety bolt

Inclination angle

Setting of the inclination angle is infinitely variable:

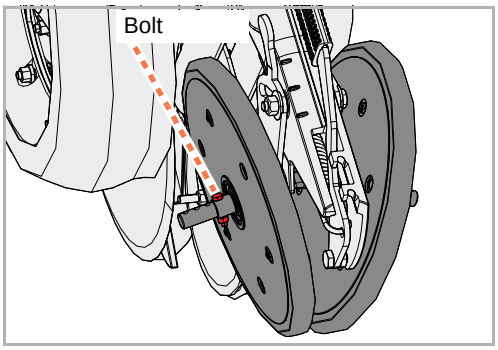
Lever position	Rubber V press wheel position	Effect
Front	Further apart	Intense stopping up of the furrow
Rear	Closer together	Less covering of the furrow



- Release nut
- Move the lever to the desired position. Use the markings for orientation.
- Re tighten the nut
- Make adjustments to 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.



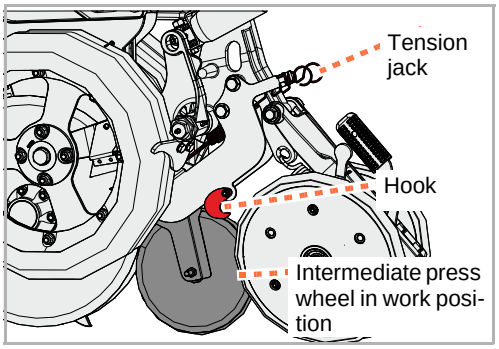
- Remove the safety bolt from each rubber V press wheel
- Replace the rubber V press wheel and secure it again with the safety bolt

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 necessary to use heavy or light pressure on the ground. In special cases the intermediate pressure roller can also be fully lifted out.

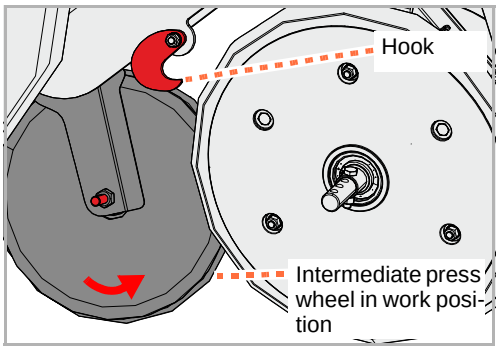
At greater working depths from approximately 6 cm, the intermediate press wheel, depending on the ground type, can no longer be used. The intermediate press wheel bearing then runs in the soil, and throws the soil up. The intermediate press wheel then has to be raised.
At working depths below 8 cm, the intermediate press wheel touches the soil even when raised and conveys earth into the gauge wheel. You will need to remove the gauge wheel completely in this case.

Printing



- Push the hook forwards and move the intermediate press wheel into the work position
- Set the desired 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

Sowing unit SX

Load [+]

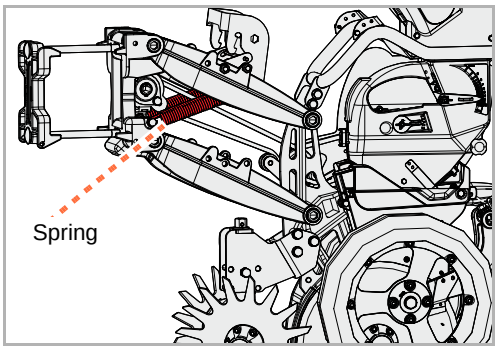
An individual sowing unit can be loaded via the springs with up to 100 kg in addition to its own weight.

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

Springs

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

- Attach the springs if necessary

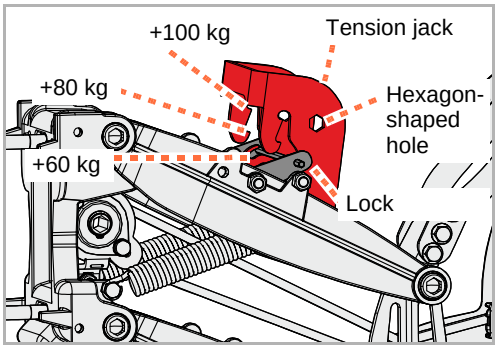


Loading

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
- Shortly press down the tension jack, release the lock and then fix it in the desired position

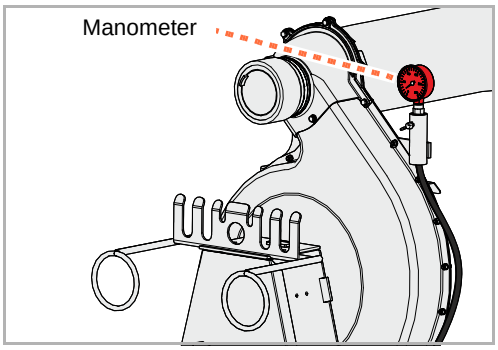
You can place a hex key in the hexagon-shaped hole to help you move the tension jack with less force.



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 operating position
- Actuate the control unit on the tractor for the hydraulic ballasting of the sowing units until 100 bar is displayed on the manometer, as shown in the table

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 drops slightly. This is normal. When lowering the machine, the pressure rises back to the set value.

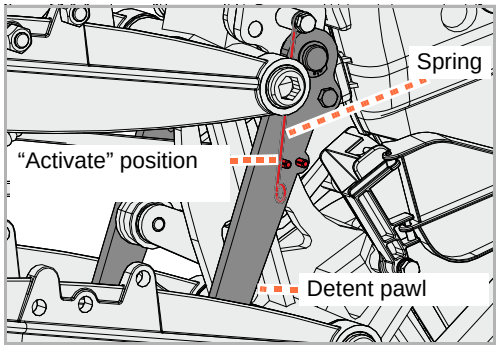
Should a constant pressure be required, the ball valve in the hydraulic line can be closed.

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

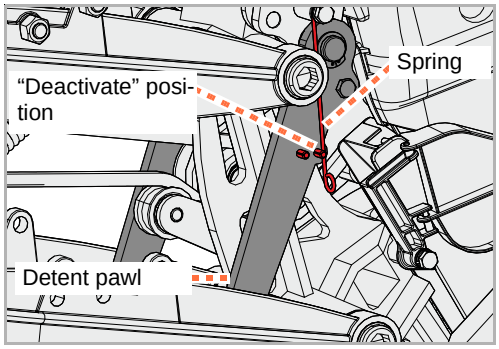
Avoid additional loading
When a load is set, it places an additional burden on the sowing units.
When a load is set, the lifting device may be damaged.

Empty 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 using 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 engages

Deactivate



- Push the spring on the detent pawl backwards to the "Deactivate" position

Lift the sowing unit using 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.

- 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 wheels and their settings determine how much the soil will be compacted. The aim is an optimum connection of the seeds to the water supply of the soil. The necessary pressure depends on the type of soil.

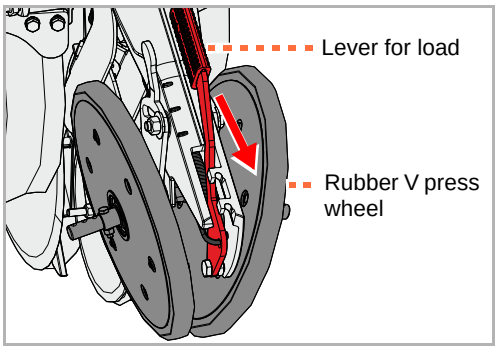
You can make various settings to the rubber V press wheels:

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

Load

The load can be set in three stages:

Less load	Push the lever forwards
More load	Push the lever rearwards



- Move the rubber V press wheels to the desired position using the lever
- Let the lever catch
- Make adjustments to all rubber V press wheels in the same way.

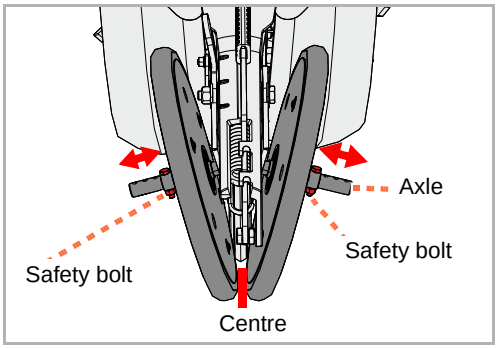
Distance

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

In addition, you can determine how the press wheels work by the distance on the axle. The effect is heavily 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.

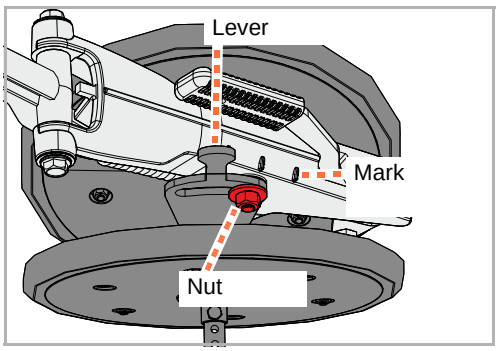


- Remove the safety bolt from each rubber V press wheel
- Shift the rubber V press wheel on the axle as required
- Secure the rubber V press wheel again with the safety bolt

Inclination angle

Setting of the inclination angle is infinitely variable:

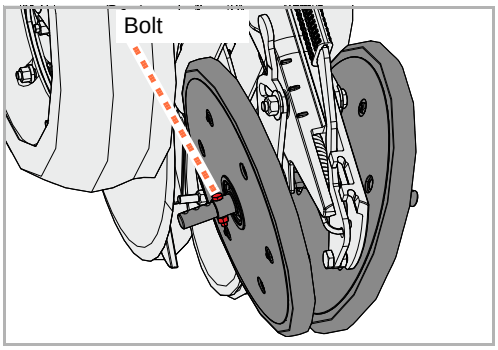
Lever position	Rubber V press wheel position	Effect
Front	Further apart	Intense stopping up of the furrow
Rear	Closer together	Less covering of the furrow



- Release nut
- Move the lever to the desired position. Use the markings for orientation.
- Re tighten the nut
- Make adjustments to 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.

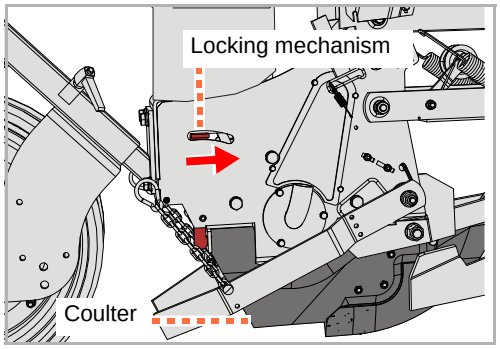


- Remove the safety bolt from each rubber V press wheel
- Replace the rubber V press wheel and secure it again with the safety bolt

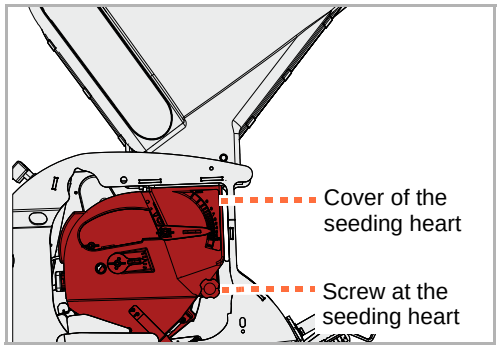
Seed disc

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
Sowing unit

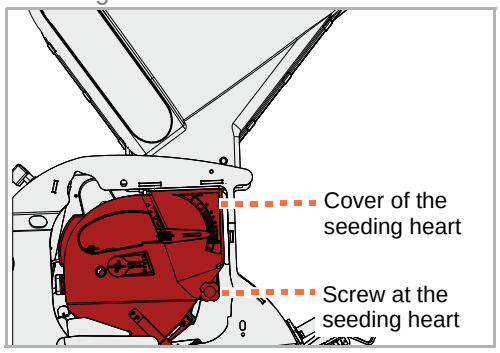


- Release the locking mechanism for the coulter
- Fold down the coulter



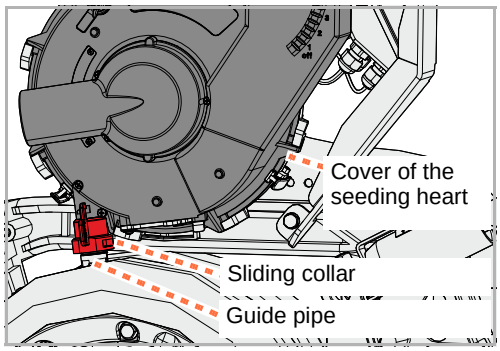
- Release the bolt, remove the cover of the seeding heart

Sowing unit, Sowing unit HD, Sowing unit HD II

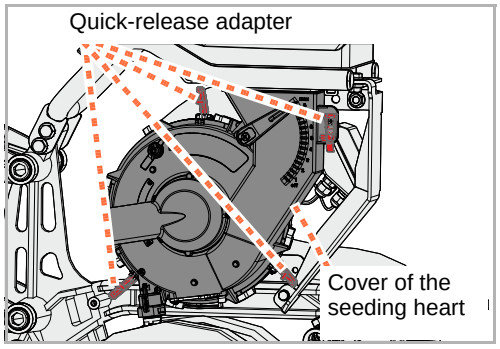


- Release the bolt, remove the cover of the seeding heart

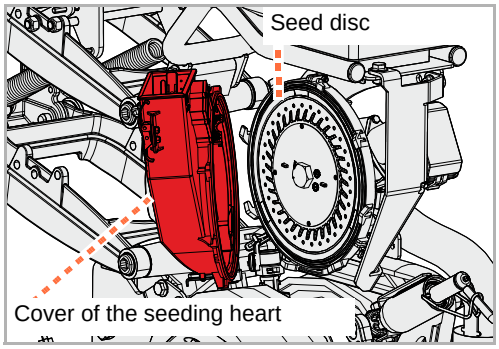
System using overpressure
Sowing unit SX



- 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

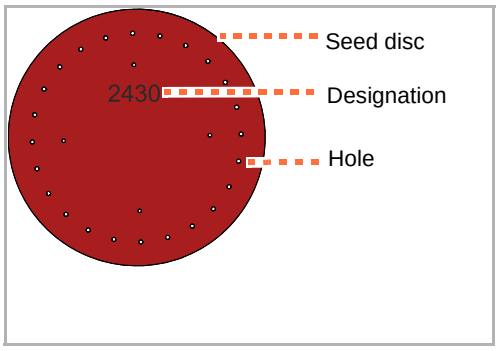


- Turn the cover of the seeding heart clockwise and unlock it
- Move the cover of the seeding heart to one side

There is a 4-digit label on the seed disc. It consists of:

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

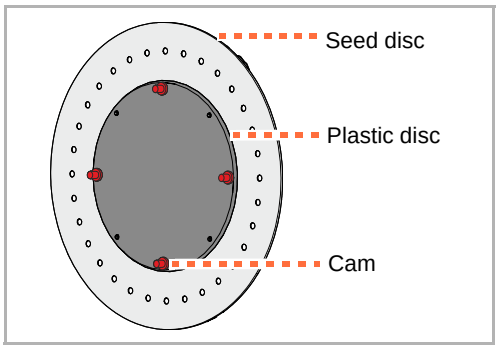
Example



Seed disc 2430 =
Seed disc with 24 holes, each with a diameter of 3.0 mm

Deliverable seed discs

System using negative pressure

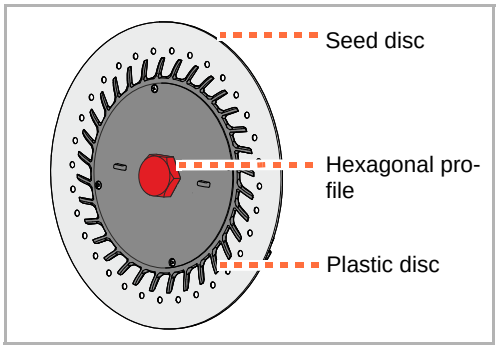


The seed discs for the system using negative pressure can be identified by the plastic disc with the driving pins.

Extract of the available seed discs:

Seed disc	Seed	Seed disc	Seed
1250	Maize narrow sowing	3255	Maize from TGW 280, broad beans
1275	Broad beans	4820	Beet
2420	Beet	4835	Dwarf beans
2430	Sunflowers	4855	Broad beans with narrow sowing distance
2465	Big Beans	6420	Beet
3220	Beet	6430	Soybeans
3230	Sunflowers and others	6440	Soybeans
3245	Maize up to TGW 220	2420	Chicory
3250	Maize up to TGW 320	3220	Chicory

System using overpressure



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

Extract of the available seed discs:

Seed disc	Seed
3225	Turnips
3230	Sunflowers
3250	Maize up to TGW 280
3255	Maize TGW 280 or above
9612	Rape

Replacement

→ Chapter »Refitting«, section »Seed discs«, page 195

Setting of the sowing distance

The sowing distance can be changed by:

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

→ Operating manual for the electronic control system

The desired distance of the grains 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 then you can calculate the sowing distance in the row with the aid of a formula, which you can then set on the sowing machine.

Formula for calculating the sowing distance in the row

$$\text{Sowing distance} = \frac{10000}{\text{Seeds/hectare x row spacing [m]}}$$



Example:
You wish to sow 100,000 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

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 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 add dust or other fine particles from the seed bag to the seed hopper.
This can cause serious wear to the seed discs.

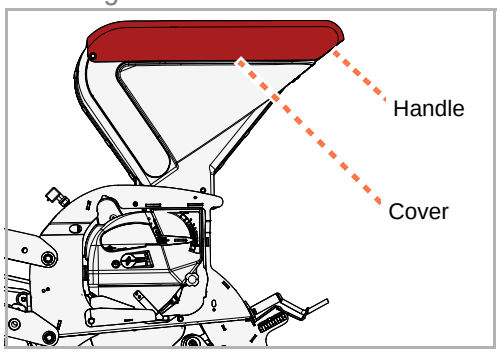
Observe the fill level
Minimum and maximum fill levels must be observed. For the minimum fill level: The seeding heart inlet must be filled.
Exceeding or falling short of the permitted fill level will lead to incorrect grain deposit.

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

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

System using negative pressure

Sowing unit, Sowing unit HD, Sowing unit HD II

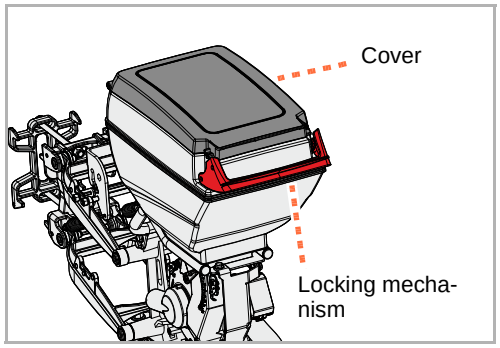


- Open cover at handle
- Examine the seed hopper for foreign bodies and remove them if necessary
- Fill the seed up to the minimum fill level. There must be free space between the max. fill level and the hopper cover.
- Close the cover

System using overpressure

Sowing unit 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
- Examine the seed hopper for foreign bodies and remove them if necessary
- Fill the seed up to the minimum fill level. There must be free space between the max. fill level and the hopper cover.
- Close the cover and secure using the locking mechanism

Setting the pressure

The separating system in the machine can be set up to use either negative pressure or overpressure.
The pressure in the separating system is set according to the model.

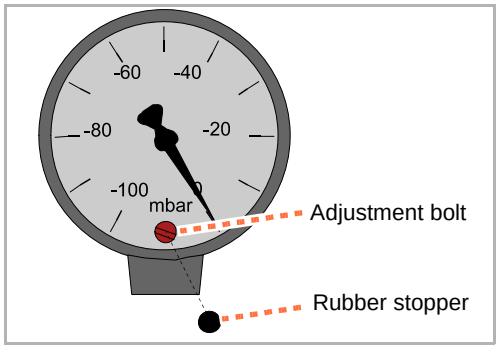
Setting the negative pressure

The fan produces a negative pressure, which is needed in the seeding heart for the separation of the seeds. The adjustment of the negative pressure depends on the following factors:

- Seed
- Thousand grain weight (TGW)
- Velocity

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

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

→ Chapter »Hydraulic system«, section »Hydraulic fan drive [+]«, page 38

The values in the table are approximations. The exact setting can only be performed on the field.

Seed disc	Seed	Negative pressure [mbar]
1250	Maize narrow sowing	70 – 90
1275	Broad beans	90 – 100
2420	Beet	40 – 50
2420	Chicory	30
2430	Sunflowers	40 – 50
2465	Big Beans	100
3220	Turnips	40 – 50
3220	Chicory	30
3230	Sunflowers	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
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	50 – 90
6440	Soybeans	80
9612	Rape	20 - 30

Fan

The fan has a manometer which displays the negative pressure.
A regulating flap on the back regulates the inflow of air.
A sliding cover on the front regulates the outflow of air. This 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.



The negative pressure should be set as low as possible. An excessive negative pressure can cause gaps and doubles. Exception: Broad beans. For this seed, the negative pressure should be set higher.

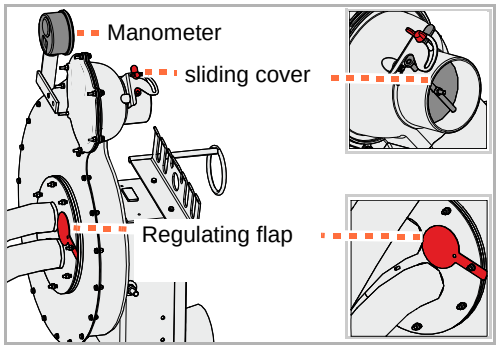


Always set the lowest possible rotational speed for the fan in order to reduce fuel consumption and noise emissions.

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 negative pressure by means of the fan speed and the sliding cover.



- Fully close the regulating flap
- Set the tractor's PTO to 800 rpm
- Set the required negative pressure using the sliding cover

If the required value is not reached:

- Increase the tractor's PTO speed

If the required value is exceeded:

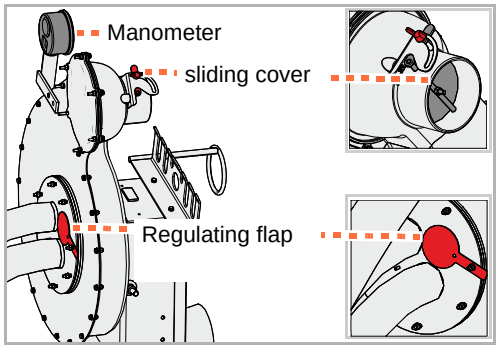
- Reduce the tractor's PTO speed

or

- Open the regulating flap further

Hydraulic fan drive

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



- 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 not reached:

- Open the sliding cover further

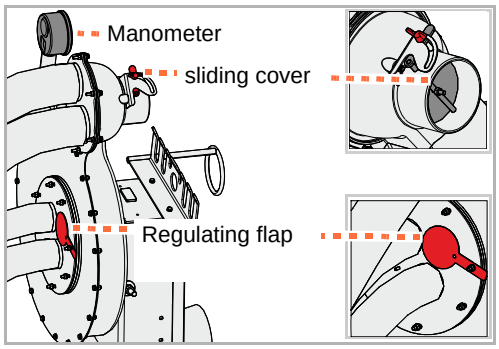
If the required value is exceeded:

- 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



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

- Open the regulating flap halfway
- Set the tractor's PTO to 800 rpm
- Set the required negative pressure using the sliding cover

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 flap further

- Check the fertiliser delivery

If the fertiliser hoses become clogged:

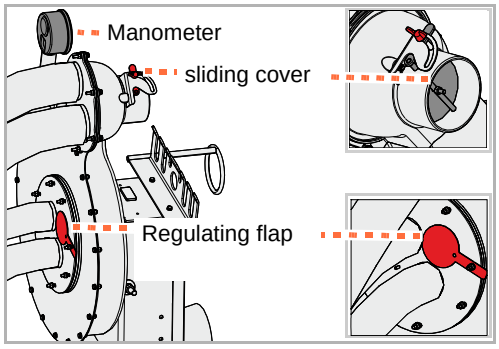
- Increase the tractor's PTO speed and readjust the negative pressure using the sliding cover

or

- Open the regulating flap further

Hydraulic fan drive

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



- 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 readjust the negative pressure using the sliding cover

or

- Open the regulating flap further

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

System using over-pressure

Setting the overpressure

The fan produces an overpressure, which is needed in the seeding heart for the separation of the seeds. The adjustment of the overpressure depends on the following factors:

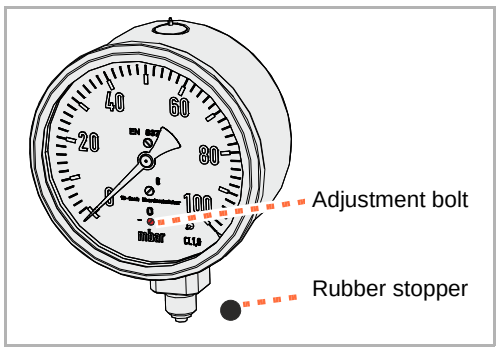
- Seed
- Thousand grain weight (TGW)
- Velocity

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



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

→ Chapter »Hydraulic system«, section »Hydraulic fan drive [+]«, page 38

The values in the table are approximations. The exact setting can only be performed on the field.

Seed disc	Seed	Negative pressure [mbar]
3225	Turnips	50 - 60
3230	Sunflowers	60 - 65
3250	Maize up to TGW 280	60 - 65
3255	Maize TGW 280 or above	60 - 65
9612	Rape	50 - 65

Fan

The fan has a manometer which displays the overpressure.
A regulating flap regulates the inflow of air between the separating system and the fertiliser delivery.



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

The overpressure should be set as low as possible. Excessive overpressure can cause patchy seeding and doubles.

Always set the lowest possible rotational speed for the fan in order to reduce fuel consumption and noise emissions.

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:

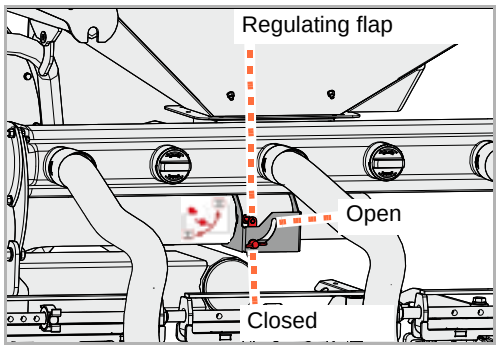
- Reduce the oil flow

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 the regulating flap halfway
- Set the tractor's PTO to 800 rpm
- Set the required overpressure using the regulating flap

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 flap further

- Check the fertiliser delivery

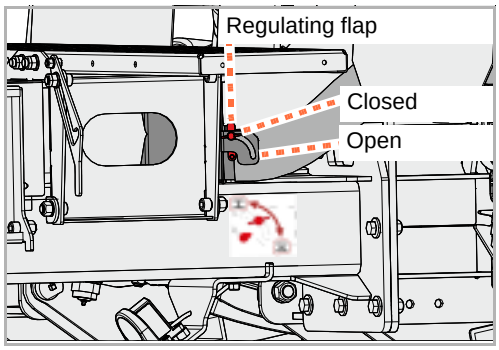
If the fertiliser hoses become clogged:

- Increase the tractor's PTO speed and readjust the overpressure using the sliding cover

If the fertiliser spreader provided is not being used, set the overpressure as you would for a machine without a fertiliser spreader
→ Chapter »Without fertiliser spreader«, section »Mechanical fan drive«, page 83

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 the regulating flap 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 readjust the overpressure using the regulating flap

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 »Without fertiliser spreader«, section »Hydraulic fan drive«, page 83

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.

Transfer the settings from the first sowing unit to the other sowing units:

- Implementation
- Checking the settings

The following must be adjusted:

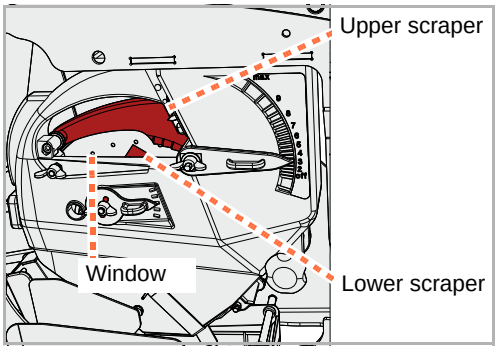
- Scraper and
- Baffle plate

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



At the seeding heart, the seed on the seed disc can be monitored through a window. Each hole in the seed disc should be occupied by exactly one grain.

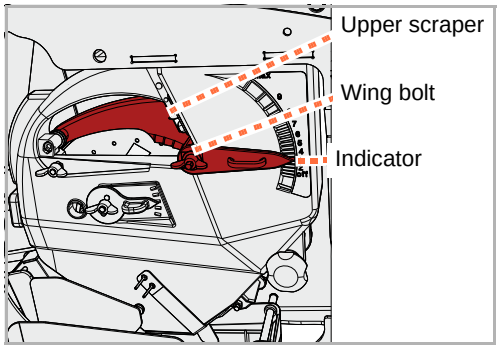
The setting is made with:

- One upper scraper
- One lower scraper

Upper scraper

Depending on the seed, the correct position of the scraper has to be determined. As a general rule:

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

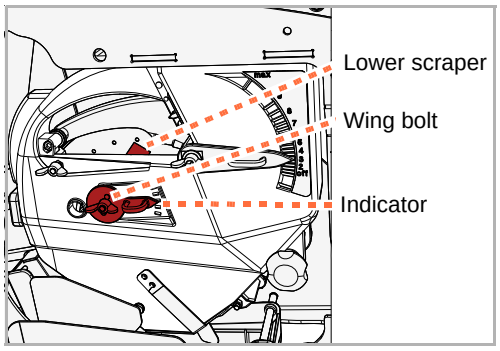


- Release wing bolt
- Lift the indicator and determine the correct setting
- Let the indicator engage
- Tighten the wing bolt

Lower scraper

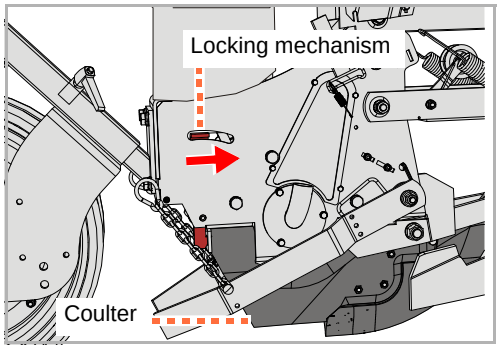
The lower scraper removes doubles that have not been detected by the upper scraper.

If seed is also removed from correctly occupied seed holes in the seed disc, the lower scraper must be moved down a little further.



- Release wing bolt
- Raise the indicator and look for the correct setting.
  Adjust the lower scraper so that it sits close to the bottom edge of the holes in the seed disc.
- Let the indicator engage
- Tighten the wing bolt

Sowing unit



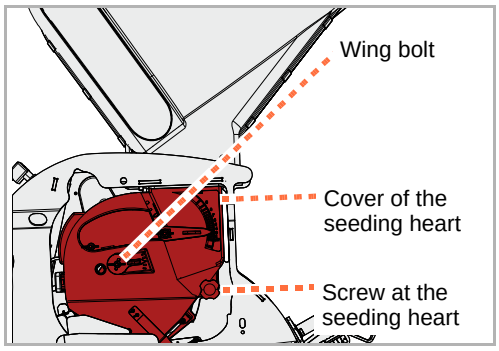
- Release the locking mechanism for the coulter
- Fold down the coulter

For broad beans or even larger seed:

For larger seed, the lower scraper can be removed:

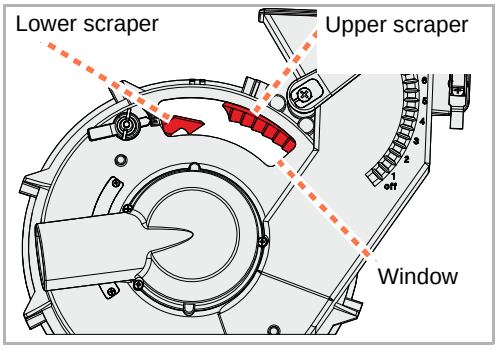
- Release the bolt, remove the cover of the seeding heart
- Release the wing bolt and pull out the lower scraper
- Replace the cover of the seeding heart correctly

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



System using over-pressure

Scraper



At the seeding heart, the seed on the seed disc can be monitored through a window. Each hole in the seed disc should be occupied by exactly one grain.

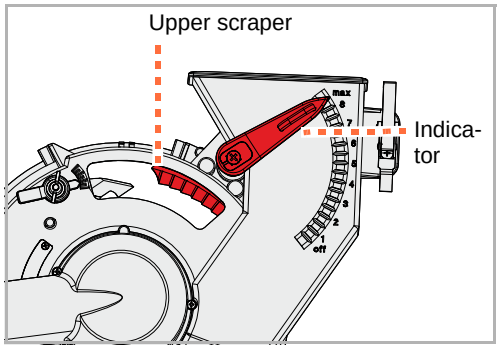
The setting is made with:

- One upper scraper
- One lower scraper

Upper scraper

Depending on the seed, the correct position of the scraper has to be determined. As a general rule:

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

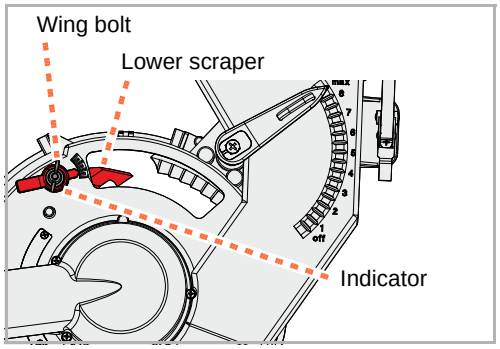


- Lift the indicator and determine the correct setting
- Let the indicator engage

Lower scraper

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

If seed is also removed from correctly occupied holes in the seed disc, the lower scraper must be moved up a little further.



- Release wing bolt
- Turn the indicator and look for the correct setting;
  adjust the lower scraper so that it sits close to the bottom edge of the holes in the seed disc.
- Tighten the wing bolt

Baffle plate

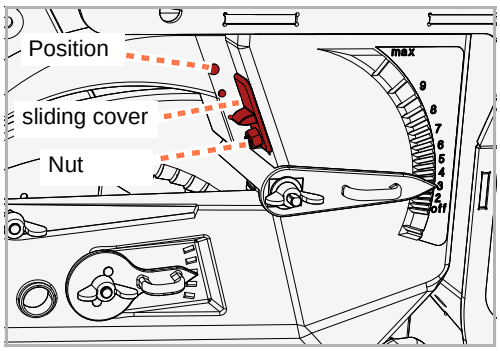
The baffle plate regulates the seed quantity which runs out of the seed hopper into the seeding heart. An incorrectly set baffle plate can result in too much seed in the seeding heart and therefore lead to the following problems:

- 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

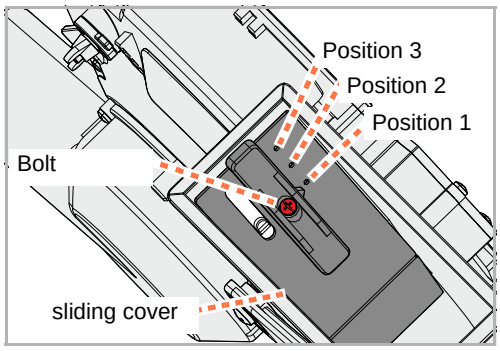


- Release nut
- Shift the sliding cover as desired
- Re tighten the nut

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 desired
- 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 the sowing units via the electronic control system

If the seed is properly singled and there are no misses on the seed disc:

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

For safety reasons, you can perform the check once again after setting all the seed rows:

▸ Fill sufficient seed into all seed hoppers

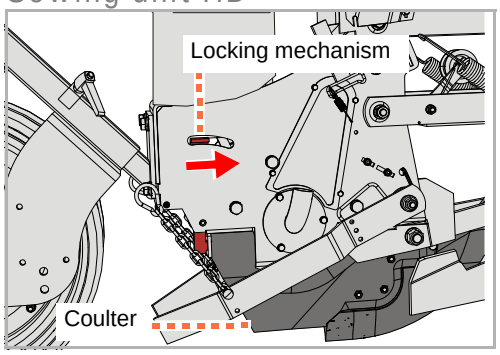
▸ Check each sowing unit

Emptying the seed hopper

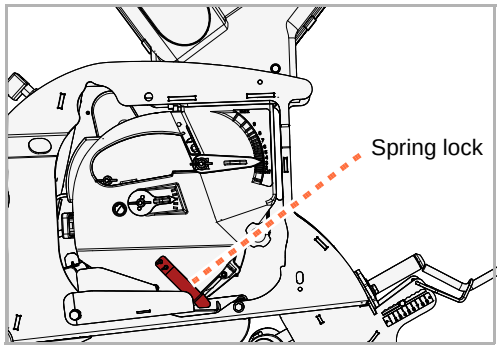
After a change of seed or after completing the seeding work, the seed has to be emptied completely from the seed hoppers.

System using negative pressure

Sowing unit, Sowing unit HD

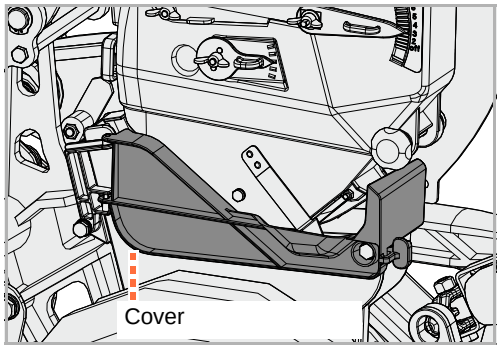


- Release the locking mechanism for the coulter
- Fold down the coulter

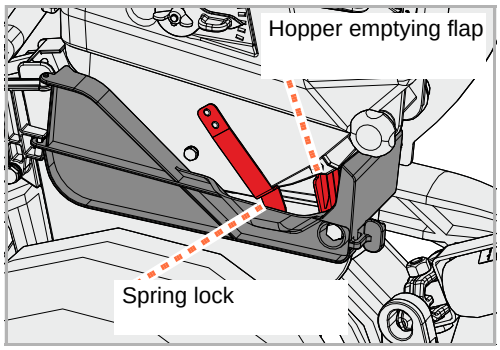


- Place a catch pan under the sowing unit
- Pull the spring lock. The hopper emptying flap is now folding downwards.
- Empty all of the seed
- Close the emptying flap. Ensure that the emptying flap and spring lock engage safely.

Sowing unit HD II



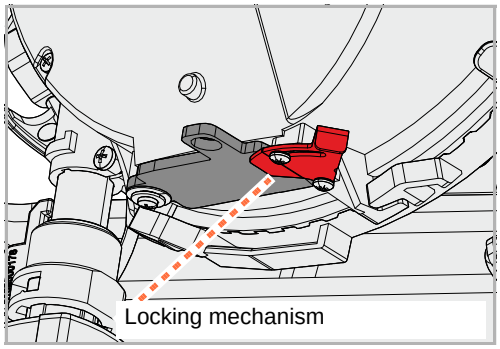
Do not open the cover. This ensures that all the seed is conveyed to the catch pan.



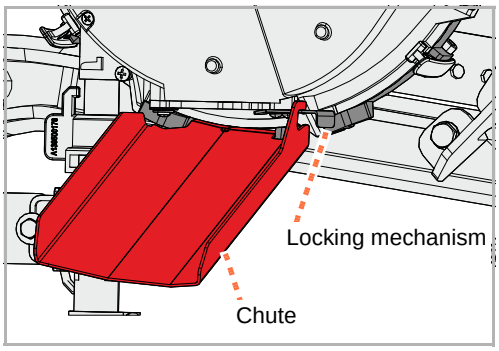
- Place a catch pan under the sowing unit
- Pull the spring lock. The hopper emptying flap is now folding downwards.
- Empty all of the seed
- Close the emptying flap. Ensure that the emptying flap and spring lock engage safely.

System using over-pressure

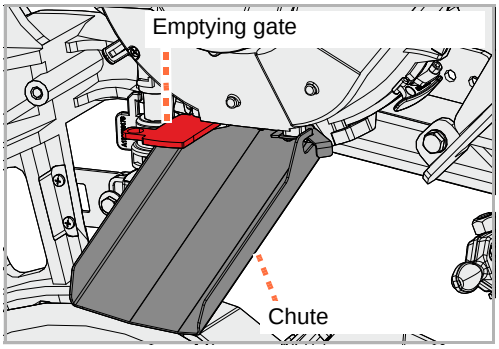
Sowing unit SX



- 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 flap
- Empty all of the seed
- Close the emptying flap
- Remove the chute
- Move the locking mechanism to the "Close" position

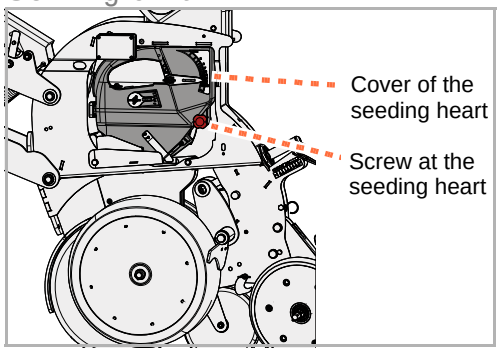
Changing the seed type

System using negative pressure

Sowing unit, Sowing unit HD

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

- Empty the seed hopper, as described above



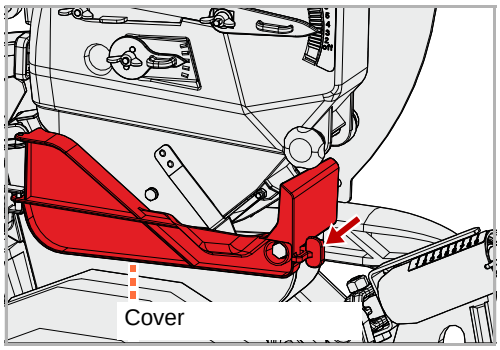
- Release bolt at the seeding heart

Remove the cover of the seeding heart and check for remaining seed

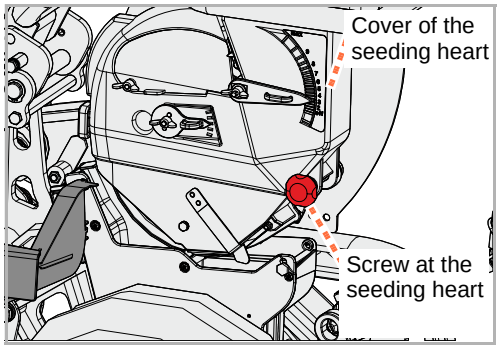
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.

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

Sowing unit HD II



- Unlock and open the cover



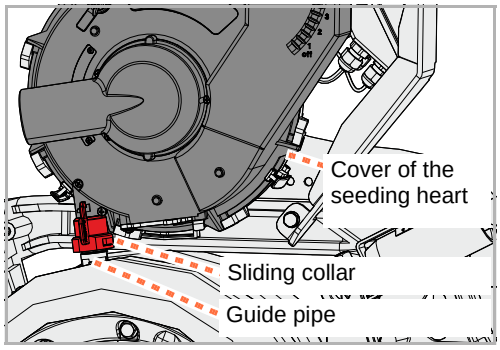
- Release bolt at the seeding heart
- Remove the cover of the seeding heart and check for remaining seed

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.

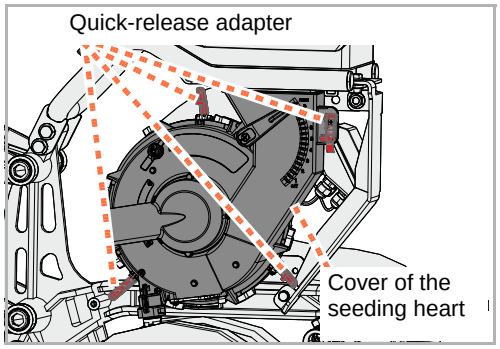
- Put the cover on the seeding heart and secure it with the bolt. When doing so, make sure that the cover of the seeding heart is positioned correctly
- Close and lock the cover

System using over-pressure

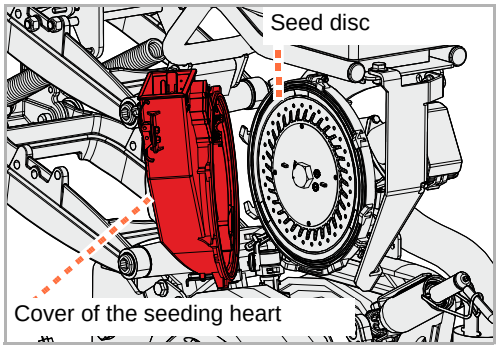
Sowing unit SX



- 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 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.

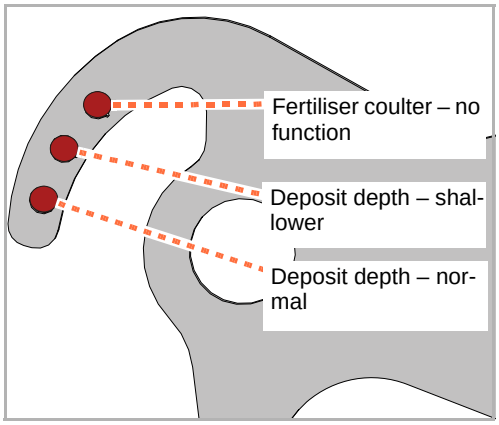
- Fit the cover of the seeding heart and turn it counter clockwise to lock it. When doing so, make sure that the cover of the seeding heart is positioned correctly
- Close the quick-release adapters
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it

Fertiliser coulters [+]

The fertiliser coulters are used to apply fertiliser to the roots of the plants. Directly at the sowing the fertiliser is deposited approximately 6 cm beside the seed row. The fertiliser must be granulated and dry.

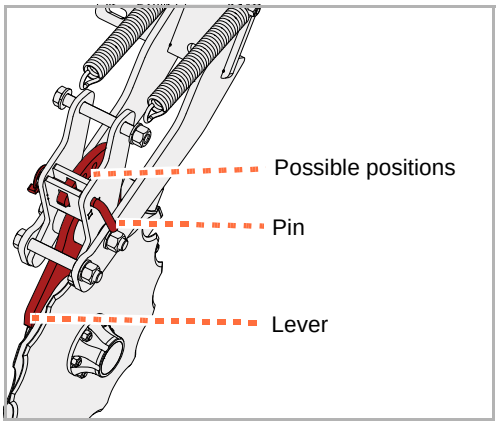
Deposit depth

The deposit depth can be adjusted in 3 positions.



Position	Selection
Fertiliser coulter – no function	You are not applying any fertiliser and the fertiliser coulters should not run in the ground
Deposit depth – shallower	You have relatively light soil and would like to apply the fertiliser to a shallower depth
Deposit depth – normal	You have average to heavy soil

Sharp-edged fertiliser coulters
The fertiliser coulters may have sharp edges.
Therefore, never touch the shares during the setting of the deposit depth.



- Remove pin
- Using the lever, adjust 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.

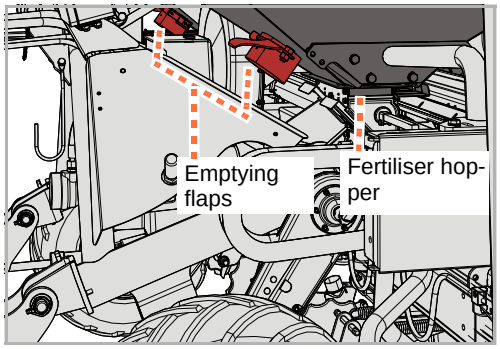
Observe maximum fill level
In the field, the fertiliser hopper can be filled up to the rim. The hopper cover must be able to close.
If the fill level is exceeded, the machine will be overloaded and the metering devices will wear considerably faster.

Suitable fertiliser can be poured into the fertiliser hopper using Big Bags or the filling auger [+].

Preparations

There are emptying flaps on the fertiliser hopper. The metering devices have emptying gates and stoppers. Before filling with mineral fertilisers, the emptying flap and the stoppers must be closed.

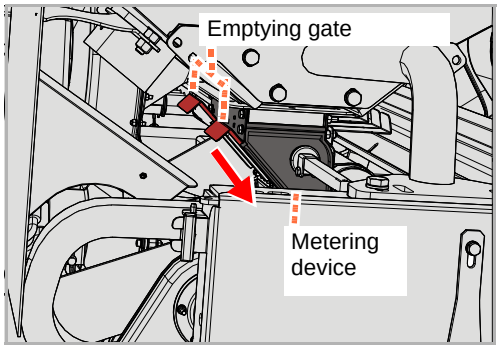
Emptying flaps



There are emptying flaps on the fertiliser hopper.

- Close the emptying flaps on all fertiliser hoppers

Emptying gate

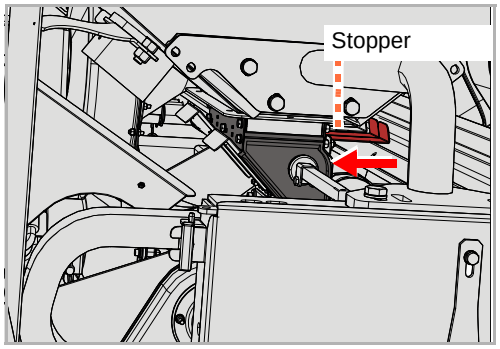


Every metering device has emptying flaps.

- Close the emptying gates on all metering devices

Stopper

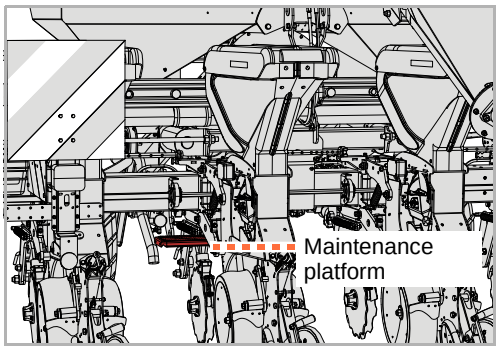
Every metering device has stoppers.



- Close the stopper at all metering devices

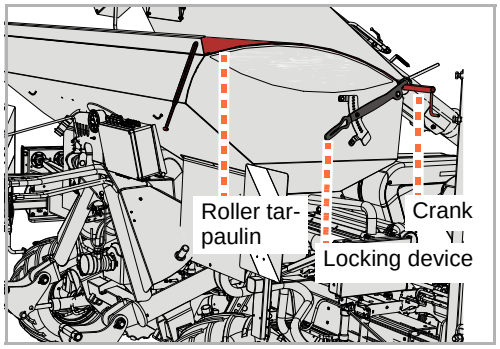
Maintenance platform

On the V-frame, a maintenance platform is located between the sowing units on the left side of the machine.



Fertiliser hopper

The fertiliser hopper is protected by a roller tarpaulin.



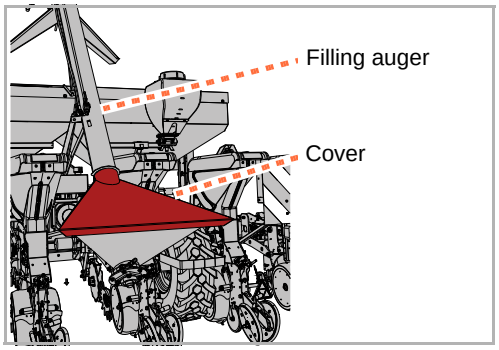
- Releasing the lock
- Roll up the roller tarpaulin using the crank

Checking

- Inspect the fertiliser hopper for foreign bodies and remove them

Filling auger [+]

Roller tarpaulin



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

- Remove the cover of the filling auger

Checking

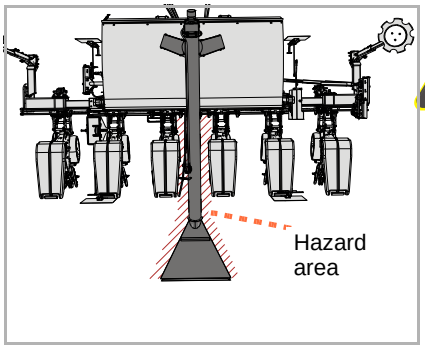
Inspect the feeding hopper for foreign bodies and remove them

Folding out

The filling auger must be folded out from the transport position into the work position.

- Activate the filling auger in the software

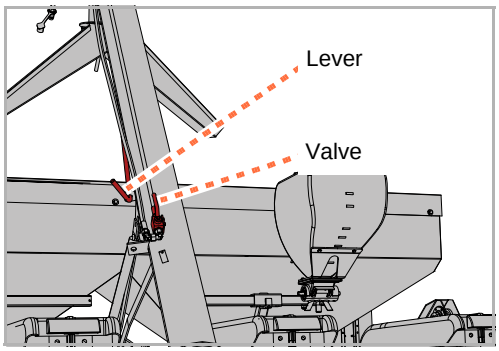
→ "e-drive II" software operating manual



Check the hazard area
Before folding out the filling auger, check the hazard area between the sowing units.
Any persons who remain in the hazard area when folding out could be seriously or fatally injured.

- Actuate the control unit on the tractor

Switching 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
- Set the control device on the tractor to the neutral position

Big Bag

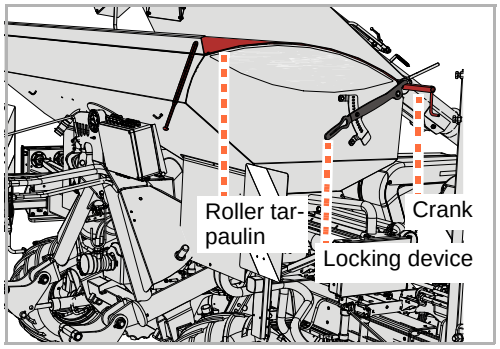
Please take particular care when filling with a Big Bag. The load can sway; even standing underneath the lifted Big Bag is dangerous.

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

- Fill the fertiliser hopper with fertiliser
  Do not overcharge the fertiliser hopper

After filling

A roller tarpaulin is available to protect against wind and rain. During sowing, the fertiliser hopper should always be closed to keep dust and moisture away from the fertiliser.

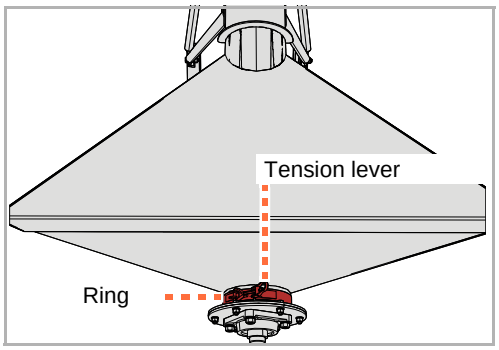


- Roll down the roller tarpaulin using the crank
- Secure the roller tarpaulin with the securing mechanism

Emptying the filling auger

Small quantities of fertiliser may remain in the feeding hopper of the filling auger. As fertiliser absorbs water very easily, the fertiliser remains may clump together and form a hard mass. Normal air humidity is enough to cause this. It is therefore necessary to ensure that the filling auger is thoroughly emptied.

Do not empty while the filling auger is in operation
When the flap is open, the auger is exposed. Do not run the filling auger if the flap has been opened.
Reaching in would cause body parts 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

Electro-hydraulic drive

Technical data

The technical specifications are for your information only. Settings or changes are not necessary.

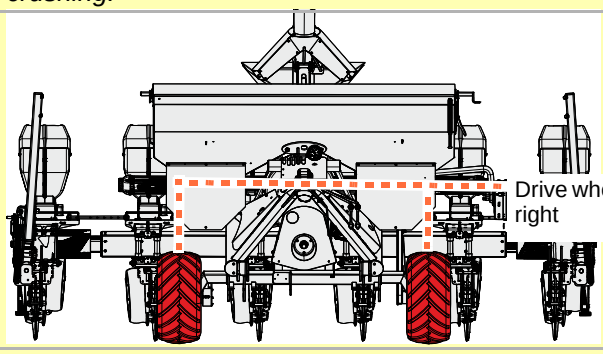
Hydraulic motor	**Values**
Hydraulic motor [ccm]	50
Displacement [l/min]	20 - 30
Maximum operating pressure [bar]	110

→ "e-drive II" software operating manual

Gear-box with chain wheels

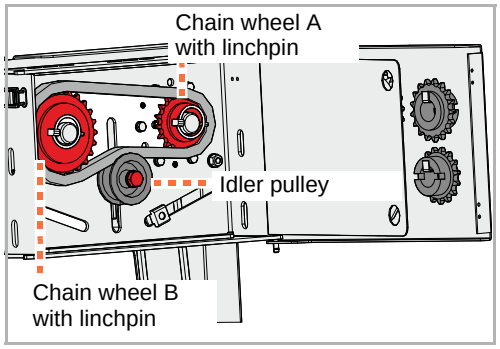
The application rate is set with chain wheels. Refer to the table to determine, which combination yields the desired application rate. The details are for reference only and can significantly deviate from the actual values, depending on the type of fertiliser. Therefore, always perform a calibration 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.



Normal cell wheel 4.0 mm

Drive chain wheel 15

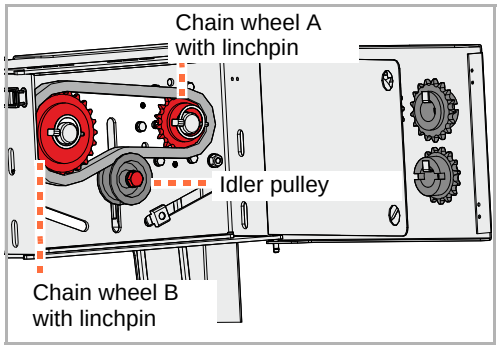


Application rate [kg/ha]

Chain wheel		Row spacing [cm]										[kg/10 m]
A	B	37,5	40	45	50	55	60	65	70	75	80	
13	30*	173	163	144	130	118	108	100	93	87	81	0,065
13	25	208	195	173	156	142	130	120	111	104	98	0,078
15	25	240	225	200	180	164	150	138	129	120	113	0,090
15	22	273	256	227	205	186	170	157	146	136	128	0,102
18	22	327	307	273	245	223	205	189	175	164	153	0,123
18	20	360	338	300	270	245	225	208	193	180	169	0,135
18	18	400	375	333	300	273	250	231	214	200	188	0,150
20	18	444	417	370	333	303	278	256	238	222	208	0,167
22	18	489	458	407	367	333	306	282	262	244	229	0,183
25	18	556	521	463	417	379	347	321	298	278	260	0,208
22	15	587	550	489	440	400	367	338	314	293	275	0,220
25	15	667	625	556	500	455	417	385	357	333	313	0,250
27*	15	720	675	600	540	491	450	415	386	360	338	0,270
25	13	769	721	641	577	524	481	444	412	385	361	0,288
30*	15	800	750	667	600	545	500	462	429	400	375	0,300
28*	13	862	808	718	646	587	538	497	462	431	404	0,323
30*	13	923	865	769	692	629	577	533	495	462	433	0,346

* = These chain wheels are an accessory

Normal cell wheel 4.0 mm

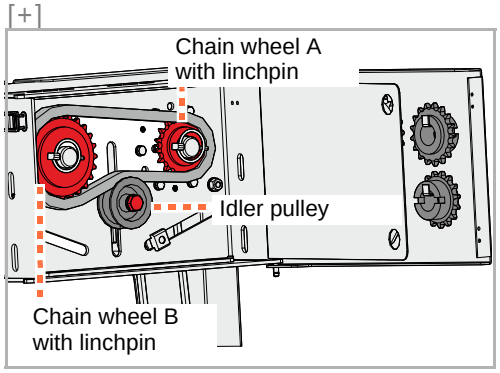


Drive chain wheel 28
Drive chain wheel 28 permits reduced application rates.

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*	93	87	77	70	63	58	54	50	46	44	0,035
13	25	111	104	93	84	76	70	64	60	56	52	0,042
15	25	129	121	107	96	88	80	74	69	64	60	0,048
15	22	146	137	122	110	100	91	84	78	73	68	0,055
18	22	175	164	146	131	120	110	101	94	88	82	0,066
18	20	193	181	161	145	131	121	111	103	96	90	0,072
18	18	214	201	179	161	146	134	124	115	107	100	0,080
20	18	238	223	198	179	162	149	137	128	119	112	0,089
22	18	262	246	218	196	179	164	151	140	131	123	0,098
25	18	298	279	248	223	203	186	172	159	149	140	0,112
22	15	314	295	262	236	214	196	181	168	157	147	0,118
25	15	357	335	298	268	244	223	206	191	179	167	0,134
27	15	386	362	321	289	263	241	223	207	193	181	0,145
25	13	412	386	343	309	281	258	238	221	206	193	0,155
30	15	429	402	357	321	292	268	247	230	214	201	0,161
28	13	462	433	385	346	315	288	266	247	231	216	0,173
30	13	195	464	412	371	337	309	285	265	247	232	0,185

Coarse cell wheel 7.5 mm [+]



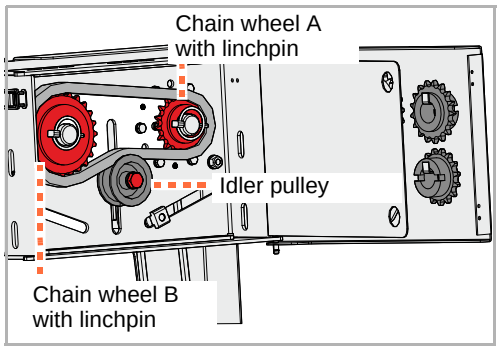
Drive chain wheel 15
The coarse cell wheel allows higher application rates.

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
18	18	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

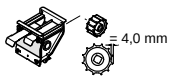


- Remove the linchpins
- Release the idler pulley with the crank or the spanner 17. The chain is now relieved of tension.
- Remove the chain
- Replace the desired chain wheels
- Secure the chain wheels with the linchpins
- Put on the chain, but do not tension the idler pulley too tight

Infinitely variable gearbox [+]

The application rate setting is infinitely variable. Refer to the table to determine which position corresponds to which application rate. The details are for reference only and can significantly deviate from the actual values, depending on the type of fertiliser. Therefore, always perform a calibration test.

Normal cell wheel 4.0 mm



Readings in kg/ha:

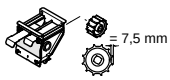
Row width	Scale	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5
	kg/10 m	0,012	0,024	0,036	0,048	0,060	0,072	0,084	0,096	0,108
	37.5 cm	32	64	96	128	160	192	224	256	288
	40.0 cm	30	60	90	120	150	180	210	240	270
	45.0 cm	27	53	80	107	133	160	187	213	240
	50.0 cm	24	48	72	96	120	144	168	192	216
	55.0 cm	22	44	65	87	109	131	153	175	196
	60.0 cm	20	40	60	80	100	120	140	160	180
	65.0 cm	18	37	55	74	92	111	129	148	166
	70.0 cm	17	34	51	69	86	103	120	137	154
	75.0 cm	16	32	48	64	80	96	112	128	144
	80.0 cm	15	30	45	60	75	90	105	120	135

Row width	Scale	5,0	5,5	6,0	6,5	7,0	7,5	8,0	8,5	9,0
	kg/10 m	0,120	0,132	0,144	0,156	0,168	0,180	0,192	0,204	0,216
	37.5 cm	320	352	384	416	448	480	512	544	576
	40.0 cm	300	330	360	390	420	450	480	510	540
	45.0 cm	267	293	320	347	373	400	427	453	480
	50.0 cm	240	264	288	312	336	360	384	408	432
	55.0 cm	218	240	262	284	305	327	349	371	393
	60.0 cm	200	220	240	260	280	300	320	340	360
	65.0 cm	185	203	222	240	258	277	295	314	332
	70.0 cm	171	189	206	223	240	257	274	291	309
	75.0 cm	160	176	192	208	224	240	256	272	288
	80.0 cm	150	165	180	195	210	225	240	255	270

Row width	45 cm
Desired application rate	133 kg
Setting on the scale	2,5

Coarse cell wheel 7.5 mm

Readings in kg/ha:

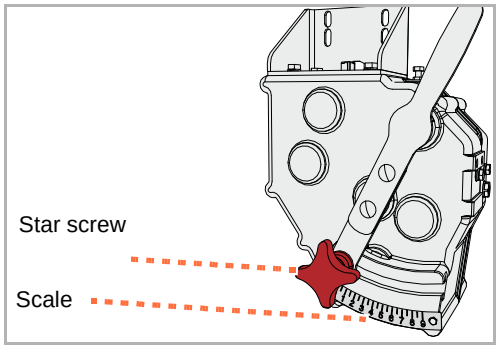


Row width	Scale	0,5	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5
	kg/10 m	0,022	0,043	0,065	0,086	0,108	0,130	0,151	0,173	0,194
	37.5 cm	58	115	173	230	288	346	403	461	518
	40.0 cm	54	108	162	216	270	324	378	432	486
	45.0 cm	48	96	144	192	240	288	336	384	432
	50.0 cm	43	86	130	173	216	259	302	346	389
	55.0 cm	39	79	118	157	196	236	275	314	353
	60.0 cm	36	72	108	144	180	216	252	288	324
	65.0 cm	33	66	100	133	166	199	233	266	299
	70.0 cm	31	62	93	123	154	185	216	247	278
	75.0 cm	29	58	86	115	144	173	202	230	259
	80.0 cm	27	54	81	108	135	162	189	216	243

Row width	Scale	5,0	5,5	6,0	6,5	7,0	7,5	8,0	8,5	9,0
	kg/10 m	0,216	0,238	0,259	0,281	0,302	0,324	0,346	0,367	0,388
	37.5 cm	576	634	691	749	806	864	922	979	1035
	40.0 cm	540	594	648	702	756	810	864	918	970
	45.0 cm	480	528	576	624	672	720	768	816	862
	50.0 cm	432	475	518	562	605	648	691	734	776
	55.0 cm	393	432	471	511	550	589	628	668	705
	60.0 cm	360	396	432	468	504	540	576	612	647
	65.0 cm	332	366	399	432	465	498	532	565	597
	70.0 cm	309	339	670	401	432	463	494	525	554
	75.0 cm	288	317	346	374	403	432	461	490	517
	80.0 cm	270	297	324	351	378	405	432	459	485

Row width	45 cm
Desired application rate	240 kg
Setting on the scale	2,5

Settings



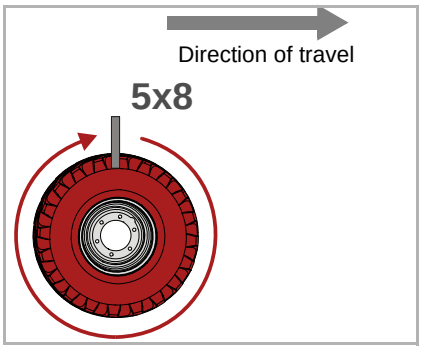
- Release the star screw
- Set value on the scale
- Tighten the star screw

Calibration test

The values in the table are only for reference purposes. The actual application rate can only be determined with a calibration test.

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
- 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 5 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 desired output rate, make the corresponding corrections via the transmission for the fertiliser output

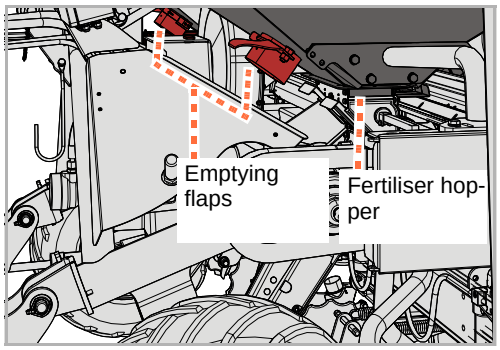
Emptying the fertiliser hopper

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

Large residues

There are emptying flaps on the fertiliser hopper.

- 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

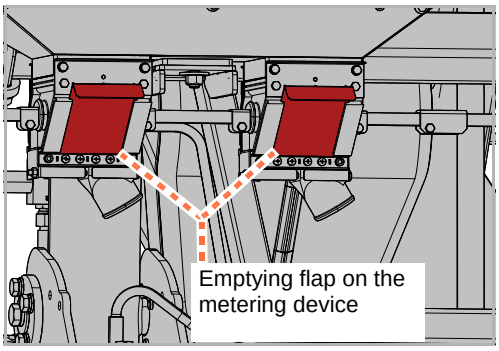


A small amount of residue remains below the emptying flap which can be removed using the emptying gate on the metering device.

Small residues

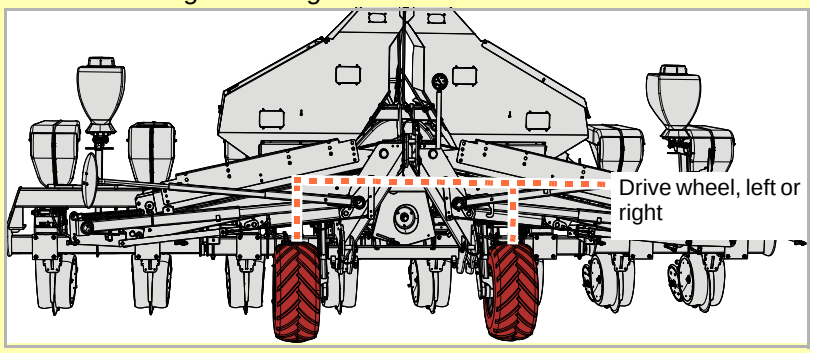
Small residues below the emptying flaps can be removed using the emptying gates on the metering device.

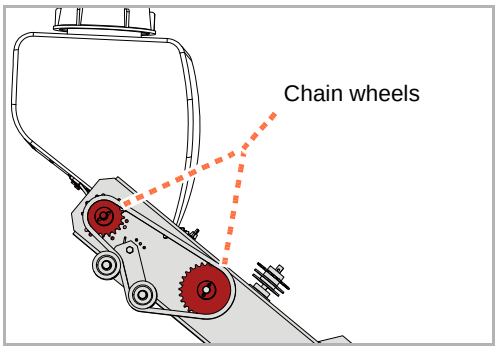
- Place a catch pan under the opening
- Open the emptying gates on the metering device
- After emptying, close the emptying gates on the metering device



Granule distributor [+]

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





The application rate for the crop protection chemical can be obtained from the following tables. It depends on the chain wheel combination. Depending on requirements, use a metering wheel with a cell width of 6 mm for standard output or a metering wheel with a 3 mm cell width for minimum application rates.

You need certain data in order to determine the chain wheel combination:

- Desired application rate
- Cell width of metering wheel
- Crop protection chemical

Chain wheels

The chain wheel combination you require for a specific application rate of crop protection chemical can be obtained from the following tables:

Crop protection chemical	Chain wheel pair A/B / metering wheel 6 mm [standard]												
[g/100 m]	28/16	28/18	28/20	20/16	20/18	20/20	18/20	16/20	20/28	18/28	16/28	13/28	13/30*
COUNTER	120,2	106,9	96,2	85,9	76,3	68,7	61,8	55,0	49,1	44,2	39,3	31,9	29,8
COUNTER SG	213,1	189,4	170,5	152,2	135,3	121,8	109,6	97,4	87,0	78,3	69,6	56,5	52,8
FORCE	95,1	84,6	76,1	68,0	60,4	54,4	48,9	43,5	38,8	34,9	31,1	25,2	23,6
MICROSTAR	64,7	57,5	51,8	46,2	41,1	37,0	33,3	29,6	26,4	23,8	21,1	17,2	16,0
PHYSIOSTART	129,4	115,0	103,5	92,4	82,1	73,9	66,5	59,1	52,8	47,5	42,2	34,3	32,0
UMOSTART	91,2	81,0	72,9	65,1	57,9	52,1	46,9	41,7	37,2	33,5	29,8	24,2	22,6
VYDATE	86,8	77,1	69,4	62,0	55,1	49,6	44,6	39,7	35,4	31,9	28,3	23,0	21,5
MESUROL	15,8	14,1	12,7	11,3	10,0	9,0	8,1	7,2	6,5	5,8	5,2	4,2	3,9

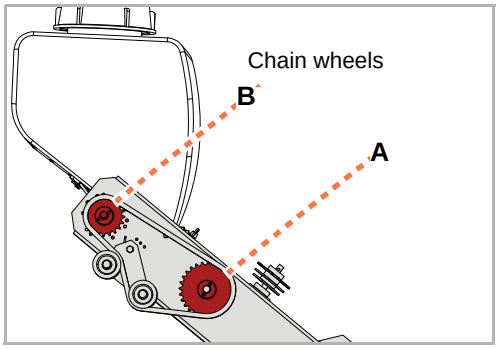
* Additional chain wheels

Example:

Desired application rate: 55 g/100 m

Width of metering wheel: 6 mm

Crop protection chemical: COUNTER



Result:

Combination of chain wheels:

- (A/B) 16/20

→ Table

kg/ha

→ Chapter »Preparation work«, section »Calculating the application rate«, page 120

g /100 m

→ Chapter »Preparation work«, section »Calculating the application rate«, page 120

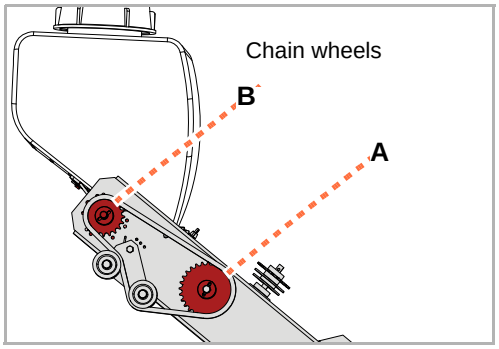
Crop protection chemical	Chain wheel pair A/B / metering wheel 3 mm [+]												
[g/100 m]	28/16	28/18	28/20	20/16	20/18	20/20	18/20	16/20	20/28	18/28	16/28	13/28	13/30*
COUNTER	60,1	53,4	48,1	42,9	38,2	34,4	30,9	27,5	24,5	22,1	19,6	16,0	14,9
COUNTER SG	106,6	94,7	85,2	76,1	67,7	60,9	54,8	48,7	43,5	39,1	34,8	28,3	26,4
FORCE	47,6	42,3	38,1	34,0	30,2	27,2	24,5	21,7	19,4	17,5	15,5	12,6	11,8
MICROSTAR	32,3	28,8	25,9	23,1	20,5	18,5	16,6	14,8	13,2	11,9	10,6	8,6	8,0
PHYSIOSTART	64,7	57,5	51,8	46,2	41,1	37,0	33,3	29,6	26,4	23,8	21,1	17,2	16,0
UMOSTART	45,6	40,5	36,5	32,6	28,9	26,0	23,4	20,8	18,6	16,7	14,9	12,1	11,3
VYDATE	43,4	38,6	34,7	31,0	27,5	24,8	22,3	19,8	17,7	15,9	14,2	11,5	10,7
MESUROL	7,9	7,0	6,3	5,6	5,0	4,5	4,1	3,6	3,2	2,9	2,6	2,1	2,0

* Additional chain wheels

Example:

Desired application rate: 30,9 kg/ha

Width of metering wheel: 3 mm
Crop protection chemical: COUNTER



Result:
Combination of chain wheels:

- (A/B) 18/20

→ Table

kg/ha

→ Chapter »Preparation work«, section »Calculating the application rate«, page 120

g /100 m

→ Chapter »Preparation work«, section »Calculating the application rate«, page 120

Calculating the application rate

The information in the tables refers to application rates in g/100 m. Information in kg/ha is not possible as this data is dependent on the number of sowing units and the row spacing.

It may, however, be that you only have information in kg/ha. In this case, use the formulas for g/100 m.

Or you may want to convert the information from g/100 m to kg/ha. In this case, use the formulas for kg/ha.

kg/ha

The application rate in g/100 m is known. You want to know how high the application rate is in kg/ha.

Calculation of the application rate in kg/ha:

Row spacing in cm	=	[R]

[g/100 m] x 10 / [R]	=	kg/ha



Example: How high is the application rate in kg/ha?

Application rate in g/100 m	60
Row spacing in cm	25

[60] x 10 / [25]	=	24 kg/ha

g /100 m

The application rate in kg/ha is known. You want to know how high the application rate is in g/100 m.

Calculation of the application rate in g/100 m:

Row spacing in cm	=	[R]

[kg/ha] x [R] /10	=	g /100 m



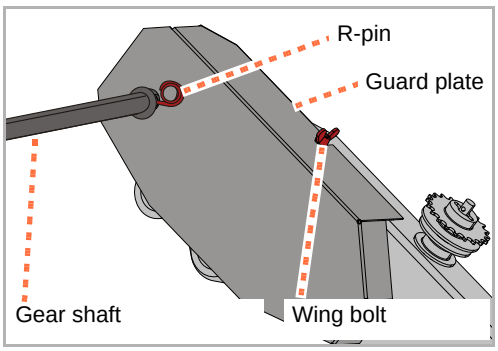
Example: How high is the application rate in g/100 m?

Application rate in kg/ha	30
Row spacing in cm	25

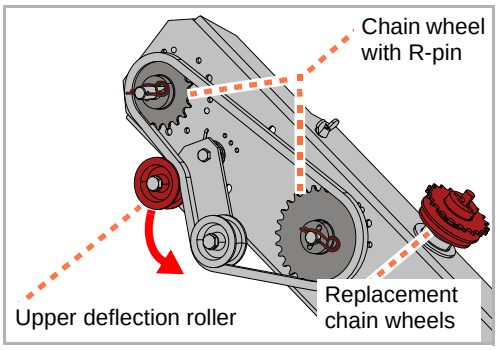
[30] x [25] / 10	=	75 g/100 m

Setting the application rate

Change the chain wheels on all drives. Use the same chain wheel size for all drives.



- Remove R-pin on gear shaft
- Remove the gear shaft
- Release wing bolt
- Remove guard plate



- Press upper deflection roller in direction of arrow
- Remove chain
- Remove the R-pin on the chain wheel you wish to replace
- Remove chain wheel and replace
- Use the same combination of chain wheels for all drives
- Secure the chain wheel with an R-pin
- Put on the chain and tension it with the deflection roller

Filling the tank

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.

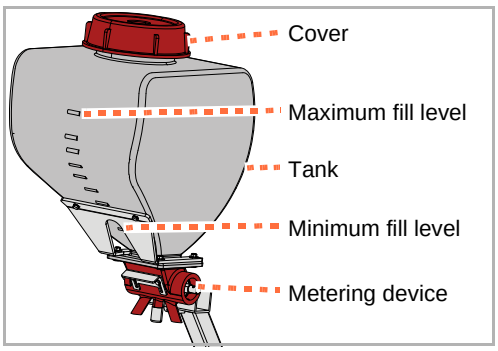
Protection against fine dust
When working in an environment contaminated with dust and other fine particles from crop protection chemicals, it may be necessary to wear a breathing mask and latex gloves. Observe the specific safety instructions issued by the crop protection chemicals manufacturer.
Improper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

Use suitable crop protection chemicals only
Ensure that the crop protection chemical filled into the tank is in original packaging and suitable for the intended use.
Unsuitable crop protection chemicals can cause damage to the granule distributor.

Remove foreign bodies
Check the tank for foreign bodies and remove any that are found before filling.
Foreign bodies can cause damage to the granule distributor.

Disposal
Collect all spilled crop protecting chemical, place in a suitable bag and dispose of in accordance with local environmental regulations. Never sweep up spilt crop protection chemical and use it in the granule distributor.
Dust or foreign bodies cause damage to the granule distributor.

Observe the fill level
Do not exceed the filling volume of 33 l for each granule distributor. Observe the minimum and maximum fill level.
Exceeding the maximum fill level causes damage to the metering device.

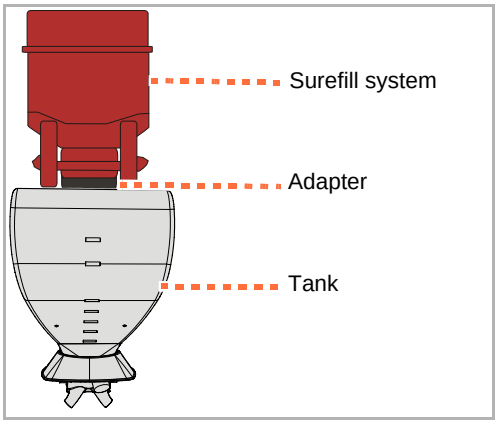


- Unscrew the cap on the tank
- Fill the tank with crop protection chemical from its original packaging. Do not fill to below the minimum fill level or exceed the maximum fill level.
- Refit the cap on the tank

Surefill system [+]

For machines with tanks equipped in the factory with an adapter for the Surefill system, use of the Surefill system is specified. The Surefill system permits the tank to be filled without pollution during filling caused by fine dust from crop protection chemicals.

Using the Surefill system
Only use the Surefill system to fill the tank. Filling without the Surefill system will result in pollution due to fine dust from crop protection chemicals.
Improper handling of crop protection chemicals is harmful to your health.



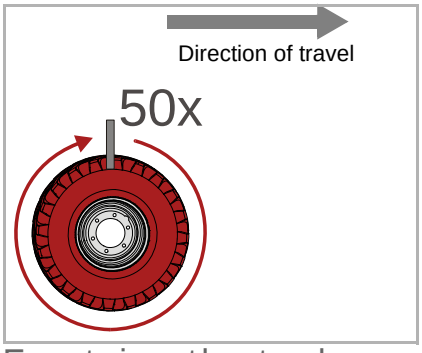
A prerequisite for use of the Surefill system is fitting the tank with an adapter.

- Place the Surefill system on the adapter on the tank and lock in place by turning slightly

Calibration test

Prerequisites:

- The application rate is set through an appropriate combination of the chain wheels
- For the calibration test, the tanks are filled with the desired crop protection chemical at least as far as the minimum fill level
- A sufficiently large catch pan is positioned under every granule tube
- The machine is lifted



- Turn the drive wheel slightly until the crop protection chemical trickles out of the hoses
- Empty catch pan and place back under the granule tubes

Mark a point on a tyre with chalk to assist counting the revolutions.

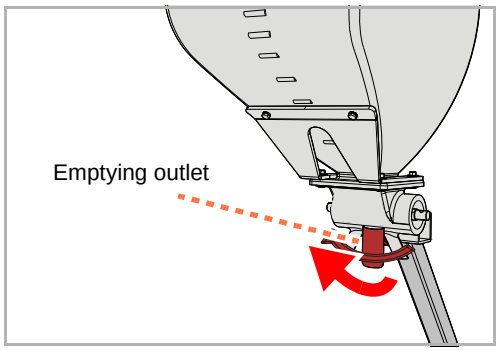
- Simulate a 100 m stretch with 50 revolutions on the drive wheel
- Weigh the applied crop protection chemical

Each catch pan should contain the same, previously set application quantity.

Emptying the tank

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.

Before road transport, the granule distributor tanks must be emptied.



- Place opened packages or empty original packages in position when emptying the tanks
- Hold the package opening under the emptying outlet.
- Unscrew the emptying outlet
- Remove the remaining crop protection chemical from the tank with a brush. Never use this brush for any other purpose.
- Screw the emptying outlet back in

Familiarising yourself with the device



Each machine is supplied with electronic scales, which are provided for the purpose of weighing the seed or fertiliser for the calibration test. Please observe the tolerances and weighing range. The scales are not suitable for weighing fine seed such as rape.
→ Section »Technical data«, page 125

Technical data

Temperature range	0 – 50 °C
Maximum length	19 cm
Maximum width	6.5 cm
Weight	140 g
Battery	2x 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.

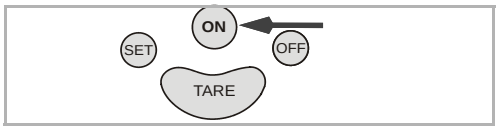
Safety

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.

Switching on

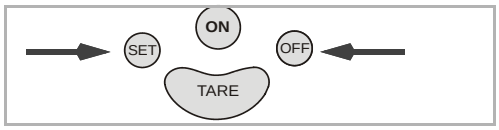


- Press the “ON” key

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.



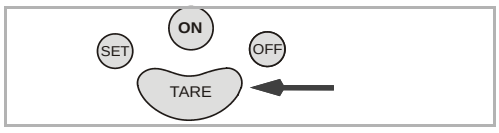
- Press the “SET” key until the desired unit is displayed
- Press the “OFF” key

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

By pressing the “SET” key several times 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 container from the weighing hook and wait until a signal sounds
- Press the “TARE” key

- Tare is displayed by a minus sign
- This value is deducted from the total weight weighed
- The tare setting is cleared when you switch off

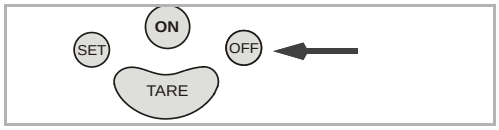
Weighing

- Suspend the weight from the weighing hook and wait until a signal sounds

The weight is displayed.

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

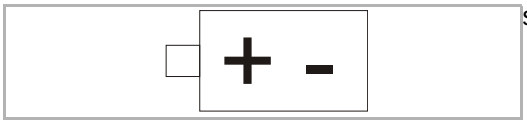
Switch off



- Press the “OFF” key

After roughly 2 minutes 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

CE symbol

The device bears the CE mark.

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest

Soest, 15.05.2009

Friedrich Pehle
CEO and authorised person for compiling technical documentation

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 must only be undertaken with an empty fertiliser hopper. Machines with a fertiliser hopper must not exceed a maximum speed of 25 km/h.
- Transport must only be undertaken with empty seed hoppers on the sowing units.
- Transport must only be undertaken with empty tanks on the granule distributor.

The driver and owner of the vehicle are liable if road traffic regulations are not observed.

Prior to road transport



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

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

Fold in the machine
All swivelling components of the machine must be folded in and securely locked in place. Lock the control units on the tractor against accidental actuation.
Accidentally folded out machine parts can cause accidents.

Transport position

If the machine is in the work position, it must be moved to the transport position.

Granule distributor [+]

Emptying the granule distributor
Road transport must only be undertaken with empty tanks
When travelling on the road with filled tanks, crop protection chemicals may escape uncontrolled.

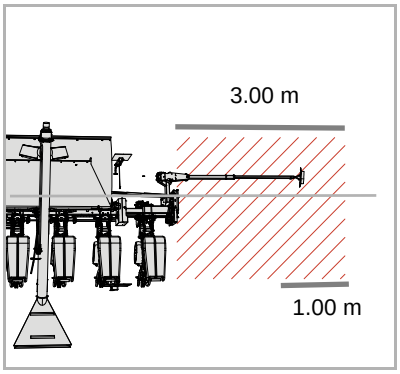
Emptying

- Emptying the granule distributor

→ Chapter »Preparation work« in section »Emptying the tank«, page 124

Track marker

Hazard area



No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.

Folding in

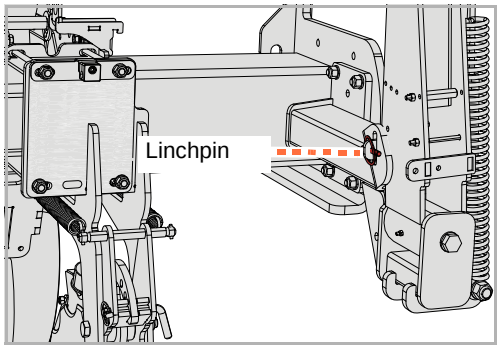
The folding in and folding out of the track marker is actuated using the electronic control system.

- Activate the required track marker on the electronic control system

→ "e-drive II" software operating manual

- Actuate the control unit on the tractor until the selected track marker is completely folded in

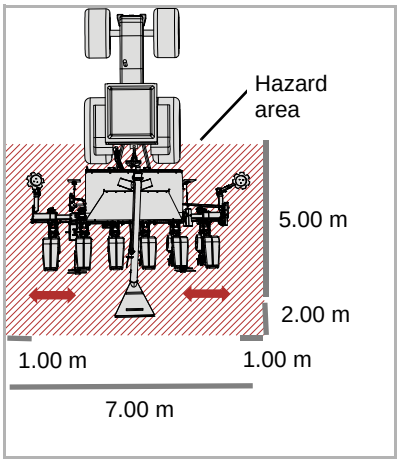
Locking device
With V-frames, you must secure the track marker after folding in with a transport locking device.



- Insert the linchpin on both track markers

Machine

For transporting the machine on the road, you must fold the machine into its transport position.



No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when retracting or extending.
Persons who remain in the hazard area when the machine is retracted or extended can be seriously or fatally injured.

Do not make any alterations
The frames fold out slowly. Never manipulate the equipment for faster folding in.
A faster folding process leads to destruction of machine components.

Folding in or folding out only when the machine is lifted and coupled
The outer wings must only be folded in or out with lifted and coupled machine.
Folding when lowered causes damage to the machine.

Keep the rear window closed
Always keep the rear window of the tractor cab closed when folding.
During the folding procedure, an open back window can be destroyed.

Observe the machine when folding
Observe the machine while folding in or folding out. If machine behaviour is unusual when folding the machine in or out, interrupt the folding immediately and determine the cause.
This will prevent damage to the machine.

Folding in

Before folding in the machine, you must check whether the track markers are folded in.

- Check whether the track markers are folded in

If the track markers are not folded in:

- Fold in the track marker

→ Chapter »Driving on the road« in section »Track marker«, page 129

Using "e-drive II" software

- Activate folding the machine in and out at the electronic control system

→ "e-drive II" software operating manual

- Actuate the control unit on the tractor until the machine is folded in

Road transport



Lock the control units
Lock all control units on the tractor when driving 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.

Observe the maximum speed
Do not exceed 25 km/h during transport
Higher speeds can cause accidents.

Adapted driving speed
Always adapt the driving speed to the ambient conditions. Extremely large forces may result under poor road conditions and excessively high speeds and these will severely load or overload the tractor and machine.
Driving without adapting your speed can cause machine damage and 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 make sure that you have a clear field of vision and, in particular, look out for children within the operating 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:

- ☑ The machine is folded in
- ☑ The support leg is in its transport position
- ☑ The track markers are secured for transport on the V-frame
- ☑ The lighting equipment is installed and operational
- ☑ The fertiliser hopper is empty
- ☑ The seed hoppers on the sowing units are empty
- ☑ The granule distributor tanks are empty
- ☑ The PTO shaft is deactivated
- ☑ All constituent parts of the "e-drive II" software are inactive
- ☑ The control units on the tractor are locked

Work position

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

- Move the machine to its work position

→ Chapter »Preparation work«, section »Work position«, page 44

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

Seed hopper

- Fill the seed hopper with seed

→ Chapter »Preparation work«, section »Seed hopper«, page 133

Fertiliser hopper [+]

- Fill the fertiliser hopper with fertiliser

→ Chapter »Preparation work«, section »Fertiliser hopper [+]«, page 104

Tank for granules [+]

- Fill the tank with granules

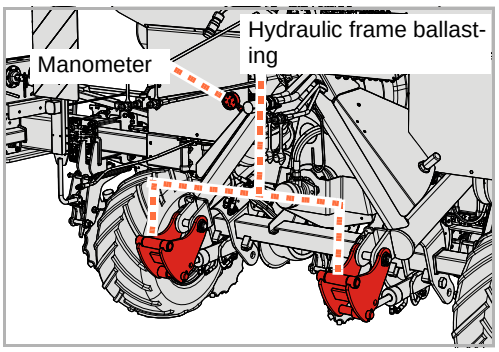
→ Chapter »Preparation work«, section »Filling the tank«, page 122

Hydraulic frame ballasting [+]

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

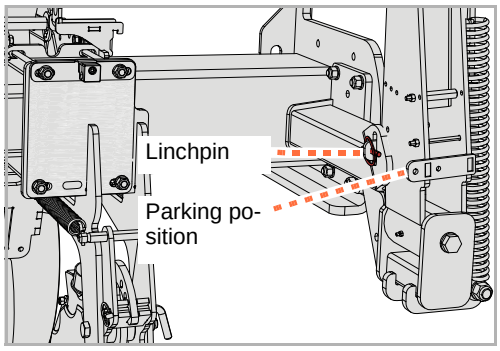
Switch on the hydraulic ballasting when work starts.

- Lower the machine to its operating 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. This is normal. When lowering the machine, the pressure drops back to 130 bar.

Track marker

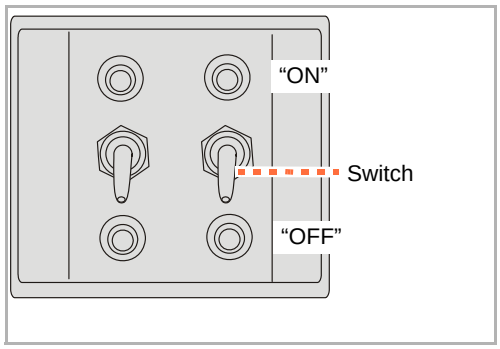


With V-frames, you must remove the transport locking device before folding out.

- Remove the linchpin on both track markers and insert in parking position

Granule distributor [+]

Electrical cut-out [+]



Switch the granule distributor on or off via the control panel at the beginning of or during work. With two gear boxes, you can switch each one on or off separately.

- When the switch is “ON”;
  the green lamp lights up.
- When the switch is “OFF”;
  the red lamp lights up.

Negative pressure or overpressure

Negative pressure and overpressure are set differently for the application of:

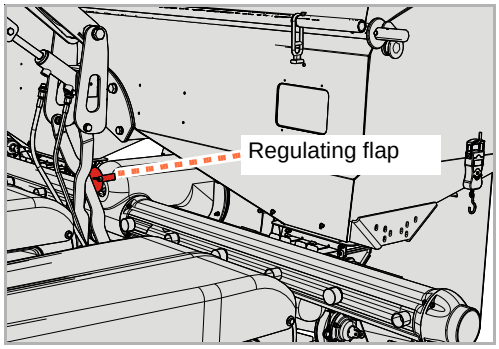
- Seed
- Seed and fertiliser

- Select appropriate negative pressure according to the seed

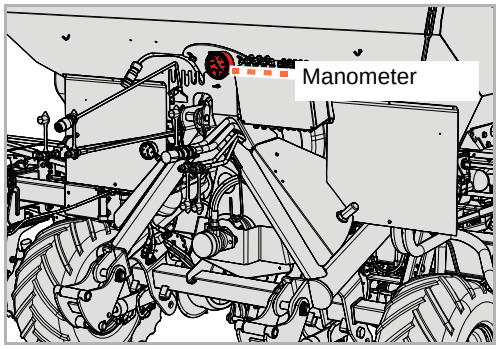
→ Chapter »Preparation work«, section »Manometer«, page 81

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

Seed

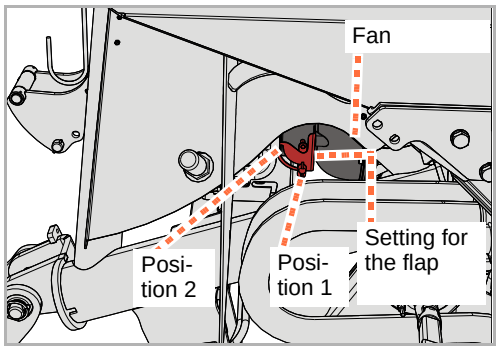


Close the regulating flap



- Switch on the PTO stub shaft on the tractor and select the rotational speed of the PTO stub shaft so that the desired negative pressure is reached on the manometer

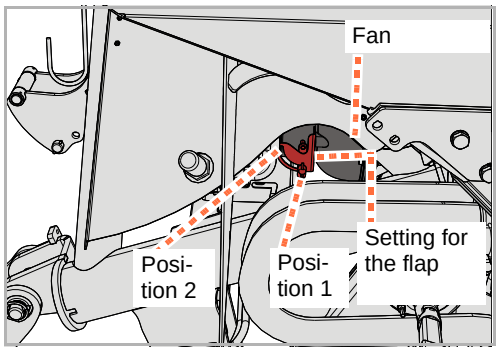
If the desired negative pressure is not reached:



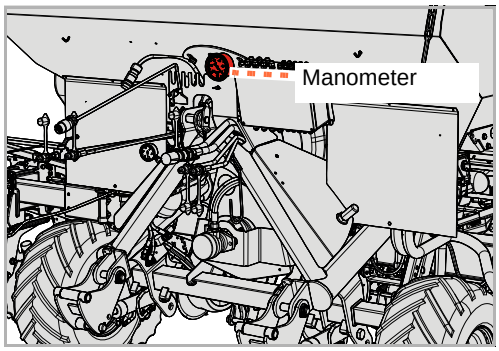
- Adjust the flap on the fan. Adjustment is infinitely variable between position 1 and position 2.

Position 1: Minimum negative pressure
Position 2: Maximum negative pressure

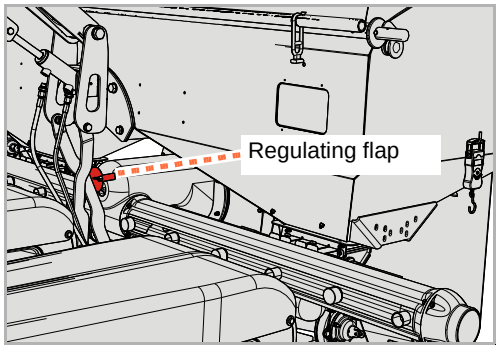
Seed and fertiliser



- Set the flap on the fan to position 1



- Switch on the PTO stub shaft on the tractor and select the rotational speed of the PTO stub shaft so that the desired negative pressure is reached on the manometer



- Close the regulating flap and then open it until the fertiliser is routed without obstruction to the coulters. If fertiliser remains in the fertiliser hoses, open the regulating flap further.
- Check the negative pressure on the manometer and readjust to the correct setting, if necessary, using the rotational speed of the PTO stub shaft

Test drive

Performing a test drive is essential for evaluating the settings on the machine. Only in this way is it possible to verify the deposit depth for seed and fertiliser reliably.

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.

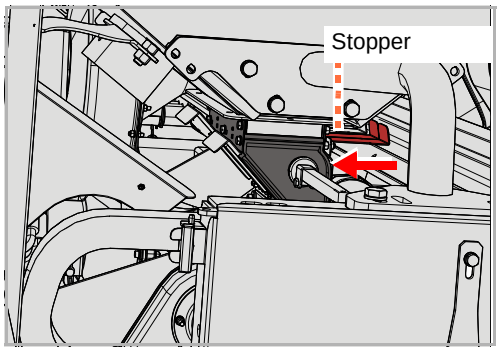
Performing the test drive

After completing all preparatory work, take a test drive.

On machines with a fertiliser spreader:

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

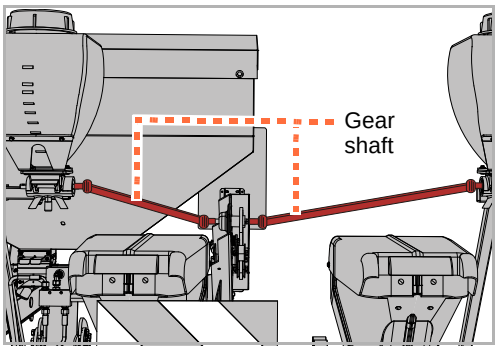
- Close the stopper at all metering devices
- Reopen the stopper after the test drive



On machines with granule distributors:

If no granules are to be applied during the test drive, you can disconnect the mechanical drive.

- Remove the gear shafts on the gear box
- Reattach the gear shafts after the test drive



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.

- Lower the machine to its work position.
- Carry out a test drive in the work position and at working speed (5–10 km/h)

→ "e-drive II" software operating manual

- Readjust the deposit depth and the soil preparation implements if necessary

Granule distributor [+]

The working speed when working with the granule distributor should be between 3 and 8 km/h to achieve an exact dosing of the application rate. Optimal dosing is not ensured outside of this speed range.

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 »Preparation work«, page 77

- Scraper

→ Chapter »Preparation work«, page 91

- Seed deposit depth

→ Chapter »Preparation work«, page 50

- Fertiliser deposit depth

→ Chapter »Preparation work«, page 103



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

→ "e-drive II" software operating manual



Only drive forwards
Avoid driving backwards and rolling backwards when sowing.
Seed coulters could jam and the machine could be damaged

Work position and cultivation

- Switch on the terminal
- Switch on the fan
- Begin sowing

Turning

Shortly before field border:

- Slow down
- 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:

- ☑ Has the negative pressure not been adjusted correctly?

→ Chapter »Preparation work«, section »Manometer«, page 81

- ☑ Sowing depth OK?
- ☑ Placing accuracy OK?
- ☑ Are all coulters unobstructed?
- ☑ Is seed consumption in all seed hoppers uniform?
- ☑ Is fertiliser being applied?
- ☑ Is the consumption of fertiliser uniform?
- ☑ Are the furrows covered as well as possible?

After sowing

Emptying the seed hoppers
→ Chapter »Preparation work«, section »Emptying the seed hopper«, page 96

Emptying the fertiliser hopper
→ Chapter »Preparation work«, section »Emptying the fertiliser hopper«, page 116

Emptying the filling auger
→ Chapter »Preparation work«, section »Emptying the filling auger«, page 108

Empty the granule distributor tank
→ Chapter »Preparation work«, section »Emptying the tank«, page 124

Parking the machine
→ Chapter »Parking and storage«, page 146

Move machine into transport position
→ Chapter »Driving on the road«, page 128

Cleaning

Only clean the machine from the outside and only with water
The inside of the fertiliser hopper or the metering device, for example, should not be cleaned with water.
Water can result in caking.

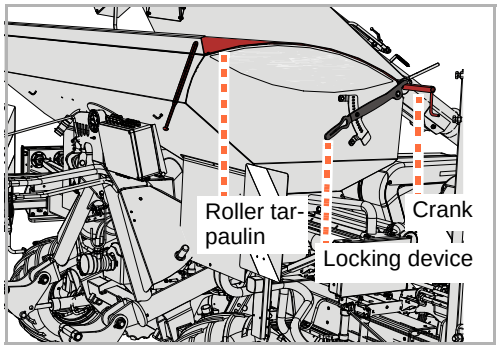
Do not use hot water
For cleaning, only use water up to a maximum temperature of 40 °C.
If hot water is used, the plastic parts on the machine may become deformed.

Only use low pressure to clean the bearings
Only use low pressure to clean 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.

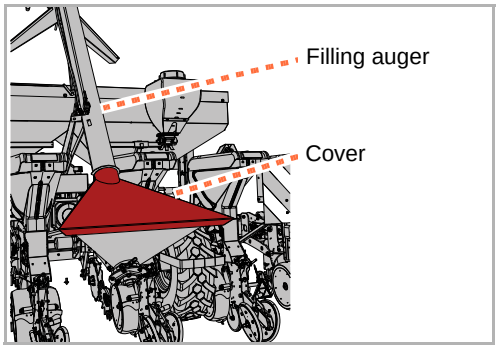
In combination with air humidity, fertiliser accelerates the corrosion of machine components. Therefore, thoroughly clean the machine with water, especially after applying fertiliser, so that no fertiliser remnants remain behind on machine components.

Prior to cleaning



- Roll down the roller tarpaulin using the crank
- Secure the roller tarpaulin with the securing mechanism

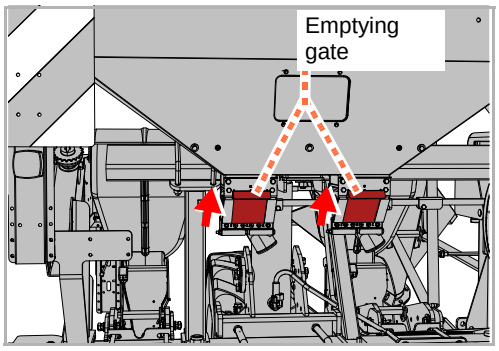
Filling auger [+]



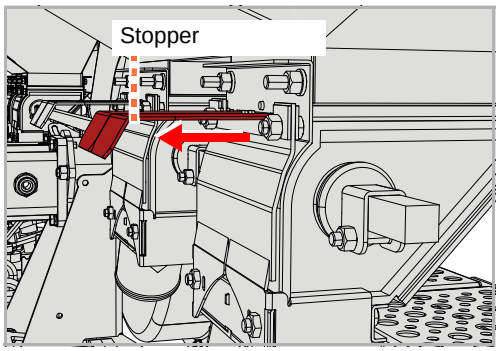
- Fit the cover to the filling auger

Metering device

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



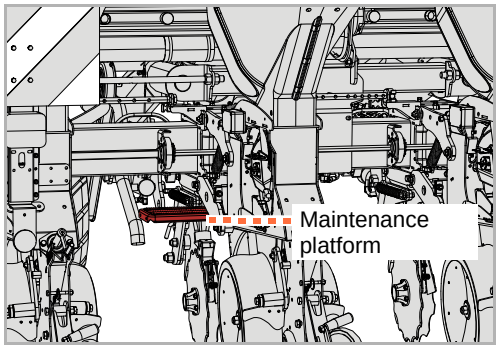
- Open the emptying flaps on all metering devices



- Open the stoppers on all metering devices

Maintenance platform, machine

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



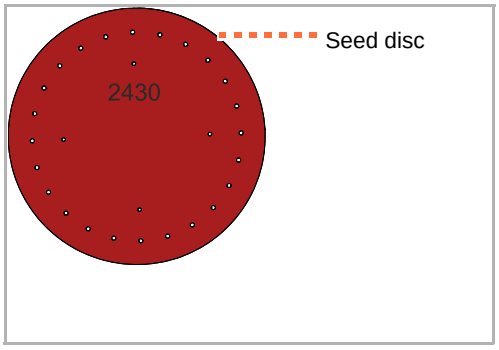
On the V-frame, a maintenance platform is located between the sowing units on the left side of the machine.

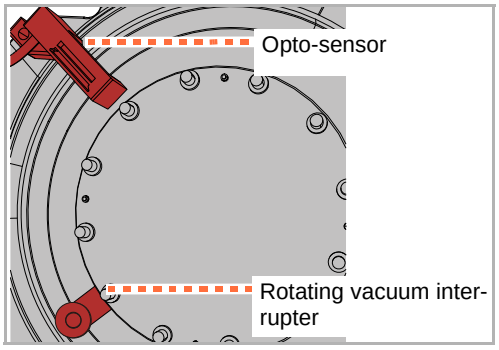
- Cleaning the maintenance platform

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.

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





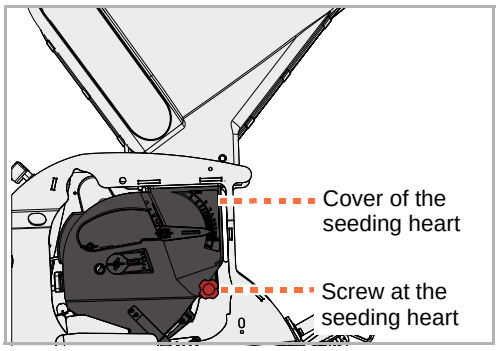
- Clean the disc of the rotating vacuum interrupter [+], the ball bearing of the vacuum interrupter and the opto-sensor with a cloth

After cleaning

- Check the fertiliser hopper for moisture. Wipe dry if necessary.
- Leave the stoppers and emptying gates on the metering devices open
- Check seed hopper for moisture

If water has entered the seed hoppers:

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



Care

To ensure that the machine has a long service life, we recommend applying a protective coat 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



Secure surface

- Ensure that the machine is lowered onto a level and stable surface

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

Seed hopper

- ▸ Empty the seed hopper

→ Chapter »Preparation work«, section »Emptying the seed hopper«, page 96

Fertiliser hopper [+]

- ▸ Emptying the fertiliser hopper

→ Chapter »Operation«, section »Emptying the fertiliser hopper«, page 116

- ▸ Leave the emptying flaps and stoppers on the metering device open

Filling auger [+]

- ▸ Emptying the filling auger

→ Chapter »Preparation work«, section »Emptying the filling auger«, page 108

Granule distributor [+]

- ▸ Empty the granule distributor tank

→ Chapter »Preparation work«, section »Emptying the tank«, page 124

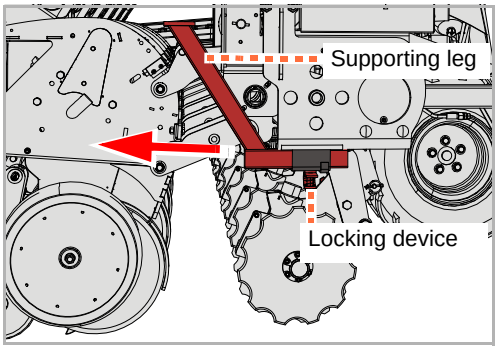
Uncoupling

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

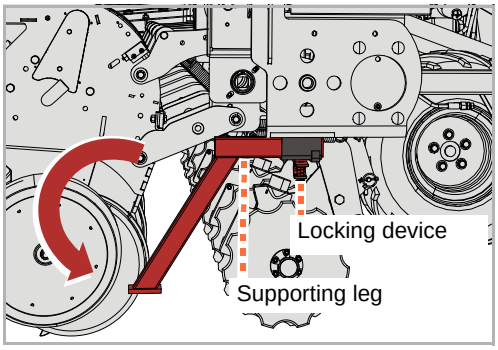
- Ensure that the machine is lowered onto a level and stable surface
- Use the supporting leg for setting down the machine

If these instructions are ignored, serious or fatal injuries may occur.

- Lift the machine
- Press the securing mechanism down and pull out the supporting leg



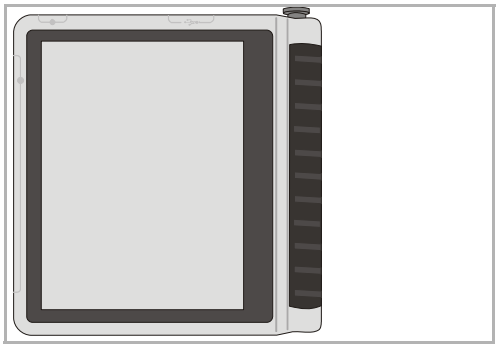
- Turn the supporting leg and push back in until the securing mechanism engages
- Turn the second supporting leg and push it back in



Connections

- 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 146

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

Before oiling, cover the wheels. The oil can damage the tyres.
→ Chapter »Cleaning and care«, page 142

Sowing units with mechanical drive:

- Oil the drive chains using suitable oil

Laborious but worthwhile: Remove the chains and put them in an oil bath.

For your safety

Special safety information



Prerequisites for maintenance work
Only perform the maintenance work if you have the required expert knowledge and suitable tools.
Only perform the maintenance work that is described in this operating manual.
Insufficient technical knowledge or the use of unsuitable tools can cause accidents. Improper maintenance work jeopardizes machine safety and can cause accidents. This can result in persons being seriously or fatally injured.

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

- Deactivated PTO
- 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 are then possible.

Structural modifications and expansions on the machine
Structural modifications and expansions may impair the accuracy and safety of the machine. Structural modifications and expansions must only be performed by an authorised specialist workshop.
Unauthorised modifications may result in persons being seriously or fatally injured.

Welding work on the machine
You must only perform welding work if there is no doubt that the welding work is possible without compromising the safety of the machine. If you are uncertain, contact a specialist workshop.
If the safety of the machine is compromised during welding work, this may result in serious accidents.

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 when 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 grease gun strokes 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)

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 a season

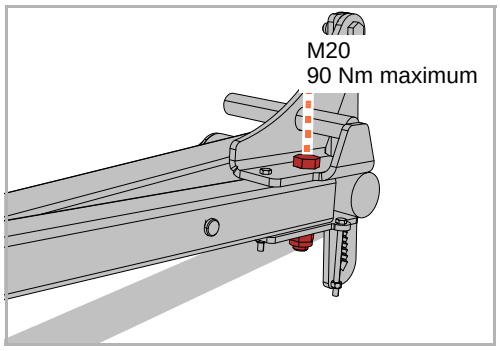
Tightening torques, general

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

Bolt size	Bolt quality		
	„8.8“	„10.9“	„12.9“
	Tightening torques in Nm		
M6	9,9	14	17
M8	24	34	41
M10	48	68	81
M12	85	120	145
M16	210	290	350
M20	425	610	710
M24	730	1050	1220
M27	1170	1675	1960
M30	1600	2275	2660
M12x1.5	75	89	125
M14x1.5	125	150	205
M16x1.5	190	220	310
M18x1.5	270	320	450
M20x1.5	380	450	630
M22x1.5	510	600	850
M24x1.5	670	800	1120
M27x1.5	990	1170	1640

Tightening torques, special

Track marker arm



Bolt	M20
Tightening torque	90 Nm maximum

Maintenance intervals and setting work

	After the first hours of operation	Daily	After 20 hours of operation	After 40 hours of operation	After 75 hours of operation	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	•							•								152
Visual inspection	•	•														
Bearing					•			•		•						158
Hose connections						•					•					
Pivot points (frame, track markers)					•					•						158
		•									•					
Hydraulics																
Hydraulic hoses every 6 years												•				165
Hydraulic hoses in general								•	•			•				165
Hydraulic cylinders for the lower link					•			•		•	•					158
Hydraulic fan drive						•					•					
Hydraulic oil from the external oil supply about every 7000 ha [+]								•				•				
Electronic control system																
All sensors		•									•					

	After the first hours of operation	Daily	After 20 hours of operation	After 40 hours of operation	After 75 hours of operation	Once per season	After heavy use	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Sowing unit, Sowing unit HD, Sowing unit HD II seeding hearts																
General		•									•				•	
Seed disc						•					•					195
									•			•				
Ejector									•			•				170
								•					•			
Rotating vacuum interrupter									•			•				167
						•					•					
								•					•			
Vacuum interrupter									•			•				167
Sowing unit SX seeding heart																
General		•									•				•	
Seed disc						•					•					195
									•			•				
Ejector									•			•				
								•					•			
Rotating interrupter									•			•				170
						•					•					
								•					•			
Interrupter									•			•				170

	After the first hours of operation	Daily	After 20 hours of operation	After 40 hours of operation	After 75 hours of operation	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	After 20 hours of operation	After 40 hours of operation	After 75 hours of operation	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									•			•				179
Metering wheels									•			•				178
Drive shafts				•	•					•						
Filling auger					•					•						
Delivery hose clamps						•					•					
Granule distributor																
Metering device						•		•							•	
Scraper									•			•				179
Metering wheels									•			•				182
Other																
Tyres						•					•					163
Tyre pressure						•					•					163
Wheel nuts First of all after first laden journey						•					•					163
Tractor hitch		•				•				•	•	•				164
Drive shafts								•		•						
Clean Air						•		•			•	•				192

Secure 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.

1. Lower the machine to its operating position
2. Switch off the machine's electronic control system
3. Switch off the tractor's PTO stub shaft
4. Switch off the tractor engine
5. 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.
6. Secure the tractor against rolling away
7. Secure the machine against rolling away

Working under the machine

- Mechanically secure the machine against lowering

Lubricating work

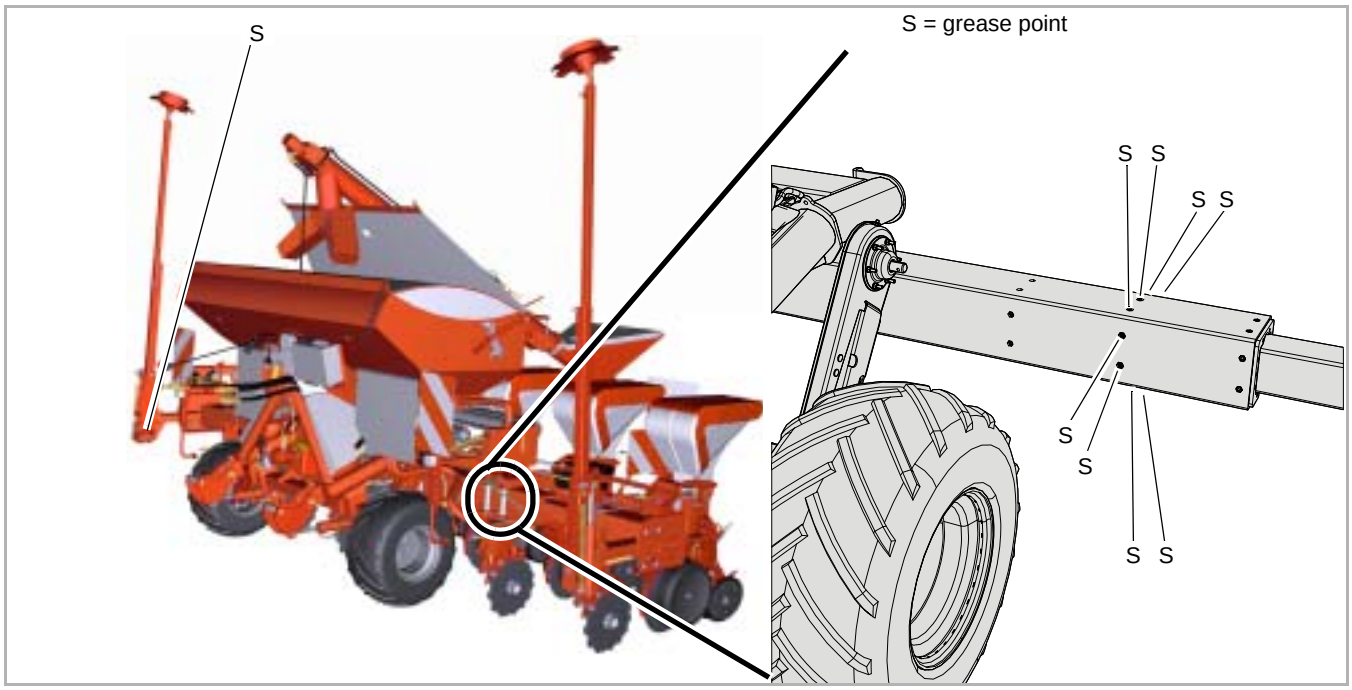
Lubricate bearings

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

- According to the maintenance chart
- After heavy use
- But at least once a season

Do not lubricate maintenance-free bearings.

Overview of lubrication points



Sowing units

Sowing unit



S = grease point

Sowing unit Tandem



Sowing unit HD



Sowing unit HD II
Sowing unit SX



Other lubrication points

Generally:

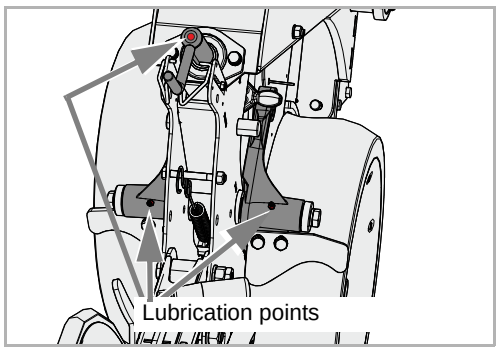
- In addition to the lubrication points shown in this operating manual, your machine may have other lubrication points
- As a rule, lubrication points are located at pivots or bearings. Therefore, check the entire machine for lubrication points.

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.

Sowing units

Each sowing unit has three lubrication points.

After 75 hours of operation

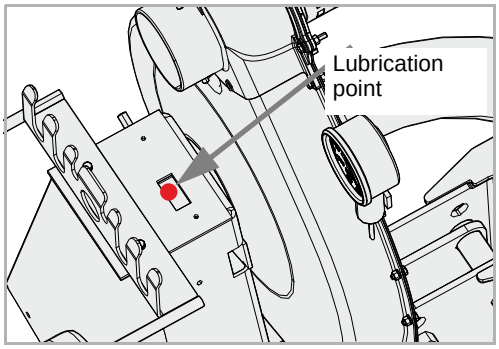


- Lubricate with one to two pumps of the grease gun

Fan

The mechanical fan drive has one lubrication point.

After 75 hours of operation



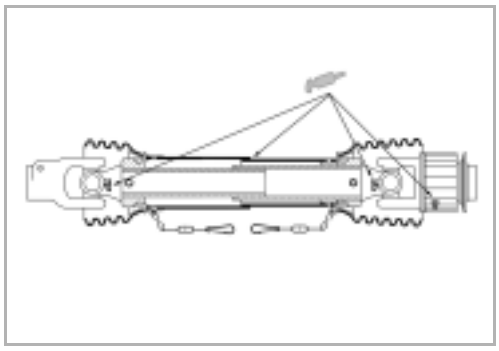
- Remove the cover
- Lubricate with one to two pumps of the grease gun
- Fit the cover

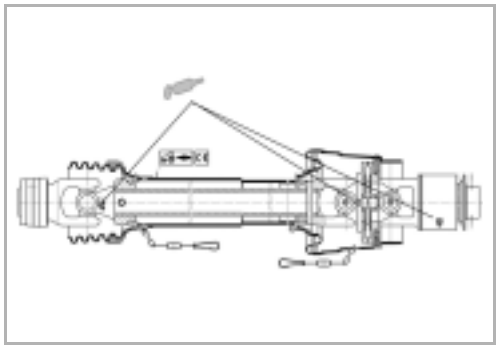
Lubricating the PTO shafts

After 75 hours of operation

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.





- To lubricate the PTO shaft, remove it on the coupling side and slide the profile section tubes fully together

Wheels

Works:

- Check the tyres of the transport 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 per season:

7.00x12	=	Around 2.0 bar
26x12.00	=	Around 1.4 bar

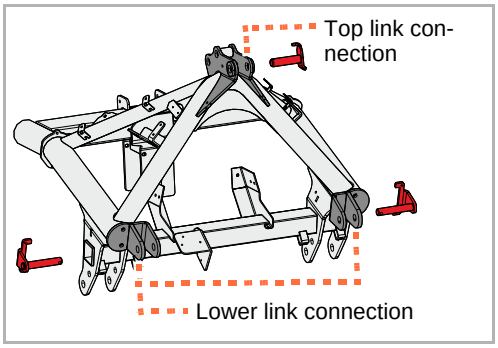
Pin connections to the tractor

Once per season

All pins and corresponding holes for the pin connection to the tractor must be checked.

- The values 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			
Pin diameter [mm]	25,37 - 25,50	31,55 - 31,75	44,20 - 45,00
Bore diameter [mm]	25,70 - 25,90	32,00 - 32,25	45,20 - 45,50
Lower link connection			
Pin diameter [mm]	27,80 - 28,00	36,4 - 36,60	49,70 - 50,80
Bore diameter [mm]	28,70 - 29,00	37,4 - 37,75	51,00 - 51,50



▸ Check all pins and corresponding holes using the information provided in the table.

Sensors

This section contains information concerning setting and sensor replacement.

Setting the sensors

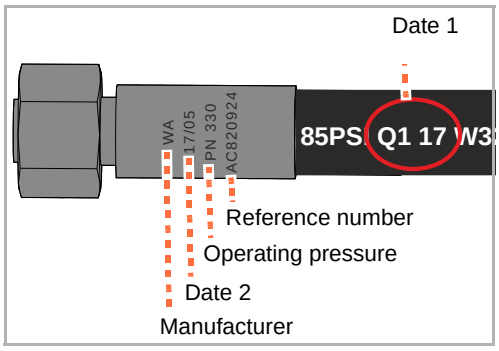
The following sensors may be connected by the electronic control system:

- Radar sensor [+]
- Sensors on the drive shafts
- Track marker sensors
- Hopper low level sensor [+]
- 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 swaging 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.

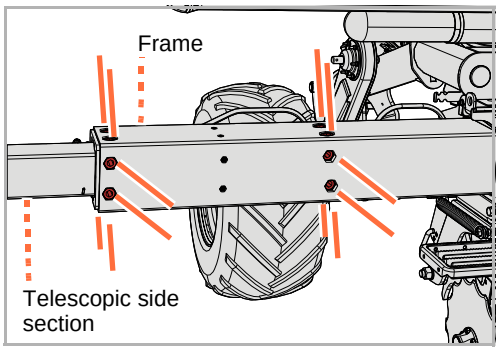
Sliding pieces

In case of wear

At the V-frame there are sliding pieces to guide the telescopic outer wings. In case of large amounts of play in the side section guides, the sliding pieces may be readjusted.

Adjusting

There are 4 adjustment screws on each surface of the frame.



- Lift the machine
- Extend telescopic side sections
- Turning the adjustment screws clockwise reduces the play. To do this, turn the adjustment screws by just one revolution and then check the play.
- Ensure that the side section is guided centrally.
- Repeat this process until the guide is completely without play again.
- Adjust the horizontal and vertical play separately, one after the other.

Replacement

If the play in the guide can no longer be removed by readjusting the sliding pieces:

- Have the sliding pieces replaced. Please consult your dealer about this.

Seed discs

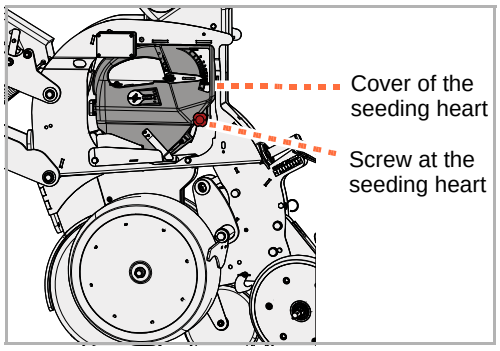
If the seed discs are worn or if a different seed is to be spread, the seed discs must be replaced.
→ Chapter »Refitting«, section »Seed discs«, page 195

System using negative pressure

Vacuum interrupter

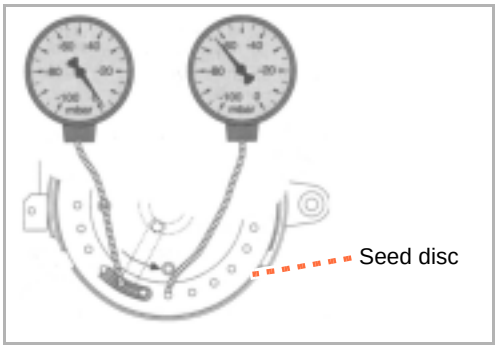
In case of wear

The vacuum interrupter can be incorporated as a standard version or as rotating vacuum interrupter. Its operation must be checked before and at the end of the season.



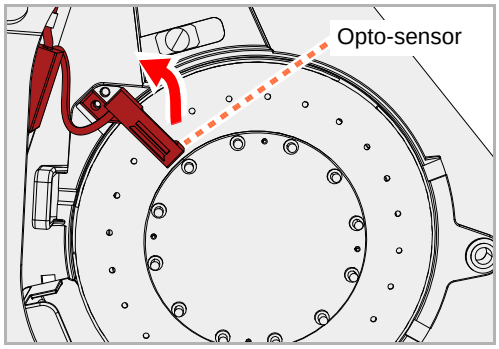
- Lift the machine
- Release the bolt, remove the cover of the seeding heart

Checking

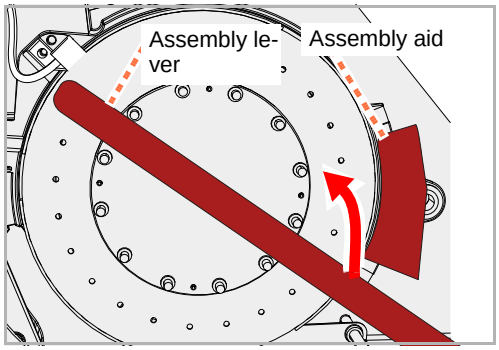


- Drive machine to working speed
- Unplug the tube of the manometer at the fan and remove the manometer from the frame
- Put the end of the tube on a hole on the seed disc
- Use the electronic control system to activate the drive motor for the sowing unit, so that the seed disc rotates. Carry on the 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

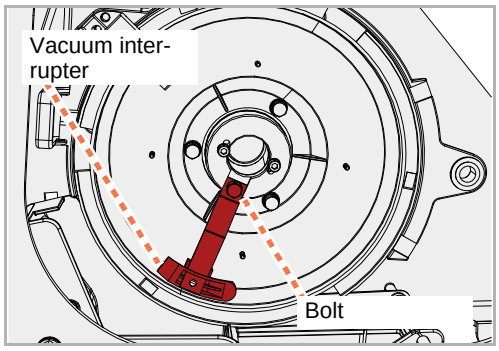
Replacement



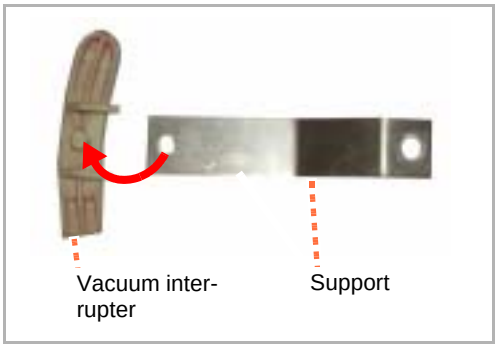
- Slightly lift the opto-sensor, turn it upwards and let it engage



- 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

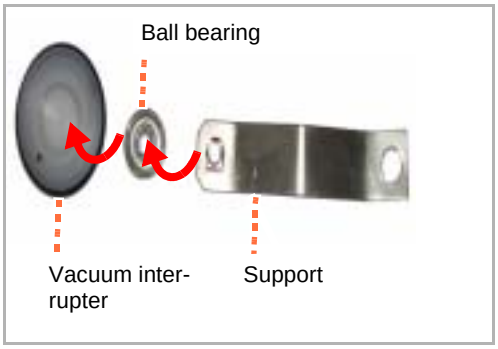


- Release the bolt and remove the support with the vacuum interrupter



Vacuum interrupter Standard

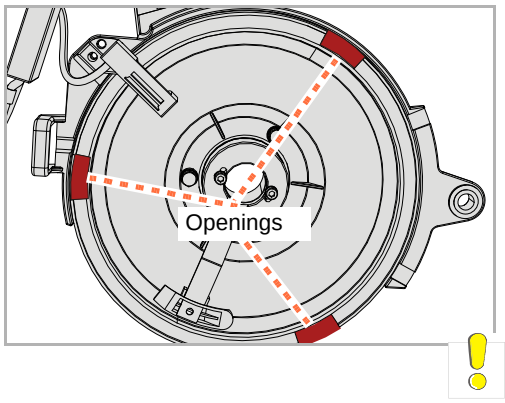
- Unplug the defective vacuum interrupter from the support
- place new vacuum interrupter upon the support and press it down tightly



Rotating vacuum interrupter

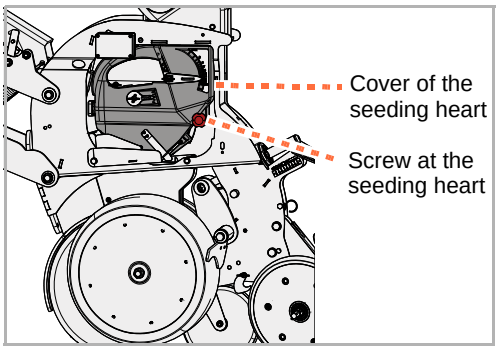
- Unplug the defective vacuum interrupter from the support
- Place the ball bearing and the new vacuum interrupter upon the support and press it down tightly

- 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.



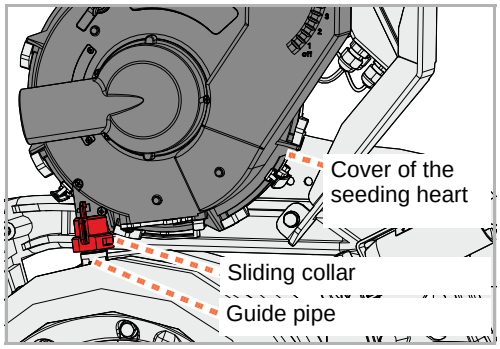
- Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

System using over-pressure

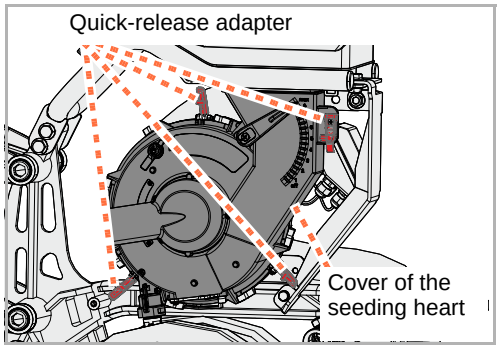
Interrupter

The interrupter is designed as a rotating interrupter. Its operation must be checked before and at the end of the season.

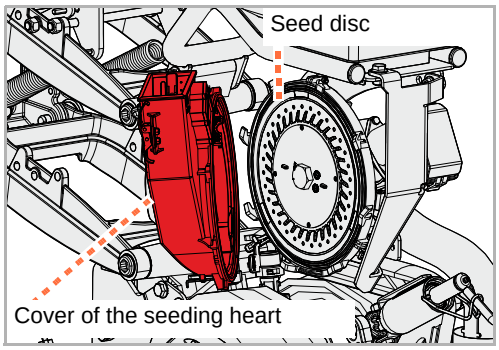
In case of wear



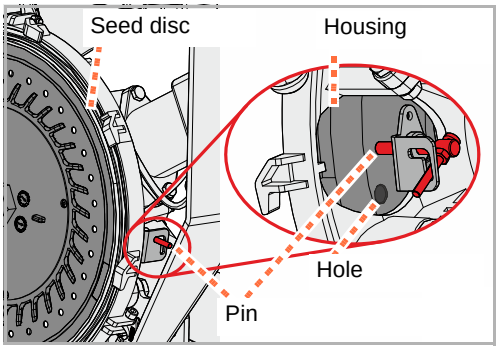
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart



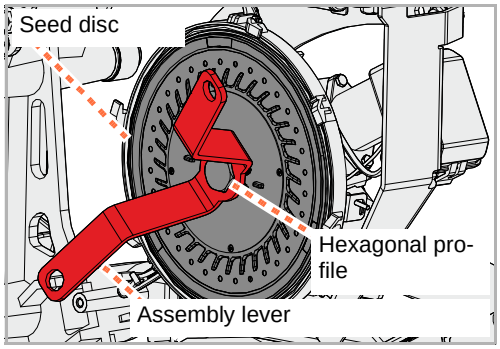
- Loosen the quick-release adapters on the cover of the seeding heart



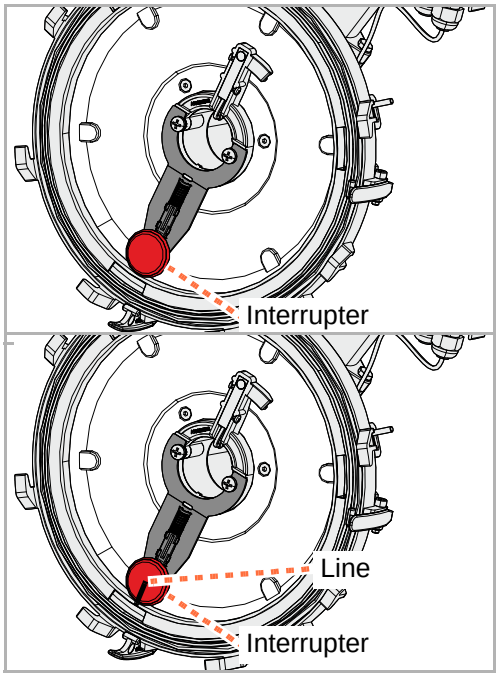
- Turn the cover of the seeding heart clockwise and unlock it
- Move the cover of the seeding heart to one side



- 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



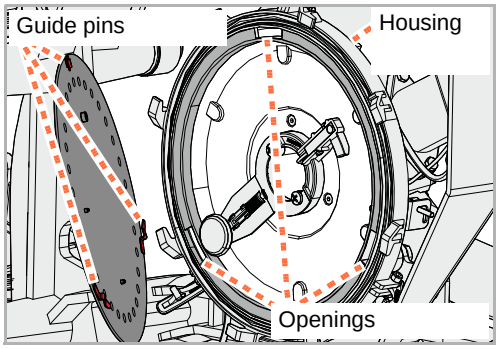
- Fit the assembly lever onto the hexagonal profile
- Use the assembly lever to turn the seed disc counter clockwise and unlock it
- Remove the seed disc



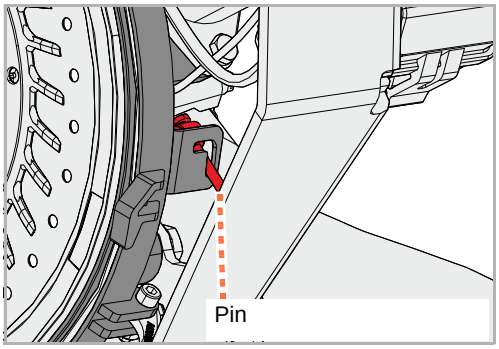
- Check whether the spring is dirty
- Check whether the slide on the interrupter moves freely
- Remove any soiling
- Check the interrupter for wear and damage

In case of wear, the interrupter or slide must be replaced.

- Use a pen to 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

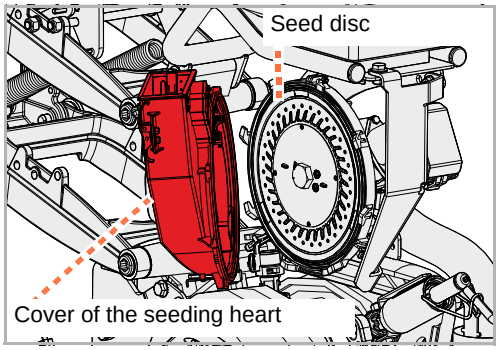


- Return the pin to the parking position
- Turn the seed disc manually
- Look through the seed holes to see whether the interrupter is turning

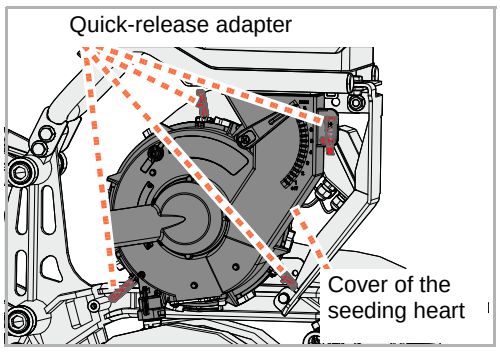
In case of wear, the interrupter must be replaced.

If the pin remains in one of the holes, the electronics will issue a fault message in the drive.

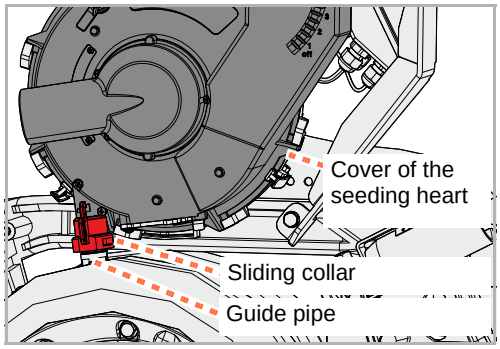
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.



- Fit the cover of the seeding heart and turn it counter clockwise to lock it. When doing so, make sure that the cover of the seeding heart is positioned correctly



- Close the quick-release adapters



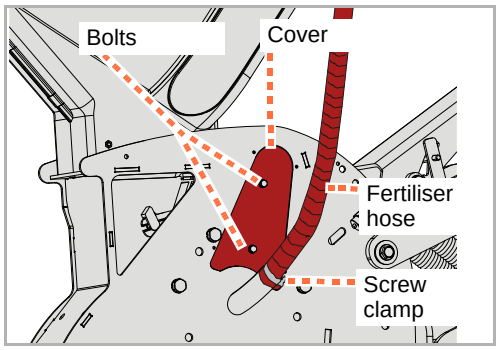
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to move it out of the parking position, then reconnect the cover of the seeding heart with the guide pipe and secure it

Timing belt for e-drive

Once per season

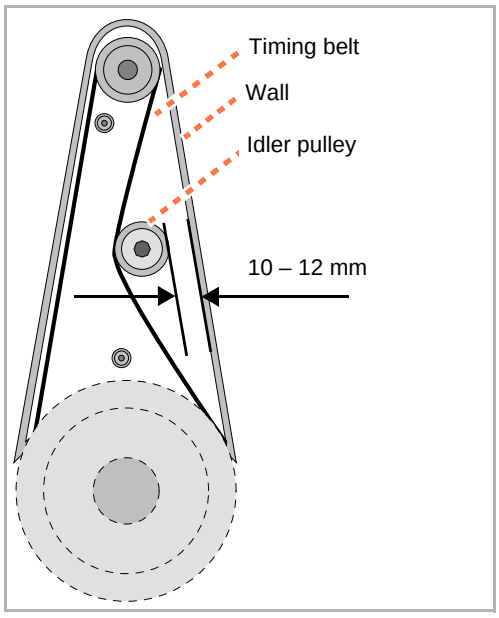
The timing belt serves to transmit the rotary motion of the electric motor onto the seed disc.

Checking



The timing belt tension on each sowing unit must be checked once per season.

- Loosen the screw clamp on the fertiliser hose and remove the fertiliser hose
- Release the bolts on the cover and remove the cover



- Check the timing belt tension. The idler pulley should be 10 – 12 mm from the wall.

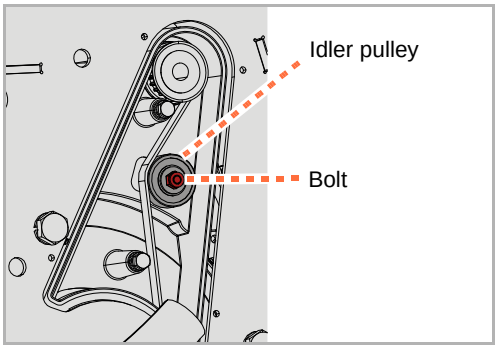
If the timing belt is sufficiently tensioned:

- Secure the cover and seed hose back onto the sowing unit

Tensioning

Retension the timing belt:

- If it is not sufficiently tensioned
- After replacement of the timing belt

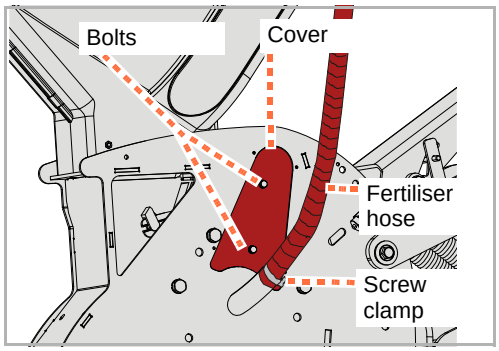


- Release bolt on the idler pulley
- Shift the idler pulley. The idler pulley should be 10 – 12 mm from the wall.
- Tighten bolt on the idler pulley
- Check the timing belt tension. If necessary, readjust the tension.
- Secure the cover and seed hose back onto the sowing unit

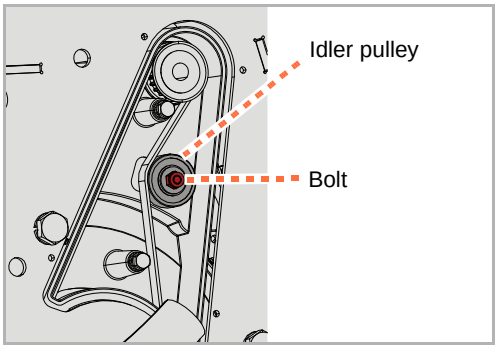
Replacement

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

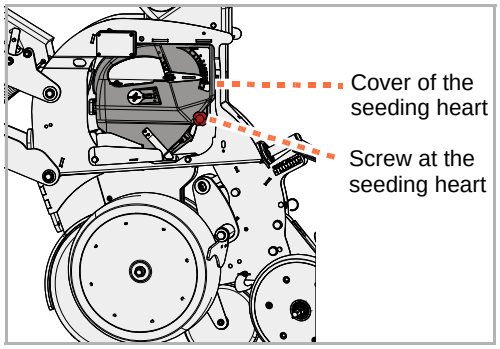


- Loosen the screw clamp on the fertiliser hose and remove the fertiliser hose
- Release bolts on the cover and take off the cover. The toothed belt is now visible.



- Release bolt on the idler pulley

Left-hand sowing unit

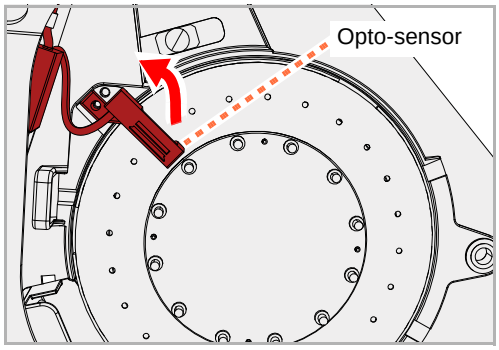


- Release the bolt, remove the cover of the seeding heart

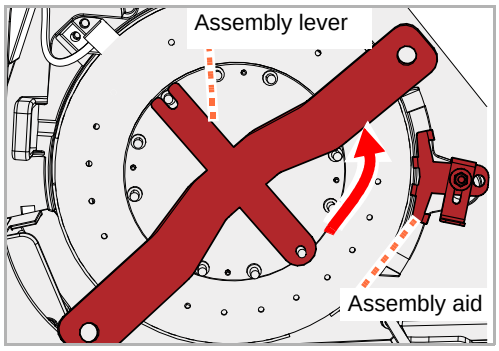
The following tools are required to disassemble the seeding heart:

- Size 4 Allen key
- 10 a/f spanner
- 13 a/f spanner
- Assembly lever
- Assembly aid

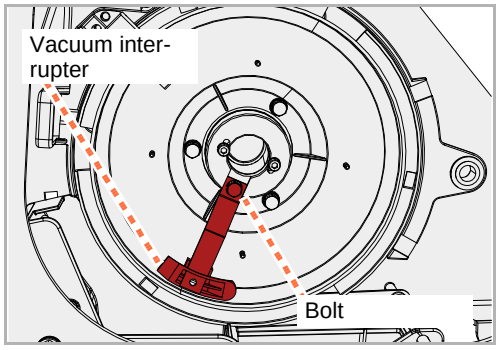
Seed disc, vacuum interrupter



- Slightly lift the opto-sensor, turn it upwards and let it engage

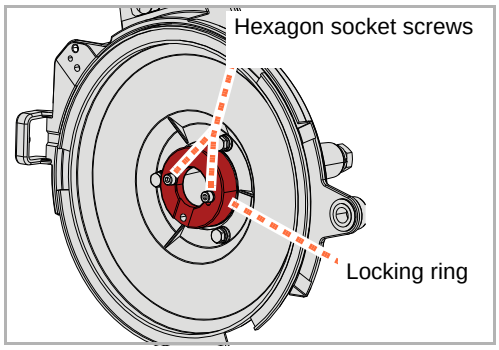


- Move the assembly aid into position. This secures the seed disc against turning.
- Turn the seed disc to the left using the assembly lever, release it and remove



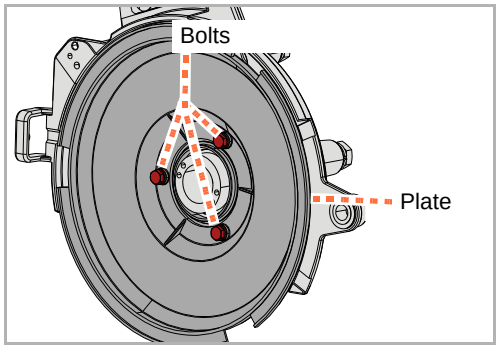
- Release the bolt and remove the support with the vacuum interrupter

Locking ring, plate



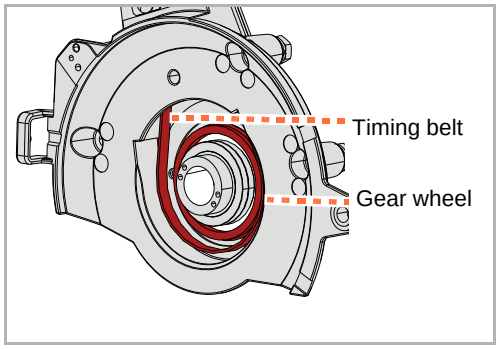
Take a note of the position of the locking ring before removing it. The locking ring must be reinserted in this position during reassembly.

- Release and remove the hexagon socket screws
- Remove locking ring



- Release bolts and remove
- Remove the plate. The toothed belt is now visible.

Replacing the timing belt and tensioning

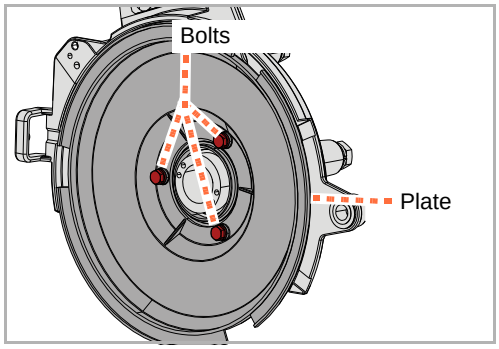


- Remove the timing belt and replace it
- Place the timing belt under the gear wheel
- Tensioning the timing belt

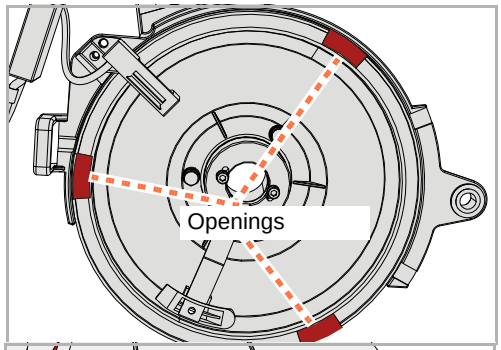
→ Section »Tensioning«, page 175

Fitting the seeding heart

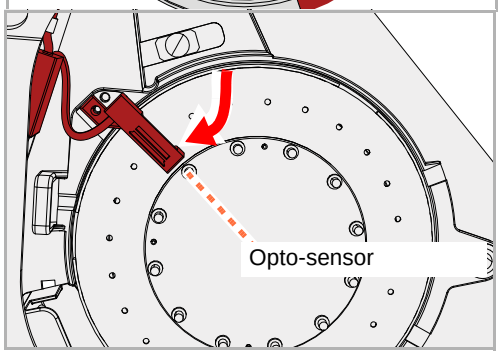
During assembly, ensure that the bolts are pre-tightened to prevent twisting of the plate.



- Insert the plate and fasten with a screw

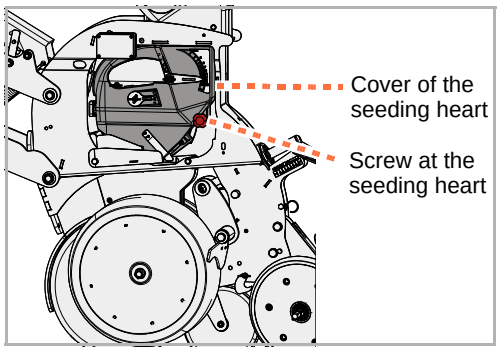


- Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.



- 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:

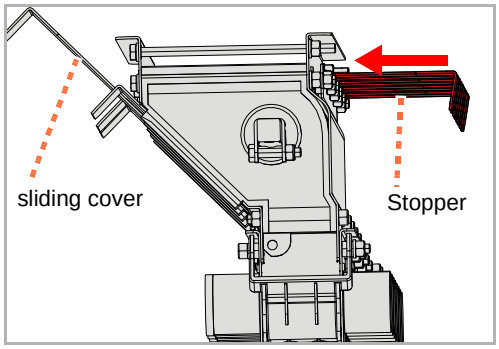
- Sealing lips
- Metering wheels

Sealing lips

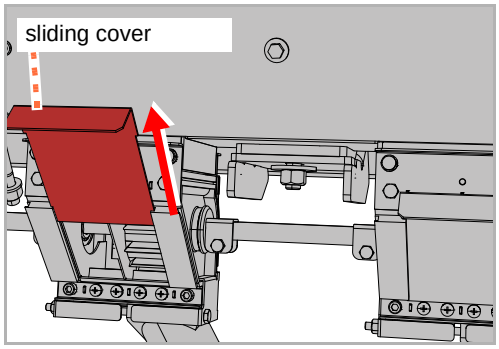
The sealing lips have to be readjusted or replaced if required.

In case of wear

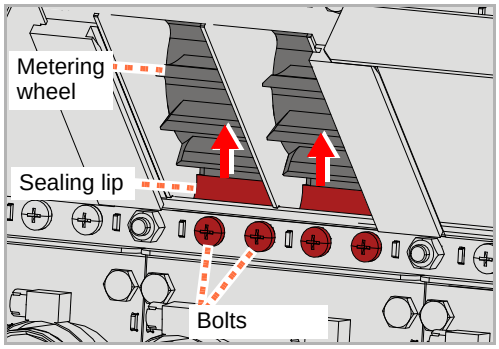
Push in the stoppers
If the fertiliser hopper is not completely empty, the stoppers on the metering device must be pushed in.
If the fertiliser hopper is not empty, the fertiliser will flow uncontrollably out of the metering device when the sliding cover is lifted up.



- Push in the stoppers



- Pull up the sliding cover



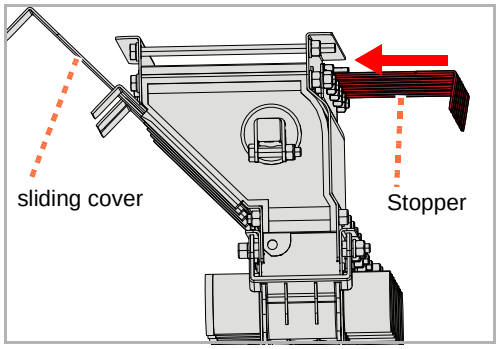
- Undo the screws with nuts
- Turn the metering wheels that the sealing lips fit into a hollow of the metering wheels
- Slide the sealing lip upwards. If the sealing lips are worn, replace the sealing lips.
- Tighten the bolts with nuts
- Slide in the sliding cover
- Pull out the stopper

Metering wheels

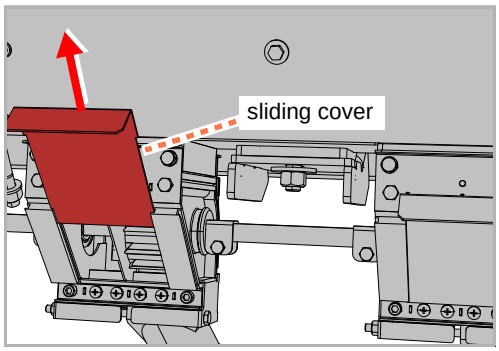
The metering wheels have to be replaced if worn.

In case of wear

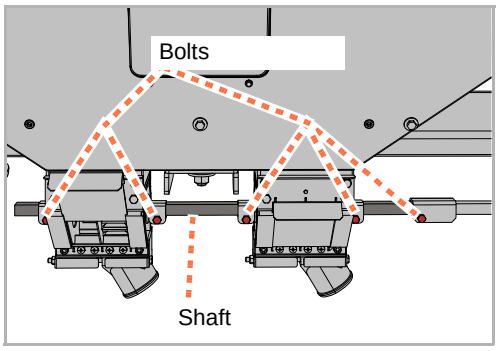
Push in the stoppers
If the fertiliser hopper is not completely empty, the stoppers on the metering device must be pushed in.
If the fertiliser hopper is not empty, the fertiliser will flow uncontrollably out of the metering device when the sliding cover is lifted up.



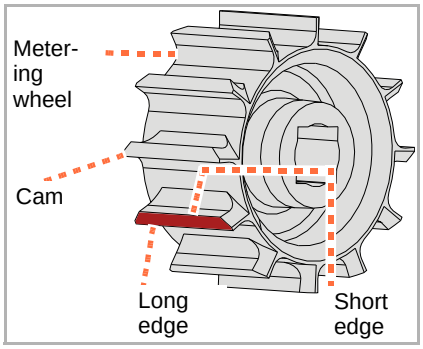
- Push in the stoppers



- Pull out the stopper



- Release the bolts
- Pull out the shaft
- Take out the worn 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

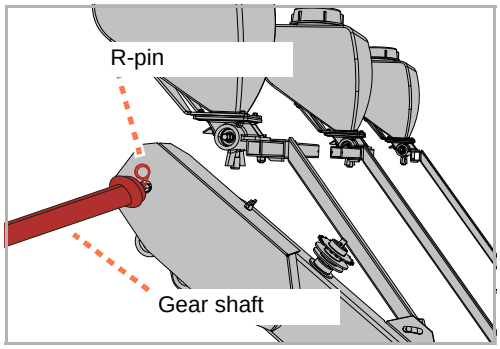
Granule distributor [+]

Mechanical drive

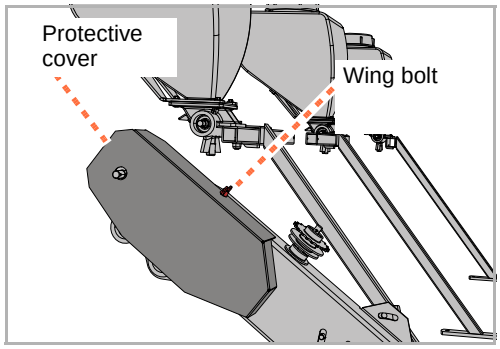
Gear wheels, chain

If there is wear, replace the gear wheels or the chain.

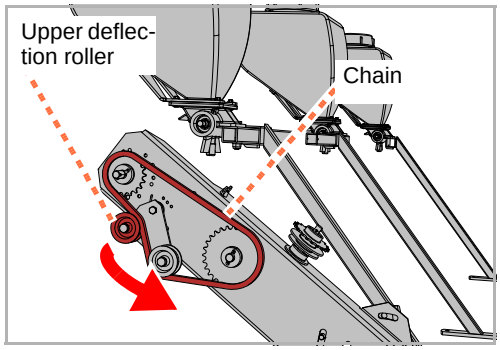
In case of wear



- Release the R-pin on the gear shaft
- Remove the gear shaft



- Release wing bolt
- Remove the protective cover



- Press upper deflection roller in direction of arrow
- Remove chain

To replace the chain:

- Fit the new chain

To replace the chain wheel:

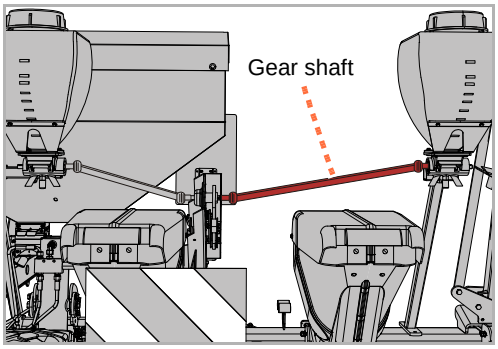
- Remove the R-pin on the chain wheel you wish to replace
- Remove chain wheel and replace
- Refit the chain

- Attach the protective cover and secure with a wing bolt
- Attach the gear shaft and secure with an R-pin

Gear shaft

Once per season

The gear shafts consist of two parts. The overlapping sliding surface must be lubricated with grease.

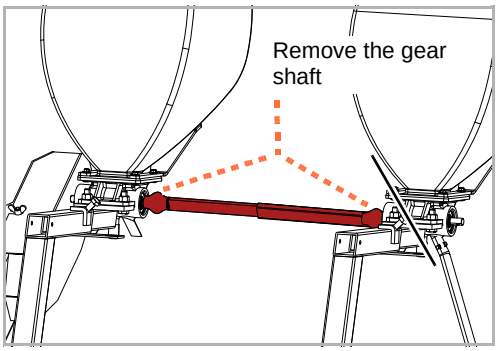


- Remove the R-pin on both sides of the gear shaft
- Remove the gear shaft and pull it apart
- Apply grease to sliding surfaces with a brush
- Reassemble both parts of the gear shaft
- Lock the gear shaft in position again

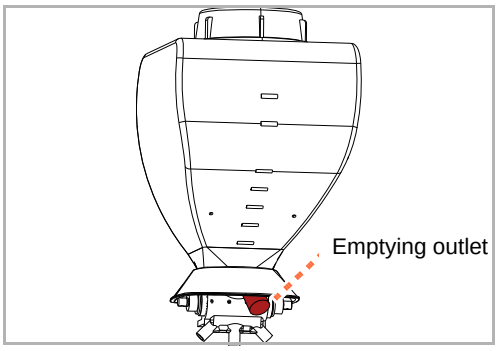
Replacing the metering wheels

If they are worn

Regularly check the metering wheels for wear. The metering wheels are visible at the bottom of the granule hopper. Worn out metering wheels must be changed. Worn metering wheels can result in an incorrect application rate.



- Remove R-pin on gear shaft
- Remove the gear shaft



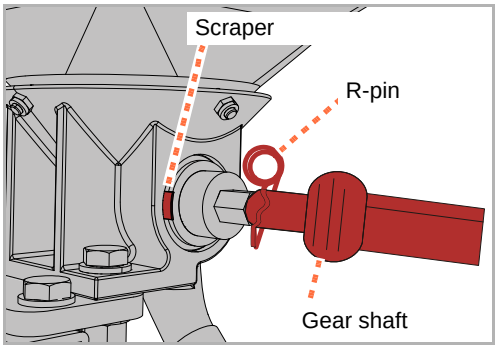
- Place a container underneath
- Unscrew the emptying outlet

Scraper

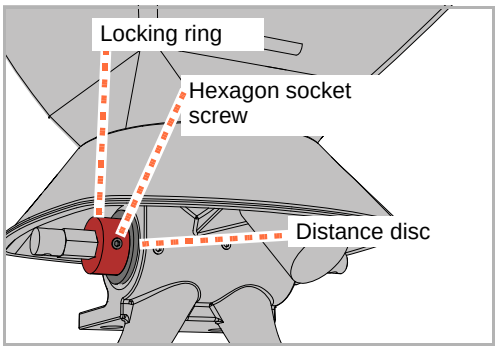
The scraper must be adjusted when it is worn.

2 sowing units

The scraper is very close to the metering unit and cannot be accessed from outside.



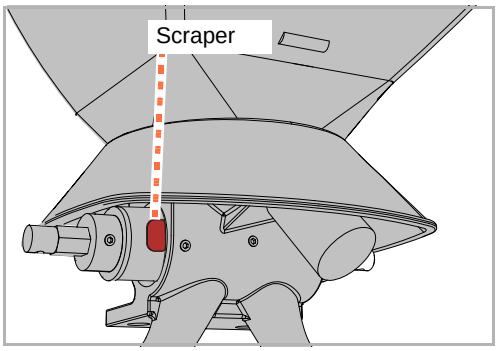
- Remove the R-pin from the gear shaft
- Remove the gear shaft



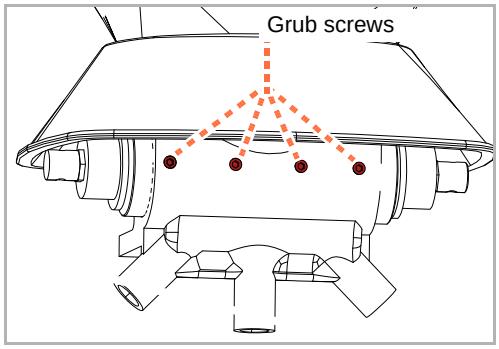
- Undo the hexagon socket screw on the locking ring
- Remove locking ring
- Remove shim
- Use a suitable tool to push in scraper slightly
- Refit the shim
- Refit the locking ring and secure it with the hexagon socket screw

3 sowing units

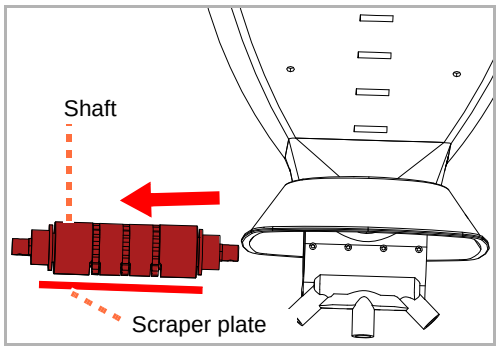
The scraper is visible from the outside.



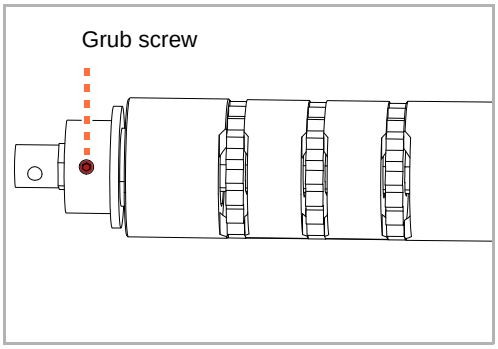
- Use a suitable tool to push in scraper slightly



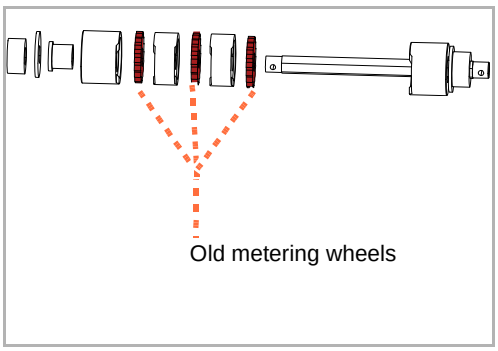
- Release the grub screws



- Pull out the shaft. When doing so, pay attention to the scraper plate.
- Lay the scraper plate on a clean support surface

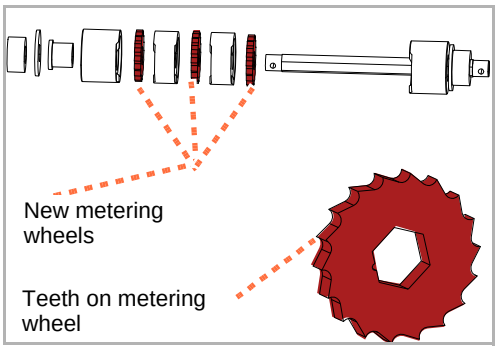


- Release the grub screw

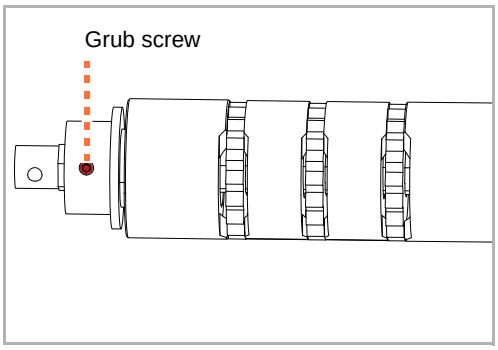


- Remove the components from the shaft and lay them on a clean support surface in the same order and the identical position as when fitted

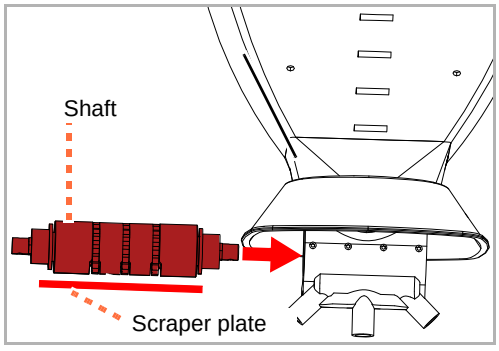
When fitting the new metering wheels, note the position of the teeth. The position of the teeth on the new metering wheels must match the position on the old metering wheels.



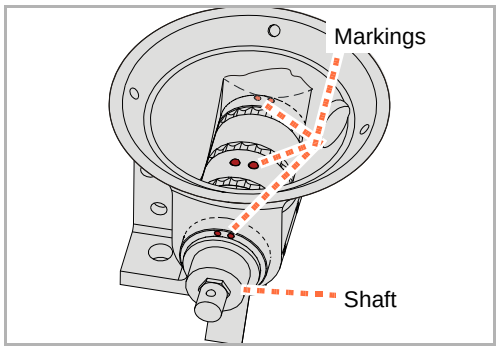
- In the same order and using new metering wheels, slide the components back onto the shaft



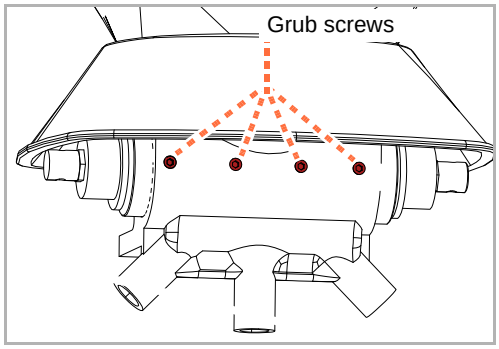
- Tightly fasten the grub screw



- Slide the scraper plate into the slot on the housing
- Insert the shaft. Ensure the correct position of the scraper plate whilst doing so.



- Align the individual parts of the shaft. Note the markings when doing so.



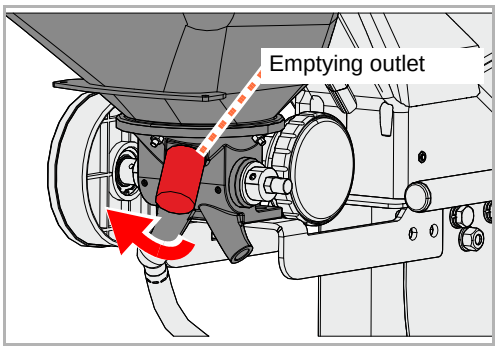
- Carefully tighten the grub screws
- When doing so, check occasionally that the shaft is still able to turn slightly

Electrical drive

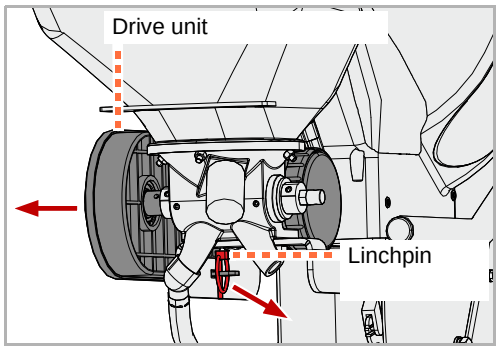
Replacing the metering wheels

In case of wear or refitting

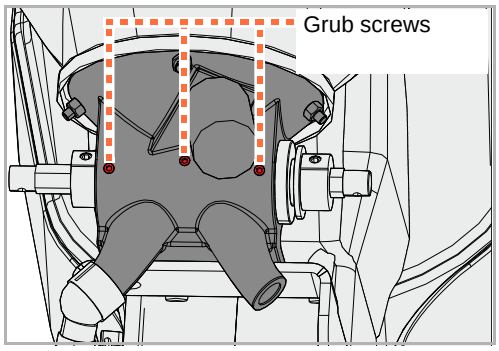
Regularly check the metering wheels for wear. The metering wheels are visible at the bottom of the granule hopper. Worn out metering wheels must be changed. Worn metering wheels can result in an incorrect application rate.



- Place opened packages or empty original packages in position when emptying the tanks
- Hold the package opening under the emptying outlet.
- Unscrew the emptying outlet
- Remove the remaining crop protection chemical from the tank with a brush. Never use this brush for any other purpose.
- Screw the emptying outlet back in

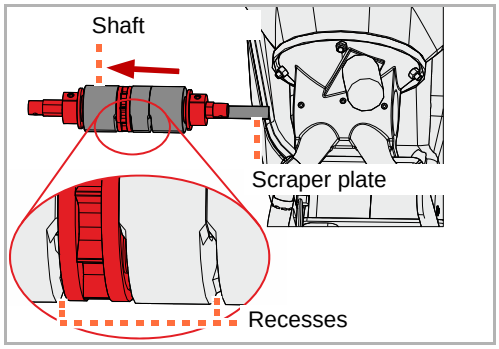


- Remove the linchpin
- Remove the drive unit and put it to one side

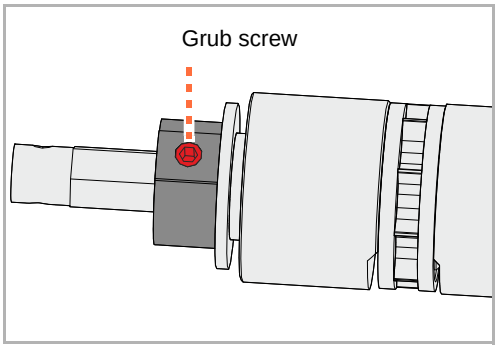


- Release the grub screws

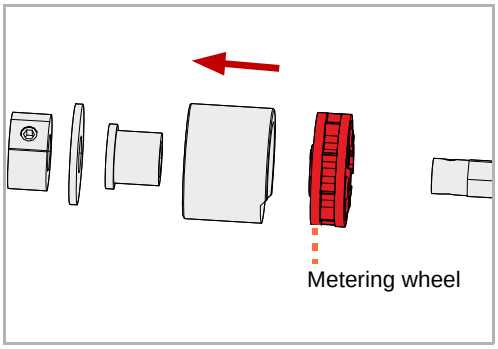
Pay attention to the position of the recesses in relation to the housing when removing the shaft. Pay attention to the position of the scraper plate



- Pull out the shaft. When doing so, pay attention to the scraper plate.
- Place all parts on a clean surface

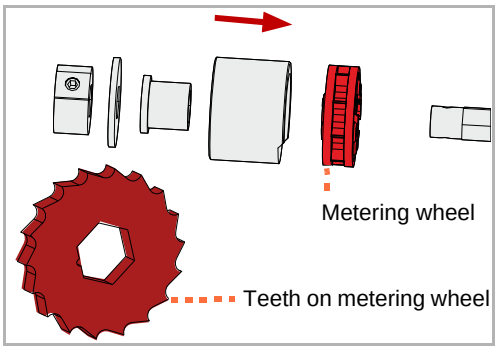


- Release the grub screw

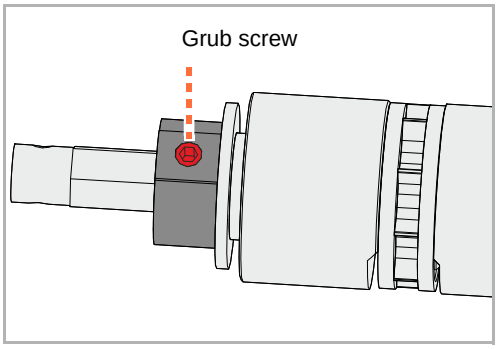


- Remove the components from the shaft and lay them on a clean support surface in the same order and the identical position as when fitted

Pay attention to the position of the teeth when installing a new metering wheel or a metering wheel with a different width. The teeth must be in the same position with the new metering wheel as they were with the previous metering wheel.

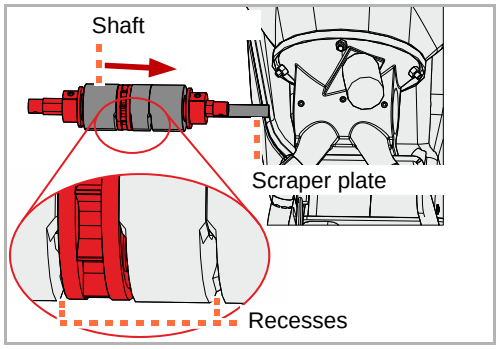


- In the same order and with the new metering wheel, slide the components back onto the shaft

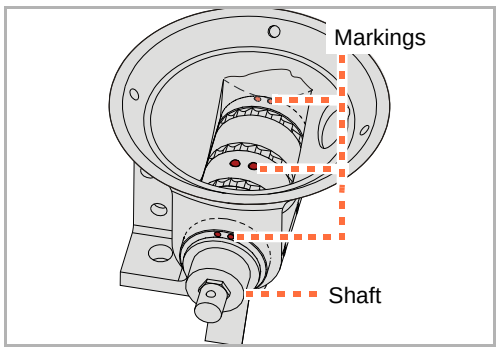


- Tightly fasten the grub screw

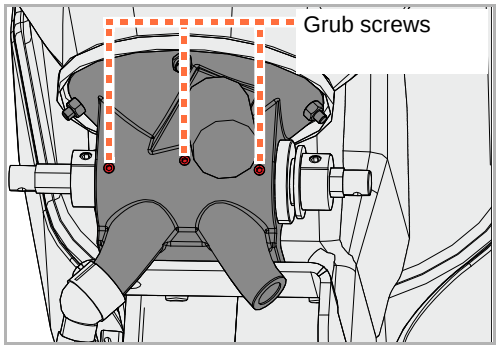
Pay attention to the position of the recesses in relation to the housing when fitting the shaft. Pay attention to the position of the scraper plate



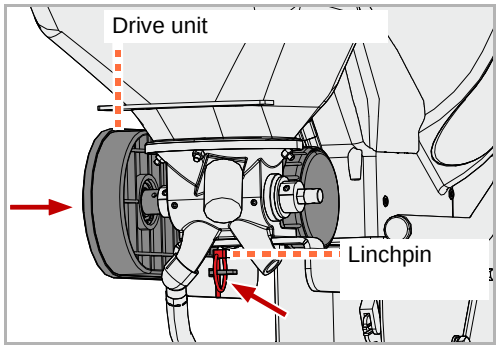
- Slide the scraper plate into the slot on the housing
- Insert the shaft. Ensure the correct position of the scraper plate whilst doing so.



- Align the individual parts of the shaft. Note the markings when doing so.



- Carefully tighten the grub screws
- When doing so, check occasionally that the shaft is still able to turn slightly

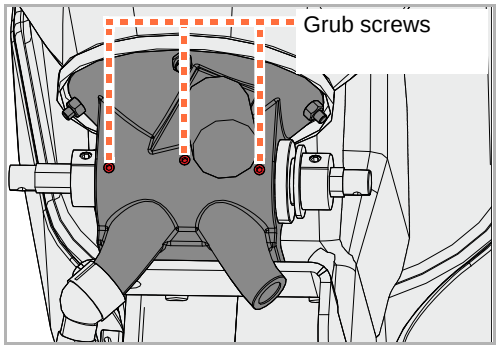


- Install the drive unit and secure it with a linchpin

Scraper

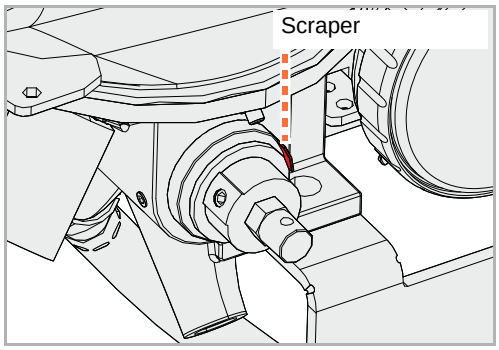
The scraper must be adjusted when it is worn.

In the event of wear



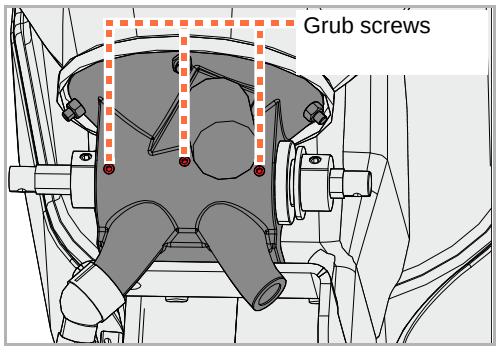
- Release the grub screws

The scraper is visible from the outside.



- Use a suitable tool to push the scraper in by approx. 10 mm

If the scraper needs to be adjusted again, pull this out by approx. 20 mm.



- Carefully tighten the grub screws
- When doing so, check occasionally that the shaft is still able to turn slightly

Clean Air

The clean Air is equipped with the following components:

- Air hose
- Cover
- Guide plate

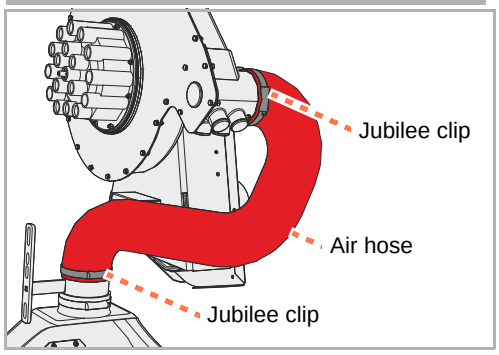
Wear breathing protection when in contact with dust which is harmful to health
For example, harmful dust could be created if dressing has been used or fertiliser has been deposited.
It is necessary to wear breathing protection with the appropriate protection class if harmful dust could be released when 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 must be conducted out of the machine near the ground

Air hose

The air hose must be checked for damage and replaced if required.

Once per season

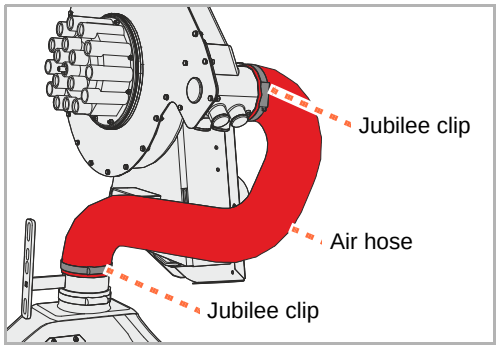


- Check the air hose for leaks
- If leaks are discovered, replace the air hose
- Check the transitions between the air hose and the adjacent components for leaks
- If leaks are discovered, re-tighten the jubilee clips

Replacement

In the event of damage or wear, you must replace the air hose.

In case of wear

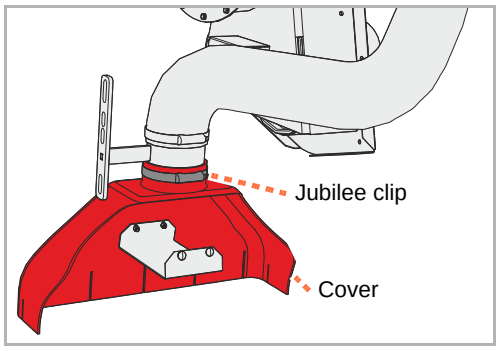


- Undo the jubilee clips
- Remove the air hose
- Cut the new air hose to the length of the old air hose
- Install a new air hose and secure with the jubilee clips

Cover

The cover must be checked for damage and replaced if required.

Once per season

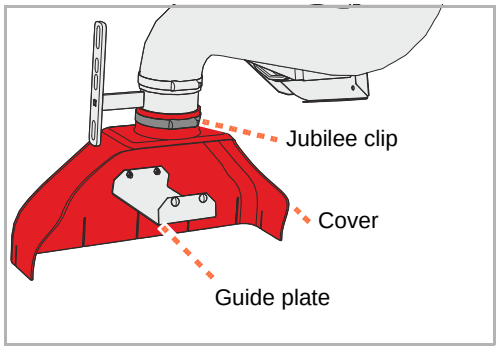


- Check the cover for damage

Replacement

In the event of damage or wear, you must replace the cover.

In case of wear

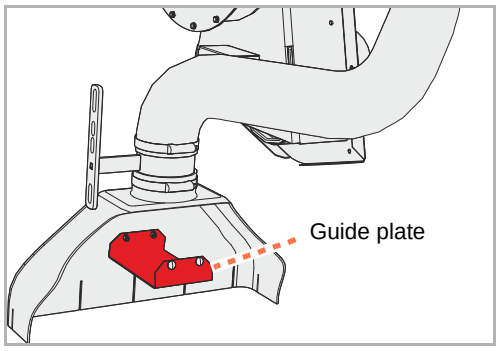


- Undo the jubilee clips
- Remove the cover
- Remove the guide plate from the cover
- Install the guide plate in a new cover
- Install a new cover and secure with the jubilee clips

Guide plate

Once per season

The guide plate must be checked for damage and replaced if required.

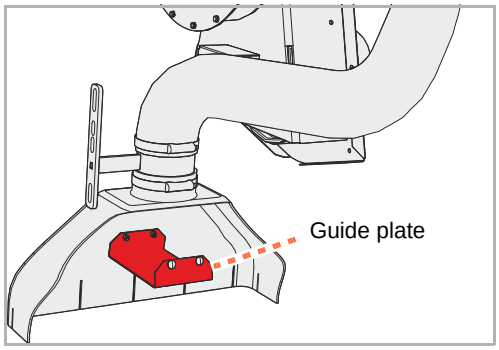


- Check the guide plate for damage

Replacement

In case of wear

In the event of damage or wear, you must replace the guide plate.



- Release the bolts
- Remove the guide plate
- Install a new guide plate and secure with the bolts

System using negative pressure

Seed discs

In case of wear or refitting

Seed discs have to be refitted at:

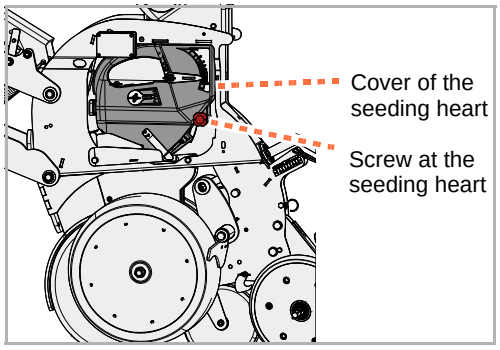
- Change of seed
- Wear of the seed disc

Before refitting, empty the seed hopper.
→ Chapter »Preparation work«, section »Emptying the seed hopper«, page 96

Preparation

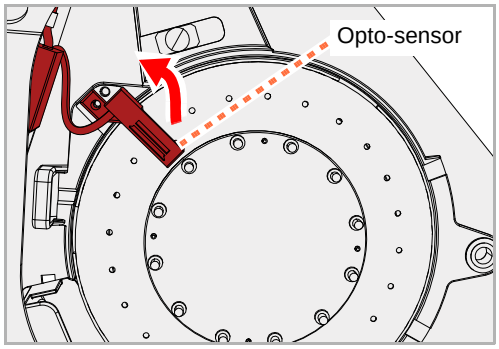
You must prepare the seeding heart for the other conversion work. This section explains all of the steps that are required. For the individual conversions, we will then refer to the numbering of the steps that are prerequisites for the relevant conversion work.

Step A1



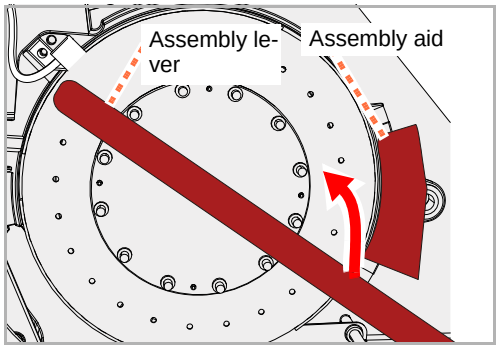
- Lift the machine
- Release the bolt, remove the cover of the seeding heart

Step A2



- Slightly lift the opto-sensor, turn it upwards and let it engage

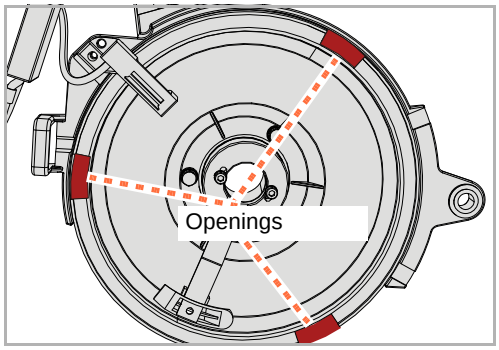
Step A3



- 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

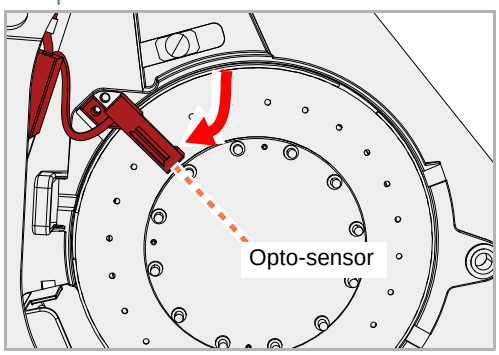
Assembly

Step Z1



- Insert the seed disc. Make sure that the lock springs of the seed disc fit into the openings of the seed drum.

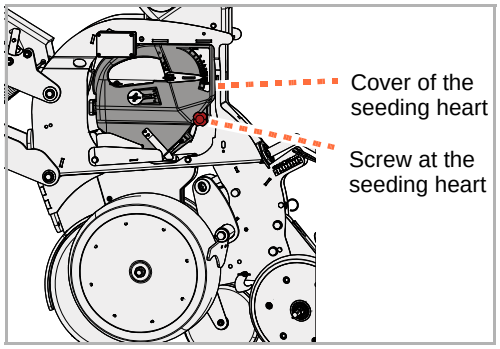
Step Z2



- 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

Step Z3

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.



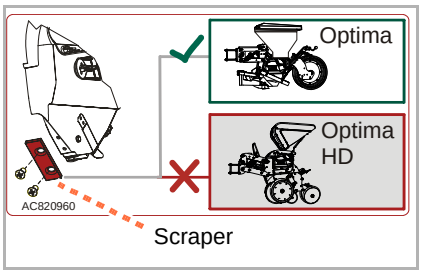
Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

Turnips, sunflowers, beans

The sowing unit is set for maize seeding. Parts of the seeding heart have to be converted for other seed. To do this, replace the following parts:

Conversion set for turnips, sunflowers, beans

- Seed disc
- Scraper for sowing units



You are given a scraper with the retrofit kit. Do not fit this scraper on HD sowing units.

Prerequisite:

- Step A1 of the preparation
- Step A2 of the preparation
- Step A3 of the preparation

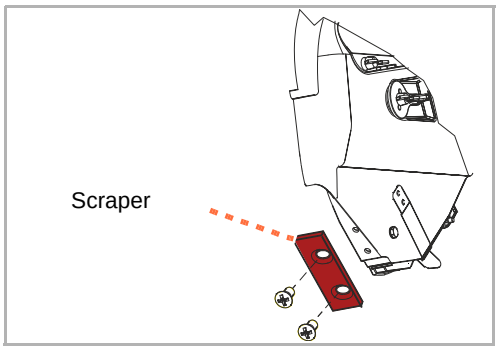
→ Chapter »Maintenance«, section »Preparation«, page 195

▸ Select the seed disc

Assembly:

- Step Z2 of the assembly
- Step Z3 of the assembly
- Step Z4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 196

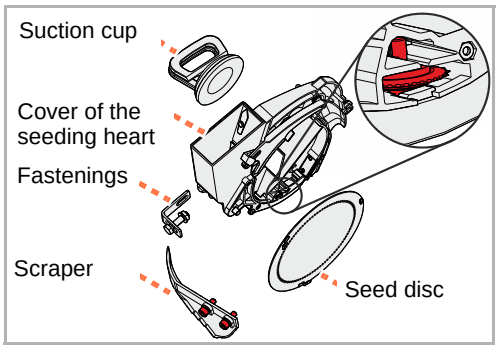


▸ Only install the scraper on sowing units

Rape

for sowing units

The sowing unit is set for maize seeding. Parts of the seeding heart have to be converted for other seed. To do this, replace the following parts:



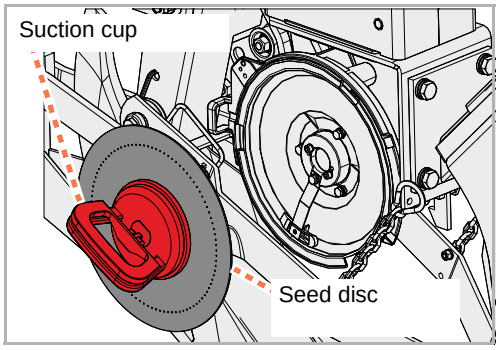
Rape conversion set for sowing units

- Seed disc for rape
- Cover of the seeding heart for rape
- Suction cup
- Fastenings
- Scraper for sowing units

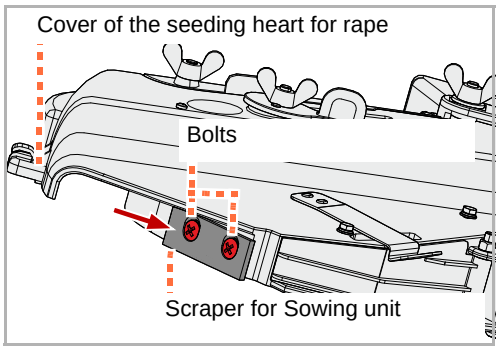
Prerequisite:

- Step A1 of the preparation
- Step A2 of the preparation
- Step A3 of the preparation

→ Chapter »Maintenance«, section »Preparation«, page 195



- Fit the seeding heart and seed disc for maize
- Remove the seed disc for rape using the suction cup



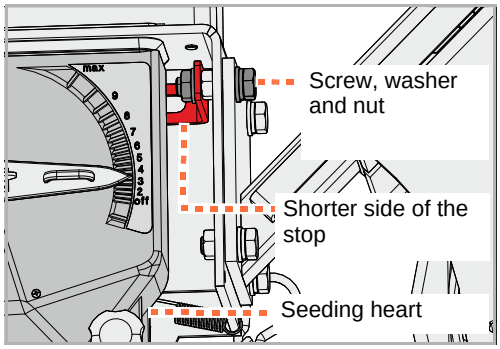
- Pre-fit the scraper for sowing units to the cover of the seeding heart for rape but do not tighten the screws

Assembly:

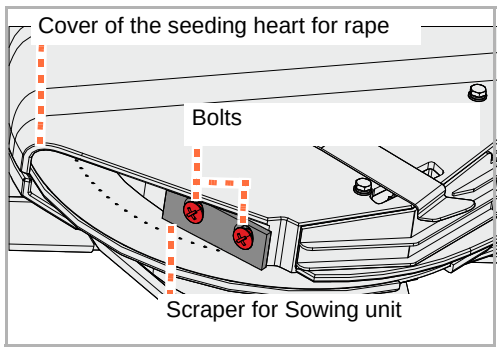
- Step Z2 of the assembly
- Step Z3 of the assembly
- Step Z4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 196

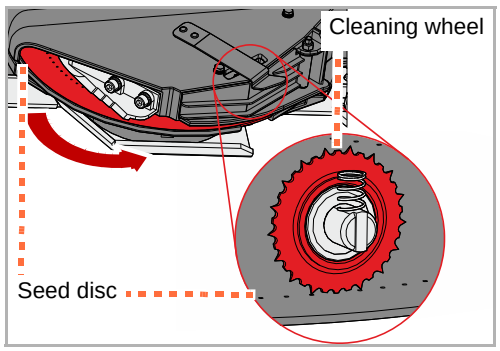
The stop must be fitted so as to prevent the seed in the lower part of the cover of the seeding heart from pressing away from the disc. The seed can be damaged in the resulting gap and lose its germination capacity.



- 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.



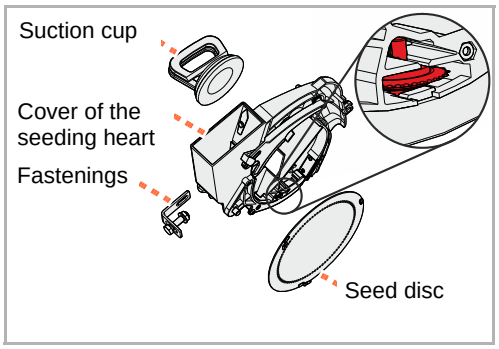
- Place the scraper for sowing units on the seed disc and secure it in place with the screws



- 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.

for HD sowing units



The sowing unit is set for maize seeding. Parts of the seeding heart have to be converted for other seed. To do this, replace the following parts:

Rape conversion set for HD sowing units

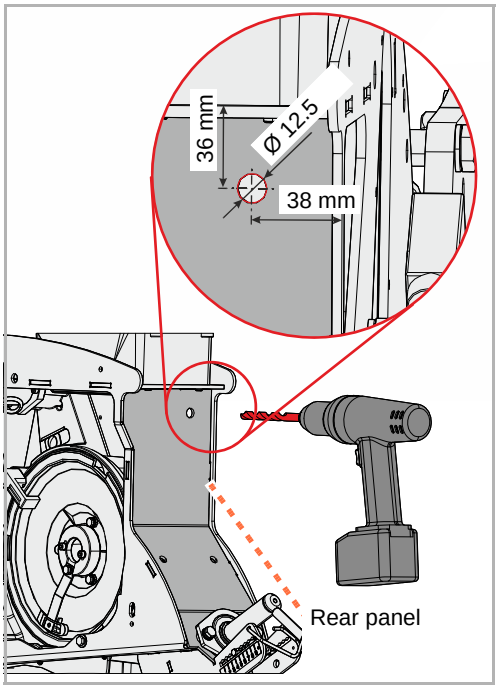
- Seed disc for rape
- Cover of the seeding heart for rape
- Suction cup
- Fastenings

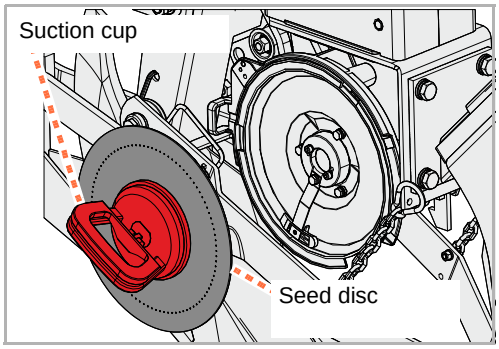
Prerequisite:

- Step A1 of the preparation
- Step A2 of the preparation
- Step A3 of the preparation

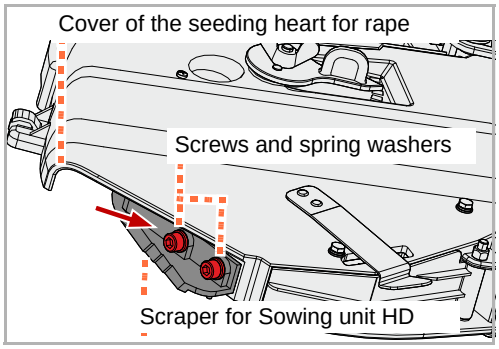
→ Chapter »Maintenance«, section »Preparation«, page 195

- Fit the seeding heart and seed disc for maize
- Drill a 12.5 mm hole in the rear panel





- Remove the seed disc for rape using the suction cup



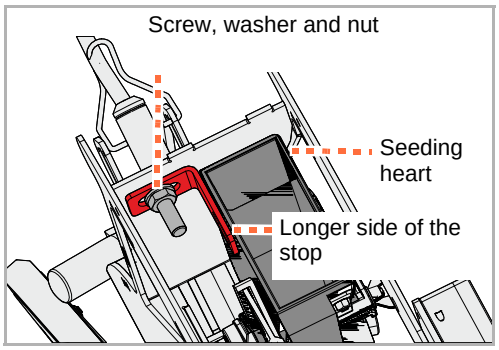
- Pre-fit the scraper for HD sowing units to the cover of the seeding heart for rape with the screws and the spring washers but do not tighten the screws

Assembly:

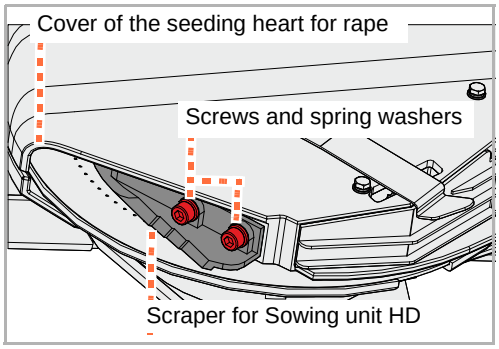
- Step Z2 of the assembly
- Step Z3 of the assembly
- Step Z4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 196

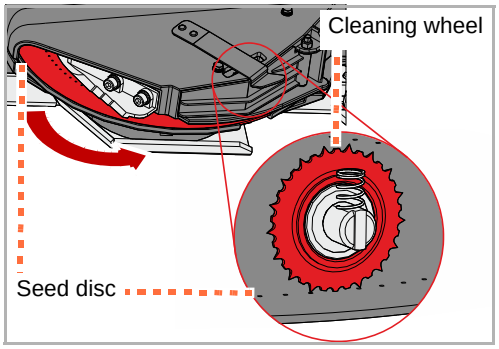
The stop must be fitted so as to prevent the seed in the lower part of the cover of the seeding heart from pressing away from the disc. The seed can be damaged in the resulting gap and lose its germination capacity.



- Align the stop with its longer 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 HD sowing units on the seed disc and secure it in place with the screws

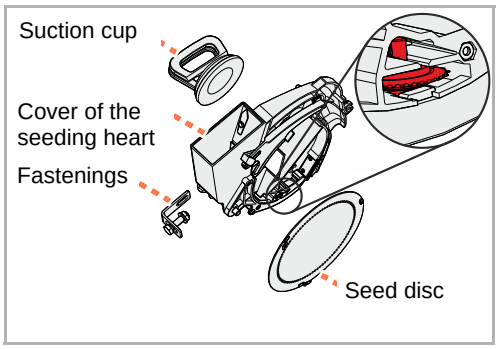


- Manually turn the seed disc in the direction of the arrow until you hear the cleaning wheel locking into the holes in the seed disc.

The cleaning wheel will then rotate along with the seed disc.

For HD II sowing unit

The sowing unit is set for maize seeding. Parts of the seeding heart have to be converted for other seed. To do this, replace the following parts:



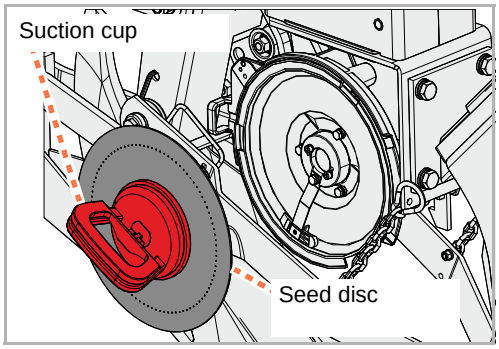
Rape conversion set for HD sowing units

- Seed disc for rape
- Cover of the seeding heart for rape
- Suction cup
- Fastenings

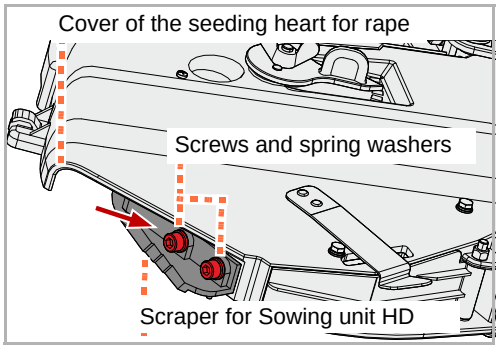
Prerequisite:

- Step A1 of the preparation
- Step A2 of the preparation
- Step A3 of the preparation

→ Chapter »Maintenance«, section »Preparation«, page 195



- ▸ Fit the seeding heart and seed disc for maize
- ▸ Remove the seed disc for rape using the suction cup

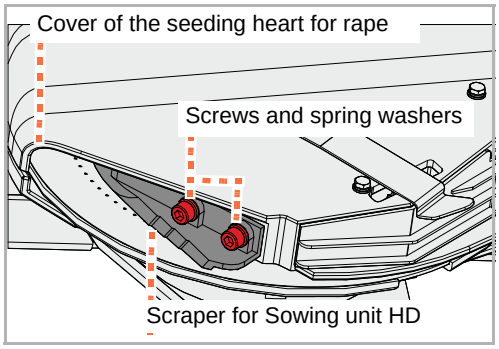


- Pre-fit the scraper for HD sowing units to the cover of the seeding heart for rape with the screws and the spring washers but do not tighten the screws

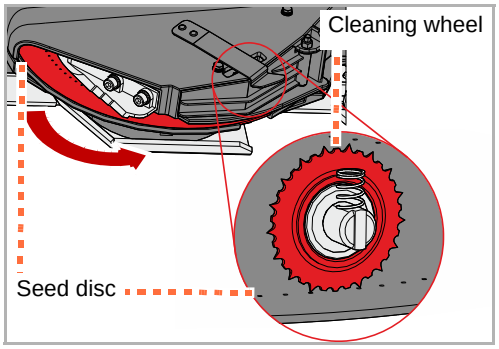
Assembly:

- Step Z2 of the assembly
- Step Z3 of the assembly
- Step Z4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 196



- Place the scraper for HD sowing units on the seed disc and secure it in place with the screws



- 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 over-pressure

Seed discs

In case of wear or refitting

Seed discs have to be refitted at:

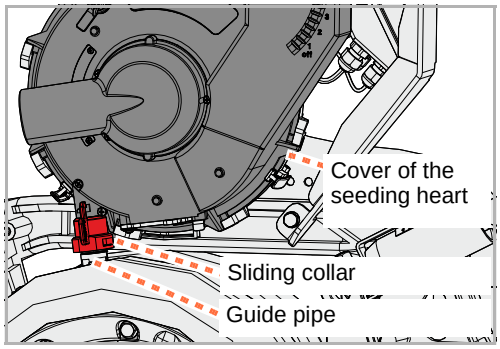
- Change of seed
- Wear of the seed disc

Before refitting, empty the seed hopper.
→ Chapter »Preparation work«, section »Emptying the seed hopper«, page 96

Preparation

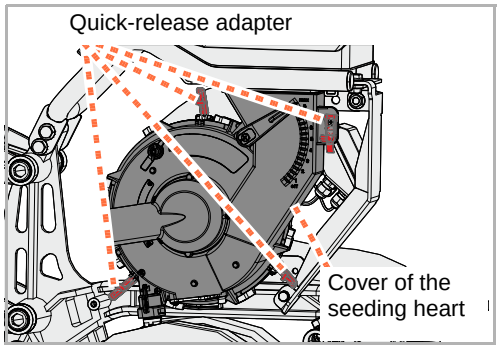
You must prepare the seeding heart for the other conversion work. This section explains all of the steps that are required. For the individual conversions, we will then refer to the numbering of the steps that are prerequisites for the relevant conversion work.

Step B1



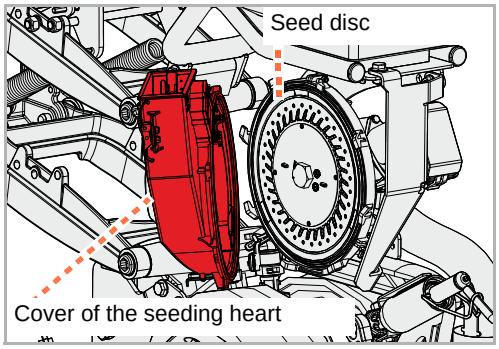
- Turn the sliding collar between the guide pipe and the cover of the seeding heart to open it, then lock it in the parking position on the cover of the seeding heart

Step B2



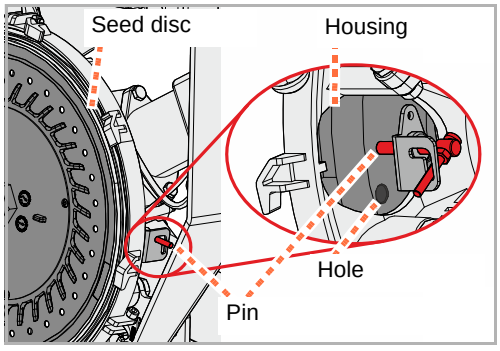
- Loosen the quick-release adapters on the cover of the seeding heart

Step B3



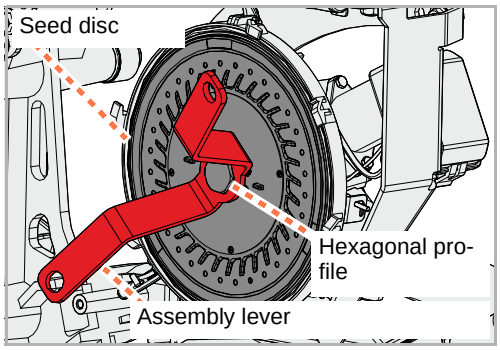
- Turn the cover of the seeding heart clockwise and unlock it
- Move the cover of the seeding heart to one side

Step B4



- 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

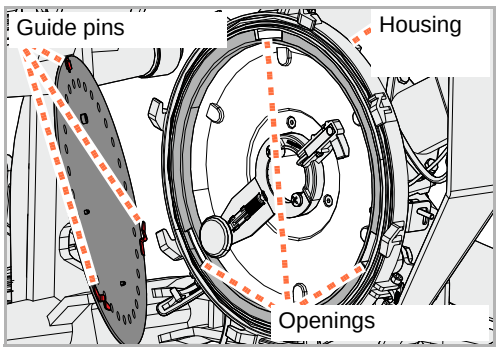
Step B5



- Fit the assembly lever onto the hexagonal profile
- Use the assembly lever to turn the seed disc counter clockwise and unlock it
- Remove the seed disc

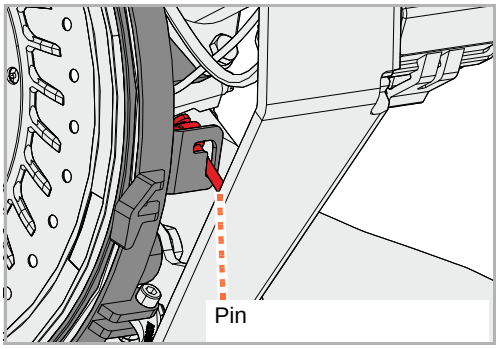
Assembly

Step Y1



- 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

Step Y2

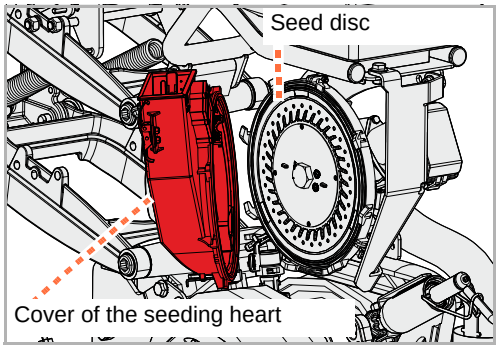


- Return the pin to the parking position

If the pin remains in one of the holes, the electronics will issue a fault message in the drive.

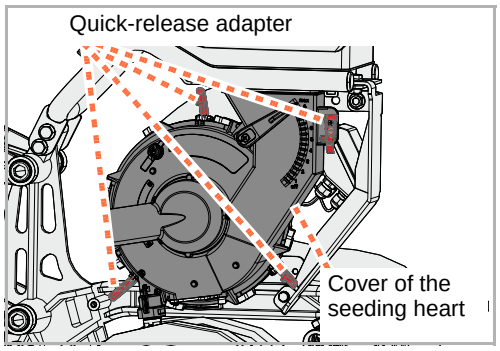
Checking the cover of the seeding heart
Check that the cover of the seeding heart is properly positioned.
An incorrectly fitted seeding heart cover can cause an unrestrained flow of seed out of the seeding heart and cause incorrect seed results.

Step Y3



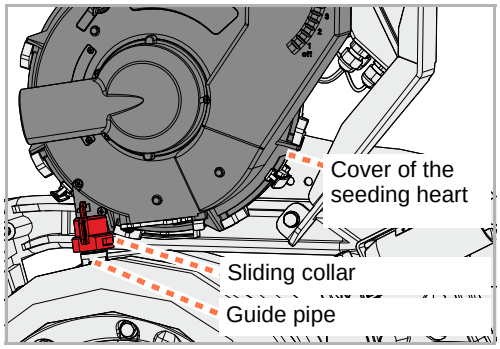
- Fit the cover of the seeding heart and turn it counter clockwise to lock it. When doing so, make sure that the cover of the seeding heart is positioned correctly

Step Y4



- Close the quick-release adapters

Step Y5



- 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

Turnips, sunflowers, beans, rape

The sowing unit is set for maize seeding. You will need to change the cover of the seeding heart for other seeds. You will need the following parts:

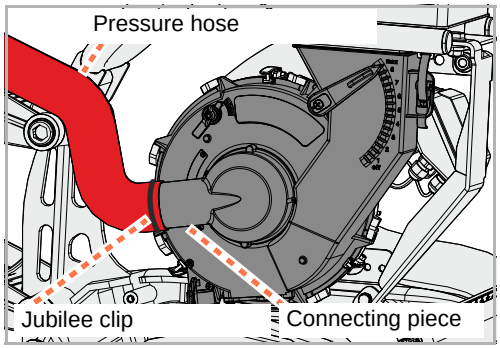
Cover of the seeding heart for turnips

- Cover of the seeding heart for turnips

Cover of the seeding heart for rape

- Cover of the seeding heart for rape

Replacing the cover of the seeding heart

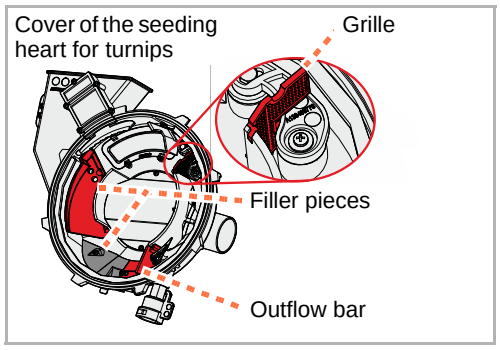


Removal:

- Loosen the jubilee clip and pull the pressure hose out from the connecting piece
- Step B1 of the preparations
- Step B2 of the preparations
- Step B3 of the preparations

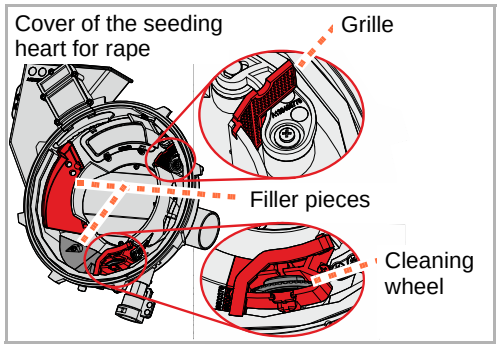
→ Chapter »Maintenance«, section »Preparation«, page 195

The covers of the seeding hearts for turnips and rape differ from the cover of the seeding heart for maize in terms of the following components



Cover of the seeding heart for turnips

- Two filler pieces
- Grille with a small, curved outlet
- Outflow bar



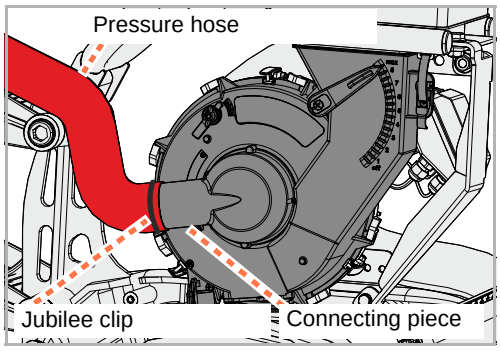
Cover of the seeding heart for rape

- Two filler pieces
- Grille with a small, curved outlet
- Housing with cleaning wheel for the holes in the seed disc
- Outflow bar for turnips is loosely attached

Assembly:

- Select the required cover of the seeding heart
- Step Y2 of the assembly
- Step Y3 of the assembly
- Step Y4 of the assembly

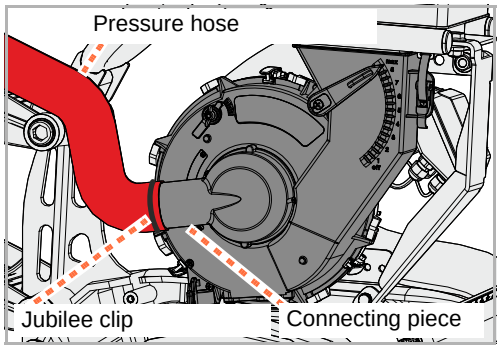
→ Chapter »Maintenance«, section »Assembly«, page 196



- Attach the pressure hose to the connecting piece and secure with a jubilee clip

Refitting from rape to turnips

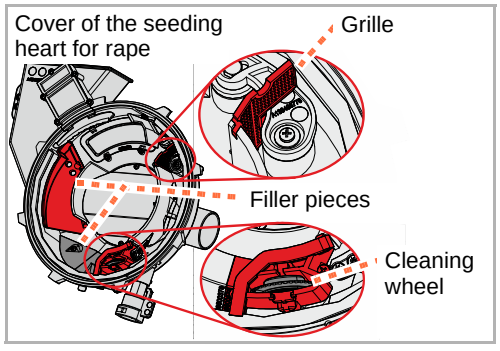
Removal:



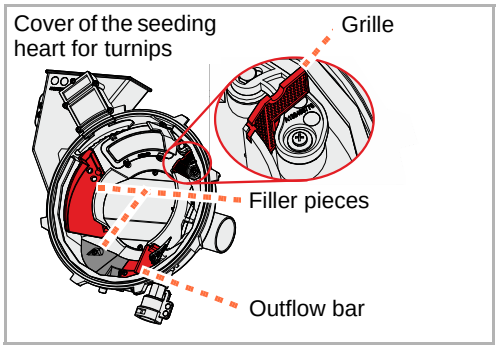
- Loosen the jubilee clip and pull the pressure hose out from the connecting piece
- Step B1 of the preparations
- Step B2 of the preparations
- Step B3 of the preparations

→ Chapter »Maintenance«, section »Preparation«, page 195

Refitting:



- Remove the housing with the cleaning wheel

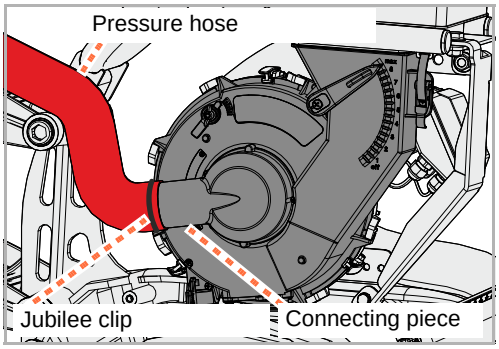


- Fit the outflow bar for turnips

Assembly:

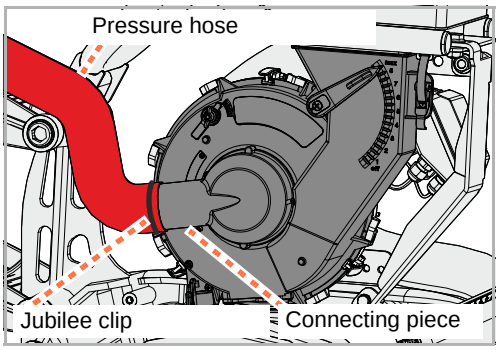
- Select the required cover of the seeding heart
- Step Y2 of the assembly
- Step Y3 of the assembly
- Step Y4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 196



- Attach the pressure hose to the connecting piece and secure with a jubilee clip

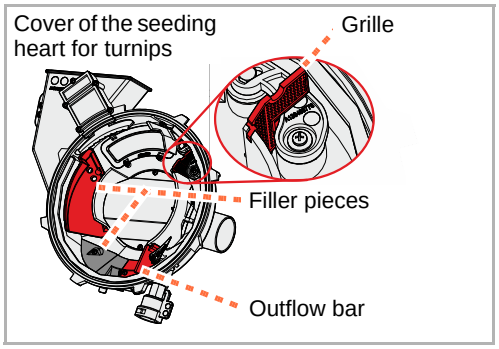
Refitting from turnips to rape



Removal:

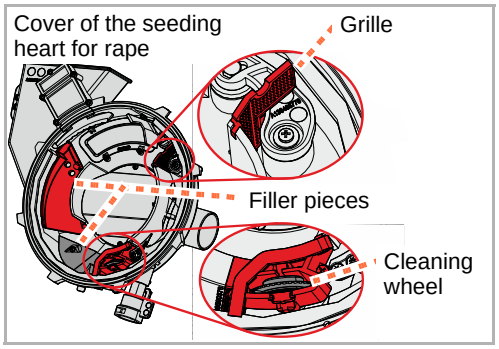
- Loosen the jubilee clip and pull the pressure hose out from the connecting piece
- Step B1 of the preparations
- Step B2 of the preparations
- Step B3 of the preparations

→ Chapter »Maintenance«, section »Preparation«, page 195



Refitting:

- Remove the outflow bar for turnips

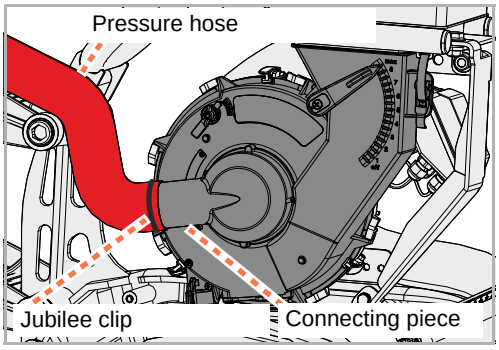


- Fit the housing with the cleaning wheel

Assembly:

- Select the required cover of the seeding heart
- Step Y2 of the assembly
- Step Y3 of the assembly
- Step Y4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 196



- 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	ESA 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
Opto-sensor receiving no pulses	Opto-sensor defective	Check opto-sensor operation with the Service key on the OEC. If the fault cannot be eliminated, contact the dealer.
Indication of the seeds/hectare varies a lot	Irregular separation of the seeds	Set the sowing units correctly
	Opto-sensor is contaminated	Clean opto-sensor with a brush
LED on opto-sensor lights up "RED"	Opto-sensor is contaminated	Clean opto-sensor with a brush

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		
• Bare patches	Incorrect seed size	Completely empty the seed hopper, fill with suitable seed
	Diameter of the seed holes too small	Use suitable seed discs
	Negative pressure too low	Open the sliding cover further or increase 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
	The seed hopper contains foreign bodies	Remove foreign bodies
	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
	Vacuum tube defective	Replace tube, lay without kinks and abrasion points
	The fan drive speed does not match the PTO speed of the tractor used	Set the correct drive speed
• Doubles	Diameter of the seed holes too large	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

Fault	Cause	Remedy
Sowing distances change uncontrolled	Vacuum interrupter worn	Replace the vacuum interrupter
	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

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»Preparation work«
No fertiliser applied	Fertiliser too wet	Use dry fertiliser
	Fertiliser clots too much	Use a removable sieve
	Stoppers are closed too much Drive disconnected	Fully open the stoppers 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 The emptying gate is open	Fully open the stoppers 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

Folding

Fault	Cause	Remedy
Side sections cannot be folded out	No voltage	Check the power supply
	Hydraulic valve (solenoid valve) defective	Have the hydraulic valve (solenoid valve) replaced by the dealer
	Sensors cannot recognise the status of the machine	Use the "X-fold" software to manually bring the machine to a defined position → “ESA software” operating manual

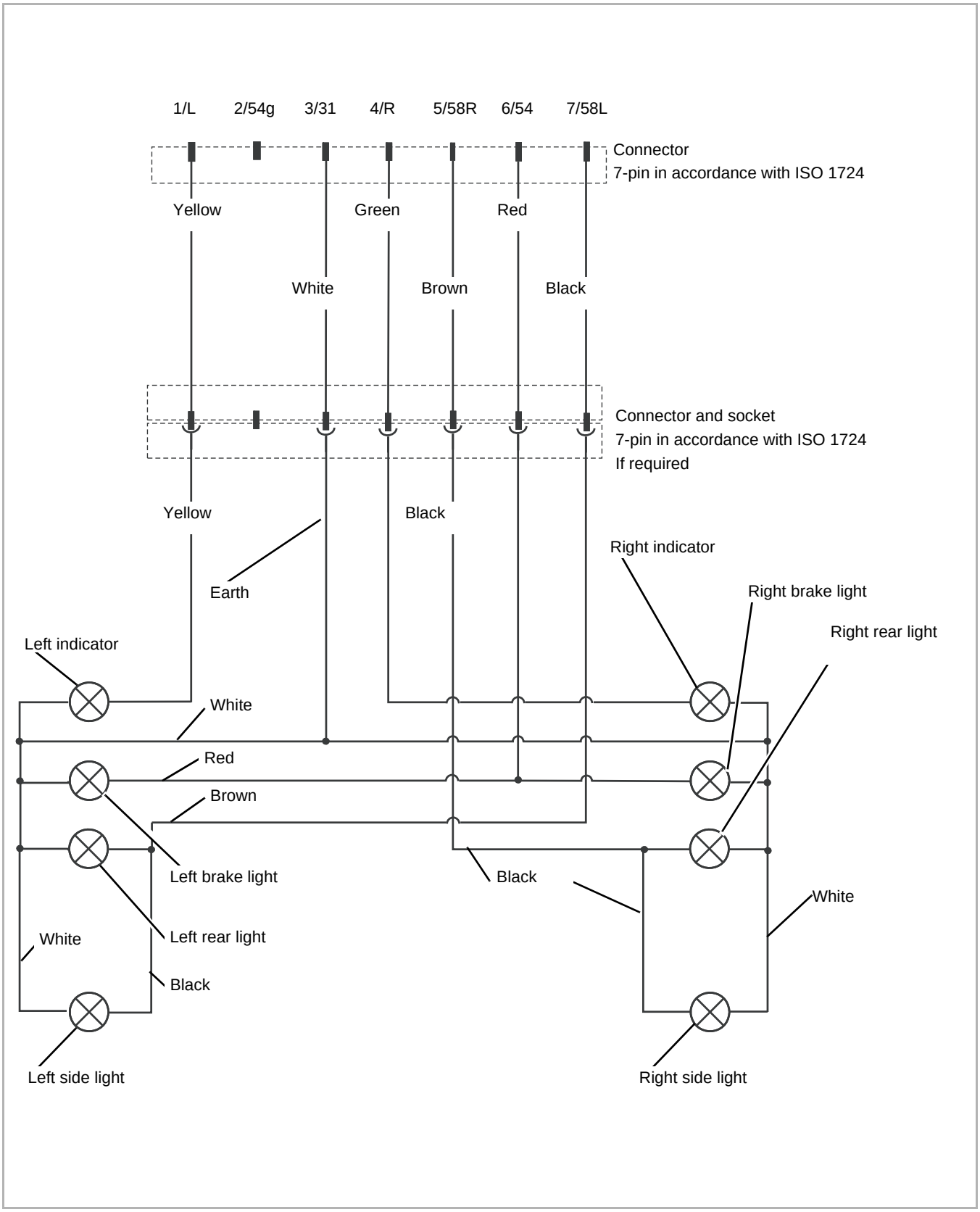
Mechanical fan drive

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«

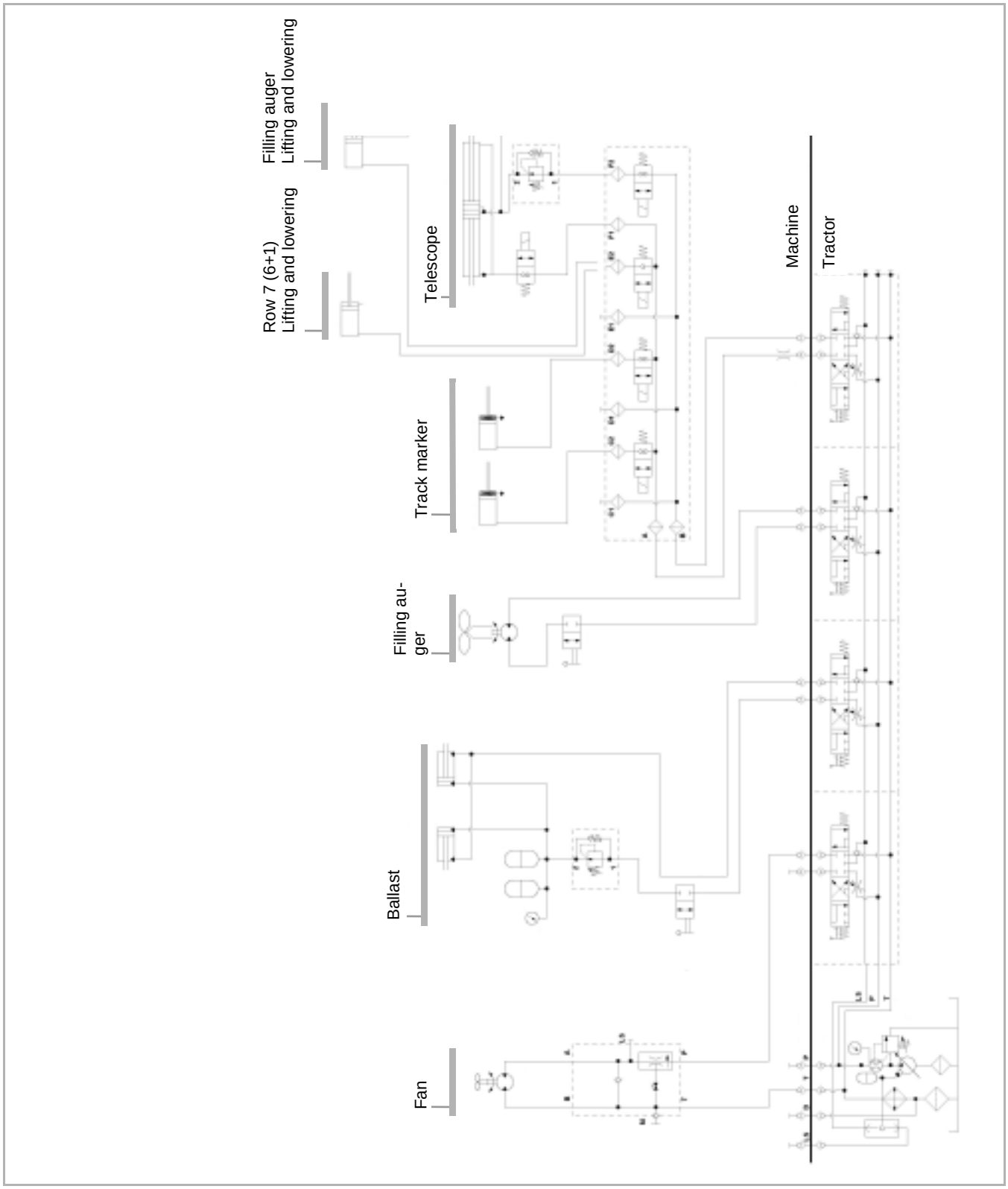
Hydraulic fan drive

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	Worn or reversed shaft seal	Install a new shaft seal
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	Choose another 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

Circuit diagram of lighting equipment



Hydraulics circuit diagram



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 waste. 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.

EC Declaration of Conformity

In accordance with EC Directive 2006/42/EC

We

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declare with sole responsibility that the product



V-frame in all equipment variants and its accessories
Type:
Valid from machine number: ACKPPxx175 –,

to which this Declaration relates, comply with the relevant basic health and safety requirements of EC Directive 2006/42/EC.

To demonstrate our compliance with the health and safety requirements quoted in the EC Directive, we make reference to the following standards:

- EN ISO 12100:2010
- EN ISO 4254-1:2013
- CEN 14018:2010

Kverneland Group Soest GmbH
Soest, 30.10.2017



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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