

VP 1000 series
VP 1000F series

Operating manual

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From machine number	ACKVPxx101
Model	Rigid and foldable
Reference number	A139290740

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	VP 1000/1000F series
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 Conformity Declaration«, page 170
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

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.

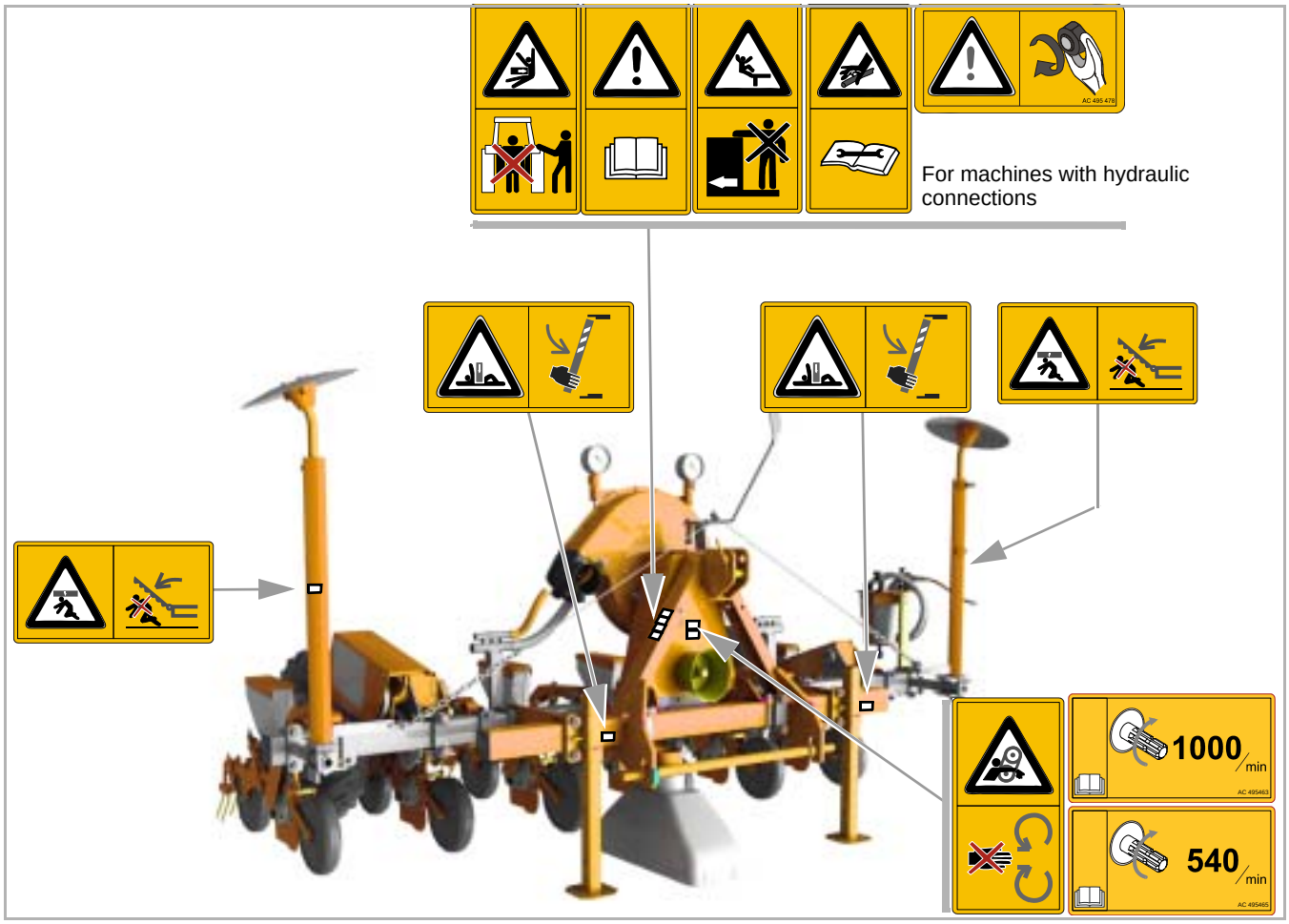
For the employer
Provide instruction in these safety instructions for personnel working with the machine on a regular basis and provide information on statutory regulations.

Warning signs

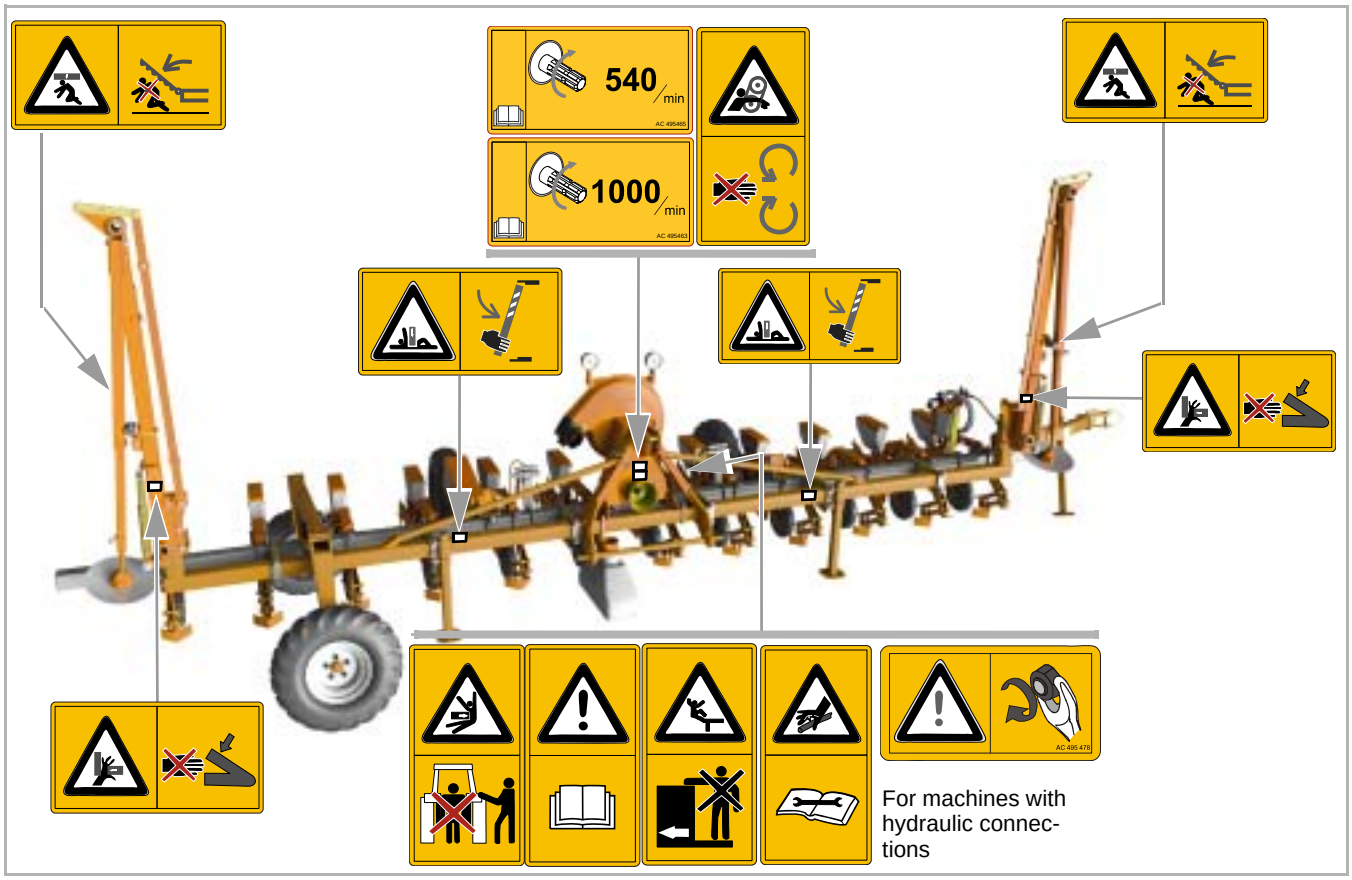
On the machine you will find stickers that serve to ensure your safety. The stickers must not be removed. If stickers become illegible or begin to peel off, new stickers can be ordered and attached in the appropriate places.

Rigid frames

Up to 3.50 m



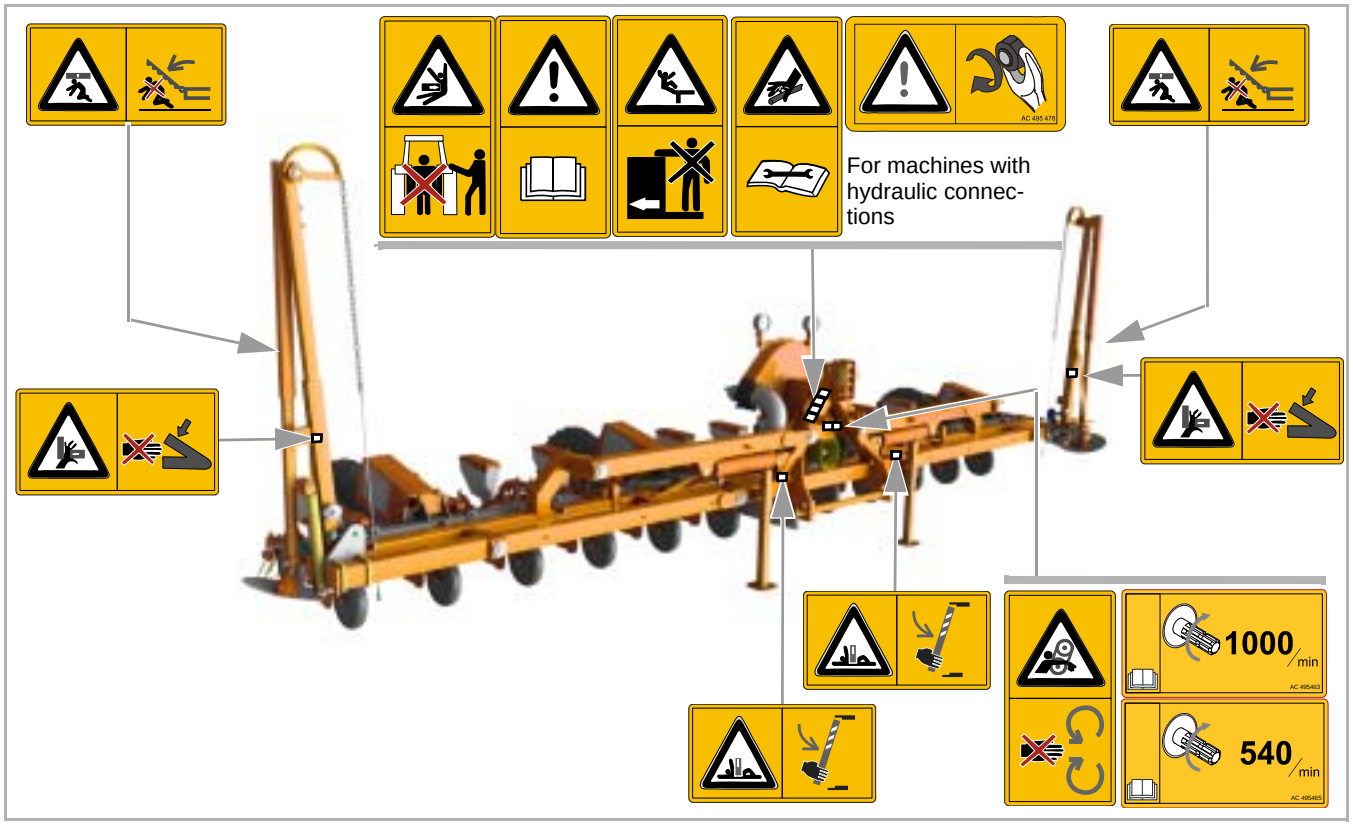
Up to 6.50 m



For machines with hydraulic connections

Hydraulically folda-
ble frame

6.00 m



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



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



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



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



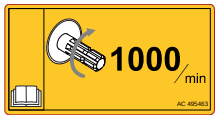
Risk of crushing
Avoid hazard area. The space between components may become smaller or disappear completely.

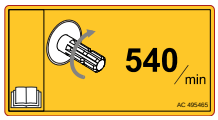


Retightening bolts
After the first hours of operation, all bolts must be checked and tightened if necessary. Screw connections might have come loose due to vibrations.



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.

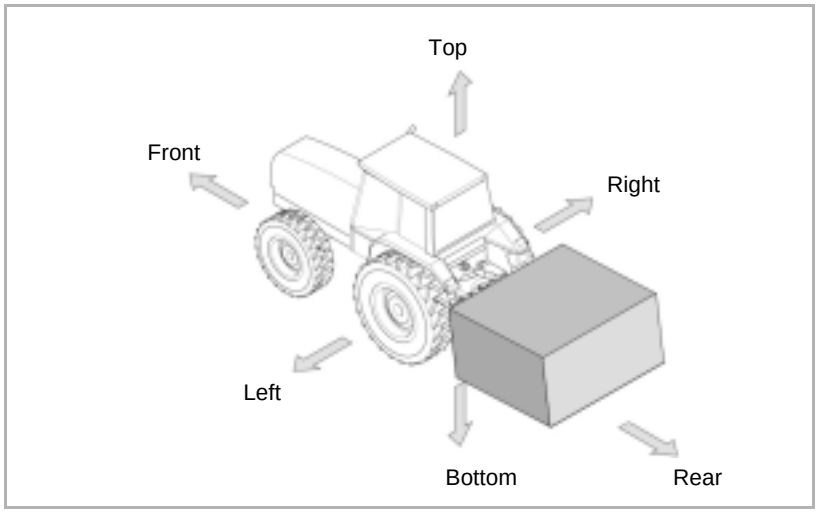




Checking the PTO speed
Connect the PTO shaft to a PTO with the required rotational speed. Always switch off the PTO when working on the machine.

Definitions

All direction information is given in relation to the direction of travel of the machine:



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.

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 can result in serious or fatal injury.

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.

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.

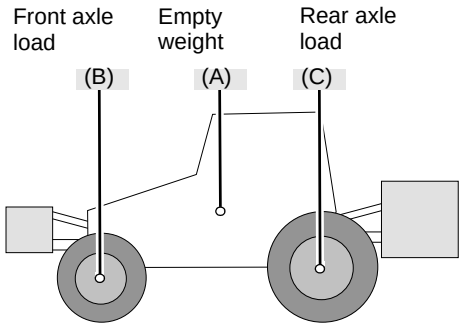
Centre of gravity

Observe the total weight, axle loads, tyre load-bearing capacity and minimum ballast specifications
The machine's front or rear attachment must not exceed the tractor's permissible total weight, its permissible axle load or its tyre load-bearing capacity. 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

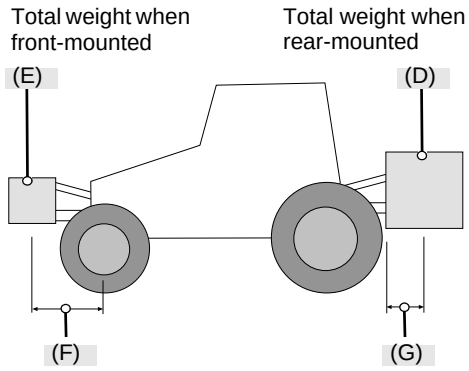
For this calculation, the following data is required:



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.

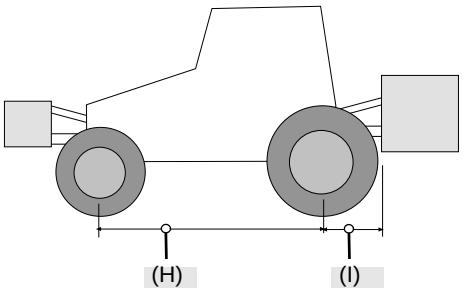


Distance:
Centre of gravity when front-mounted to the front-axle midpoint

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

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

Ballast with rear weights

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

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

Front axle load

Calculation of the actual front axle load

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

Total weight

Calculation of actual total weight

$$\text{Total weight} = E + A + D$$

Rear axle load

Calculation of the actual rear axle load
Rear axle load in kg = 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 or the front axle load must be less than the permissible values given in the operating manual of the tractor.
- The tyre load-bearing capacity must be greater than the values for the rear axle load or the front 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 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. This can result in damage to the machine or accidents.

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.

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.

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

Instruction required before initial operation
The machine must not be put into operation until the user has been given proper initial instruction by an employee of the dealer, a factory representative, or an employee of the manufacturer. If the machine is commissioned without instruction, incorrect operation can result in damage to the machine or accidents.

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.

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.

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.

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 never be folded in the vicinity of live 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 starting, folding out and putting the machine into operation, check the area in the immediate vicinity of the machine and make sure there is sufficient room, including when the track marker is lowered. 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 at regular intervals and tightened if necessary. bolts can come loose unnoticed while operating. This can result in damage to the machine or accidents.

What to do in the event of a fault
In the event of a fault, shut down and secure the machine immediately. Eliminate the fault immediately, or commission a workshop. Continuing to operate the machine can cause damage to the machine or accidents.

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
- Only uncouple the hydraulic hoses if the tractor and machine hydraulic system is depressurised

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

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 are then possible.

When performing all care work and maintenance work:

- Switch off the PTO
- Depressurise the hydraulic system
- Whenever possible, uncouple the tractor
- Ensure that the machine is standing securely. Provide additional support as required
- Do not use parts of the machine as climbing aids; use only proper safety climbing aids
- Secure the machine against rolling away
- Never reach into V-belts while they are moving

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.

Cleaning the machine
Only use a dry cleaning method to clean the machine, using a hand brush, a cloth and compressed air.

Do not wash the machine using water or a pressure washer
Do not use water or a pressure washer to clean the machine, as water can enter the seeding hearts and combine with the dust there to form caking.
The caking can block the seed disc when the machine is next used.

If water nevertheless enters the machine, open the seeding hearts and let the machine dry. After this, wipe the inside of the seeding hearts dry.

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:

- Accident prevention regulations
- Generally recognised safety regulations, occupational health requirements and 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:

- Definition of agronomic terms
- 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.

Range of application

The VP 1000/1000F series is a precision seeding machine for seeding after seedbed preparation. It is for normal use in agriculture. It is suitable for seeding appropriate seed thanks to its versatile equipment options. For the various seeds different seed discs are available.
Depending on the equipment used, it can spread free-flowing microgranulate at the same time.
A soil condition that enables cultivation and seeding is always a prerequisite for use. With some soil types, wetness or drought, for example, can make cultivation or seeding impossible.

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

Perfect combination
The specially hardened material combined with optimum design engineering and high manufacturing quality ensures that you receive a reliable machine for seeding. It is easy to handle and features low-maintenance mechanics.

Exact depth adjustment and control
All sowing units can be set exactly to the desired depth. The deposit depth can be set via the front press wheels and the rear press wheel. The pre-running pressure rollers allow in combination with parallelogram construction of the sowing units a exact depth guidance.

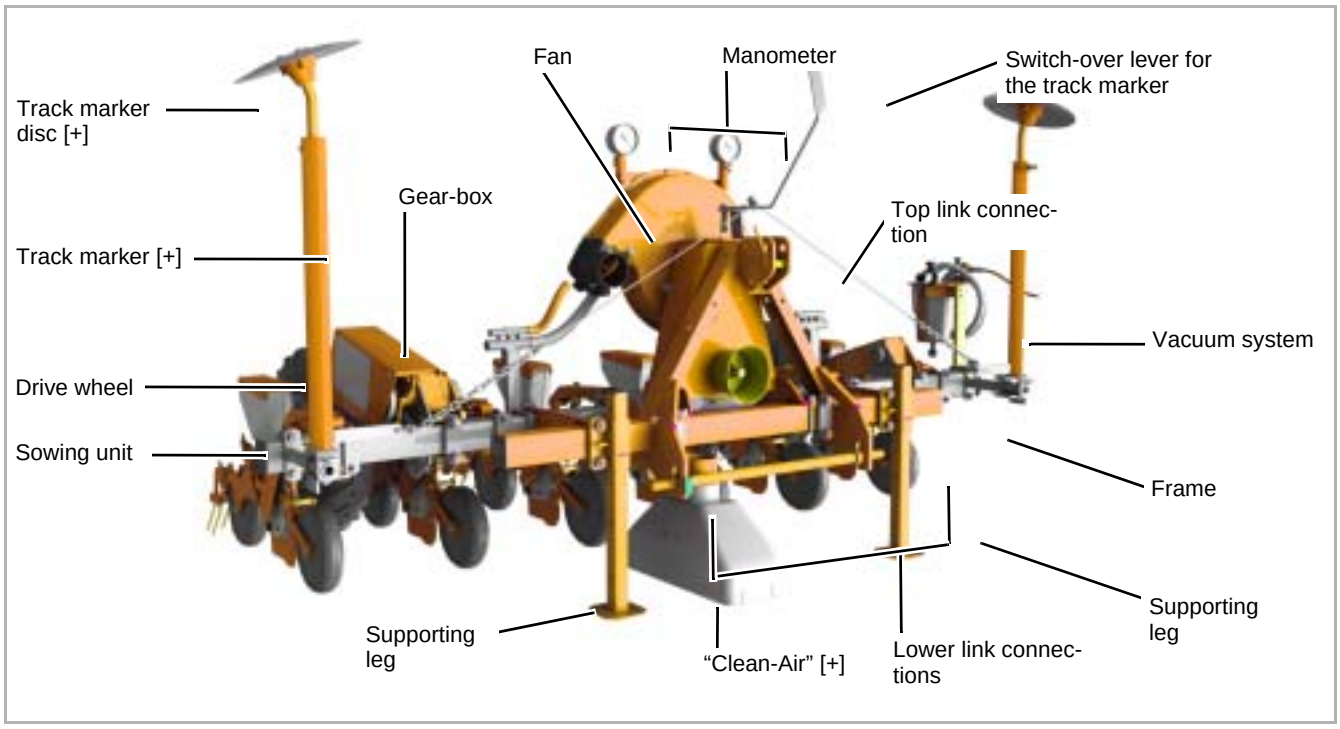
Sowing distances and deposit
The sowing distances can be set via a practical chain-driven gearbox even without using tools. An intermediate press wheel beds the seed in an optimum manner in the moisture-conducting soil layer. A seed coverer covers it with loose earth and a press wheel firms up the ground which means that it is better protected against mud formation.

Component designations

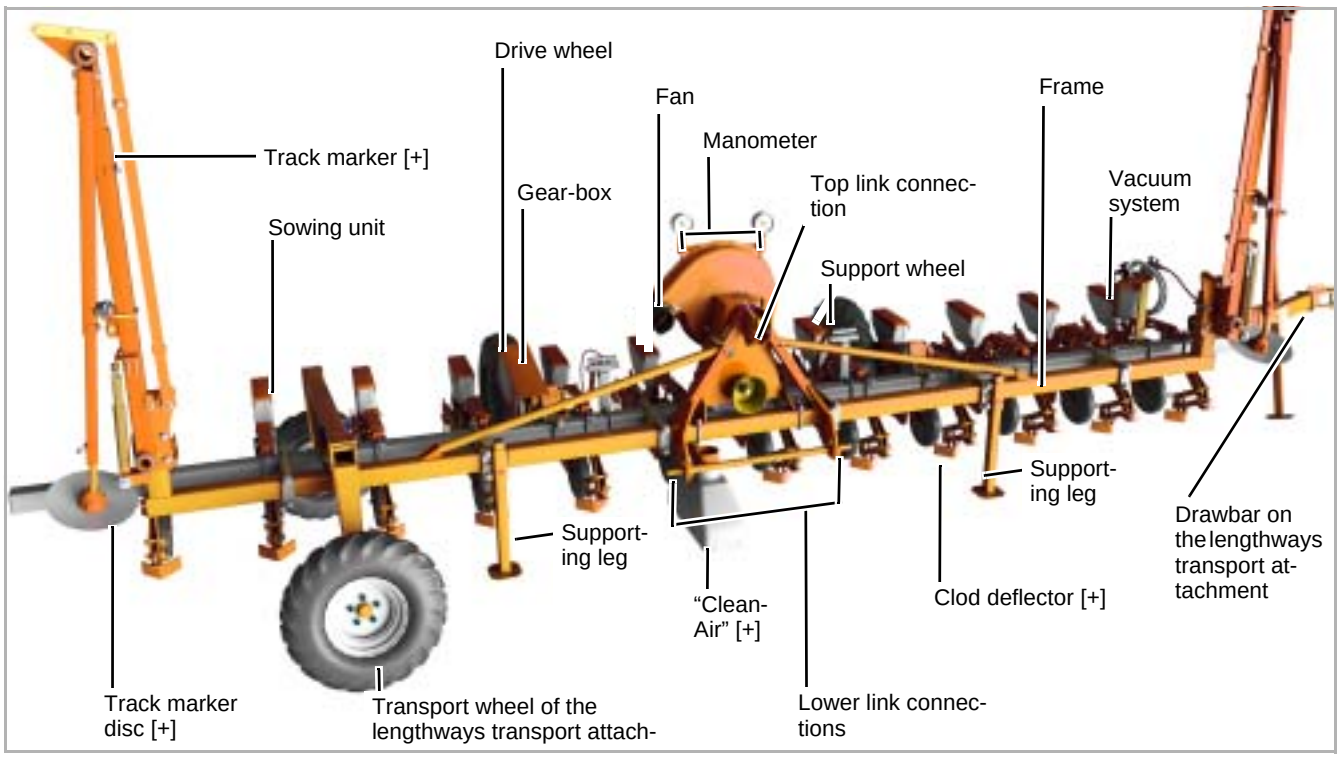
Rigid frames

The following is a listing of the most important assemblies in the frame as an overview.

Up to 3.50 m

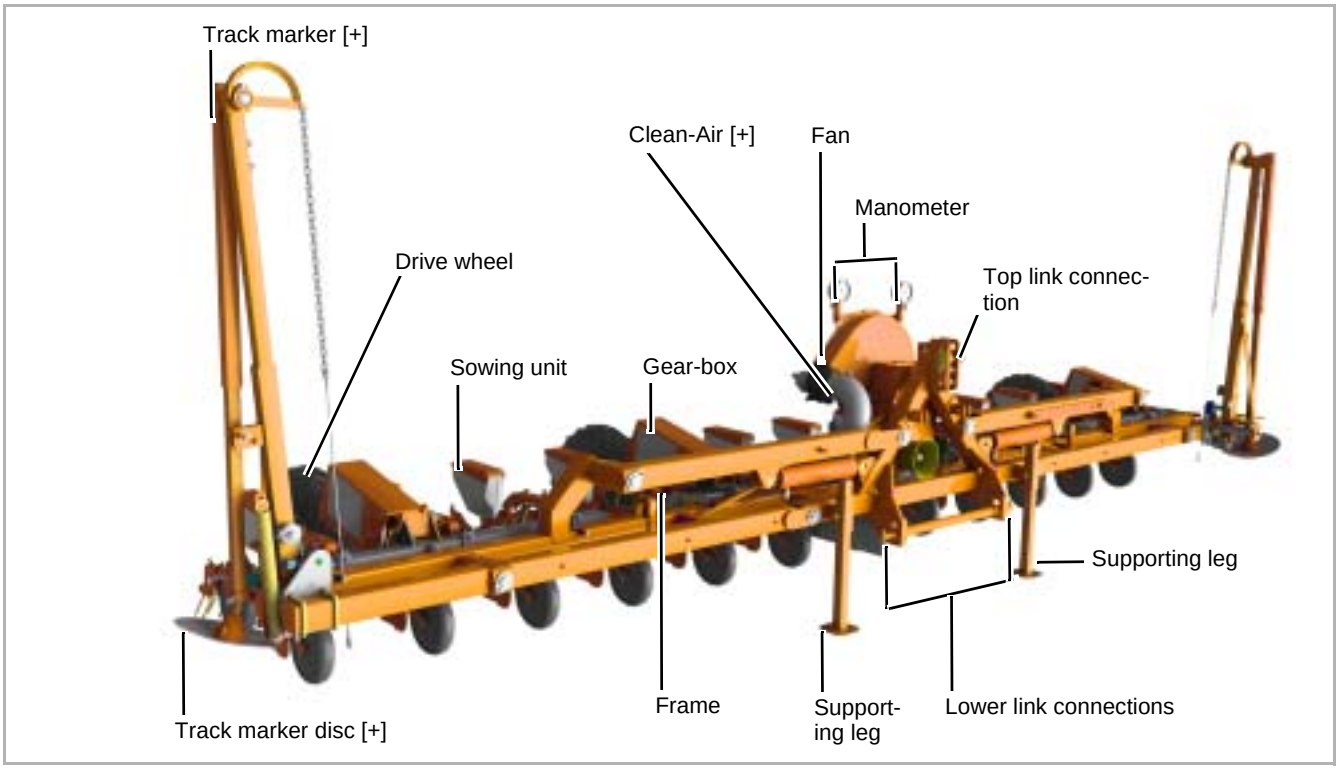


Up to 6.50 m



Hydraulically foldable frame

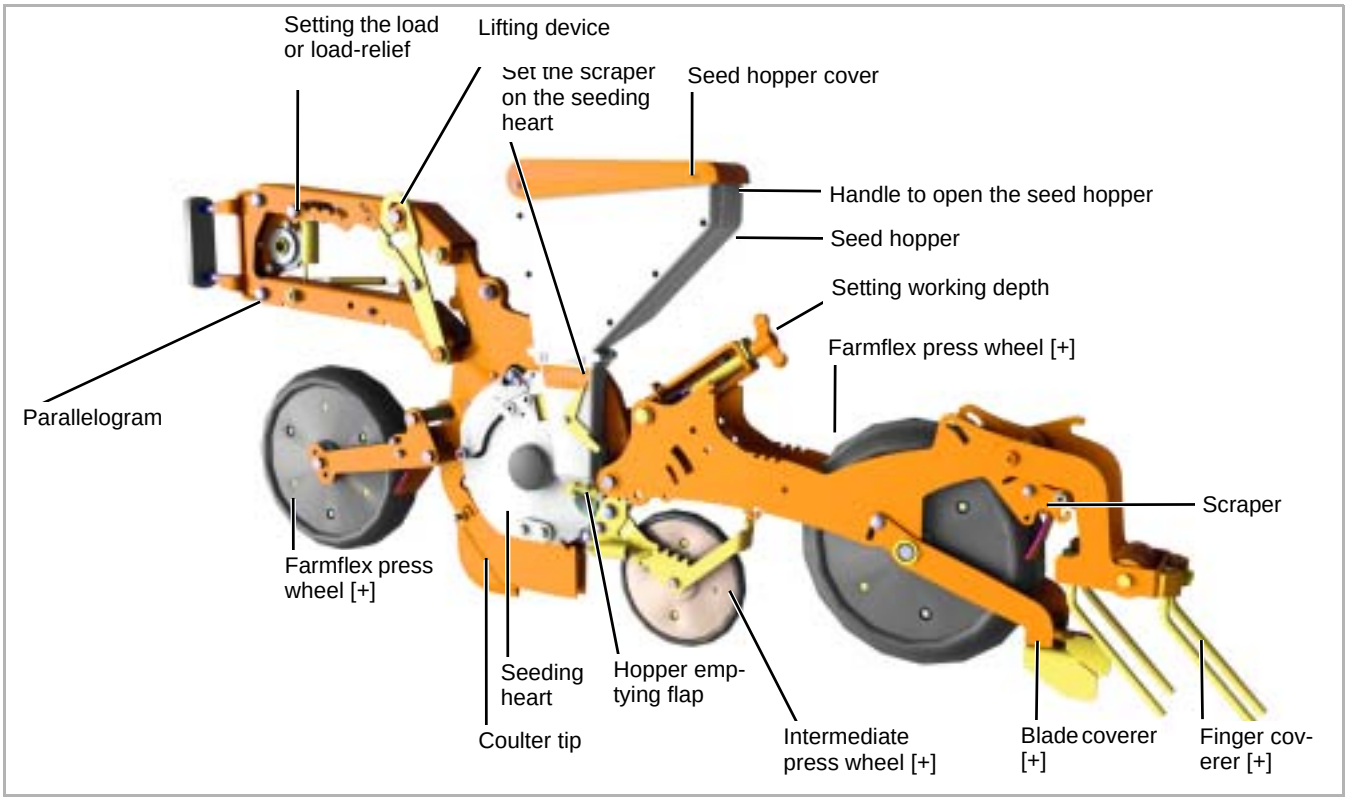
6.00 m



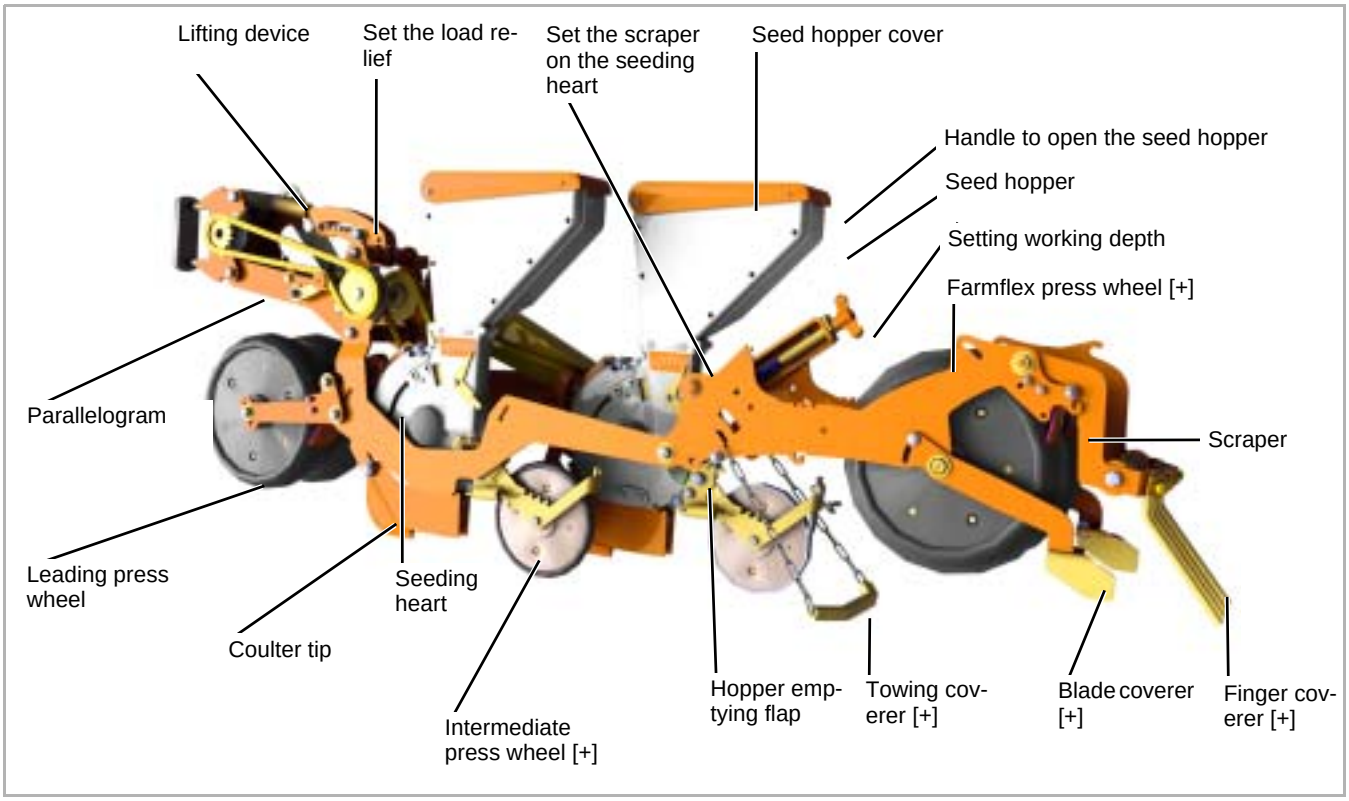
Sowing units

The following is a listing of the most important assemblies for the sowing units.

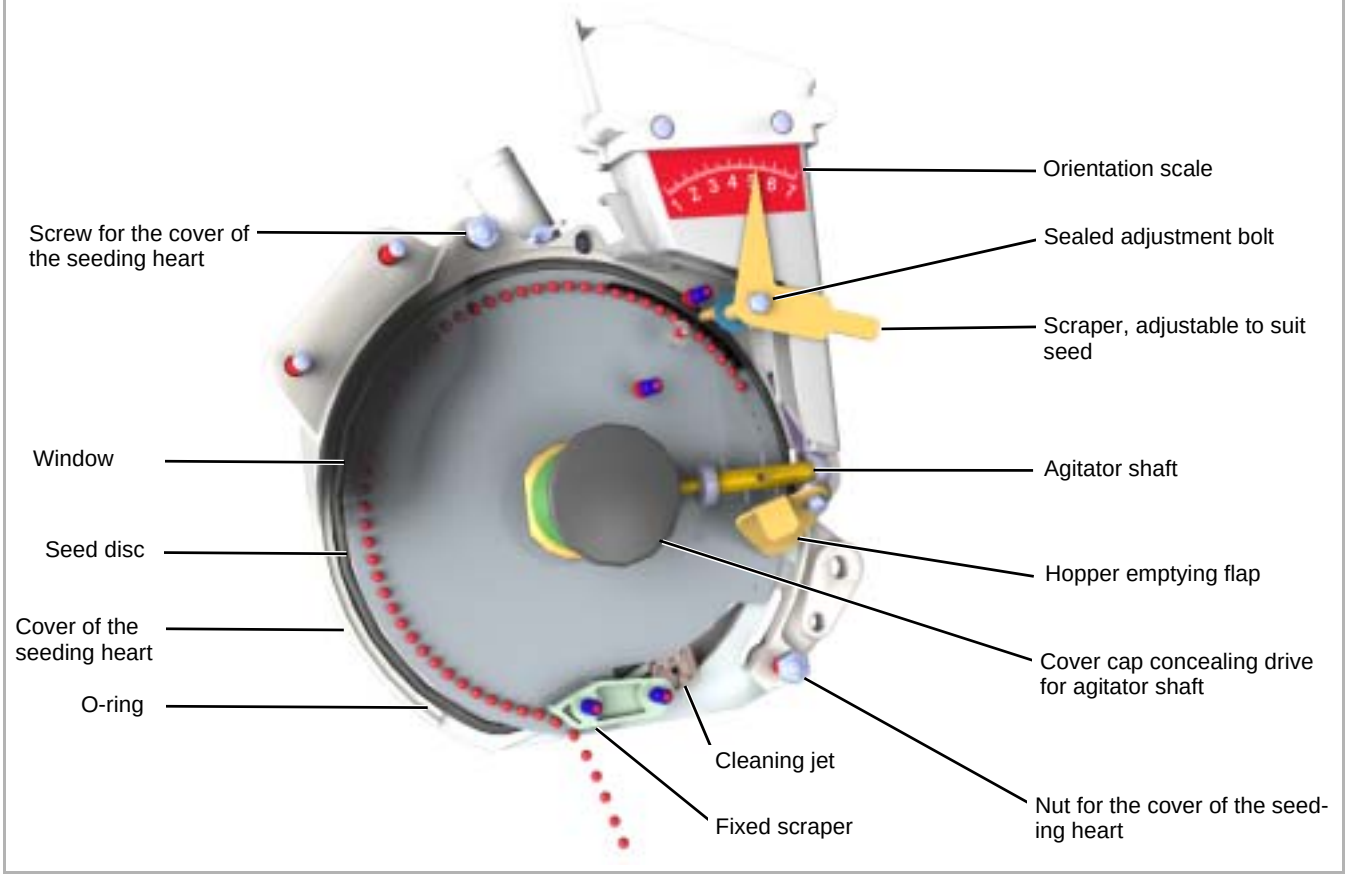
Single and twin seed unit



Double seed row



Seeding heart



Technical data

Frame

	Height [m]		Width [m]		Depth [m]	Weight [kg]
	Work position	**Transport position**	**Work position**	**Transport position**		
Rigid frames						
2.00 – 4.00 m	2,25 – 2,50	2,25 – 2,50	2,55 – 2,80	2,55 – 4,00	1,80	See model plate
4.50 – 6.50 m	2,70 – 3,00	2,70 – 3,00	4,50 – 6,50	2,65 – 2,90	1,80	See model plate
Hydraulically foldable frame (F)						
6.00 m	1,80 – 2,20	2,90 – 3,20	6,10	2,80 – 3,20	1,70	See model plate
Lengthways transport attachment, attachable						
Draw bar						25
Per transport wheel						40
Equaliser bar						30
Fan drive						
At the 540 drive	540					
With 1000 rpm drive	1000					
Noise level [dBA]						
Fan at 4200 rpm	98* *Driven by electric motor. Maximum value, measured on the enveloping curve. The tractor can change the noise level					

Sowing unit

Seed hopper		
	Volume [l]	4
	Fill level • Minimum • Maximum	 Up to filler Approx. 1 cm from hopper edge
Weights of the sowing unit [kg] without seed		
	Single / twin seed unit	29,5/32,0
	Double seed row	50,0
Tool weights [kg]		
	Finger coverer	1,7
	Adjustable coverer	1,1
	Towing coverer	0,3
	Intermediate press wheel with rubber mount	1,0
	Intermediate press wheel with stainless-steel ring	1,2
	Press wheel with stainless-steel ring	4,8

Others

Tractor		
	Tractive effort, minimum [kW]	
	• 2.00 – 4.00 m rigid	from 30
	• 4.50 – 6.50 m rigid	From 50
	• 6.00 m (F)	From 65
Tyre pressure [bar]		
	Transport wheels 7.00 – 12	2,0
	Drive wheels 7.00 – 12	1,5
Granule distributor [+]		
	Hopper volume [l]	33
	Number of outlets	2 or 3
	Fill level	
	• Minimum [l]	0,3
	• Maximum	Approx. 1 cm from hopper edge
	Number of sowing units	6 – 18
Hydraulic fan drive, flow rate [l/min]		
	all frames	35
Control valves		
	Frame track marker up to 3.50 m	1x single acting
	Frame track marker up to 3.50 m	1x double acting
	Frame track marker up to 6.50 m	1x double acting
	Frame folding mechanism 6.00 m	1x double acting
	Hydraulic fan drive	1x single acting 1x pressureless return line
Control system and the electrohydraulics		
	Power supply [V]	12
	Fuse [A]	16
Protection class		
	for all electrical systems	IP 65

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

Assembling the unit without specialist knowledge may lead to damage to the machine or to poor work results.

Electrical control system
An electrical control system is available as an accessory for creating tramlines, for example. 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.

Coupling

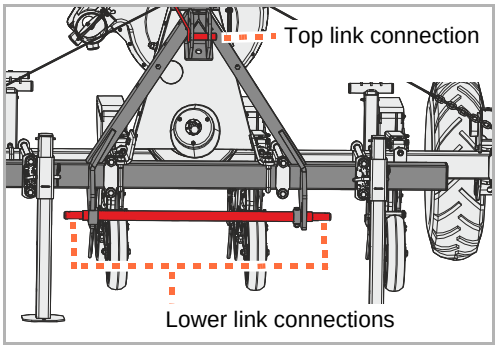
Increased risk of injury
Coupling the machine to the tractor creates an increased risk of injury. Therefore:

- 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.

Lower link

The machine is factory-equipped for mounting with a three-point linkage.



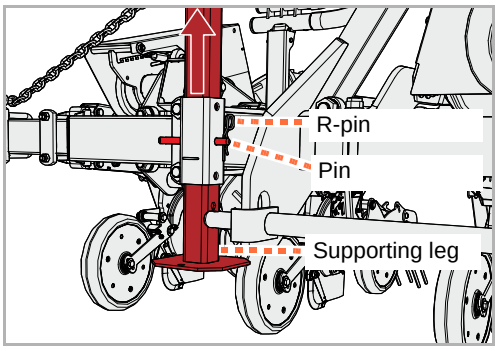
- Slide suitable catch pans on the lower link arms of the machine for the tractor and secure with linchpins
- Set both lower links on the tractor to the same height

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

- Couple the machine with the tractor. Ensure that the lower link engages.
- Lift the machine slightly above the lower link.

Supporting leg

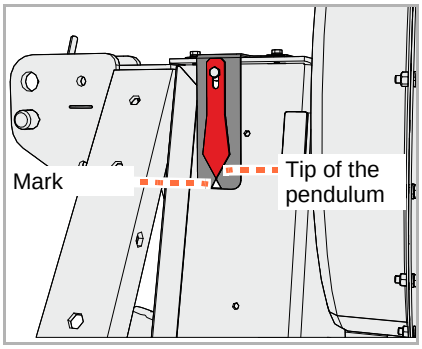
There may be one or two supporting legs depending on the type of machine.



- Remove the R-pin from the pin
- Remove the pin
- Slide up the supporting leg and secure it using the pin
- Secure the pin with the R-pin

Top link

- Set the top link so that the frame is parallel to the ground in the work position and the three-point linkage is vertical
- Set the lower link so that the machine has little play to the left or right



For orientation purposes, there is a pendulum on the fan holder. You can carry out adjustments with the aid of the pendulum on a horizontal surface. The tip of the pendulum must correspond to the marking.

Never set the depth of the machine via the lower link, but rather at each individual sowing unit.

Connecting

After coupling, make the following connections:

- Electrical connections
- Hydraulic connections

Electrics

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

- The electrical or electronic control system of the machine
- The lighting of the machine

▶ Check all connections to ensure they are working properly

Hydraulics

Attach the following hydraulic lines to the tractor, if available, for:

- Hydraulically actuated track marker
- Hydraulic folding mechanism for the frame
- Hydraulic fan drive

▶ Check all connections to ensure they are working properly

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

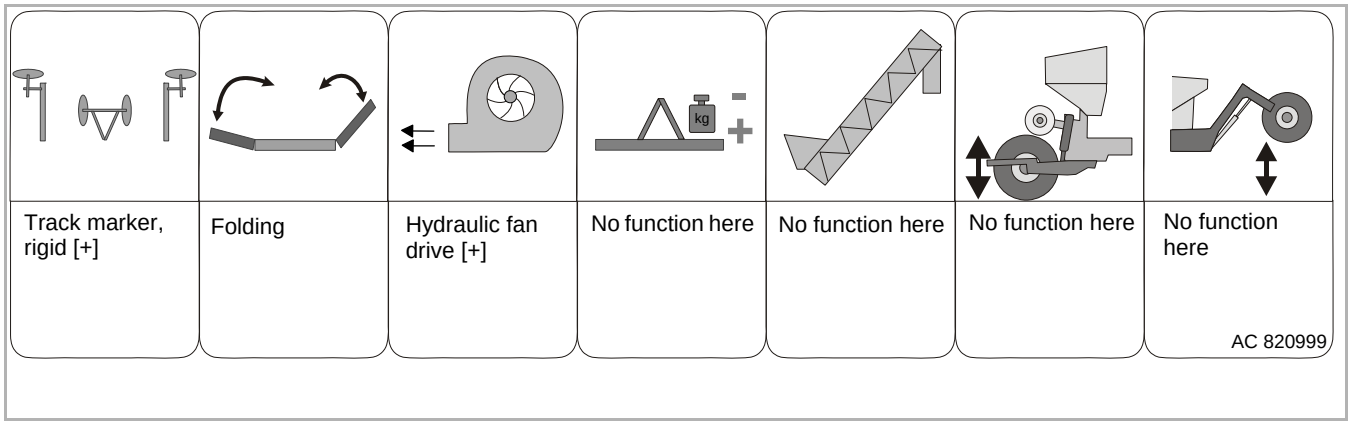
Securing the control units
In the transport position, secure the control units on the tractor to prevent accidental operation.
Accidental actuation of the control units can trigger unpredictable movements on the machine and cause accidents.

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

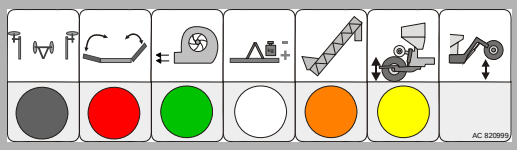
The machine must be connected to the tractor's hydraulic system.

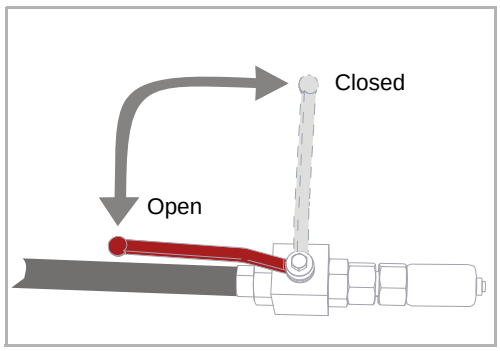
The hydraulic hoses are colour-coded so that you can assign the functions to the individual hydraulic hoses more easily. The functions available on your machine are labelled on the label with coloured dots.



Control valves

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

Function 	Control valves		Colour coding
	Single-acting	Double-acting	
Frame track marker up to 3.50 m	x		Grey
Frame track marker up to 3.50 m		x	Grey
Frame track marker up to 6.50 m		x	Grey
Hydraulic fan drive pressureless return line, maximum 10 bar	x		Green
hydraulic folding mechanism		x	Red



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	Values
Hydraulic motor [ccm]	
all frames	6,3
Displacement [l/min] at 5400 rpm at fan	
all frames	35

The rotational speed has a fluctuating range of ± 50 rpm if the rotational speed has been set with 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.

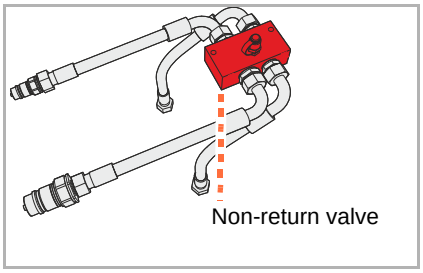
Conversions only with fan turned off
Adjustments to the rotational speed may only be made when the fan is stationary.
Otherwise, the machine can be damaged.

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

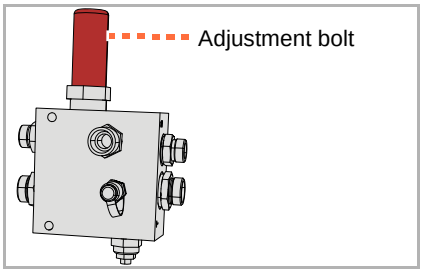
Non-return valve on the machine

If there is a non-return valve on the machine, you must set the fan speed at the tractor.



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

3-way flow control valve on the machine

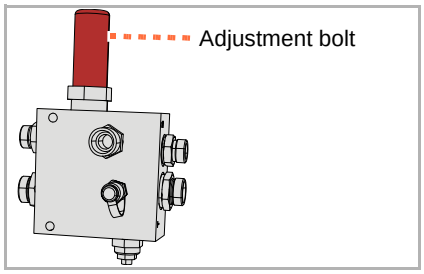


- Fully open the 3-way flow control valve

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



- Set the desired speed with the adjustment bolt at the 3-way flow control valve

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 performed 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.

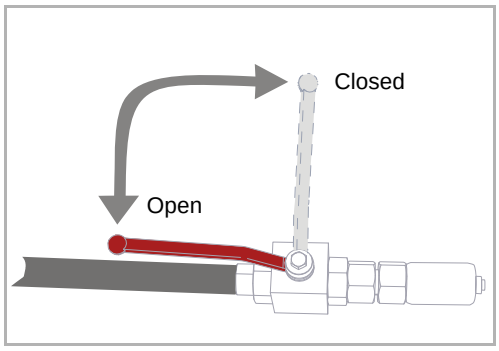
Example:

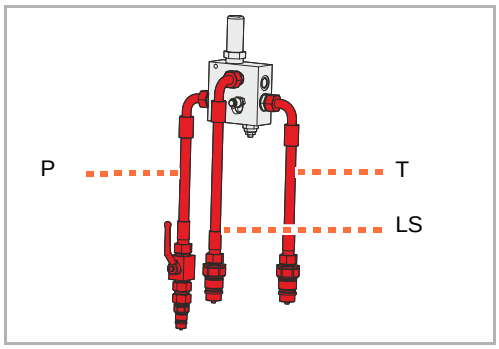
Conveying capacity of the hydraulic pump	100 l/min
Quantity of oil required for permanent consumer	40 l/min
Quantity of oil required for other consumers	70 l/min
Quantity of oil lacking	10 l/min
Reduction of the working speed to	60 %

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)

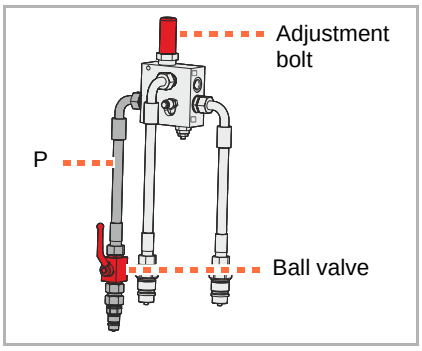




- Make connections in the following sequence:
  - 1. Return line (T)
  - 2. Control line (LS)
  - 3. Feed line (P)
- Activate the fan speed counter (depending on the available display unit or monitor)

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.

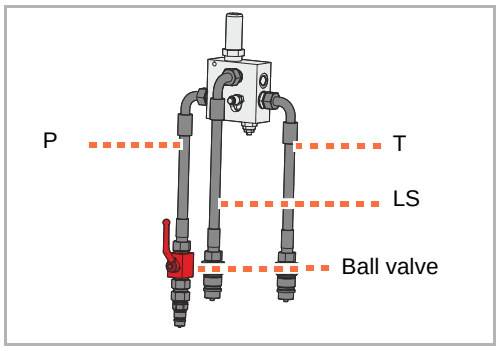


- Open the ball valve at the feed line (P)

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.

- Set the desired speed with the adjustment bolt at the 2-way flow control valve

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 of its own accord until the hydraulic oil has reached 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:

- Frame
- Track marker
- Sowing units
- Double seed row
- Chain-driven gearbox
- Coverer
- Intermediate press wheel
- Clod deflector
- Press wheel
- Seed hopper
- Negative pressure and overpressure
- Settings at the seeding heart
- Granule distributor

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

The following applies for all work:

- Secure the machine
- Lower the machine to its work position
- Make settings as desired
- Move the machine back into the transport position

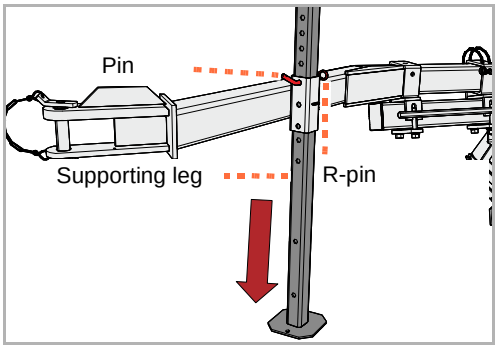
Work position

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

Rigid frame with lengthways transport attachment

Use of safety shoes
Wear proper shoes. So you can prevent injury.
Carrying out work without wearing proper shoes can lead to crush injuries

Do not place your feet under the drawbar
The drawbar weighs approx. 25 kg, and a support wheel approx. 40 kg. Under no circumstances should feet be positioned under the drawbar or support wheel when working. Secure drawbar so that it cannot fall down.
If the drawbar or support wheel falls down by accident, this can cause injuries.

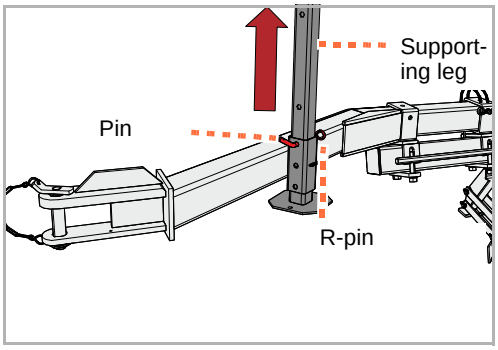


- Lower the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin

If there are electrical connections or hydraulic connections:

- Disconnect the electrical connections and hydraulic connections from the tractor

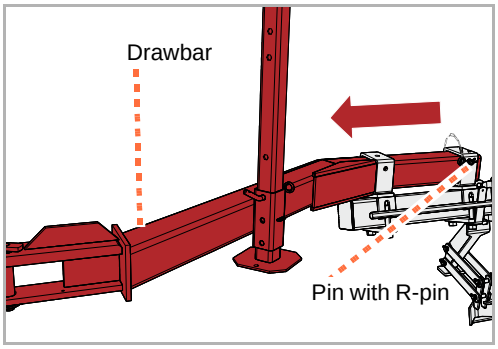
- Lower the machine and park it on the ground
- Uncouple the machine
- Drive the tractor in front of the three-point linkage of the machine
- Coupling the machine
- Lift the machine



- Pull up the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin

Drawbar

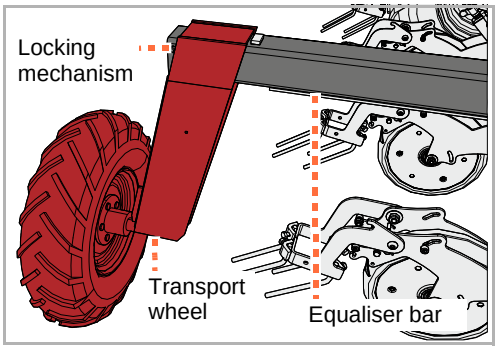
You can remove the drawbar if it causes problems when working at the field edge.



- Remove the pin on the drawbar
- Pull out the drawbar

Transport wheels

You can remove the transport wheels or carry them along on the machine.



- Press the lock on the equaliser bar and take the transport wheel from the equaliser bar

If the transport wheels are to be carried along on the machine during work:

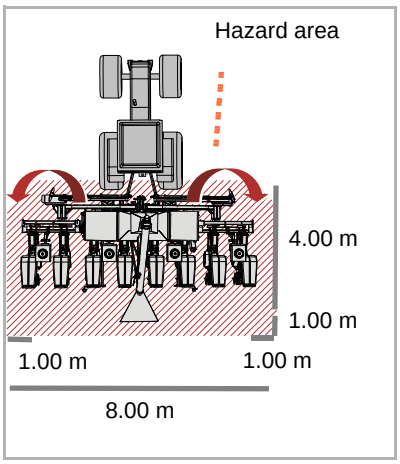
- Turn the transport wheels 180° and slide them onto the equaliser bar until they lock

If there are electrical connections or hydraulic connections:

- Connect the electrical connections and hydraulic connections to the tractor

Hydraulically foldable frame

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 can be seriously or fatally injured.

Folding out

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 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.

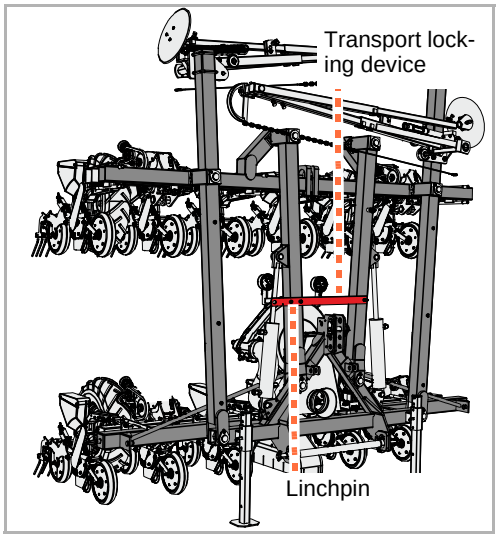
Do not make any alterations
The frames fold out slowly. Never manipulate the equipment for faster folding in.
A faster folding process leads to destruction of machine components.

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 switch position on the control panel
Track markers and frame folding mechanism must not be “ON” at the same time. This can result in damage to the machine.

Transport locking device

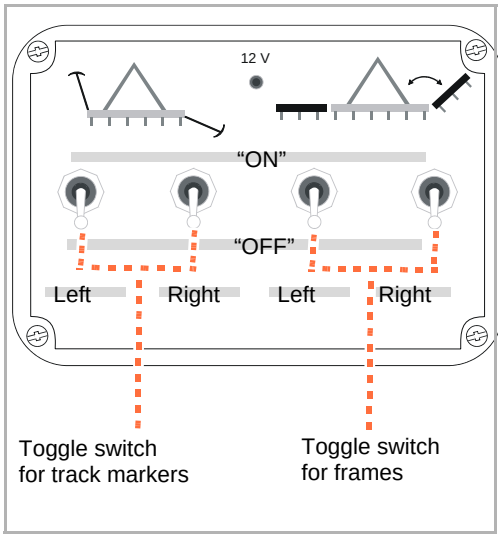
The transport locking device is secured by a linchpin on the right side of the frame. You must unlock the transport locking device before folding out.



- Remove the linchpin on the right side
- Fold back the transport locking device
- Hook the transport locking device on the left side and secure with the linchpin

Folding

To fold out the frame operate the toggle switch of the control panel.



- Move both toggle switches for the track marker to “OFF”
- Move both toggle switches for the frame to “ON”
- Actuate the control unit on the tractor. The frames now fold out.
- Actuate the control unit until the frame is folded out completely

After the frame has folded out:

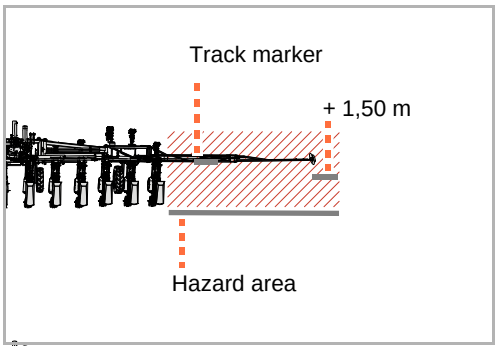
- Lower the frame to its work position
- Move both toggle switches for the frame to “OFF”
- Move both toggle switches for the track marker to “ON”

Track marker [+]

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

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 can be seriously or fatally injured.

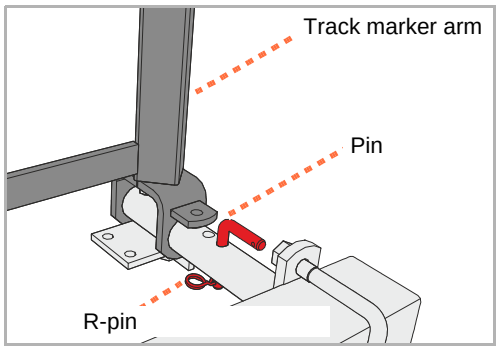


Frame width [m]	Hazard area [m]
2,50	2,75
3,00	3,00
3,50	3,25
4,00	3,50
4,50	3,75
5,00	4,00
5,50	4,25
6,00	4,50
6,50	4,75

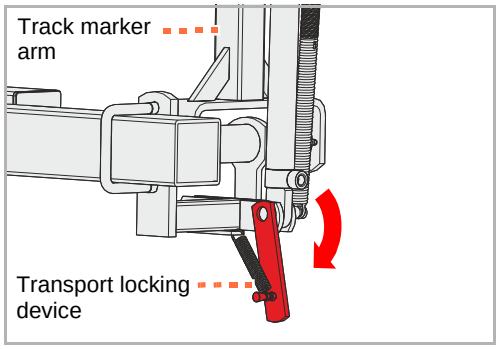
Transport locking device

Depending on the type of frame different transport guards are available. The track markers must be released on both sides before use.

Frame up to 3.50 m

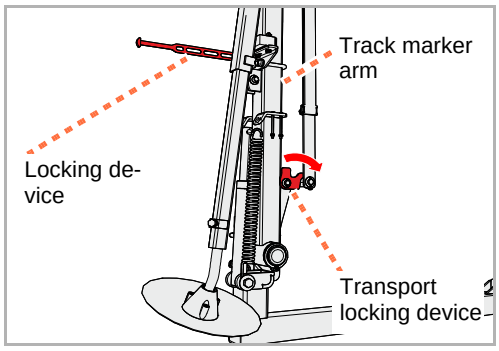


- Remove the R-pin on the pin and remove the pin
- Swivel the track marker arm downwards
- Insert the pins and secure them with safety splints



- Press against the track marker arm with one hand
- Open the transport locking device

Frame up to 6.50 m



- Press against the track marker arm with one hand
- Open the transport locking device
- Releasing the lock

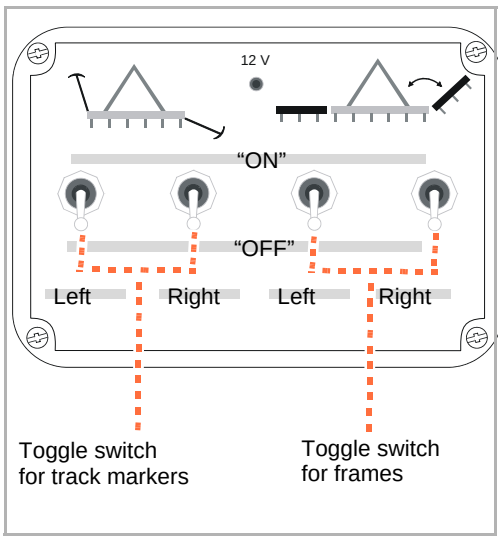
Track marker

Without an electrical control system

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

With an electrical control system

To fold out the track marker using a double-acting control valve, actuate the toggle switch on the control panel and the control unit on the tractor.



- Check that the toggle switch for the frame is set to “Off”
- Turn toggle switch for the track marker left or right to “ON”
- Actuate the control unit on the tractor. The track marker folds out.
- Toggle switch to “OFF”
- Toggle switch for the second track marker to “ON”
- Actuate the control unit on the tractor. The second track marker folds out.
- Turn both toggle switches to “ON”

Length

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:

- On the tractor front wheels:
  The centre of the tractor front wheel crosses the mark.

or

- On the centre of the tractor:
  The centre of the tractor crosses the mark.

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.

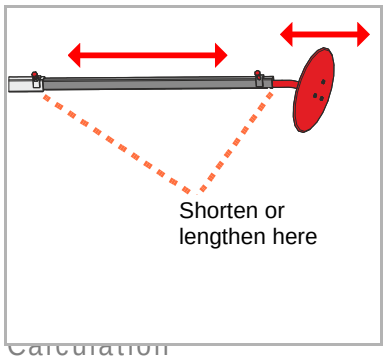
To the front tractor wheels

You will need the following information:

- Row spacing of the seeding machine (= distance between seed rows)
- Working width of the seeding machine
- Tractor track width (= distance between centres of front wheels)

▸ Move the machine to its work position

▸ Lower the track markers



Only shorten or extend them to the same length
Always shorten or lengthen track markers at both track marker legs so that the marker disc does not damage the hydraulic hoses during the folding procedures.
Persons can suffer injury if hydraulic oil is released under high pressure.

Calculation

Length of the track markers for tractor front wheels =

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

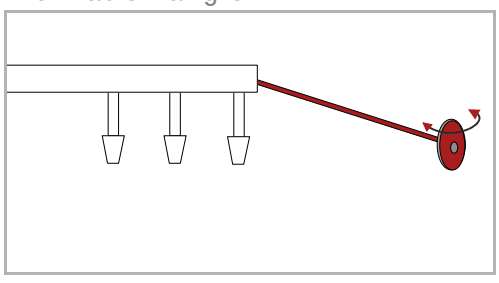
Example

Row spacing of the seeding machine	25.0 cm
Working width of the seeding machine	600.0 cm
Tractor track width	200.0 cm

$$\frac{25 + 600 - 200}{2} = 212,5$$

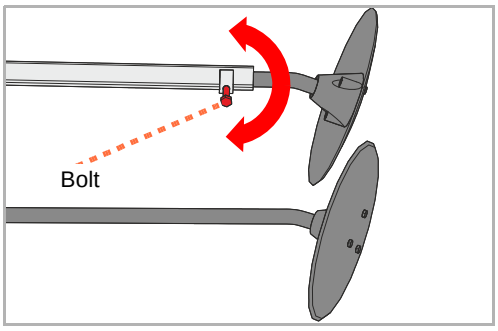
In this example, the calculated length of the track markers is 212.50 cm.

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 screw

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

Row spacing

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

To the tractor centre

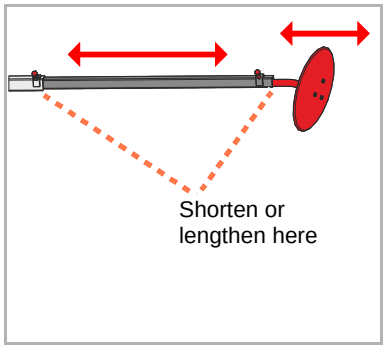
The sowing units can be arranged at the same distance throughout or at different distances for use on flower beds.

Sowing units arranged with the same spacing throughout

You will need the following information:

- Row spacing of the seeding machine (distance between sowing units)
- Working width of the seeding machine

- Move the machine to its work position
- Lower the track markers



Only shorten or extend them to the same length
Always shorten or lengthen track markers at both track marker legs so that the marker disc does not damage the hydraulic hoses during the folding procedures.
Persons can suffer injury if hydraulic oil is released under high pressure.

Calculation

Length of the track markers for tractor centre =

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

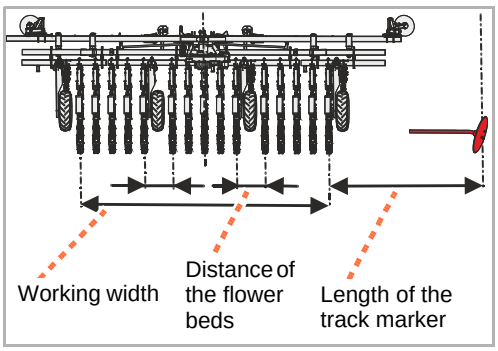
Example

Row spacing of the seeding machine 25.0 cm
Working width of the seeding machine 600.0 cm

$$\frac{25 + 600}{2} = 312,5$$

In this example, the calculated length of the track markers is 312.50 cm.

Sowing units for use on flower beds

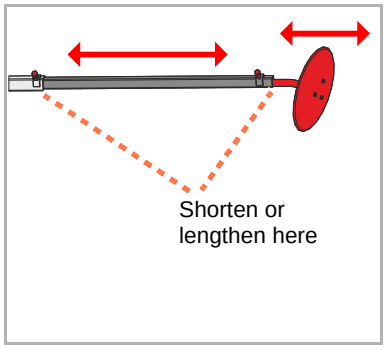


You will need the following information:

- Working width of the seeding machine
  (distance from the first sowing unit to the last sowing unit)
- Distance between the flower beds
  (distance from the last sowing unit of the first flower bed to the first sowing unit of the second flower bed)

▸ Move the machine to its work position

▸ Lower the track markers



Only shorten or extend them to the same length
Always shorten or lengthen track markers at both track marker legs so that the marker disc does not damage the hydraulic hoses during the folding procedures.
Persons can suffer injury if hydraulic oil is released under high pressure.

Calculation

Length of the track markers for tractor centre =

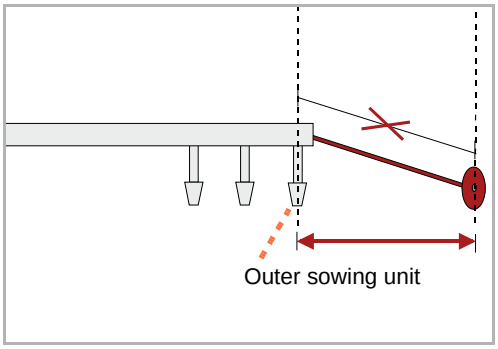
$$\frac{\text{Arbeitsbreite}}{2} + \text{Distance of the flower beds}$$

Example

Working width of the seeding machine	400.0 cm
Distance of the flower beds	46.0 cm

$$\frac{400}{2} + 46 = 246,0$$

In this example, the calculated length of the track markers is 246.0 cm.



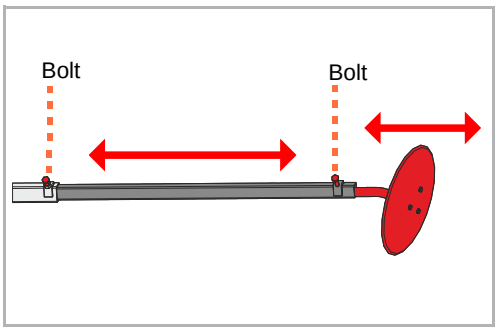
Measure out the calculated track marker length on the ground, never directly on the track marker arm. That would introduce inaccuracies.

Right track marker arm:

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

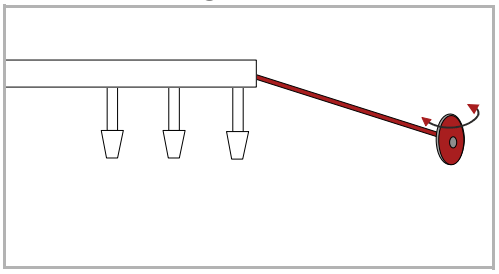
Left track marker arm:

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



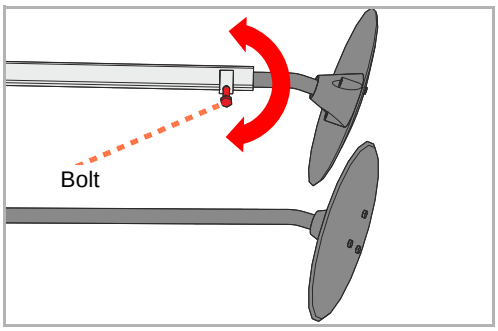
- Release the bolts
- Set the track marker as desired
- Re-tighten bolts

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 screw

Row spacing

If necessary, a correction of the length of the track marker is required. Therefore, check the length after setting the inclination angle.
If different row spacings need to be set, please contact your dealer.

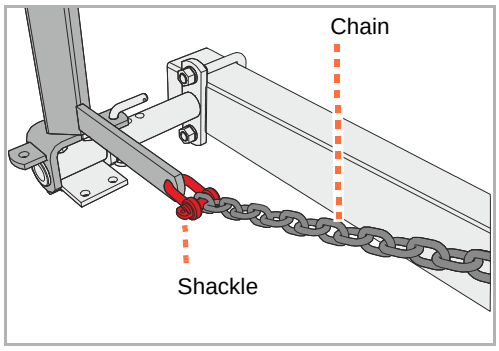
Working depth of the track markers

After setting the length of the track markers it is then necessary to set the working depth.

Frame up to 3.50 m with rope

The length of the chain is set for the initial application only. The length of the chain depends on the working depth of the track marker in the ground.

The chain can only be adjusted with the track markers folded out.

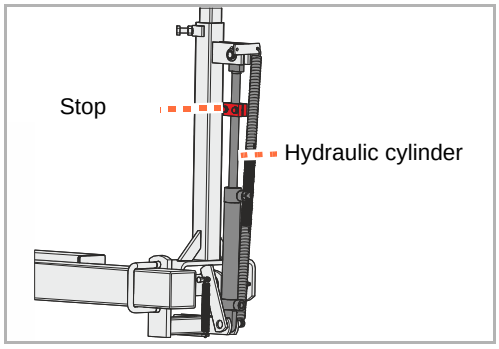


- Open and remove the shackle
- Shorten or lengthen the chain in accordance with the working depth
- Insert the shackle at the chosen point and tighten the bolt

Frame up to 3.50 m with hydraulic cylinder

It is only necessary to set the length of the hydraulic cylinder the first time it is used. The length of the hydraulic cylinder depends on the working depth of the track marker in the ground.

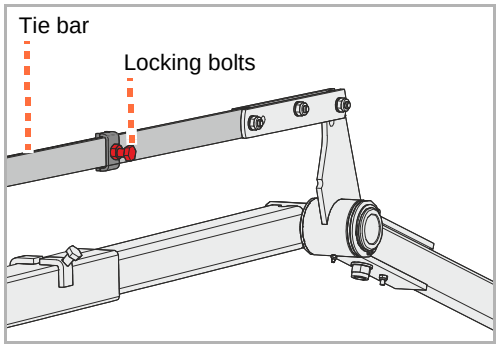
The stop on the hydraulic cylinder can only be set with the track markers folded in.



- Fold in the track marker
- Undo the bolts in the stop
- Move the stop on the hydraulic cylinder as required
- Tighten the bolts in the stop

Frame up to 6.50 m with hydraulic cylinder

It is only necessary to set the length of the tie bar the first time it is used. For later uses, it is only necessary to check the working depth of the track markers and adjust the length of the tie bar as required.



- Folding out the track markers
- Undo the locking bolts on the tie bar
- Set the length of the tie bar
- Tighten the locking bolts on the tie bar

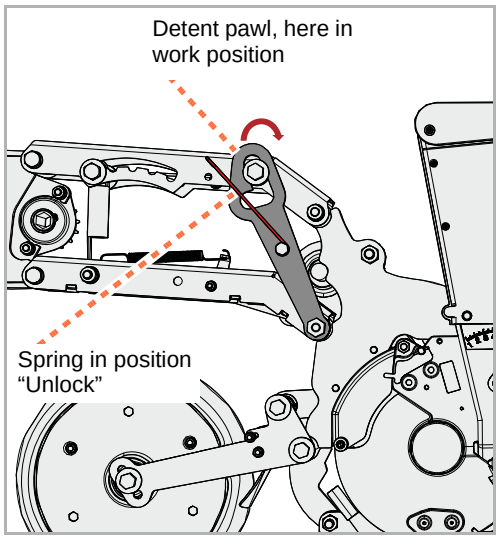
Sowing units

Before carrying out work on the sowing units, the machine must be parked securely.
→ Chapter »Maintenance«, section »Secure the machine«, page 147

Prerequisites:

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

Work position



For the setting up work, the seed rows must be lowered into the work position.

- Place spring on detent pawl at “Unlock” position
- Lift the machine
- Lift the sowing unit over the engaging point. The detent pawl is folded away by the spring.
- Lower the sowing unit again

Particular features during road transport
The seed rows must be brought into their work position for road transport. This is especially necessary for particularly poor routes. *Otherwise, the machine can be damaged.*

Load or load relief

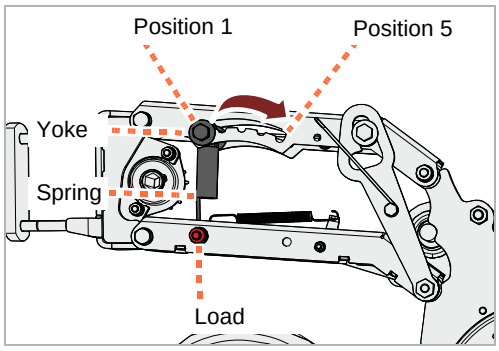
You can apply or remove additional pressure to load or relieve the load on individual sowing units using springs. This enables you to set the sowing unit to optimally suit the soil conditions.

Double seed row

In the case of the twin seed row, only the load relief setting can be adjusted.

Single seed unit

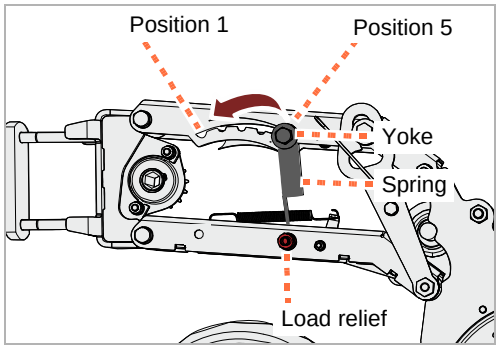
Load



- Setting the spring to load
- Engage the yoke in the desired position

Position of the yoke	Additional load of sowing unit
1	0
2	Low
3	Medium
4	Strong
5	Maximum

Load relief

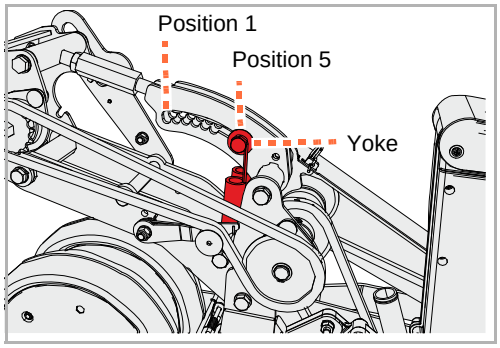


- Setting the spring to load relief
- Engage the yoke in the desired position

Position of the yoke	Additional relieving of seed row
1	Maximum
2	Strong
3	Medium
4	Low
5	0

Double seed row

Load relief



- Engage the yoke in the desired position

Position of the yoke	Additional relieving of seed row
1	Maximum
2	Strong
3	Medium
4	Low
5	0

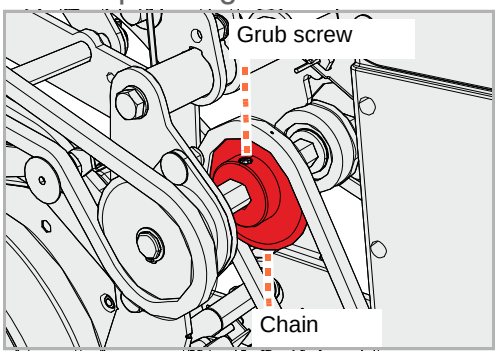
Sowing depth

The deposit depth can only be set in the field.
→ Chapter »Preparations in the field«, section »After the test drive«, from page 123

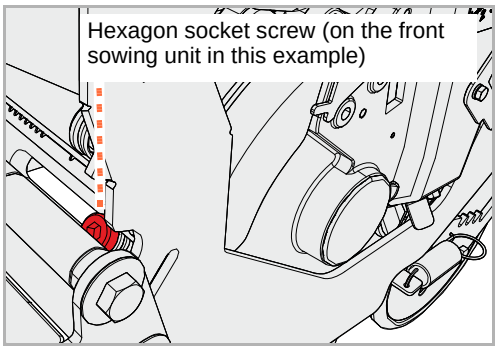
Double seed rows

With double seed rows, the distance that can be set between rows is infinitely variable.

Row spacing



- Release the grub screw on the chain wheel for the seed row concerned



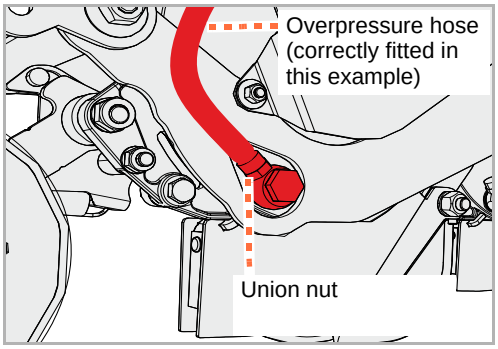
- Release the hexagon socket screw on the seed row
- Slide the chain wheel and seed row alternately in small increments as desired. Ensure correct chain alignment whilst doing so.
- Resecure the chain wheel and seed row

Right-hand sowing unit of the double seed row

For the right-hand sowing unit of the double seed row, you must carry out the following adjustments in addition to the steps stated above:

- Overpressure hose
- Chain wheel

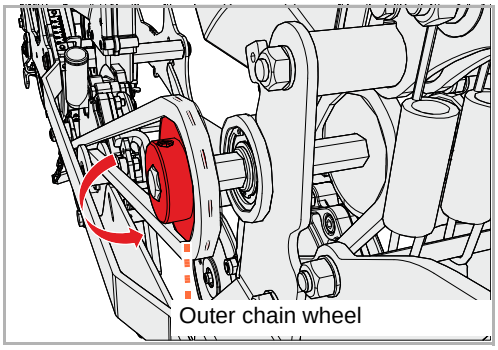
Overpressure hose



- Undo the union nut on the overpressure hose and remove the overpressure hose
- Move the sowing unit as required
- Fit the overpressure hose on the outside again

Chain wheel

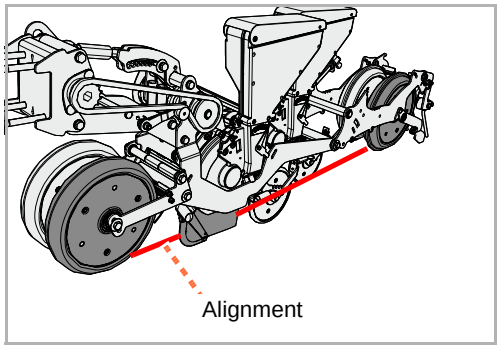
You can remove the outer chain wheel and turn it 180°. It is easier to achieve the correct alignment of the seed row and chain wheel if the seed row is positioned fully outwards.



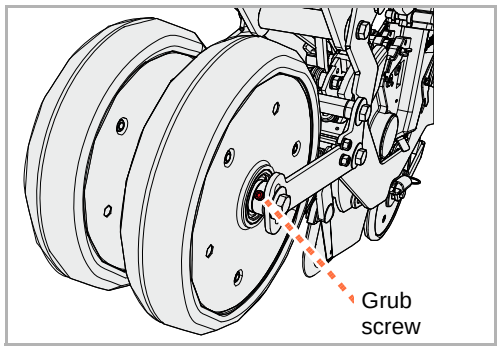
- Slacken the chain
- Release the grub screw on the chain wheel
- Remove the chain wheel and turn it through 180°
- Slide on the chain wheel and secure with the grub screw
- Pull on the chain

Press wheels

If the distance between seed rows has been modified, the pressure wheels upstream and downstream of the seeding heart must be set to the new distance.
The forward and rear pressure wheels should be in exact alignment with the coulter tips.



For orientation purposes, the axles are marked. Using these markings, it is possible to make the same settings for all pressure wheels.



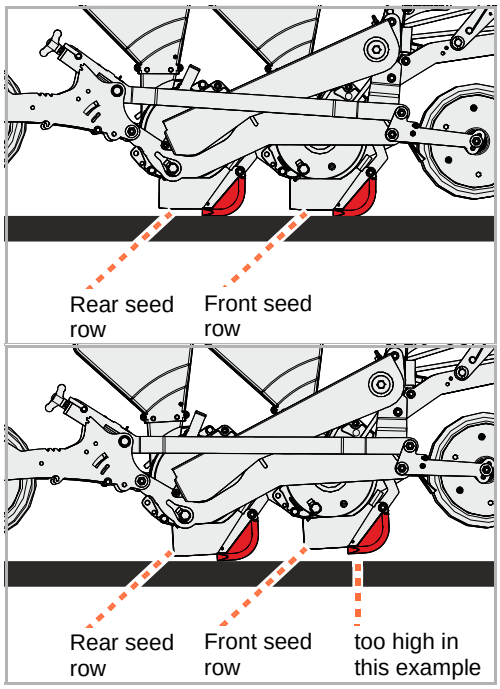
- Release the grub screw on both sides of the pressure wheel and set the pressure wheel as desired
- Secure the pressure wheel using the grub screws

Parallelogram

Both seed rows of a double seed row unit should run one behind the other at the same height. With some double seed rows, minor offsets can cause the rear seed row to sow lower or higher than the front seed row.

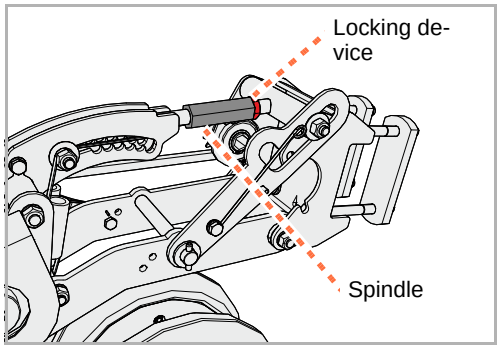
By making settings on the parallelogram, it is possible to ensure that the seed rows are level again.

- Park the machine on a perfectly level surface, which should also be as flat as possible
- Using the top link, set the frame parallel with the ground
- Check whether any offset is present between the front and rear seed rows



If there are is any offset between the front and rear sowing units:

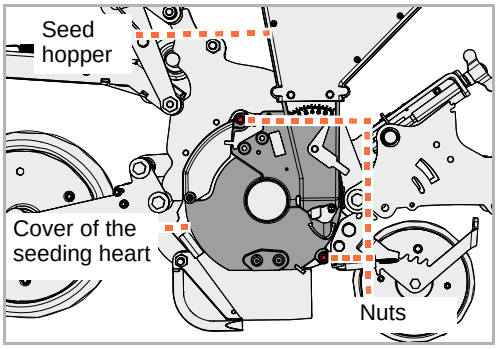
- Release the securing device on the spindle
- Set the spindle as desired until both seed rows are operating on one level
- Secure the spindle



The spindle setting shown is required only if a correction using the tractor's top link does not prove satisfactory.

Seed disc

Appropriate seed discs are available for the different seeds. Check before starting to sow, whether the correct seed disc is installed.



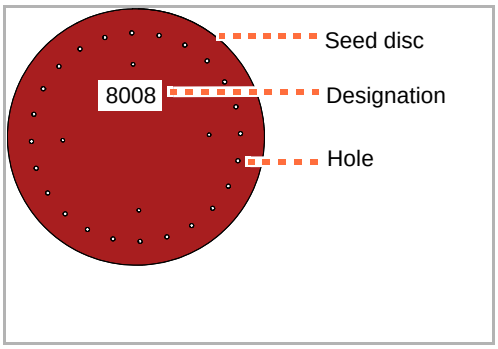
- Undo and remove the nuts
- Remove the cover of the seeding heart with the seed hopper

Identification

A 4-digit or 5-digit designation is located on the seed disc. It consists of:

- Number of holes
  (Numbers 1+2+(3))
- Bore diameter [mm]
  (The last two numbers)

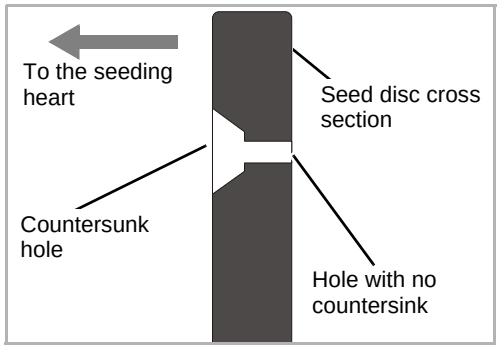
Example



Seed disc 8008 =
Seed disc with 80 holes, each with a diameter of 0.8 mm

Ensure that the seed disc is in the correct installation position:

- Fit the disc with the countersunk holes facing the seeding heart



Deliverable seed discs

Which seed disc is suitable for which seed can be determined from the table on the next page. However, the values in the table are provided for guidance only. The calibration and form of the seed depend on:

- Type
- Growth pattern
- Manufacturer

The number of holes in the seed disc determines the spacing between crops in the seed row. The following table is a reference:

Crop spacing [cm]	Number of holes
2,0 – 10,0	80
3,0 – 15,0	60
4,0 – 20,0	40
7,0 – 43,0	20

Extract of the available seed discs:

Vegetable	Calibration (non-pelleted or pelleted)	Seed disc		
		Type	Holes	
			Quantity	Ø [mm]
Asparagus	2,50 – 3,50	2020	20	2,0
	3,50 – 4,00	2020	20	2,0
Cucumber	–	2020	20	2,0
Beetroot	3,00 – 4,00	8020	80	2,0
	3,00 – 4,00	6020	60	2,0
Onions, calibrated	2,00 – 2,25	8010	80	1,0
Onions, pelleted	3,00 – 4,00	6020	60	2,0
Cabbage	1,50 – 1,75	2008	20	0,8
	1,50 – 1,75	4008	40	0,8
	2,00 – 2,25	2010	20	1,0
	2,00 – 2,25	4010	40	1,0
Fennel	–	6012	60	1,2
	–	8012	80	1,2
Leek	1,50 – 1,75	8008	80	0,8
	1,75 – 2,25	8010		1,0
Garden radish	2,50 – 2,75	8012		1,2
	2,75 – 3,00	8012	80	1,2
	3,00 – 3,25	8015		1,5
Spinach	2,50 – 3,50	4015	40	1,5
Carrots	1,00 – 1,60	8006	80	0,6
	1,00 – 1,60	16006	160	0,6
	1,60 – 2,00	8008	80	0,8
	1,60 – 2,00	16008	160	0,8
Carrots, pelleted	2,00 – 2,50	8010	80	1,0
Parsnips, calibrated	–	6012	60	1,2
Winter radish	2,75 – 3,25	8015	80	1,5
	2,75 – 3,25	6015	60	1,5
Parsley	0,75 – 1,00	8005	80	0,5
Lettuce	0,75 – 1,00	2005	20	0,5
	0,75 – 1,00	4005	40	0,5
Corn salad	1,25 – 2,00	8006	80	0,6
Iceberg lettuce (use only ground seed)	–	2004	20	0,4
	–	4004	40	0,4
Poppy	1,25 – 1,50	8006	80	0,6
	1,25 – 1,50	6006	60	0,6
Chicory	1,25 – 1,50	8005	80	0,5
	1,50 – 1,75	8006		0,6
Tomatoes	2,00 – 2,25	4010	40	1,0
	2,00 – 2,25	6010	60	1,0
Beet, calibrated	3,25 – 4,25	2020	20	2,0
Turnips	3,25 – 4,75	2020	20	2,0

Each seed disc is designed for a specific distance between the seeds in the row. If you are not sure about which seed disc you need, please contact your dealer.

Replacing the seed disc:
→ Chapter »Maintenance«, section »Replacing the seed disc«, page 152

Sowing distance

You can modify the sowing distance by:

- The type of seed disc (number of holes)
- Adjustments made at the chain-driven gearbox

Calculation

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

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



Example:
You intend to sow 250,000 individual seeds/ha:

Seeds/hectare	= 250.000
Row spacing	= 15 cm
Sowing distance	= ?

$$\frac{10.000}{50{,}000 \times 0.15} = 0,267\text{r} = 26{,}7 \text{ cm}$$

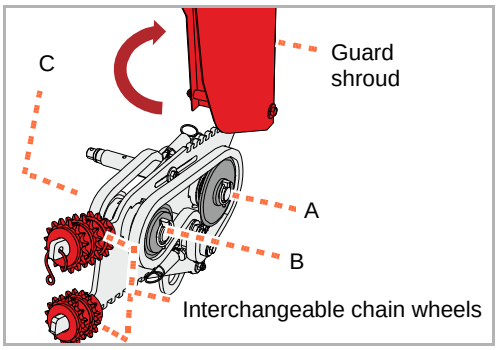
The following tables indicate some sowing distances depending in the number of grains/ha and the row spacing. The values apply to machines with sowing units that are equipped with seed discs with one row of holes.
For machines with sowing units that are equipped with seed discs with two rows of holes, the values must be doubled.

Sowing distance [cm]	Row spacing [cm]										
	5	6	7	8	9	10	11	12	13	14	15
1	20.000.000	16.666.667	14.285.714	12.500.000	11.111.111	10.000.000	9.090.909	8.333.333	7.692.308	7.142.857	6.250.000
2	10.000.000	8.333.333	7.142.857	6.250.000	5.555.556	5.000.000	4.545.455	4.166.667	3.846.154	3.571.429	3.125.000
3	6.666.667	5.555.556	4.761.905	4.166.667	3.703.704	3.333.333	3.030.303	2.777.778	2.564.103	2.380.952	2.083.333
4	5.000.000	4.166.667	3.571.429	3.125.000	2.777.778	2.500.000	2.272.727	2.083.333	1.923.077	1.785.714	1.562.500
5	4.000.000	3.333.333	2.857.143	2.500.000	2.222.222	2.000.000	1.818.182	1.666.667	1.538.462	1.428.571	1.250.000
6	3.333.333	2.777.778	2.380.952	2.083.333	1.851.852	1.666.667	1.515.152	1.388.889	1.282.051	1.190.476	1.041.667
7	2.857.143	2.380.952	2.040.816	1.785.714	1.587.302	1.428.571	1.298.701	1.190.476	1.098.901	1.020.408	892.857
8	2.500.000	2.083.333	1.785.714	1.562.500	1.388.889	1.250.000	1.136.364	1.041.667	961.538	892.857	781.250
9	2.222.222	1.851.852	1.587.302	1.388.889	1.234.568	1.111.111	1.010.101	925.926	854.701	793.651	694.444
10	2.000.000	1.666.667	1.428.571	1.250.000	1.111.111	1.000.000	909.091	833.333	769.231	714.286	625.000
11	1.818.182	1.515.152	1.298.701	1.136.364	1.010.101	909.091	826.446	757.576	699.301	649.351	568.182
12	1.666.667	1.388.889	1.190.476	1.041.667	925.926	833.333	757.576	694.444	641.026	595.238	520.833
13	1.538.462	1.282.051	1.098.901	961.538	854.701	769.231	699.301	641.026	591.716	549.451	480.769
14	1.428.571	1.190.476	1.020.408	892.857	793.651	714.286	649.351	595.238	549.451	510.204	446.429
15	1.333.333	1.111.111	952.381	833.333	740.741	666.667	606.061	555.556	512.821	476.190	416.667
16	1.250.000	1.041.667	892.857	781.250	694.444	625.000	568.182	520.833	480.769	446.429	390.625
17	1.176.471	980.392	840.336	735.294	653.595	588.235	534.759	490.196	452.489	420.168	367.647
18	1.111.111	925.926	793.651	694.444	617.284	555.556	505.051	462.963	427.350	396.825	347.222
19	1.052.632	877.193	751.880	657.895	584.795	526.316	478.469	438.596	404.858	375.940	328.947
20	1.000.000	833.333	714.286	625.000	555.556	500.000	454.545	416.667	384.615	357.143	312.500
21	952.381	793.651	680.272	595.238	529.101	476.190	432.900	396.825	366.300	340.136	297.619
22	909.091	757.576	649.351	568.182	505.051	454.545	413.223	378.788	349.650	324.675	284.091
25	869.565	724.638	621.118	543.478	483.092	434.783	395.257	362.319	334.448	310.559	271.739
24	833.333	694.444	595.238	520.833	462.963	416.667	378.788	347.222	320.513	297.619	260.417
25	800.000	666.667	571.429	500.000	444.444	400.000	363.636	333.333	307.692	285.714	250.000
36	769.231	641.026	549.451	480.769	427.350	384.615	349.650	320.513	295.858	274.725	240.385
30	740.741	617.284	529.101	462.963	411.523	370.370	336.700	308.642	284.900	264.550	231.481
36	714.286	595.238	510.204	446.429	396.825	357.143	324.675	297.619	274.725	255.102	223.214
46	689.655	574.713	492.611	431.034	383.142	344.828	313.480	287.356	265.252	246.305	215.517

Row spacing [cm]											
Sowing distance [cm]	**16**	**20**	**25**	**30**	**35**	**38**	**42**	**45**	**50**	**62,5**	**75**
1	6.250.000	5.000.000	4.000.000	3.333.300	2.857.100	2.631.600	2.381.000	2.222.200	2.000.000	1.600.000	333.300
2	3.125.000	2.500.000	2.000.000	1.666.700	1.428.600	1.315.800	1.190.500	1.111.100	1.000.000	800.000	666.700
3	2.083.300	1.666.700	1.333.300	1.111.100	952.400	877.200	793.700	740.700	666.700	533.300	444.400
4	1.562.500	1.250.000	1.000.000	833.300	714.300	657.900	595.200	555.600	500.000	400.000	333.300
5	1.250.000	1.000.000	800.000	666.700	571.400	526.300	476.200	444.400	400.000	320.000	266.700
6	1.041.700	833.300	666.700	555.600	476.200	438.600	396.800	370.400	333.300	266.700	222.200
7	892.900	714.300	571.400	476.200	408.200	375.900	340.100	317.500	285.700	228.600	190.500
8	781.300	625.000	500.000	416.700	357.100	328.900	297.600	277.800	250.000	200.000	166.700
9	694.400	555.600	444.400	370.400	317.500	292.400	264.600	246.900	222.200	177.800	148.100
10	625.000	500.000	400.000	333.300	285.700	263.200	238.100	222.200	200.000	160.000	133.300
11	568.200	454.500	363.600	303.000	259.700	239.200	216.500	202.000	181.800	145.500	121.200
12	520.800	416.700	333.300	277.800	238.100	219.300	198.400	185.200	166.700	133.300	111.100
13	480.800	384.600	307.700	256.400	219.800	202.400	183.200	170.900	153.800	123.100	102.600
14	446.400	357.100	285.700	238.100	204.100	188.000	170.100	158.700	142.900	114.300	95.200
15	416.700	333.300	266.700	222.200	190.500	175.400	158.700	148.100	133.300	106.700	88.900
16	390.600	312.500	250.000	208.300	178.600	164.500	148.800	138.900	125.000	100.000	83.300
17	367.600	294.100	235.300	196.100	168.100	154.800	140.100	130.700	117.600	94.100	78.400
18	347.200	277.800	222.200	185.200	158.700	146.200	132.300	123.500	111.100	88.900	74.100
19	328.900	263.200	210.500	175.400	150.400	138.500	125.300	117.000	105.300	84.200	70.200
10	312.500	250.000	200.000	166.700	142.900	131.600	119.000	111.100	100.000	80.000	66.700
21	297.600	238.100	190.500	158.700	136.100	125.300	113.400	105.800	95.200	76.200	63.500
22	284.100	227.300	181.800	151.500	129.900	119.600	108.200	101.000	90.900	72.700	60.600
25	271.700	217.400	173.900	144.900	124.200	114.400	103.500	96.600	87.000	69.600	58.000
24	260.400	208.300	166.700	138.900	119.000	109.600	99.200	92.600	83.300	66.700	55.600
25	250.000	200.000	160.000	133.300	114.300	105.300	95.200	88.900	80.000	64.000	53.300
36	240.400	192.300	153.800	128.200	109.900	101.200	91.600	85.500	76.900	61.500	51.300
30	208.300	166.700	133.300	111.100	95.200	87.700	79.400	74.100	66.700	53.300	44.400
36	173.600	138.900	111.100	92.600	79.400	73.100	66.100	61.700	55.600	44.400	37.000
46	135.900	108.700	87.000	72.500	62.100	57.200	51.800	48.300	43.500	34.800	29.000

Chain-driven gearbox

The sowing distance in the row is established using the chain-driven gearbox. The sowing distance in the row is dependent on the seed disc and the selected combination of chain wheels. The chain-driven gearbox has thee exchangeable chain wheels: A – B – C.



- Open the guard shroud on the gearbox
- Select the combination of chain wheels for the desired sowing distance in the row for the corresponding seed disc

→ Plant spacing chart

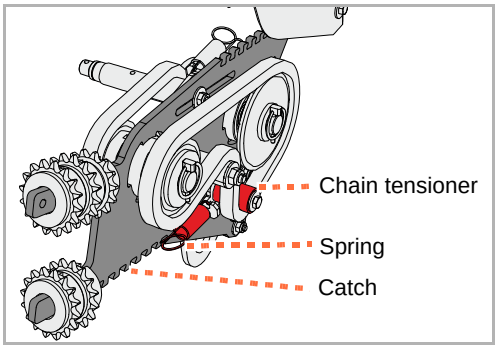
Plant spacing chart

Chain wheel			Sowing distance in the row [cm]					
			Number of holes in the seed disc					
A	B	C	20	40	60	80	120	160
28	13	20	7,0	3,5	2,3	1,8	1,2	0,9
28	15	20	8,1	4,0	2,7	2,0	1,3	1,0
28	16	20	8,6	4,3	2,9	2,2	1,4	1,1
28	17	19	9,7	4,8	3,2	2,4	1,6	1,2
20	13	19	10,3	5,2	3,4	2,6	1,7	1,3
28	19	18	11,4	5,7	3,8	2,8	1,9	1,4
28	20	18	12,0	6,0	4,0	3,0	2,0	1,5
17	13	18	12,8	6,4	4,3	3,2	2,1	1,6
16	13	18	13,6	6,8	4,5	3,4	2,3	1,7
20	17	18	14,3	7,1	4,8	3,6	2,4	1,8
19	17	18	15,0	7,5	5,0	3,8	2,5	1,9
20	19	18	16,0	8,0	5,3	4,0	2,7	2,0
19	20	18	17,7	8,8	5,9	4,4	2,9	2,2
15	17	18	19,0	9,5	6,3	4,8	3,2	2,4
16	20	18	21,0	10,5	7,0	5,2	3,5	2,6
20	28	19	22,3	11,1	7,4	5,6	3,7	2,8
15	19	16	23,9	12,0	8,0	6,0	4,0	3,0
16	20	15	25,2	12,6	8,4	6,4	4,2	3,2
13	20	17	27,4	13,7	9,1	6,8	4,6	3,4
13	20	16	29,1	14,5	9,7	7,3	4,8	3,6
19	28	15	29,7	14,9	9,9	7,4	5,0	3,8
20	28	13	32,6	16,3	10,9	8,1	5,4	4,1
15	28	17	33,2	16,6	11,1	8,3	5,5	4,2
16	28	15	35,3	17,6	11,8	8,8	5,9	4,4
13	28	17	38,3	19,2	12,8	9,6	6,4	4,8
16	28	13	40,7	20,4	13,6	10,2	6,8	5,1
13	28	15	43,4	21,7	14,5	10,9	7,2	5,4

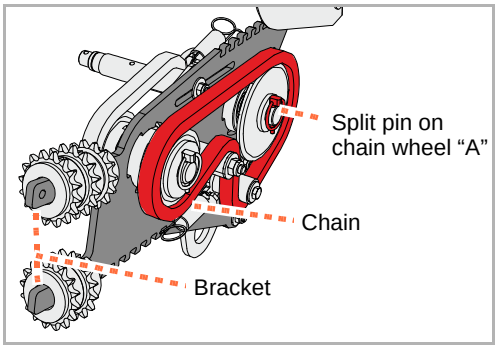
Replacing the chain wheels

The chain wheel combinations can be found in the sowing distance table.

A chain tensioner is tensioned by a spring. The chain tensioner has to be relieved of tension first. For chain wheel “C”, the chain tensioner is located on the other side of the gearbox.



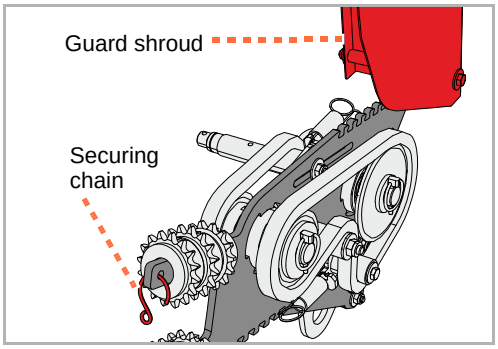
- Pull on the spring and detach it from the detent. The chain tensioner is now relieved of tension and the chain can be removed from the chain wheels.



- Remove the split pin from the chain wheel that you wish to change
- Remove the chain from the chain wheel
- Remove the chain wheel
- Remove the desired chain wheel from the holder and slot it onto the gearbox in place of the removed chain wheel
- Secure the chain wheel with the split pin
- Pull the chain over the chain wheel
- Tension the chain tensioner using the spring
- Slide the chain wheel that is no longer needed onto the holder

When all chain wheels have been fitted to the gearbox correctly:

- Close the guard shroud and secure with the chain



Coverer

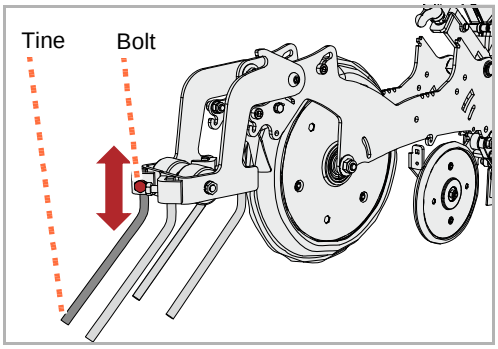
Coverers can be present in a variety of versions:

- Tine coverer
- Towing coverer
- Adjustable coverer

Coverers cover the seed with earth. The correct setting can differ according to the soil conditions and type.

Tine coverer

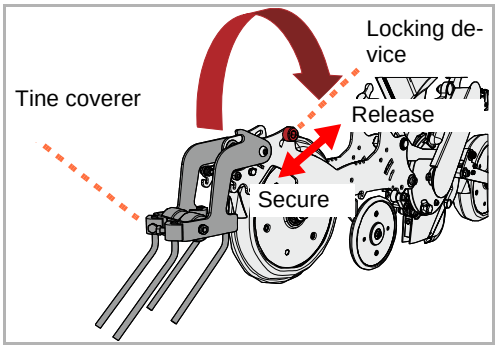
Working depth



You can set the working depth individually for each tine.

- Release the bolt
- Set the tines as required
- Secure the tines with a bolt

No function



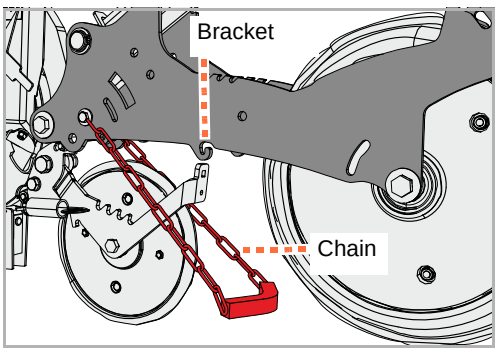
You can fold up the tine coverer. The tine coverer has no function in this position.

- Releasing the lock
- Fold up tine coverer
- Secure tine coverer with securing mechanism

Towing coverer [+]

It is not necessary to make any settings on the towing coverer.

No function



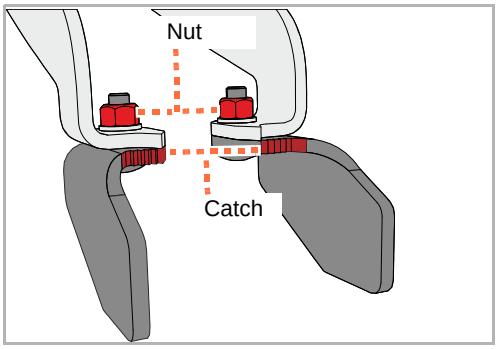
You can hang up the towing coverer. The towing coverer has no function in this position.

- Attach the chain to the bracket

Blade coverer [+]

Working angle

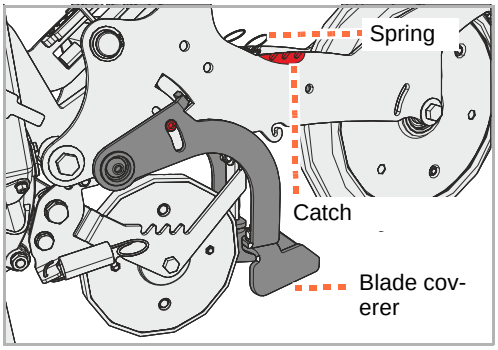
You can set the working angle of the blade coverer separately for each side to suit the soil conditions.



- Release nut
- Modify the angle as required. The catch can be used as a guide
- Retighten the nut

Bearing pressure

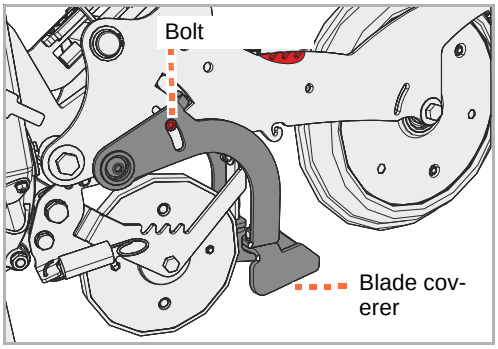
You can set the bearing pressure of the blade coverer separately for each side to suit the soil conditions.



- Pull on the spring and engage it in the desired position

Working depth

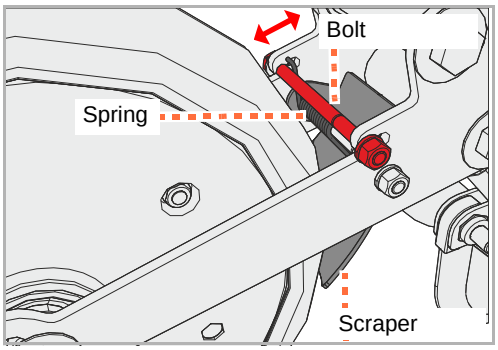
You can set the working depth of the blade coverer separately for each side to best suit the soil conditions.



- Release the bolt
- Move the bolt up or down as required
- Tighten the bolt

Front press wheel [+]

You can adjust the bearing pressure between the scraper and the front press wheel.

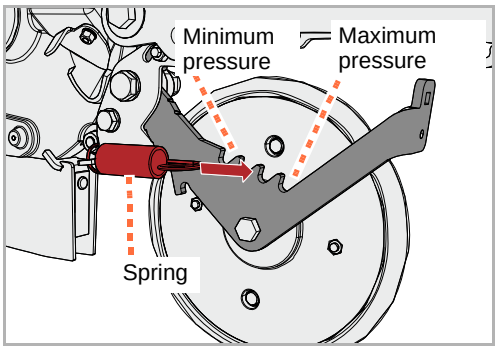


- Release the bolt
- Turn the spring away from the bolt
- Remove the bolt and relocate it to the other position
- Release the spring again
- Tighten bolt

Intermediate press wheel [+]

Bearing pressure

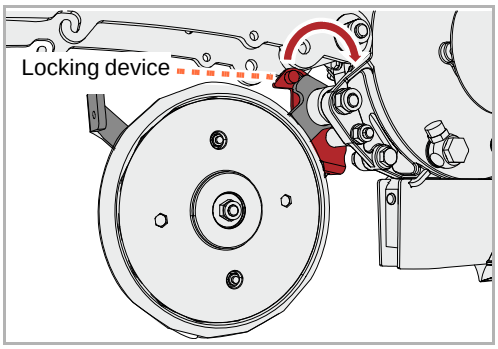
You can adjust the force exerted by the intermediate press wheel to suit the soil conditions.



- Pull on the spring and engage it in the desired position

No function

You can fold up the intermediate press wheel. The intermediate press wheel has no function in this position.



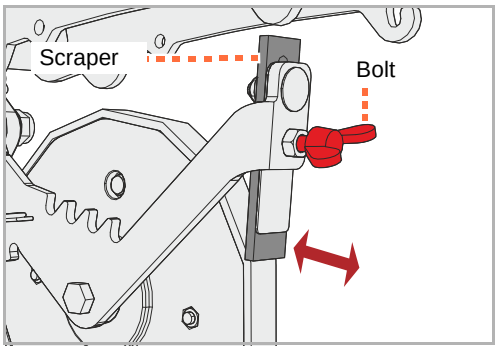
- Move the securing mechanism and fold up the intermediate press wheel
- Secure the intermediate press wheel with the securing mechanism

Scraper

The contact pressure and the scraper length can be set at the scraper.

Contact pressure

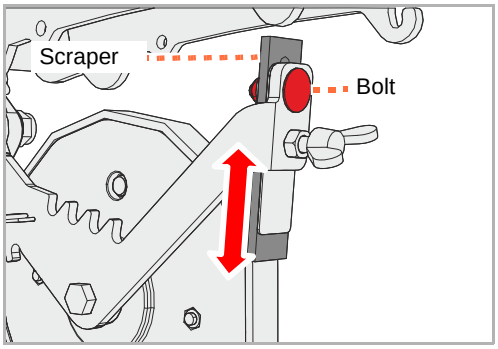
The contact pressure of the scraper can be set to be higher or lower depending on the soil conditions.



- Set the contact pressure as required using the bolt

Length

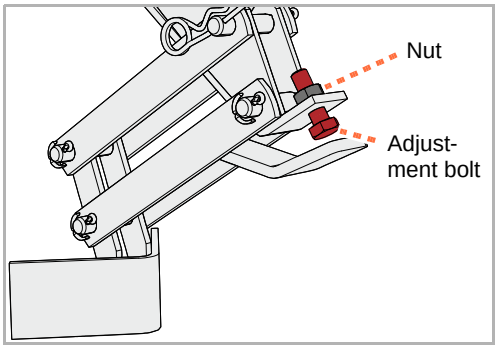
The scraper length can be set, for example in case of wear on the scraper.



- Release the bolt
- Move the scraper and secure it with the bolt

Clod deflector [+]

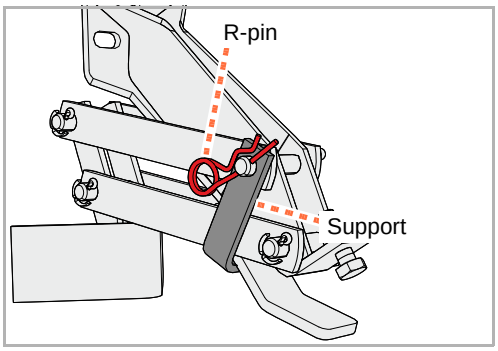
The clod deflector can be set higher or deeper depending on the soil conditions.



- Release nut
- Set the working depth of the clod deflector by means of the adjustment bolt as required
- Tighten the nut again

No function

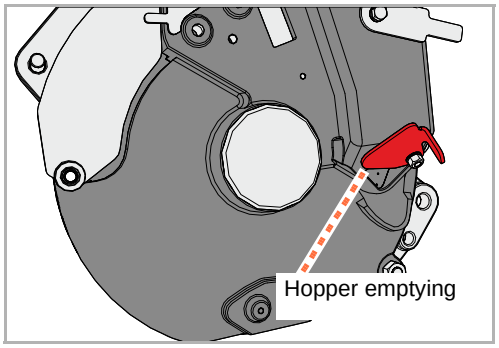
You can fold up the clod deflector. The clod deflector has no function in this position.



- Pull out the R-pin
- Remove the holder
- Fold up the clod deflector
- Place the holder on the clod deflector
- Secure the holder with the R-pin

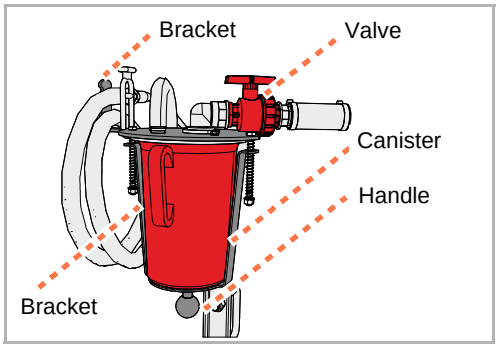
Emptying the seed hopper

Upon a seed change or completion of seeding work, the seed has to be emptied completely from the seed hopper.



- Place a catch pan under the sowing unit
- Open the emptying flap
- Empty all of the seed. Gently tapping the seed hopper makes it easier to empty, because doing so separates clumped seeds.
- Close the emptying flap. Ensure that the emptying flap is securely sealed.

Vacuum system [+]



If you change the seed type, the seed hopper has to be completely emptied. You can use the vacuum system to help you.

- Open the cover at the seed hopper
- Run the fan
- Open the valve on the vacuum system
- Take the hose from the hose bracket and suck the seed out of the seed hopper

Check the fill level in the canister. If necessary, empty the canister.

- Close the valve on the vacuum system
- Press the canister down and remove it
- Remove the seed
- Pull the holder downwards using the handle
- Refit the canister

Do not open the valve on the vacuum system unless the vacuum system is required. Otherwise, the power of the fan will drop too much.

Fill 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.

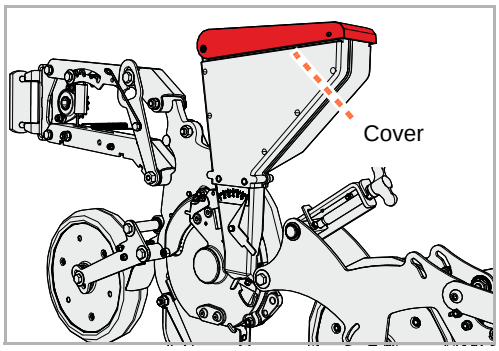
Use only suitable seed
Use only appropriate and clean seed.
Objects like stones or metal cause significant damage to the seed discs and incorrect seeding results.

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.

Fill the seed hopper evenly.



- Open the cover
- Inspect the seed hopper for any foreign bodies and remove them
- Fill in seed;
  there must be an airspace between the fill level and the hopper cover.
- Close the cover
- If necessary, replenish the seed on the field with the desired quantity

Negative pressure and overpressure

The fan generates both negative pressure and overpressure. For the correct setting for the seed concerned, please observe the following important information:

- The negative pressure is required in the seeding heart for singling the seed; the overpressure is required for cleaning the seed discs
- The smaller the seed, the less negative pressure is required
- Negative pressure and overpressure have a mutual influence on each other
- An initial, preliminary adjustment is possible by setting the PTO speed

The settings also depend on:

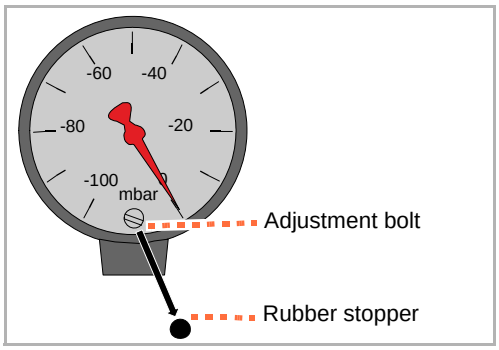
- Seed
- Thousand grain weight (TGW) and
- Velocity

Manometer

The needle of the manometer must be at “0” for a switched off fan.

If the indicator is not at “0”, the manometer must be adjusted:

- Remove the rubber stopper from the glass pane
- Turn the adjustment bolt at the manometer with a small boltdriver to the right or to the left
- Reinsert the rubber stopper

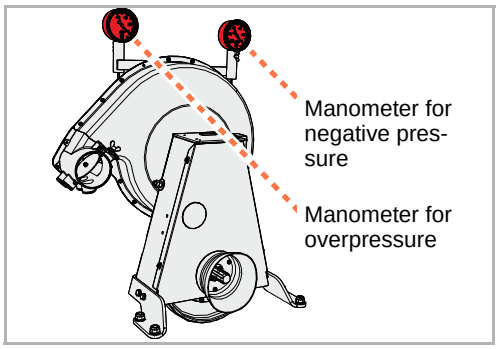


Guide values

We have compiled a table for selected seeds that contains reference values for negative pressure and overpressure settings:

Seed		Seed disc			Fan	
Type	**Calibration**	**Type**	**Number of holes in the seed disc**	**Diameter of the holes [mm]**	**Negative pressure [mbar]**	**Overpressure [mbar]**
Chicory	1,25 – 1,50	8005	80	0,5	30	40
	1,50 – 1,75	8006	80	0,6	30 – 40	40
Corn salad	1,25 – 2,00	8006	80	0,6	30	40
Fennel	–	6012	60	0,6	30	40
	–	8012	80	0,8		
Cucumber		2020	20	2,0	40 – 50	-
Cabbage	1,50 – 1,75	2008	20	0,8	30	40
		4008	40	0,8	30	
	2,00 – 2,25	2010	20	1,0	30	30
		4010	40	1,0	30	
Poppy	1,25 – 1,50	8008	80	0,8	25 – 30	40
		6008	60	0,8	25 – 30	
Carrots	1,00 – 1,60	8006	80	0,6	30	40 – 50
		16006	80	0,6	30	40 – 50
	1,60 – 2,00	8008	80	0,8	30 – 40	40 – 50
		16008	160	0,8	30 – 40	
Carrots, pelleted	2,00 – 2,50	8010	80	1,0	40	30
Parsley	0,75 – 1,00	8005	80	0,5	30	40
	1,50 – 1,75	8008	80	0,8	40	30
	1,75 – 2,25	8010		1,0	40	
				1,0	40	20
Garden radish	2,50 – 2,75	8012	80	1,2	30 – 40	20
	2,75 – 3,00	8012		1,2		
				1,2	35 – 45	20
	3,00 – 3,25	8015		1,5		
				1,5	40 – 50	20
Winter radish	2,75 – 3,25	8015	80	1,5	40	-
		6015	60	1,5		
Beetroot	3,00 – 4,00	8020	80	2,0	30 – 40	-
		6020	60	2,0		
Beet	3,25 – 4,25	2020	20	2,0	35 – 40	-
Turnips	3,25 – 4,75	2020	20	2,0	40	-
Lettuce	0,75 – 1,00	2005	20	0,5	30	40
		4005	40	0,5		
Asparagus	2,50 – 3,50	2020	20	2,0	30	-
	3,50 – 4,00	2020		2,0		
				2,0	40	-
Spinach	2,50 – 3,50	4015	40	1,5	40	-
Tomatoes	2,00 – 2,25	4010	40	1,0	40	20
		6010	60	1,0		
Onions	2,00 – 2,25	8010	80	1,0	40	30

Regulating flap

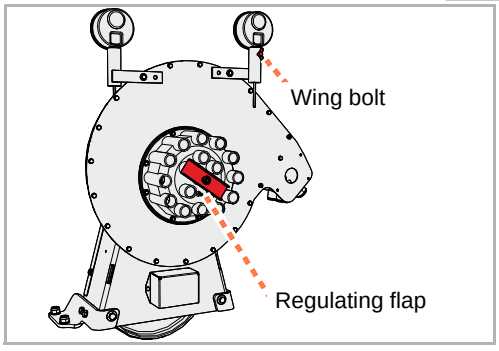


The fan has two manometers. One manometer shows overpressure, the other shows negative pressure.

→ Switch on the PTO on the tractor. Whilst doing so, ensure that the speed is correct for the machine.

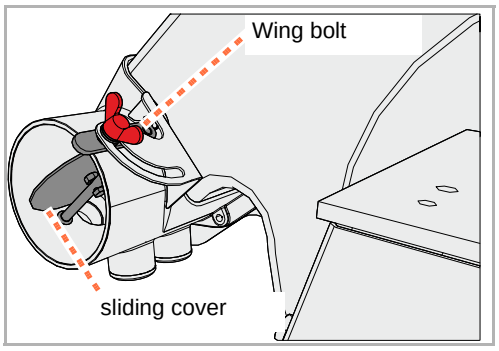
Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

A regulating flap for adjusting the negative pressure is located on the back of the fan. An adjuster for adjusting the ratio of overpressure to negative pressure is located on the front.



The manometers can be turned so that their readings can still be seen during the setting.

- Release wing bolt
- Turn the manometer
- Secure the manometer with the wing bolt
- First set the regulating flap so that it covers both openings in the fan



- Release wing bolt
- Turn the sliding cover so that a ratio of overpressure to negative pressure is set that enables the values for the selected seed to be achieved
- Secure the sliding cover with the wing bolt

If the appropriate values cannot be achieved by adjusting this ratio:

- Make another setting on the regulating flap and then set the ratio again

Seeding heart

Make the following settings only at the first sowing unit, at first. The settings cannot be carried over to the other seed rows until you have made and checked the following adjustments on the first seed row.

Prerequisite for subsequent work:

- Seed hopper of the first sowing unit has been filled with seed
- Fan running at corresponding PTO speed
- Negative pressure and overpressure set to suit seed and seed disc
- Catch pan placed under the first sowing unit

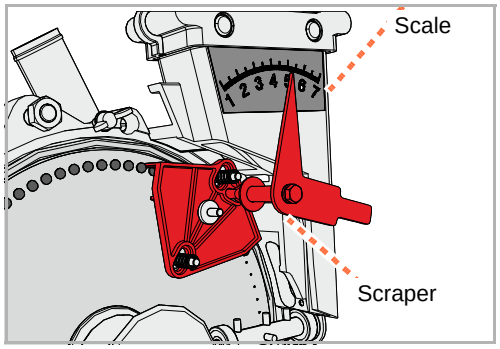
Scraper on single seed unit and double seed row

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

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

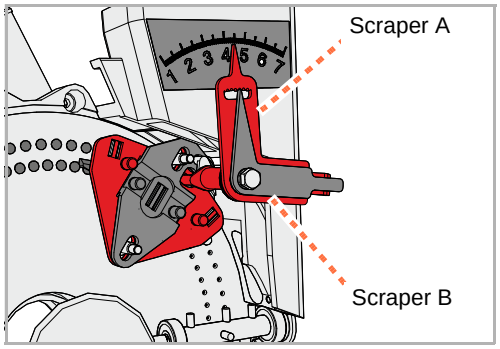
Higher scale value	=	More doubles
Lower scale value	=	More misses

- Turn the drive wheel to drive the seeding heart. The seed now falls into the catch pan.
- Move the scraper carefully and find the correct setting.



Scraper on twin seed unit

Two scrapers must be set for twin seed units.
The two scrapers are coupled to each other. The scraper for the inner circle can be readjusted independently of the scraper for the outer circle.



- Turn the drive wheel to drive the seeding heart. The seed for both sowing units now falls into the catch pan.
- Move scraper A for the outer circle carefully and find the correct setting.
- If necessary, readjust scraper B for the inner circle accordingly.

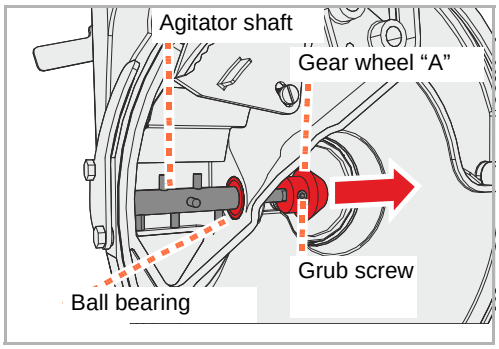
Removing the agitator shaft

The agitator shaft can be shut down or removed when working with highly fluid seed. This enables you to prevent the seeding heart being overfilled.

- Remove the cover of the seeding heart with the seed hopper

→ Chapter »Preparing for operation«, section »Seed disc«, from page 62

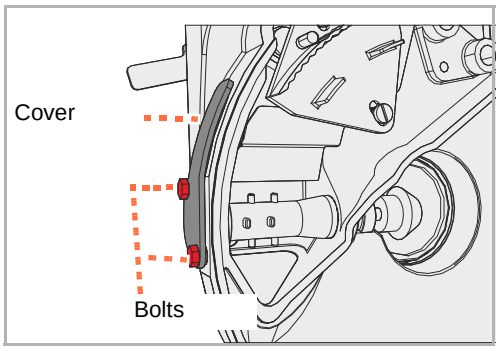
Version A



Version A is fitted with a ball bearing. The agitator shaft is shut down.

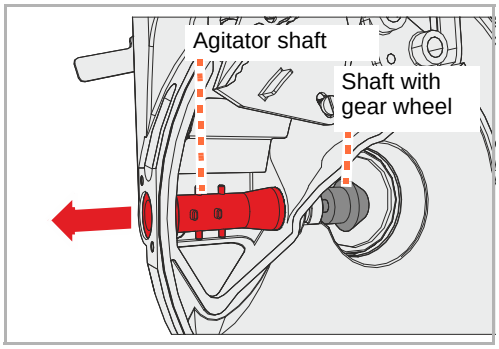
- Release the grub screw
- Remove gear wheel “A”
- Fit the cover of the seeding heart with the seed hopper again

Version B



Version B is not fitted with a ball bearing. The agitator shaft is removed.

- Remove the bolts
- Remove the cover



- Pull out the agitator shaft. The shaft with gear wheel remains installed.
- Fit the cover again and secure it with bolts
- Fit the cover of the seeding heart with the seed hopper again

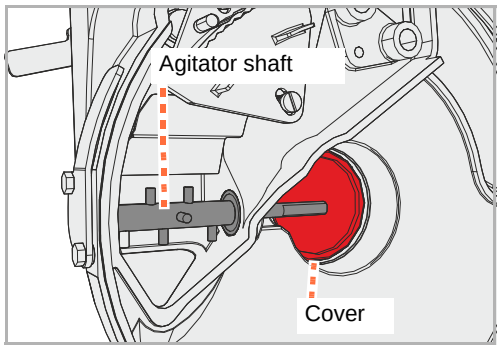
Installing the agitator shaft

The agitator shaft must be reactivated or reinstalled when working with seed that is not fluid.

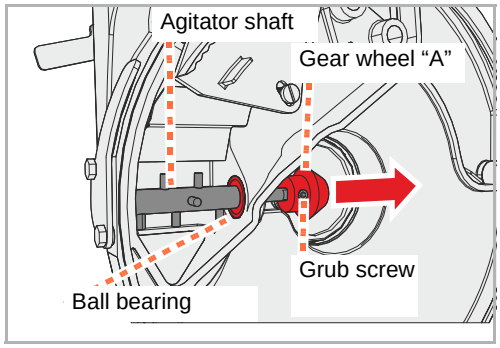
- Remove the cover of the seeding heart with the seed hopper

→ Chapter »Preparing for operation«, section »Seed disc«, from page 62

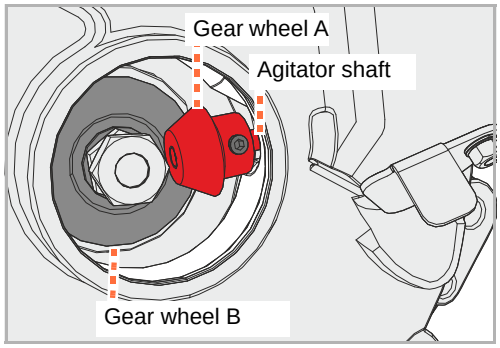
Version A



- Remove the cover

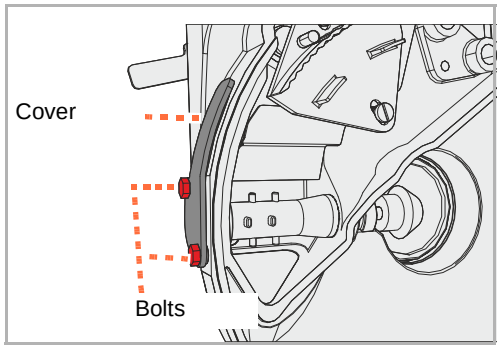


- Insert gear wheel “A”
- Slightly tighten the grub screw
- Fit the cover of the seeding heart with the seed hopper again

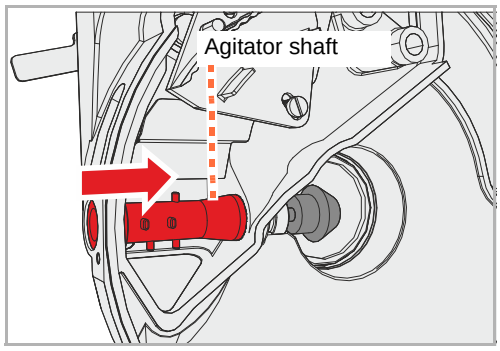


- Set gear wheel “A” to match gear wheel “B”
- Firmly tighten the grub screw
- Reinstall the cover

Version B



- Remove the bolts
- Remove the cover



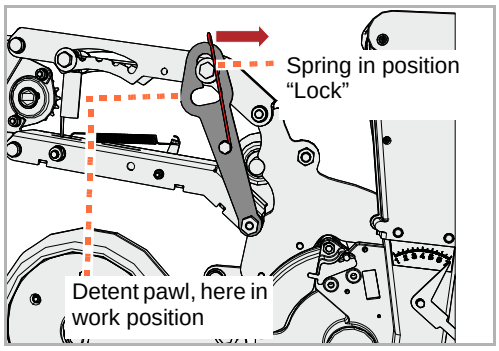
- Insert the agitator shaft
- Fit the cover again and secure it with bolts
- Fit the cover of the seeding heart with the seed hopper again

Lifting device

The lifting device allows you to lift individual sowing units. Then, the sowing unit has no longer contact to the ground.

Observe the notes
Always empty the seed hopper and the seeding heart when the sowing units are lifted. The sowing unit is driven also with the lifting device.
If there is seed in the seed hopper, the seed falls unrestrained to the ground.

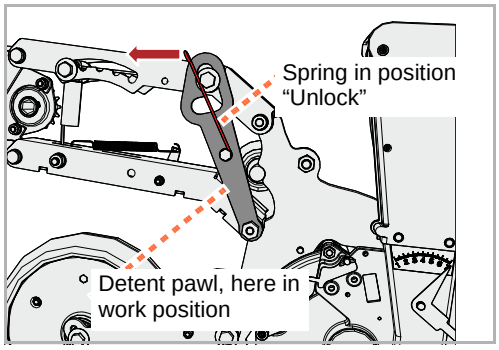
Lifting



- Place spring on detent pawl at “Lock” position
- Lift the machine
- Lift the sowing unit over the engaging point. The detent pawl is pressed into the correct position by the spring
- Lower the sowing unit until it reaches the limit stop

Particular features during road transport
The seed rows must be brought into their work position for road transport. This is especially necessary for particularly poor routes.
Otherwise, the machine can be damaged.

Work position



- Place spring on detent pawl at “Unlock” position
- Lift the machine
- Lift the sowing unit over the engaging point. The detent pawl is folded away by the spring
- Lower the sowing unit into the work position

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.
→ Chapter »Preparations in the field«, section »After the test drive«, from page 123

Prerequisites:

- ☑ The seed disc is adapted to the seed
- ☑ Settings have been made on the gearbox in accordance with the required application rate
- ☑ The negative pressure has been set
- ☑ The overpressure has been set
- ☑ The scraper or scrapers have been set
- ☑ The sliding cover for regulating the seed flow has been set
- ☑ The seed hopper of the first sowing unit is filled with enough seed
- ☑ The machine is lifted

- ▸ Let the fan run with the corresponding PTO shaft rpm
- ▸ Place a catch pan under the first sowing unit
- ▸ Turn the drive wheel to drive the seeding heart. The seed now falls into the catch pan.

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

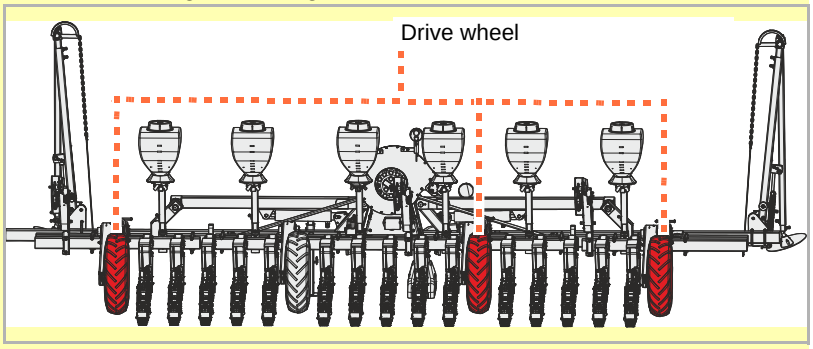


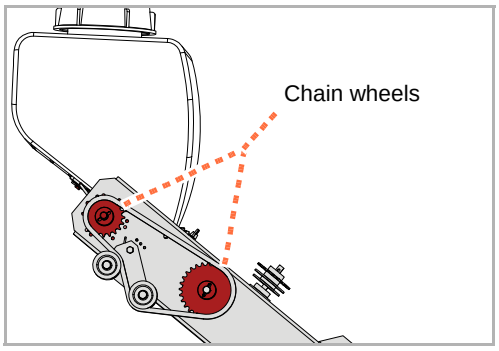
For safety reasons, you can perform the check once again after setting all the seed rows:

- ▸ Fill all seed hoppers with sufficient seed
- ▸ Place catch pans underneath each sowing unit
- ▸ Check each sowing unit

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	117	104	93	83	74	67	60	53	48	43	38	31	24
COUNTER SG	207	184	166	148	131	118	106	95	84	76	68	55	43
FORCE	92	82	74	66	59	53	47	42	38	34	30	25	20
MICROSTAR	63	56	50	45	40	36	32	29	26	23	20	17	13
PHYSIOSTART	126	112	101	90	80	72	65	58	51	46	41	33	26
UMOSTART	88	79	71	63	56	51	45	40	36	33	29	23	18
VYDATE	84	75	67	60	54	48	43	39	34	31	28	22	17
MESUROL	15,4	13,7	12,3	11,0	9,8	8,8	7,9	7,0	6,3	5,6	5,0	4,1	3,2

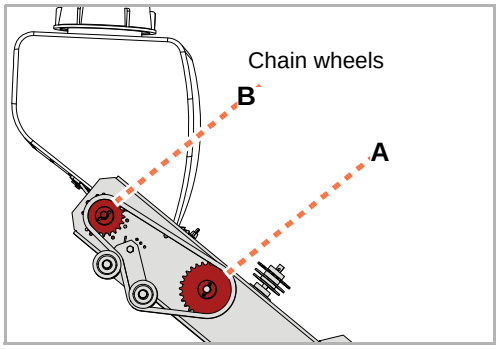
* Additional chain wheels

Example:

Desired application rate: 60 g /100 m

Width of metering wheel: 6 mm

Crop protection chemical: COUNTER



Result:

Combination of chain wheels:

- (A/B) 18/20

→ Table

kg/ha

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 88

g /100 m

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 88

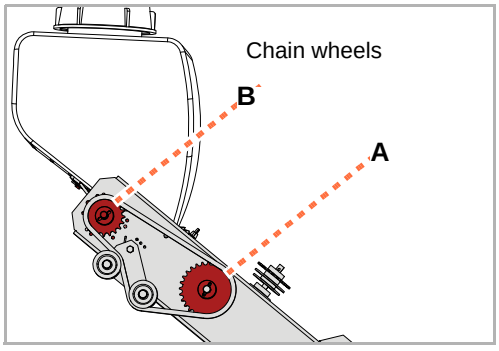
Crop protection chemical	Chain wheel pair A/B / metering wheel 3 mm [+]												
[g/100 m]	28/16	28/18	28/20	20/16	20/18	20/20	18/20	16/20	20/28	18/28	16/28	13/28	13/30*
COUNTER	58,5	52,0	46,5	41,5	37,0	33,5	30	26,5	24,0	21,5	19,0	15,5	12,0
COUNTER SG	103,5	92,0	83,0	74,0	65,5	59,0	53,0	47,5	42,0	38,0	34,0	27,5	21,5
FORCE	46,0	41,0	37,0	33,0	29,5	26,5	23,5	21,0	19,0	17,0	15,0	12,5	10,0
MICROSTAR	31,5	28,0	25,0	22,5	20,0	18,0	16,0	14,5	13,0	11,5	10,0	8,5	6,5
PHYSIOSTART	63,0	56,0	50,5	45,0	40,0	36,0	32,5	29,0	25,5	23,0	20,5	16,5	13,0
UMOSTART	44,0	39,5	35,5	31,5	28,0	26,5	22,5	20,0	18,0	16,5	14,5	11,5	9,0
VYDATE	42,0	37,5	33,5	30,0	27,0	24,0	21,5	19,5	17,0	15,5	14,0	11,0	8,5
MESUROL	7,7	6,9	6,3	5,5	4,9	4,4	4,0	3,5	3,1	2,8	2,5	2,1	1,6

* Additional chain wheels

Example:

Desired application rate: 30 g /100 m

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



Result:
Combination of chain wheels:

- (A/B) 18/20

→ Table

kg/ha

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 88

g /100 m

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 88

Calculating the application rate

The information in the tables refers to application rates in g/100 m. Information in kg/ha is not possible, since this is dependent on 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



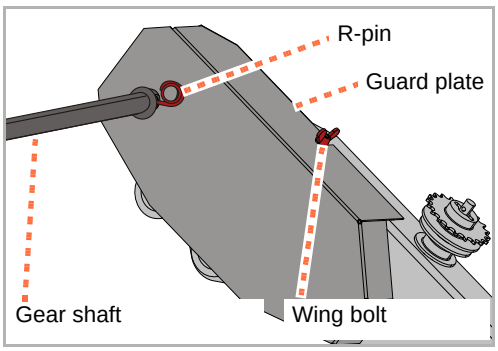
Example: How high is the application rate in g/100 m?

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

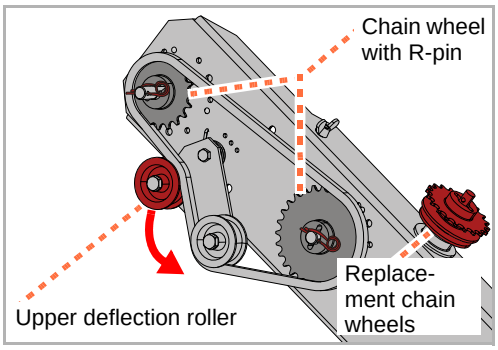
[30] x [25] / 10	=	75 g/100 m

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.

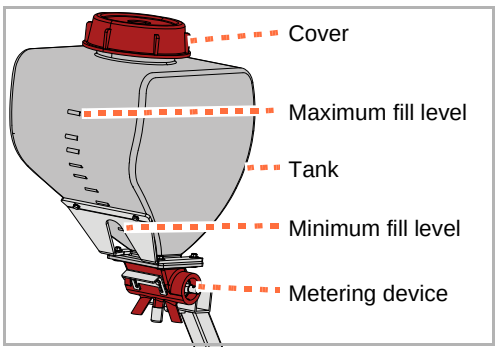
Protection against fine dust
When working in an environment contaminated with dust and other fine particles from crop protection chemicals, it may be necessary to wear a breathing mask and latex gloves. Observe the specific safety instructions issued by the crop protection chemicals manufacturer.
Improper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

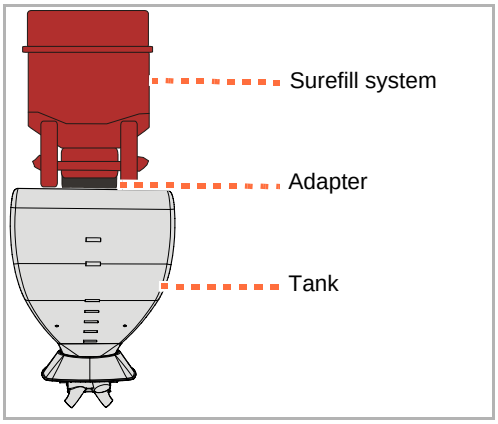


- Unscrew the cap on the tank
- Fill the tank with crop protection chemical from its original packaging. Do not fill to below the minimum fill level or exceed the maximum fill level.
- Refit the cap on the tank

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.



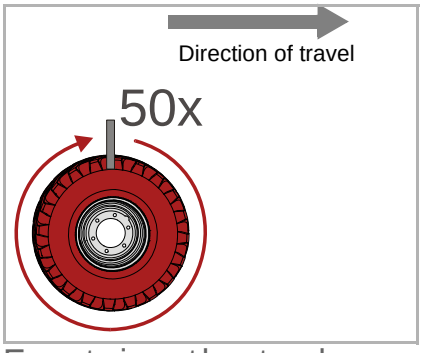
A prerequisite for use of the Surefill system is fitting the tank with an adapter.

- 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 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.

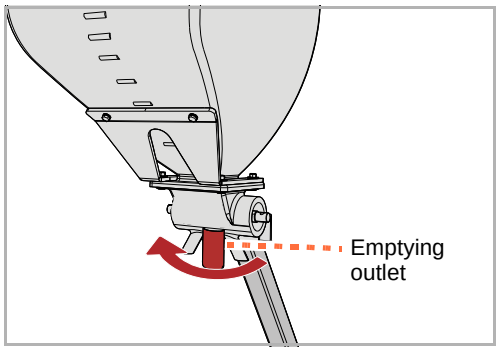
- Simulate a 100 m stretch with 50 revolutions on the drive wheel
- Weigh the applied crop protection chemical

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

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 a clear view is not possible, the lighting equipment and the number plate must be fitted to the attached 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 empty seed hoppers on the sowing units.
- Transport may only be carried out if the granule hopper is empty. Machines with granule hoppers may not exceed a maximum speed of 25 km/h.

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

Before road transport



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

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

Fold in the machine
All swivelling components of the machine must be folded in and securely locked in place. Close the control units on the tractor to prevent accidental activation.
Accidentally folded out machine parts can cause accidents.

Check the tyre pressure of the transport wheels
Check the tyre pressure of the transport wheels before road transport.
Incorrect tyre pressure can cause serious 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.

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

Attach lighting equipment
Attach the lighting equipment or warning signs. All turn indicators and side lights must be clearly visible. Secure the lighting cables so that they are not subject to tension when the vehicle goes around corners and do not come into contact with the tractor tyres.
If turn indicators or boundary lights are not visible, this can lead to accidents

Transport position

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

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.

Granule distributor [+]

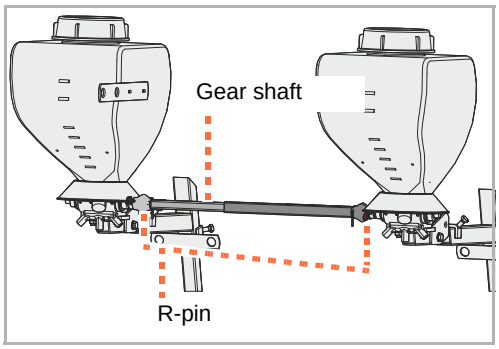
Emptying the granule distributor
Road transport must only be undertaken with empty tanks
When travelling on the road with filled tanks, crop protection chemicals may escape uncontrolled.

Emptying

- Emptying the granule distributor

→ Chapter »Preparing for operation« in section »Emptying the tank«, page 92

Hydraulically foldable frame, 6.00 m

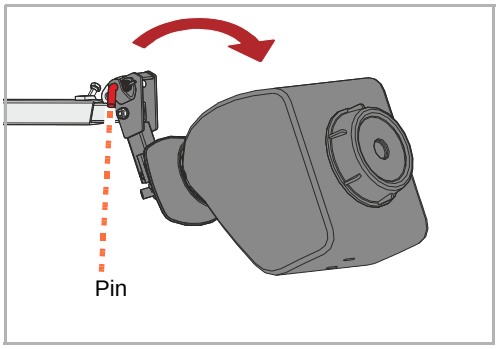


You must prepare the granule distributor for transport. The gear shafts over the pivot points of the hydraulically foldable frame must be removed.

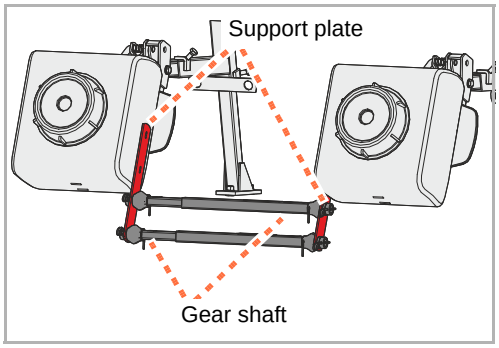
- Remove the R-pin
- Remove the gear shaft of the granule distributor on both sides

Swivel down the granule distributor
Folding must only be carried out with the tanks swivelled down
The tanks may collide with other components during folding.

Road transport must only be carried out with the tanks swivelled down
If the tanks are lifted when travelling, they may collide with obstacles above the machine.



- Unlock the pin
- Swivel down the granule distributor and lock it with the pin



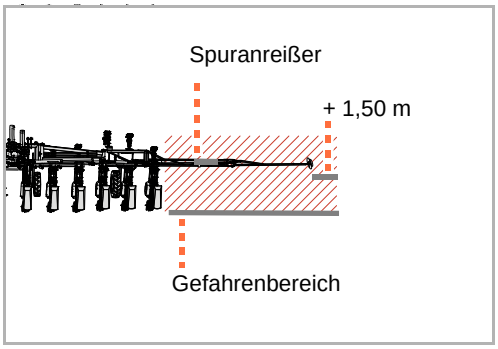
- Insert the gear shaft into the support plate between the granule distributors and lock it with R-pins

Track marker [+]

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

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 can be seriously or fatally injured.



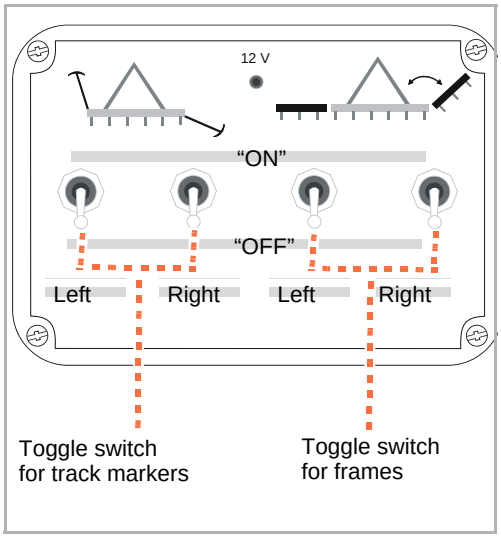
Frame width [m]	Hazard area [m]
2,50	2,75
3,00	3,00
3,50	3,25
4,00	3,50
4,50	3,75
5,00	4,00
5,50	4,25
6,00	4,50
6,50	4,75

Without an electrical control system

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

With an electrical control system

To fold in the track marker using a double-acting control valve, actuate the toggle switch on the control panel and the control unit on the tractor.

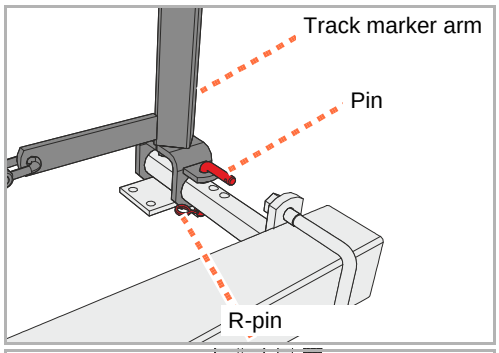


- Check that the toggle switch for the frame is set to “Off”
- Turn toggle switch for the track marker left or right to “ON”
- Actuate the control unit on the tractor. The track marker folds in.
- Toggle switch to “OFF”
- Toggle switch for the second track marker to “ON”
- Actuate the control unit on the tractor. The second track marker folds in.
- Toggle switch to “OFF”

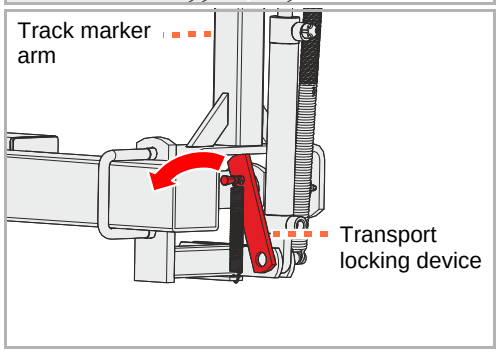
Transport locking device

Depending on the type of frame different transport guards are available. The track markers must be secured on both sides prior to travelling by road.

Frame up to 3.50 m

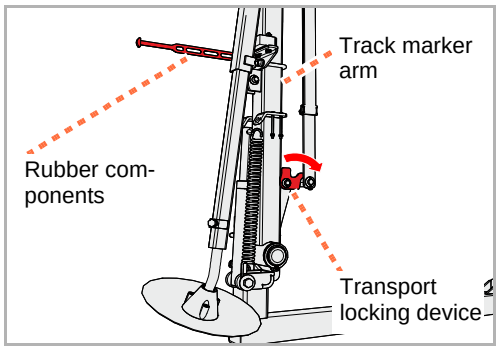


- Remove the R-pin from the pin and take the pin out of the park position
- Swivel the track marker arm up into the transport position
- Secure the track marker arm with the pin and insert the R-pin



- Press against the track marker arm with one hand
- Close the transport locking device

Frame up to 6.50 m



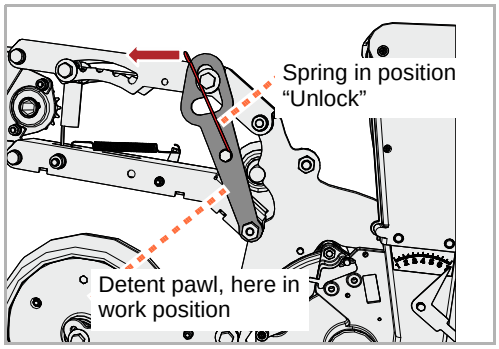
- Press against the track marker arm with one hand
- Secure the track marker arm using the transport locking device
- Close the rubber components

Transport position of sowing units

Particular features during road transport
The seed rows must be brought into their work position for road transport. This is especially necessary for particularly poor routes. *Otherwise, the machine can be damaged.*

Work position

The seed rows must be in their work position, not the lifted position, during road transport.



- Lift the machine
- Place spring on detent pawl at “Unlock” position
- Lift the sowing unit over the engaging point. The detent pawl is folded away by the spring
- Lower the sowing unit into the work position

Rigid frame up to 3.00 m

This machine cannot be equipped with a lengthways transport attachment. The machine is transported while in its work position.

The machine can be in the following positions:

The machine is coupled to the tractor	Work position
The machine is parked	Work position

The machine was parked in a work position:

- The machine is positioned on a firm surface, and the supporting leg is in the lower position

If the prerequisites have not been met:

- Prepare the machine in such a way that the prerequisites are met

Rigid frame up to 3.50 m

This machine cannot be equipped with a lengthways transport attachment. The machine is transported while in its work position or on a low loader.

Take note of traffic regulations when travelling by road. Machines with a transport width exceeding 3.00 m may not be transported by road in many countries.

The machine can be in the following positions:

The machine is coupled to the tractor	Work position
The machine is parked	Work position

The machine was parked in a work position:

- The machine is positioned on a firm surface, and the supporting leg is in the lower position

If the prerequisites have not been met:

- Prepare the machine in such a way that the prerequisites are met

Rigid frame up to 6.50 m

This machine can be equipped with a lengthways transport attachment. In what follows, a machine with a lengthways transport attachment is assumed. If your machine does not have a lengthways transport attachment, you can transport the machine in its work position or on a low loader.

Take note of traffic regulations when travelling by road. Machines with a transport width exceeding 3.00 m may not be transported by road in many countries.

The machine can be in the following positions:

The machine is coupled to the tractor	Work position
The machine is parked	Transport position
	Work position

The prerequisites for preparations then differ in each case. Check prior to coupling whether the applicable prerequisites have been met.

The machine was parked in a work position:

- The machine is positioned on a firm surface, and the supporting leg is in the lower position
- The transport wheels have been detached
- The drawbar has been detached

The machine was parked with the lengthways transport attachment in the transport position:

- The machine is positioned on a firm surface, and the supporting leg is in the lower position
- The transport wheels are attached
- The drawbar is attached

If the prerequisites have not been met:

- Prepare the machine in such a way that the prerequisites are met

Hydraulically foldable frame, 6.00 m

This machine is equipped with a hydraulic folding mechanism for the frame.

Take note of traffic regulations when travelling by road. Machines with a transport width exceeding 3.00 m may not be transported by road in many countries.

The machine can be in the following positions:

The machine is coupled to the tractor	Work position
The machine is parked	Transport position
	Work position

The prerequisites for preparations then differ in each case. Check prior to coupling whether the applicable prerequisites have been met.

The machine was parked in a work position:

- The machine is positioned on a firm surface, and the supporting leg is in the lower position

The machine was parked in a transport position:

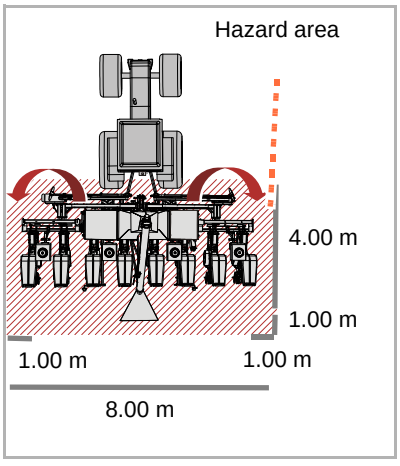
- The machine is positioned on a firm surface, and the supporting leg is in the lower position

If the prerequisites have not been met:

▸ Prepare the machine in such a way that the prerequisites are met

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

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 can be seriously or fatally injured.

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 115

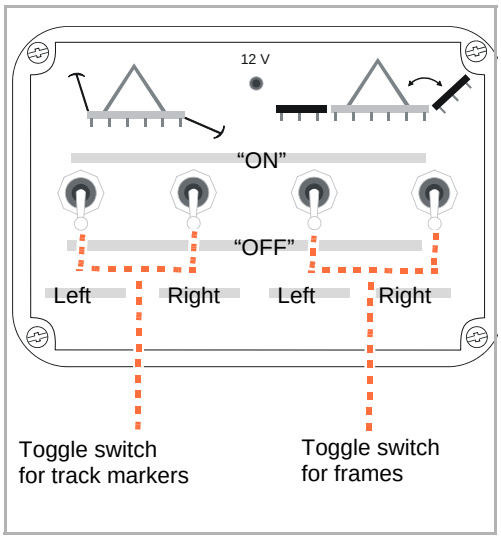
Do not make any alterations
The frames fold out slowly. Never manipulate the equipment for faster folding in.
A faster folding process leads to destruction of machine components.

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.

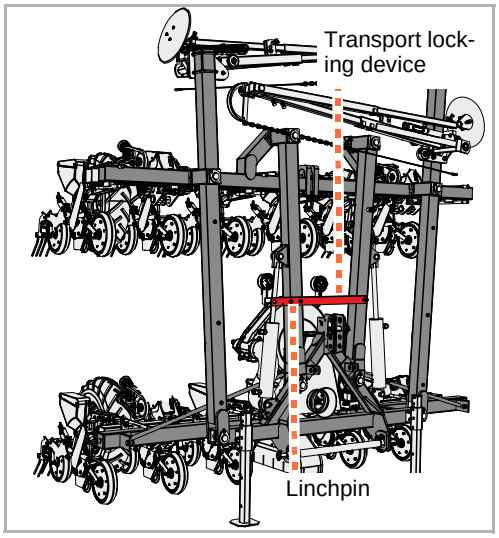
Observe the switch position on the control panel
Track markers and frame folding mechanism must not be “ON” at the same time.
This can result in damage to the machine.



- Check that the toggle switch for the track marker is set to “Off”
- Move toggle switches for the left and right frame to “ON”
- Actuate the control unit on the tractor. The frame folds.
- Move toggle switches for the frame to “OFF”

Lock the transport locking device

The transport locking device is secured by a linchpin on the right side of the frame. The transport locking device must be unlocked before unfolding.



- Remove the linchpin on the left side
- Fold back the transport locking device
- Hinge the transport locking device on the right side and secure it with the linchpin

Coupling

Without lengthways transport attachment

Machines without a lengthways transport attachment are coupled to the tractor at the three-point linkage and transported as an attached machine in a lifted transport position.

→ Chapter »Coupling the machine«, section »Coupling«, from page 30

Take note of traffic regulations when travelling by road. Machines with a transport width exceeding 3.00 m may not be transported by road in many countries.

With lengthways transport attachment

Machines with a lengthways transport attachment are coupled to the tractor with the aid of the lengthways transport attachment. The machine therefore retains a transport width of below 3.00 m.

Use of safety shoes
Wear proper shoes. So you can prevent injury.
Carrying out work without wearing proper shoes can lead to crush injuries

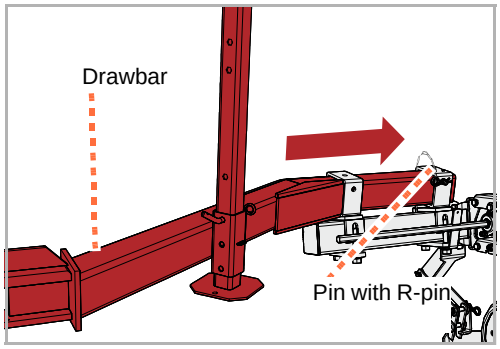
Do not place your feet under the drawbar
The drawbar weighs approx. 25 kg, and a support wheel approx. 40 kg. Under no circumstances should feet be positioned under the drawbar or support wheel when working. Secure drawbar so that it cannot fall down.
If the drawbar or support wheel falls down by accident, this can cause injuries.

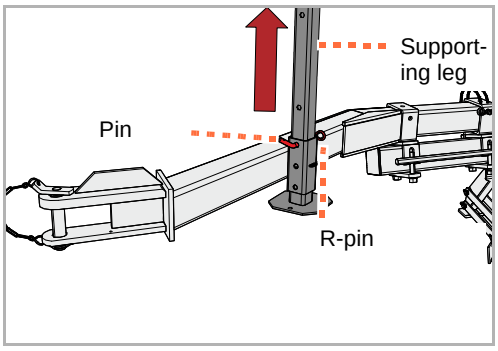
You must couple the drawbar and axle along with the transport wheels under the transport position.

- Couple the machine in its work position

→ Chapter »Coupling the machine«, section »Coupling«, from page 30

- Lift the machine
- Remove pin
- Insert the drawbar and secure it using the pin

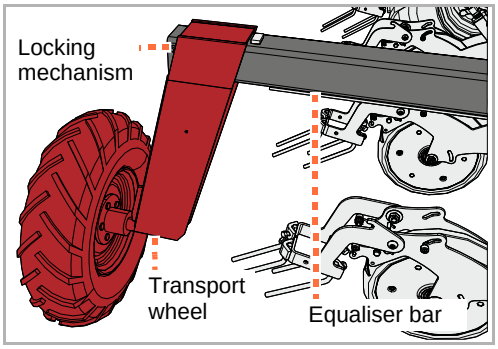




- Remove the R-pin on the pin
- Remove the pin
- Pull up the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin

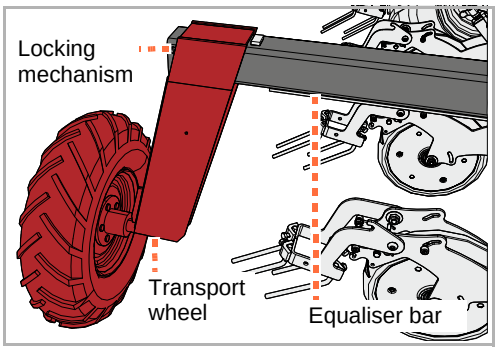
If the transport wheels are carried along on the machine during work:

- Insert the lock on the equaliser bar and remove the transport wheel
- Turn the transport wheels 180° and slide them onto the equaliser bar until they lock



If the transport wheels are not carried along during work:

- Push in the lock on the equaliser bar and slide the transport wheel up onto the equaliser bar until it locks



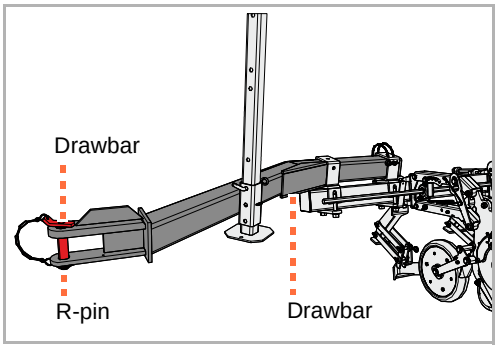
- Lower the machine

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

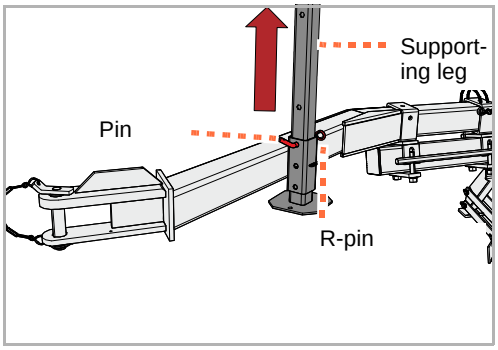
- Ensure that the machine is lowered onto a level and stable surface
- Use the supporting leg for setting down the machine

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

- Uncouple hydraulic connections
- Uncouple electrical connections
- Uncouple the machine
- Fit the lift link drawbar onto the tractor
- Drive tractor in front of the drawbar
- Remove the R-pin on the pin
- Remove the pin
- Bring the lift link drawbar to the position for coupling with the tractor
- Insert the pin and secure it with the R-pin



- Lift the drawbar over the lower link ball of the tractor
- Remove the R-pin on the pin
- Remove the pin
- Pull up the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin



Connecting

After coupling, make the following connections:

- Electrical connections

Electrics

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

- The lighting of the machine

▸ Check all connections to ensure they are working properly

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
- ☑ The lighting equipment is installed and operational
- ☑ The sowing units are in the work position
- ☑ The seed hoppers on the sowing units are empty
- ☑ The granule distributor tanks are empty
- ☑ The PTO shaft is deactivated
- ☑ All toggle switches on the control panel are set to “OFF”
- ☑ The control units on the tractor are locked

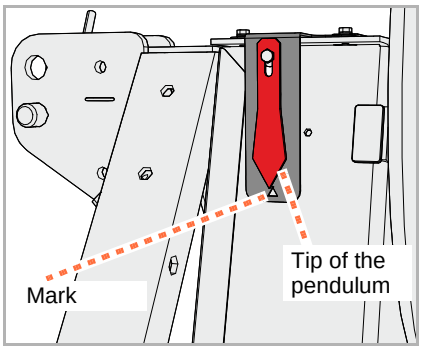
Work position

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

- Move the machine to its work position

→ Chapter »Coupling the machine«, section »Coupling«, page 30

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

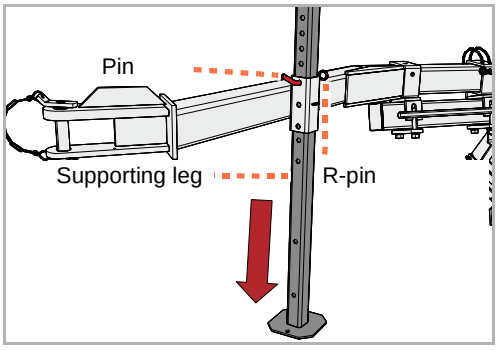


For orientation purposes, there is a pendulum on the fan holder. You can carry out adjustments with the aid of the pendulum on a horizontal surface. The tip of the pendulum must correspond to the marking.

Lengthways transport attachment

Use of safety shoes
Wear proper shoes. So you can prevent injury.
Carrying out work without wearing proper shoes can lead to crush injuries

Do not place your feet under the drawbar
The drawbar weighs approx. 25 kg, and a support wheel approx. 40 kg. Under no circumstances should feet be positioned under the drawbar or support wheel when working. Secure drawbar so that it cannot fall down.
If the drawbar or support wheel falls down by accident, this can cause injuries.

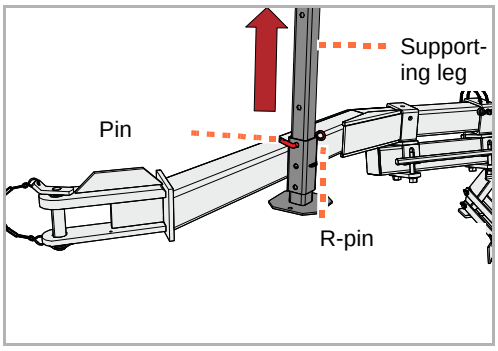


- Lower the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin

If there are electrical connections or hydraulic connections:

- Disconnect the electrical connections and hydraulic connections from the tractor

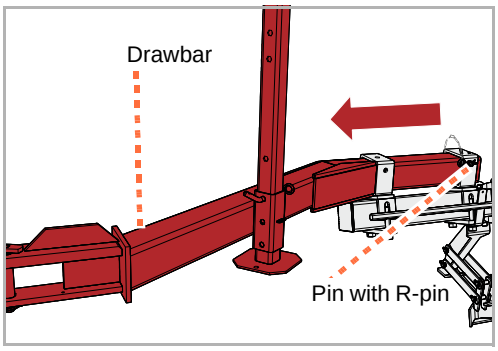
- Lower the machine and park it on the ground
- Uncouple the machine
- Drive the tractor in front of the three-point linkage of the machine
- Coupling the machine
- Lift the machine



- Pull up the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin

Drawbar

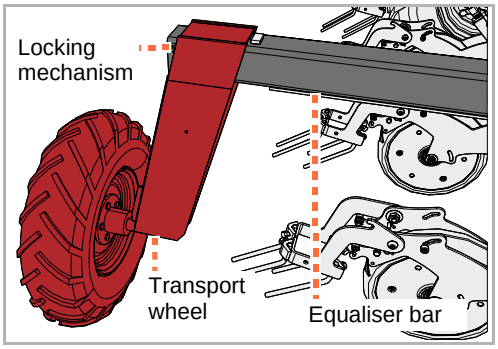
You can remove the drawbar if it causes problems when working at the field edge.



- Remove the pin on the drawbar
- Pull out the drawbar

Transport wheels

You can remove the transport wheels or carry them along on the machine.



- Press the lock on the equaliser bar and take the transport wheel from the equaliser bar

If the transport wheels are to be carried along on the machine during work:

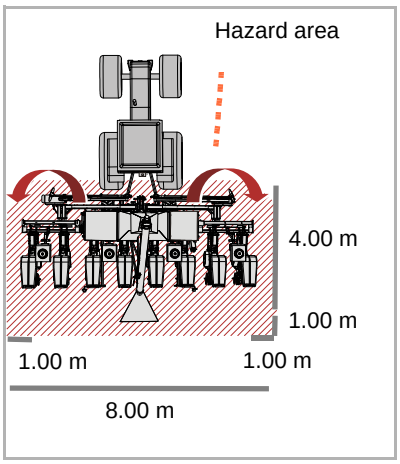
- Turn the transport wheels 180° and slide them onto the equaliser bar until they lock

If there are electrical connections or hydraulic connections:

- Connect the electrical connections and hydraulic connections to the tractor

Hydraulically foldable frame

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 can be seriously or fatally injured.

Folding out

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 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.

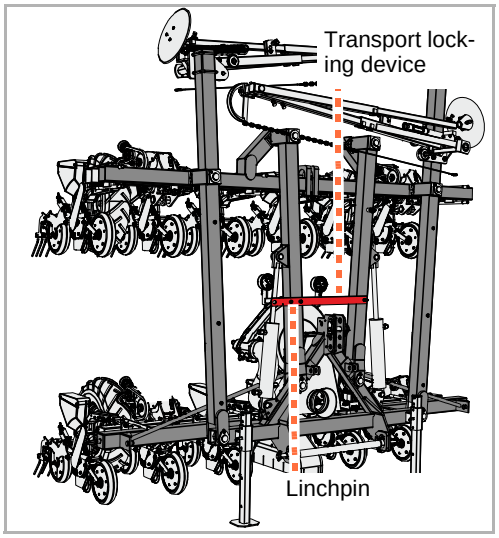
Do not make any alterations
The frames fold out slowly. Never manipulate the equipment for faster folding in.
A faster folding process leads to destruction of machine components.

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 switch position on the control panel
Track markers and frame folding mechanism must not be “ON” at the same time. This can result in damage to the machine.

Unlock transport locking device

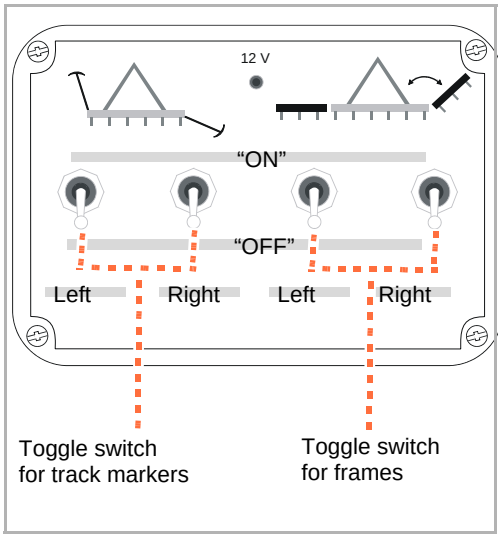
The transport locking device is secured by a linchpin on the right side of the frame. The transport locking device must be unlocked before unfolding.



- Remove the linchpin on the right side
- Fold back the transport locking device
- Hook the transport locking device on the left side and secure with the linchpin

Folding

To fold out the frame operate the toggle switch of the control panel.



- Move both toggle switches for the track marker to “OFF”
- Move both toggle switches for the frame to “ON”
- Actuate the control unit on the tractor. The frames now fold out.
- Actuate the control unit until the frame is folded out completely

After the frame has folded out:

- Lower the frame to its work position
- Move both toggle switches for the frame to “OFF”
- Move both toggle switches for the track marker to “ON”

Track marker

You need to release the track markers and fold them out before sowing.

→ Chapter »Preparing for operation«, section »Track marker [+]«, page 47

Seed hopper

- Fill the seed hopper with seed

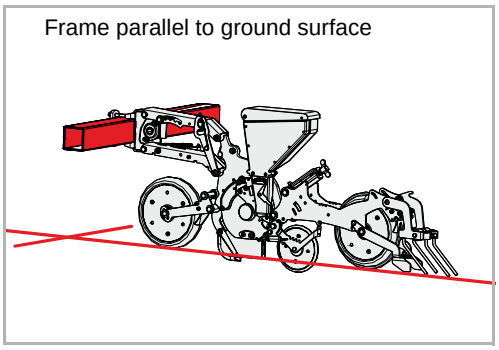
→ Chapter »Preparing for operation«, section »Fill with seed«, page 75

Granule distributor [+]

- Fill the granule distributor with granules

→ Chapter »Preparing for operation«, section »Filling the tank«, page 90

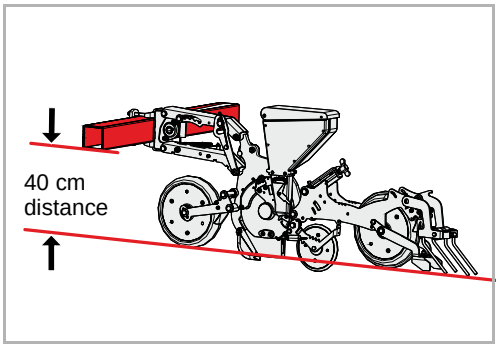
Adjusting frame



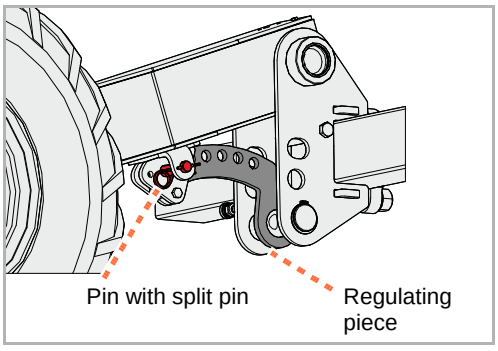
- Lower the machine to its work position

During work, the machine frame and covers of all seed hoppers must be parallel to the ground. In most cases, adjustment to soil conditions is required. Therefore, it is necessary to set the drive wheels, which bear the frame during seeding work.

No settings via the lower links
Never make the setting for seeding work via the depth adjustment of the lower link on the tractor.
Severe forms of incorrect sowing can result.



The distance between the frame and the surface of the soil should be approximately 40 cm.



- Remove the split pin and pin
- Lift the drive wheel slightly and align it with the desired hole in the regulation piece
- Insert the pin and secure it with the split pin

The setting can be different for the individual drive wheels. For example, the drive wheel which runs in the tractor track may need to be set to a lower position than the other drive wheels.

Negative pressure

Negative pressure is set differently for the application of:

- Seed

▸ Select appropriate negative pressure according to the seed

→ Chapter »Preparing for operation«, section »Manometer« page 76

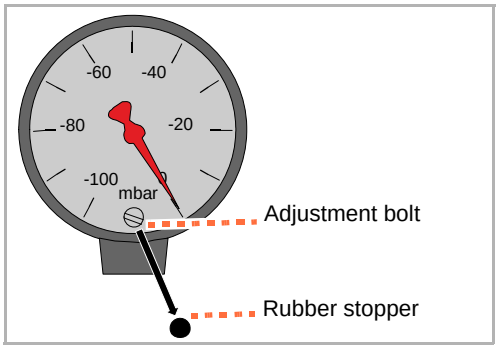
Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

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 bolt-driver to the right or to the left
▸ Reinsert the rubber stopper



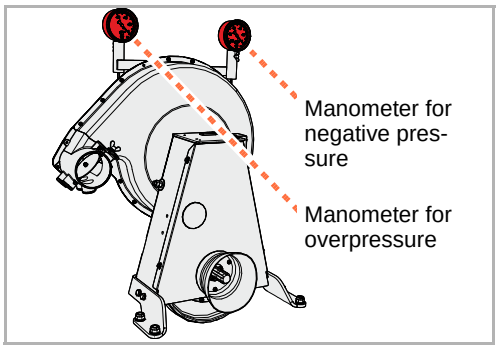
Seed

At the fan there is a regulating flap you can use to set negative pressure. The adjustment of the negative pressure should be carried out at the speed rating of the tractor PTO shaft

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

Seed		Seed disc			Fan	
Type	**Calibration**	**Type**	**Number of holes in the seed disc**	**Diameter of the holes [mm]**	**Negative pressure [mbar]**	**Overpressure [mbar]**
Chicory	1,25 – 1,50	8005	80	0,5	30	40
	1,50 – 1,75	8006	80	0,6	30 – 40	40
Corn salad	1,25 – 2,00	8006	80	0,6	30	40
Fennel	–	6012	60	0,6	30	40
	–	8012	80	0,8		
Cucumber		2020	20	2,0	40 – 50	-
Cabbage	1,50 – 1,75	2008	20	0,8	30	40
		4008	40	0,8	30	
	2,00 – 2,25	2010	20	1,0	30	30
		4010	40	1,0	30	
Poppy	1,25 – 1,50	8008	80	0,8	25 – 30	40
		6008	60	0,8	25 – 30	
Carrots	1,00 – 1,60	8006	80	0,6	30	40 – 50
		16006	80	0,6	30	40 – 50
	1,60 – 2,00	8008	80	0,8	30 – 40	40 – 50
		16008	160	0,8	30 – 40	
Carrots, pelleted	2,00 – 2,50	8010	80	1,0	40	30
Parsley	0,75 – 1,00	8005	80	0,5	30	40
	1,50 – 1,75	8008	80	0,8	40	30
	1,75 – 2,25	8010		1,0	40	
				1,0	40	20
Garden radish	2,50 – 2,75	8012	80	1,2	30 – 40	20
	2,75 – 3,00	8012		1,2		
				1,2	35 – 45	20
	3,00 – 3,25	8015		1,5		
				1,5	40 – 50	20
Winter radish	2,75 – 3,25	8015	80	1,5	40	-
		6015	60	1,5		
Beetroot	3,00 – 4,00	8020	80	2,0	30 – 40	-
		6020	60	2,0		
Beet	3,25 – 4,25	2020	20	2,0	35 – 40	-
Turnips	3,25 – 4,75	2020	20	2,0	40	-
Lettuce	0,75 – 1,00	2005	20	0,5	30	40
		4005	40	0,5		
Asparagus	2,50 – 3,50	2020	20	2,0	30	-
	3,50 – 4,00	2020		2,0		
				2,0	40	-
Spinach	2,50 – 3,50	4015	40	1,5	40	-
Tomatoes	2,00 – 2,25	4010	40	1,0	40	20
		6010	60	1,0		
Onions	2,00 – 2,25	8010	80	1,0	40	30

Regulating flap



The fan has two manometers. One manometer shows overpressure, the other shows negative pressure.

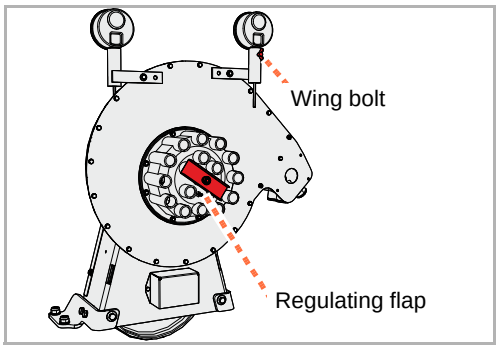
→ Switch on the PTO on the tractor. Whilst doing so, ensure that the speed is correct for the machine.

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

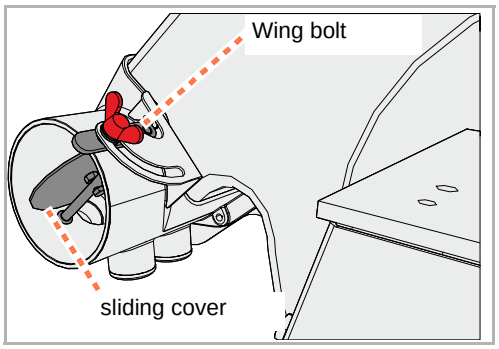
A regulating flap for adjusting the negative pressure is locating on the back of the fan and an adjuster for adjusting the ratio of overpressure to negative pressure is located at the front of the fan.

The manometers can be turned so that their readings can still be seen during the setting.

- Release wing bolt
- Turn the manometer
- Secure the manometer with the wing bolt



- First set the regulating flap so that it covers both openings in the fan



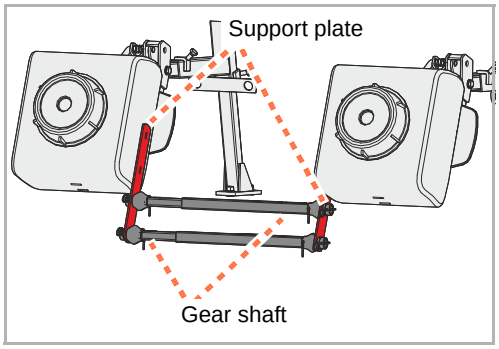
- Release wing bolt
- Turn the sliding cover so that a ratio of overpressure to negative pressure is set that enables the values for the selected seed to be achieved
- Secure the sliding cover with the wing bolt

If the appropriate values cannot be achieved by adjusting this ratio:

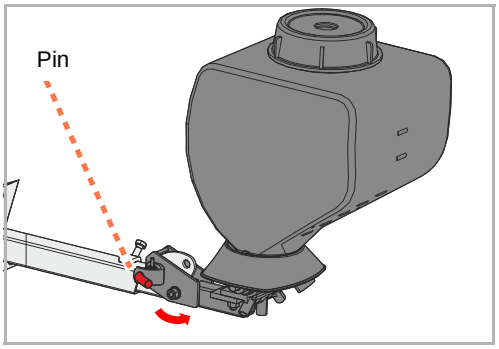
- Make another setting on the regulating flap and then set the ratio again

Granule distributor [+]

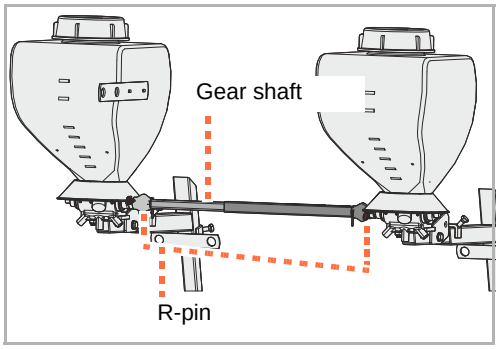
After the road transport, the granule distributor is prepared for the use on the field.



- Remove the R-pin
- Remove the gear shaft from the support plate between the granule distributors



- Unlock the pin
- Swivel up the granule distributor and lock it with the pin



- Link the gear shafts over the pivot points of the hydraulically foldable frame
- Insert the R-pin

Test drive



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

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.

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

Performing the test drive

- First perform a test drive in work position at working speed (2 – 5 km/h)

First perform a test drive on a typical part of the field. The headland or areas with obstacles are not suited for the test drive.

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

After the test drive

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

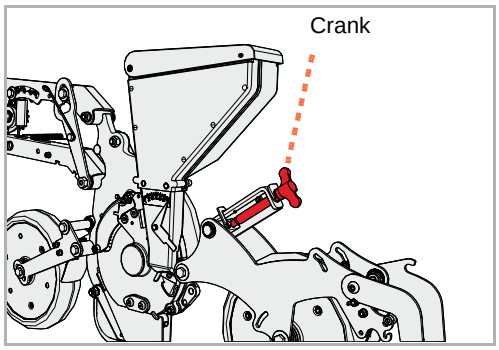
- Sowing distance

→ Chapter »Preparing for operation«, section »Sowing distance«, from page 65

- Scraper

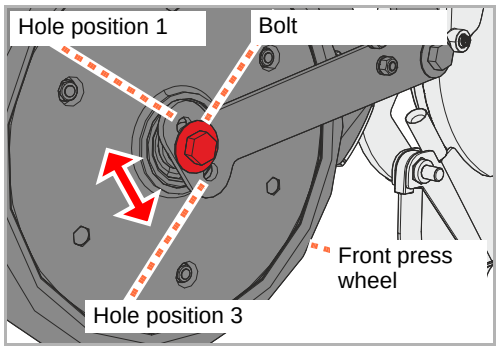
→ Chapter »Preparing for operation«, section »Scraper on single seed unit and double seed row«, from page 79

- Seed deposit depth
- ▸ Set the deposit depth as required using the crank



If the deposit depth is not reached, the front press wheel can be adjusted by three hole positions

- ▸ Undo and remove the bolt
- ▸ Bring the front press wheel into the required hole position



Hole position	Effect on the sowing depth
1	Deeper
2	Medium
3	Flatter

- ▸ Insert and secure the bolt



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 never be folded in the vicinity of live overhead power lines. Danger of electrocution!
Should the machine come into contact with a live overhead power line:

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

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

Sowing

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



Only drive forwards
Avoid driving backwards and rolling backwards when sowing.
This could lead to clogging of the seed coulters.

Work position and cultivation

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

Turning

The machine must be lifted at the headland.

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

Shortly before field border:

- Slow down
- 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 »Preparing for operation«, section »Manometer« page 76

☑ Sowing depth OK?

☑ Placing accuracy OK?

☑ Are all coulters unobstructed?

☑ Is seed consumption in all hoppers uniform?

☑ Is the fertiliser being applied?

☑ Is the consumption of fertiliser uniform?

☑ Are the furrows covered as well as possible?

Mechanical hectaremeter[+]

Cultivated surface

The hectaremeter counts the pulses during the work. The drilled filed area cannot be read directly from the hectaremeter, because the precision drill is equipped with multiple sowing units and different row spacing.

Reset the hectaremeter before every use to zero.

Calculate the cultivating field area using the following formula:

$$\frac{\text{Hectaremeter x table values display}}{10000} = \text{ha}$$

Example:
6-row seeding machine, 23 cm row spacing
Reading of the hectaremeter = 4000
Table value = 3.00

$$\frac{4000 \times 3.00}{10.000} = 1.20 \text{ ha}$$

Please refer to the table for the value for the area calculation

The values have been calculated for an average slippage. Due to deviating soil conditions, differences can result between the calculated and the actual area.

Please refer to the table for the value for the area calculation.

Number of sowing units	Row spacing [cm]																														
	11	12	13	14	15	18	20	23	25	28	30	33	35	38	40	43	45	48	50	53	55	58	60	63							
2	0,49	0,53	0,58	0,62	0,67	0,78	0,89	1,00	1,11	1,22	1,33	1,44	1,56	1,67	1,78	1,89	2,00	2,11	2,22	2,33	2,44	2,56	2,67	2,78							
3	0,73	0,80	0,87	0,93	1,00	1,17	1,33	1,50	1,67	1,83	2,00	2,17	2,33	2,50	2,67	2,83	3,00	3,17	3,33	3,50	3,67	3,83	4,00	4,17							
4	0,98	1,07	1,16	1,24	1,33	1,56	1,78	2,00	2,22	2,44	2,67	2,89	3,11	3,33	3,56	3,78	4,00	4,22	4,44	4,67	4,89	5,11	5,33	5,56							
5	1,22	1,33	1,44	1,56	1,67	1,94	2,22	2,50	2,78	3,06	3,33	3,61	3,89	4,17	4,44	4,72	5,00	5,28	5,56	5,83	6,11	6,39	6,67	6,94							
6	1,47	1,60	1,73	1,87	2,00	2,33	2,67	3,00	3,33	3,67	4,00	4,33	4,67	5,00	5,33	5,67	6,00	6,33	6,67	7,00	7,33	7,67	8,00	8,33							
7	1,71	1,87	2,02	2,18	2,33	2,72	3,11	3,50	3,89	4,28	4,67	5,06	5,44	5,83	6,22	6,61	7,00	7,39	7,78	8,17	8,56	8,94	9,33	9,72							
8	1,96	2,13	2,31	2,49	2,67	3,11	3,56	4,00	4,44	4,89	5,33	5,78	6,22	6,67	7,11	7,56	8,00	8,44	8,89	9,33	9,78	10,22	10,67	11,11							
9	2,20	2,40	2,60	2,80	3,00	3,50	4,00	4,50	5,00	5,50	6,00	6,50	7,00	7,50	8,00	8,50	9,00	9,50	10,00	10,50	11,00	11,50	12,00	12,50							
10	2,44	2,67	2,89	3,11	3,33	3,89	4,44	5,00	5,56	6,11	6,67	7,22	7,78	8,33	8,89	9,44	10,00	10,55	11,11	11,67	12,22	12,78	13,33	13,89							
11	2,69	2,93	3,18	3,42	3,67	4,28	4,89	5,50	6,11	6,72	7,33	7,94	8,56	9,17	9,78	10,39	11,00	11,61	12,22	12,83	13,44	14,05	14,67	15,28							
12	2,93	3,20	3,47	3,73	4,00	4,67	5,33	6,00	6,67	7,33	8,00	8,67	9,33	10,00	10,67	11,33	12,00	12,67	13,33	14,00	14,67	15,33	16,00	16,67							
13	3,18	3,47	3,76	4,04	4,33	5,06	5,78	6,50	7,22	7,94	8,67	9,39	10,11	10,83	11,55	12,28	13,00	13,72	14,44	15,17	15,89	16,61	17,33	18,05							
14	3,42	3,73	4,04	4,36	4,67	5,44	6,22	7,00	7,78	8,56	9,33	10,11	10,89	11,67	12,44	13,22	14,00	14,78	15,55	16,33	17,11	17,89	18,66	19,44							
15	3,67	4,00	4,33	4,67	5,00	5,83	6,67	7,50	8,33	9,17	10,00	10,83	11,67	12,50	13,33	14,17	15,00	15,83	16,67	17,50	18,33	19,16	20,00	20,83							
16	3,	4,	4,	4,	5,3	6,2	7,1	8,0	8,8	9,7	10,	11,	12,	13,	14,	15,	16,	16,	17,	18,	19,	20,	21,	22,							

After sowing

Empty the seed hopper
→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page 74

Emptying the granule distributor
→ Chapter »Preparing for operation«, section »Emptying the tank«, page 92

Parking the machine
→ Chapter »Parking and storage«, section »Parking the machine«, page 133

Move machine into transport position
→ Chapter »Driving on the road«, section »Transport position«, page 95

Cleaning



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.

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.

Only use a dry cleaning method to clean the machine, using a hand brush, a cloth and compressed air.



Do not wash the machine using water or a pressure washer
Do not use water or a pressure washer to clean the machine, as water can enter the seeding hearts and combine with the dust there to form caking.
The caking can block the seed disc when the machine is next used.



If water nevertheless enters the machine, open the seeding hearts and let the machine dry. After this, wipe the inside of the seeding hearts dry.

Seed hopper

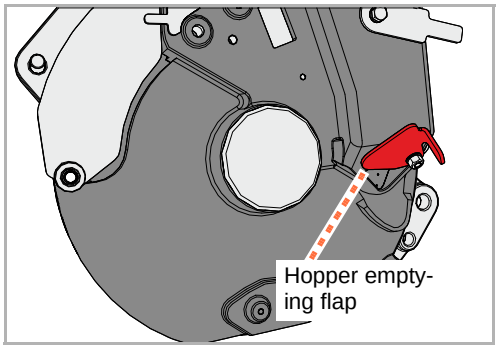
- Empty all the seed hoppers

→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page 74

- Only clean the seed hopper from the outside carefully with water. When cleaning, ensure that no water can penetrate the seed hopper.

If water has still entered the seed hopper:

- Open the emptying flap to allow the water to drain off freely



Granule distributor [+]

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.

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.

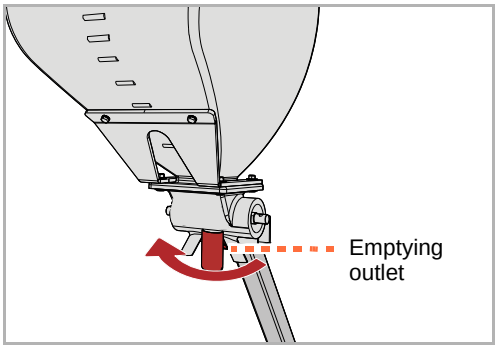
- Empty all granule distributors

→ Chapter »Preparing for operation«, section »Emptying the tank«, page 92

- Wash the outside of the granule distributor carefully with water. Ensure that no water can penetrate the granule distributor.

If water nevertheless gets into the granule distributor:

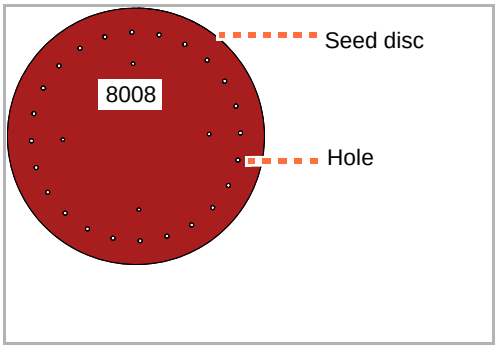
- Place opened packages or empty original packages in position when emptying the tanks
- Hold the package opening under the emptying outlet.
- Unscrew the emptying outlet
- Remove the remaining crop protection chemical from the tank with a brush. Never use this brush for any other purpose.
- Screw the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



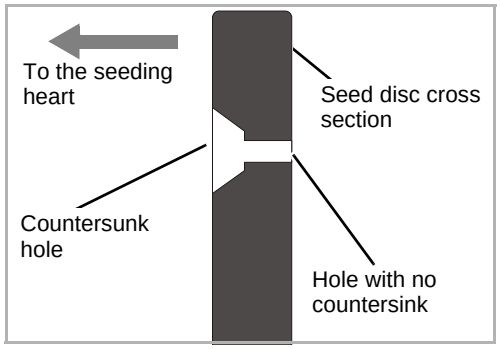
After cleaning

- Check seed hopper and cell wheels for moisture. Wipe dry if necessary.

Sowing units



- Blow out the seeding hearts and the fan with compressed air
- Clean the seeding hearts with a brush as required. Never use this brush for any other purpose
- Clean the seed disc with a cloth
- Clean blocked holes in the seed disc with a needle



Ensure that the seed disc is in the correct installation position:

- Fit the disc with the countersunk holes facing the seeding heart

Care

To ensure that the service life of the machine is as long as possible, we recommend that a protective coating of oil is applied after the end of the season and that the machine is cleaned in a dry state using a dry hand brush, a dry cloth and compressed air only before storage.

Do not wash the machine using water or a pressure washer
Do not use water or a pressure washer to clean the machine, as water can enter the seeding hearts and combine with the dust there to form caking.
The caking can block the seed disc when the machine is next used.

If water nevertheless enters the machine, open the seeding hearts and let the machine dry. After this, wipe the inside of the seeding hearts dry.

Parking the machine

Machines without a lengthways transport attachment are parked in their work position. Machines with a lengthways transport attachment can be parked in their work position or their transport position.
If the machine is parked for a longer period of time, for example over the winter, we recommend that the machine is always parked in its work position. This will help to preserve the condition of your tyres.



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 »Preparing for operation«, section »Emptying the seed hopper«, page 74

Granule distributor [+]



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.

▸ Emptying the granule distributor

→ Chapter »Preparing for operation«, section »Emptying the tank«, page 92

▸ Leave the emptying outlet open

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.

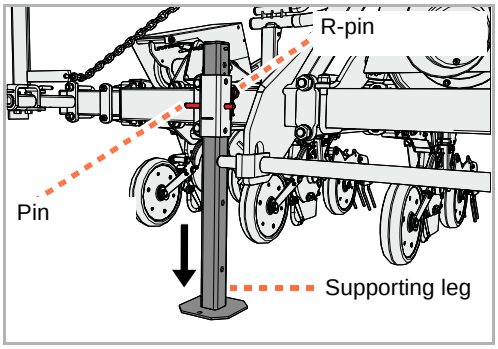
Connections

- 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

Without lengthways transport attachment

The machine can be parked:

From the work position in/into	Work position



- Lift the machine over the lower link balls of the tractor
- Remove the R-pin on the pin
- Remove the pin
- Slide the supporting leg downwards and secure it with the pin
- Secure the pin with the R-pin
- Also push the second supporting leg downwards and secure in the lower position with the pin
- Release top link
- Release lower link ball

With lengthways transport attachment

The machine is coupled differently for travelling by road or for work in the field.

Coupling for travelling by road is described in the applicable chapter.
→ Chapter »Driving on the road«, section »Transport position«, from page 95



Use of safety shoes
Wear proper shoes. So you can prevent injury.
Carrying out work without wearing proper shoes can lead to crush injuries

Do not place your feet under the drawbar
The drawbar weighs approx. 25 kg, and a support wheel approx. 40 kg. Under no circumstances should feet be positioned under the drawbar or support wheel when working. Secure drawbar so that it cannot fall down.
If the drawbar or support wheel falls down by accident, this can cause injuries.

The machine can be parked:

From the transport position in/into	Transport position
From the work position in/into	Work position



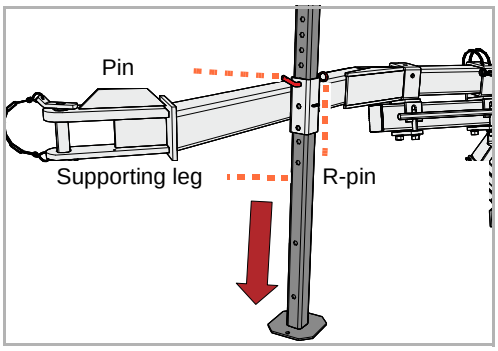
If the machine is later to be coupled in a different position than that in which it was parked, the machine must be changed accordingly.

Linkage from work position to transport position
→ Chapter »Driving on the road«, section »Transport position«, from page 95

Linkage from transport position to work position
→ Chapter »Coupling the machine«, section »Coupling«, from page 30

Transport position

Risk of rolling
The machine must be parked in such a way that it cannot roll independently. Place wheel chocks that prevent rolling in front of and behind both transport wheels.
A rolling machine can cause severe or fatal accidents.



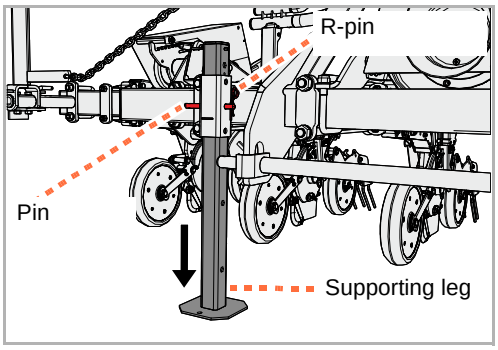
- Lift the machine over the lower link balls of the tractor
- Remove the R-pin on the pin
- Remove the pin
- Lower the supporting leg on the lengthways transport attachment and secure it with the pin
- Secure the pin with the R-pin

If there are electrical connections or hydraulic connections:

- Disconnect the electrical connections and hydraulic connections from the tractor

- Lower the machine and park it on the ground
- Uncouple the machine

Work position



- Lift the machine over the lower link balls of the tractor
- Remove the R-pin on the pin
- Remove the pin
- Slide the supporting leg downwards and secure it with the pin
- Secure the pin with the R-pin
- Also push the second supporting leg downwards and secure in the lower position with the pin
- Lower the machine and park it on the ground

If there are electrical connections or hydraulic connections:

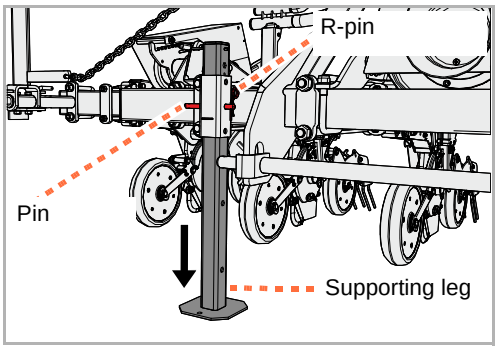
- Disconnect the electrical connections and hydraulic connections from the tractor

- Uncouple the machine

Hydraulically foldable frame, 6.00 m

The machine can be parked:

From the transport position in/into	Transport position
From the work position in/into	Work position



- Lift the machine over the lower link balls of the tractor
- Remove the R-pin on the pin
- Remove the pin
- Slide the supporting leg downwards and secure it with the pin
- Secure the pin with the R-pin
- Also push the second supporting leg downwards and secure in the lower position with the pin
- Release top link
- Release lower link ball

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 the machine«, page 133

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.



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.

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.

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 oils, 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 in accordance with 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

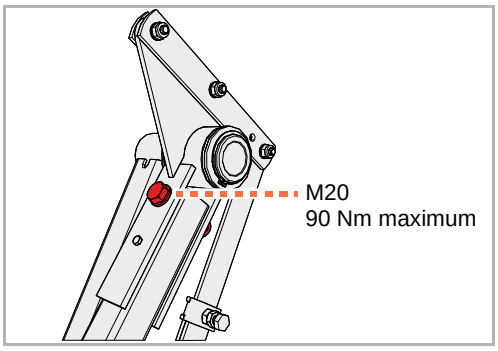
Tightening torques, general

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

Tightening torques in Nm			
Bolt size	Bolt quality		
	„8.8“	„10.9“	„12.9“
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
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 2 hours of operation	Daily	After 25 hours of operation	Once per season	After heavy use	If required	In case of wear	Lubrication	Checking	Replacement	Settings	Tensioning	Cleaning	Page
General														
Retighten all bolts	•					•								122
Visual inspection		•							•					
Bearing		•						•						122
Hose connections				•					•					
Hydraulics														
Hydraulic hoses every 6 years						•				•				123
Folding axles														
Lengthways transport attachment		•							•					
Frame		•							•					
Track marker		•							•					
Hydraulic hoses						•	•			•				123
Hydraulic cylinders on frame				•					•					
Hydraulic cylinders on track markers				•					•					
Hydraulic change-over of track markers				•					•					164
						•				•				

	After 2 hours of operation	Daily	After 25 hours of operation	Once per season	After heavy use	If required	In case of wear	Lubrication	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Seeding technology														
Chain-driven gearbox				•					•					
Sowing units				•					•					from 157
Chain							•			•				
						•						•		
				•				•						
Seeding heart		•							•				•	
Seed disc				•					•					
Coulters		•							•					160
							•			•				
Press wheel				•					•					
Coverer				•					•					
						•					•			
Scraper				•					•					
						•					•			

	After 2 hours of operation	Daily	After 25 hours of operation	Once per season	After heavy use	If required	In case of wear	Lubrication	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Other														
Track marker (disc)			•					•						163
Wheels														
Tyres				•					•					
							•			•				161
Tyre pressure			•						•					
Dust filter on the fan		•											•	155
						•					•			
Crop protection														
Granule distributor														from 165
Chain wheels				•					•					
Chain							•			•				
						•						•		
				•				•						
Gear shaft				•				•						
Metering wheels							•			•				

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 work position
2. Switch off the electrical control system of the machine
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

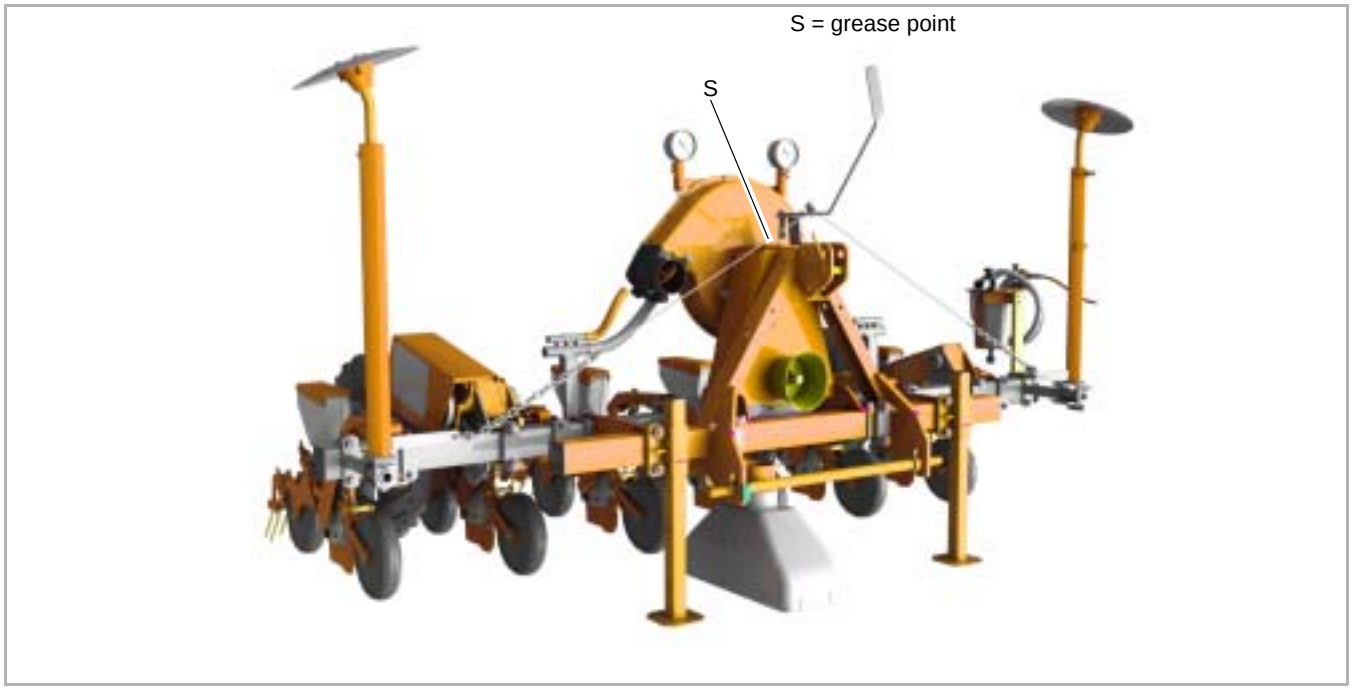
The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

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

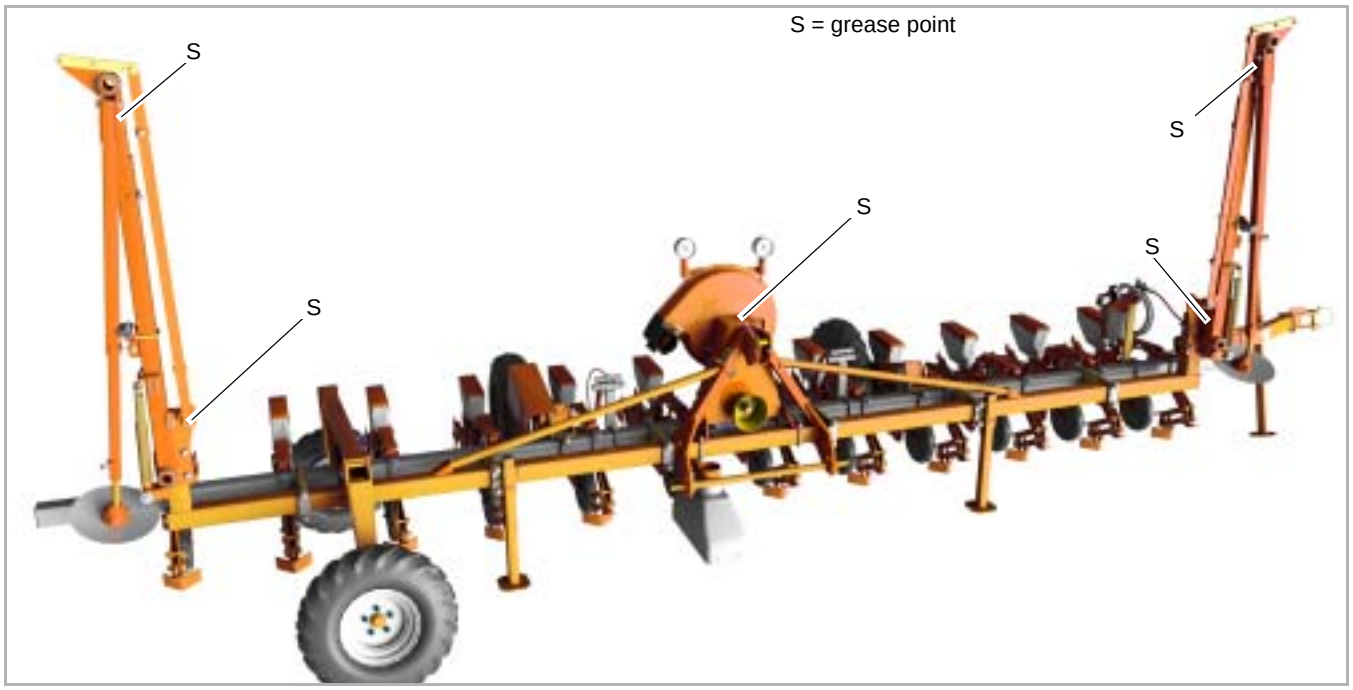
Do not lubricate maintenance-free bearings.

Overview of lubrication points

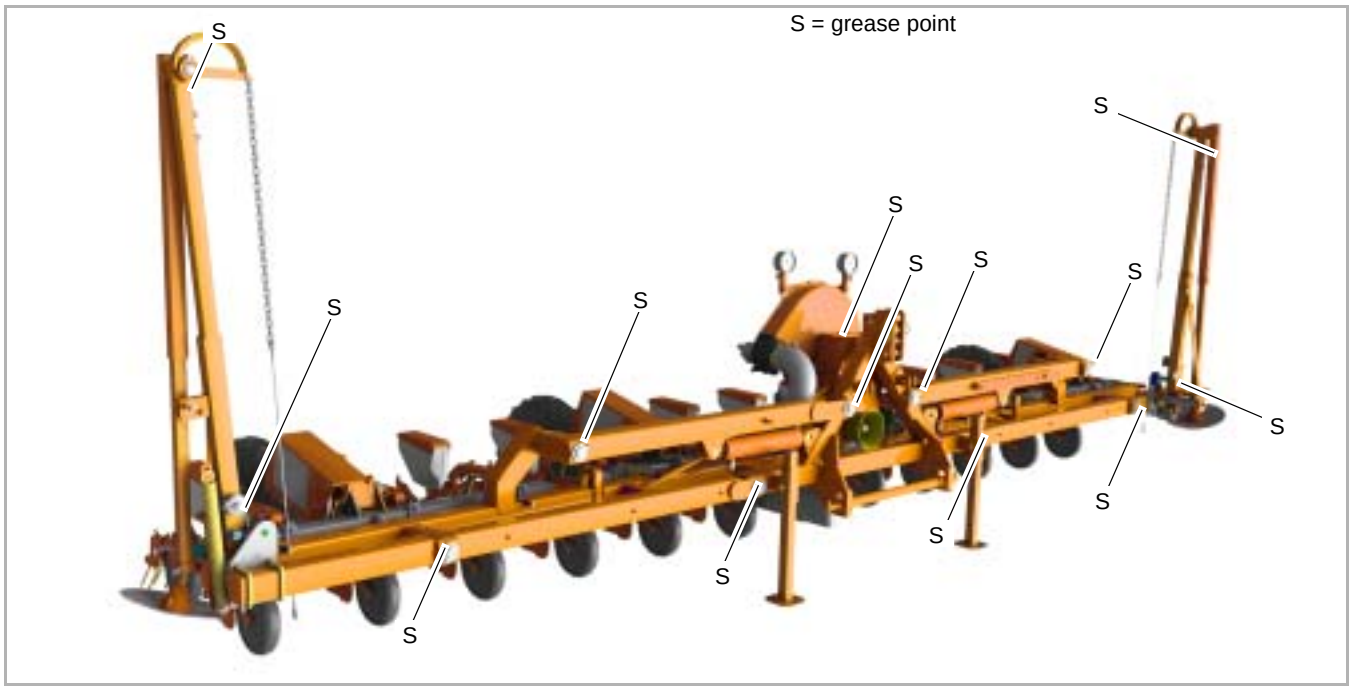
Rigid frames from 2.50 m to 3.50 m



Rigid frames from 4.00 m to 6.50 m



Hydraulically foldable frame, 6.00 m



Other lubrication points

Generally:

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

The position of the lubrication nipples is shown as an example for one component. If several components are available, each component's lubrication nipples have to be lubricated accordingly.

Frame

Before every use

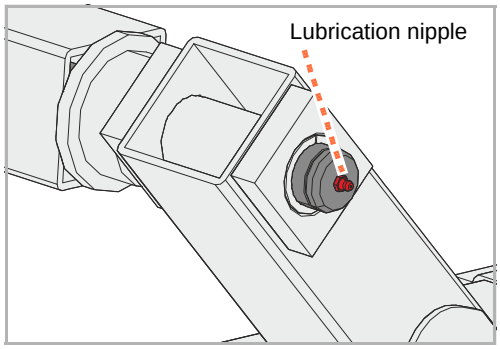
- All connection claws of the sowing units have to be checked for firm seating to ensure a constant row spacing

Boom

Once per season

The lubrication nipples are shown only as an example.

- Lubricate all booms on the hydraulically foldable frame with 1-2 strokes of the grease gun at least once per season, depending on the frequency of use.



Wheels

Works:

- Check the tyres of the transport wheels
- Check the tyres of the drive wheels
- Check the tyre pressure of the transport wheels
- Check the tyre pressure of the drive wheels

Check tyres

- 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 pressure

Once per season

- Check the tyre pressure of the transport and support wheels once each season:

Frame without lengthways transport attachment		
7,00-12 Drive wheel	=	1.5 bar

:

Frame with lengthways transport attachment		
7.00-12 transport wheel	=	2.0 bar
7,00-12 Drive wheel	=	1.5 bar

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.

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.

Sowing unit

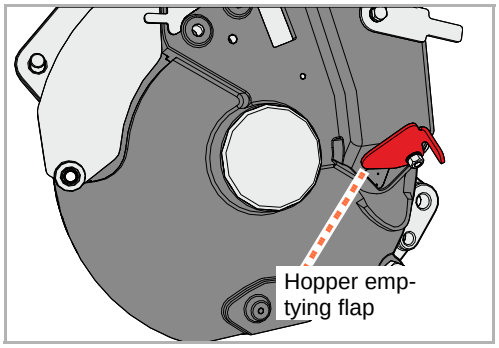
This section describes the following maintenance tasks to be carried out on the seed row:

- Replacing the seed disc
- Replacing the cleaning jet
- Replacing the coulter

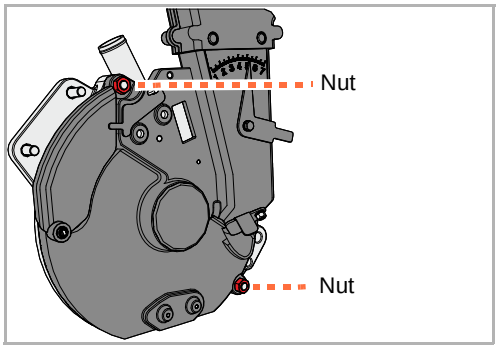
Replacing the seed disc

Replacement of the seed disc is necessary when the seed to be sown is changed or there is wear on the seed disc.

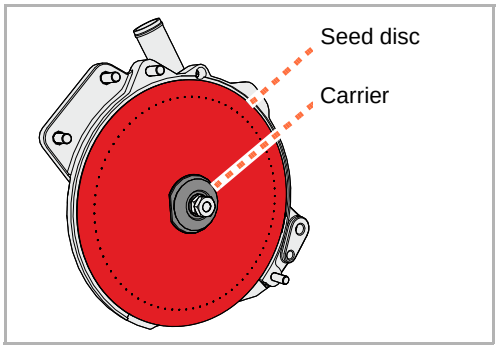
If changing the seed or if worn



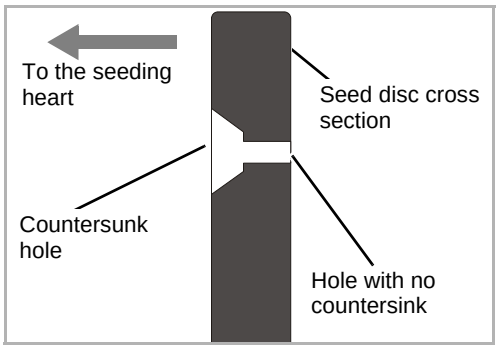
- Empty the seeding heart completely



- Release and remove the nuts on the cover of the seeding heart
- Remove the cover of the seeding heart with the seed hopper

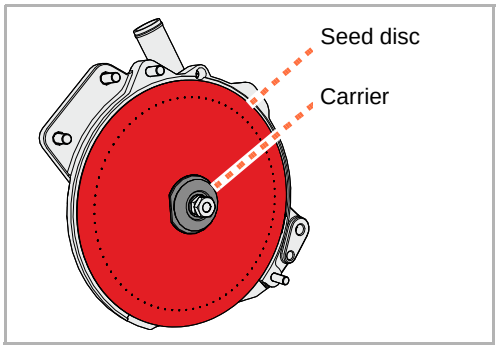


- Turn the seed disc to the left until it fits over the carrier
- Remove the seed disc



Ensure proper position of the new seed disc:

- Fit the disc with the countersunk holes facing the seeding heart

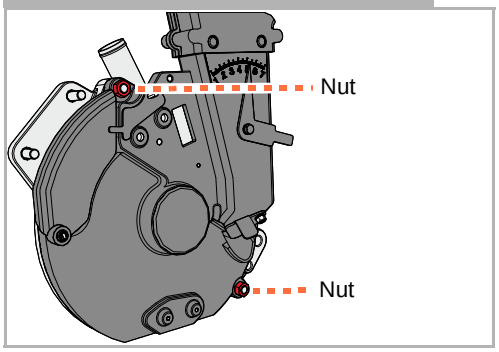


- Fit the new seed disc. Fit the seed disc onto the carrier correctly.
- Turn the seed disc slightly to the right so that it is secured
- Position the cover of the seeding heart with the seed hopper and secure it with nuts

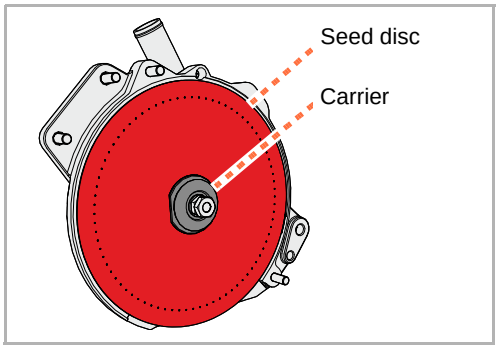
Replacing the cleaning jet

The cleaning jet is worn if no raised areas can be seen. In addition to the cleaning jet, the rubber gaiter must also be replaced.

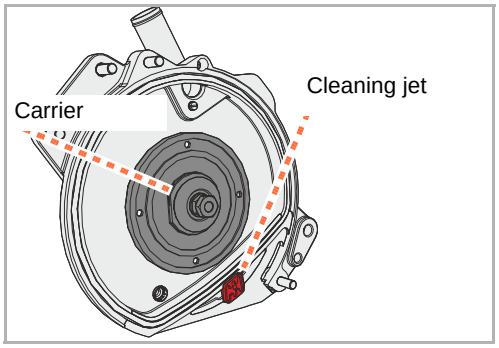
In case of wear



- Release and remove the nuts on the cover of the seeding heart
- Remove the cover of the seeding heart with the seed hopper



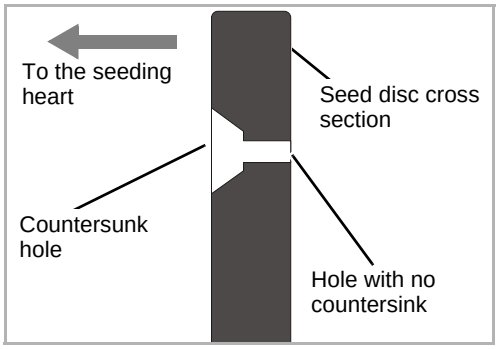
- Turn the seed disc to the left until it fits over the carrier
- Remove the seed disc



- Remove the cleaning jet. There is a rubber gaiter behind it.
- Remove the rubber gaiter
- Fit the cleaning jet onto the new rubber gaiter
- Refit the cleaning jet and rubber gaiter
- Fit the seed disc. Position the seed disc on the carrier correctly.
- Turn the seed disc slightly to the right so that it is secured
- Position the cover of the seeding heart with the seed hopper and secure it with nuts

Ensure that the seed disc is in the correct installation position:

- Fit the disc with the countersunk holes facing the seeding heart

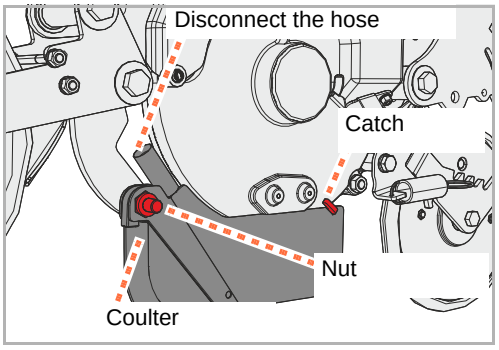


Replacing the coulter

In case of wear

If the coulter no longer draws a narrow furrow, the coulter tip is worn down and must be replaced promptly.

If a narrow furrow is no longer formed, it is possible for the seed to roll away in the furrow. The placement of the individual seeds will be uneven as a result.



- Disconnect the hose if fitted
- Release and remove the nut
- Fold the coulter down and out of the detent
- Remove share
- Replace the coulter tip or the complete coulter
- Attach the coulter and fold it upwards into the detent
- Secure the coulter with the nut

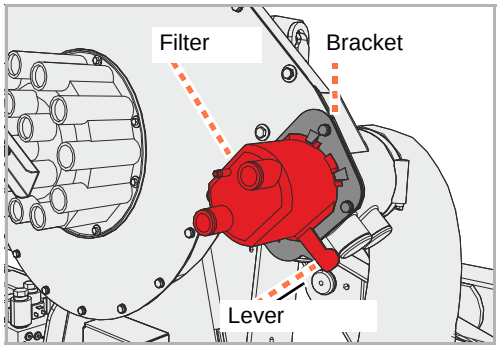
Dust filter on the fan

Daily

Cleaning the dust filter daily prevents the fine holes in the seed discs from becoming blocked.

Blocked holes in the seed disc lead to patchy seeding.

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.



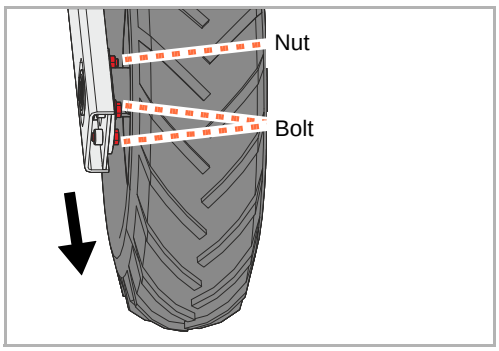
- Pull the lever
- Turn the filter to remove it from the holder
- Remove the dust filter and clean it with compressed air
- Fit the dust filter and refit the filter element. Ensure that the lever is locked in place.

Drive

If necessary, the chains have to be tensioned or replaced. The maintenance works have to be made at all drive arms.

Tensioning the chain

If required



- Undo the bolts and nuts
- Pull the drive wheel slightly into the direction of the arrow (maximum 2 cm)
- Slightly tighten the bolts and nuts
- Check chain tension
- Retension chain if necessary
- Firmly tighten the bolts and nuts

Replacing the chain

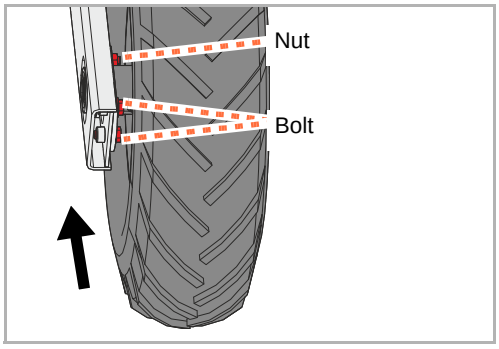
In case of wear

The chain is worn if

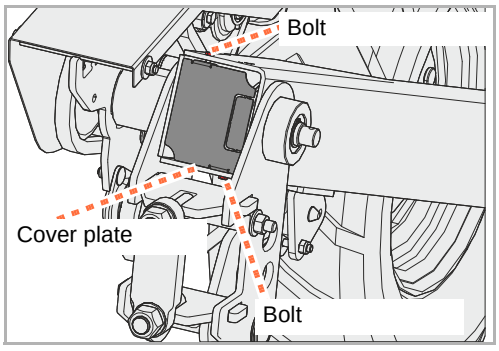
- it can no longer be tensioned,
- the roller distance has become too large or
- it has rusted.

In these cases, the chain must be replaced.

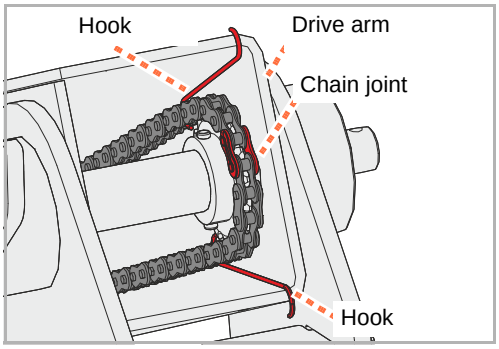
A worn chain can lead to patchy seeding.



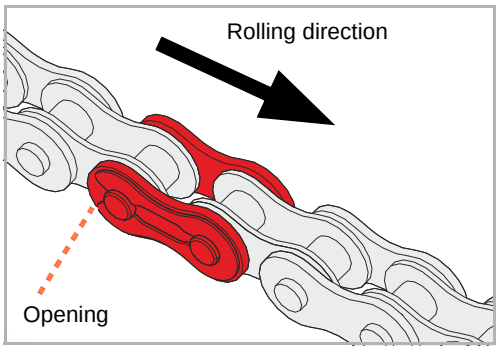
- Undo the bolts and nuts
- Push the drive wheel slightly in the direction of the arrow

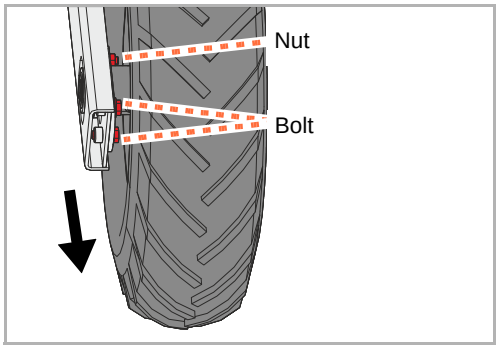


- Unscrew the bolts from the cover plate
- Remove the cover plate



- Lift the machine
- Turn the drive wheel in relation to the direction of travel until the chain joint can be seen on the chain wheel at the upper end of the drive arm
- Hook the wire hooks onto both parts of the chain and secure them on the drive arm
- Open the chain joint
- Connect the new chain with the lower part of the old chain using the chain joint
- Remove the hook from the lower part of the chain
- Pull the upper part of the chain until the new chain is pulled in
- Secure the new chain with hooks
- Remove the old chain
- Close the chain joint while ensuring that the position of the opening of the locking device is in line with the rolling direction
- Remove the hook
- Reinsert the cover plate with the bolts





- Pull the drive wheel in the direction of the arrow
- Slightly tighten the bolts and nuts
- Check chain tension
- Retension chain if necessary
- Firmly tighten the bolts and nuts

Track marker

Track marker, general

General maintenance work on the track markers includes:

- Replacing the disc

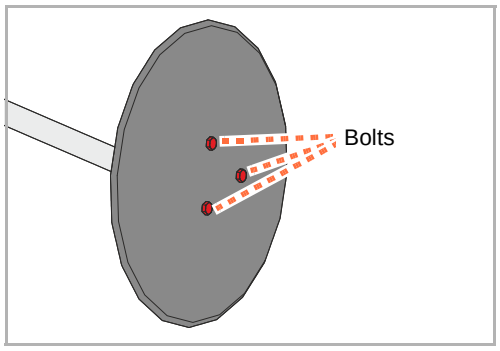
Lubricate bearings

Risk of injury through cutting
The discs can be very sharp.
There is a risk of cutting injuries if personnel are not wearing protection gloves.

Replacing the disc

In case of wear

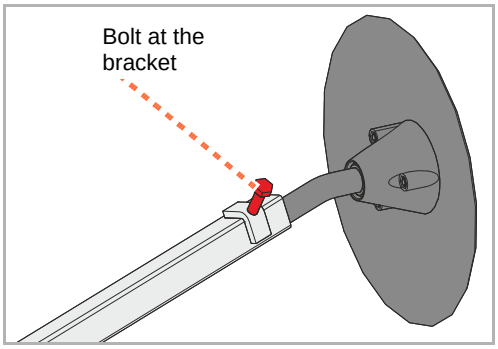
If a disc is defective, replace it.



- Release the bolts and remove the disc
- Replacing the disc
- Fit the bolts with the washers
- Tighten the bolts firmly
- Retighten the bolts after the first two hours of operation again

Replacing the disc with bearing

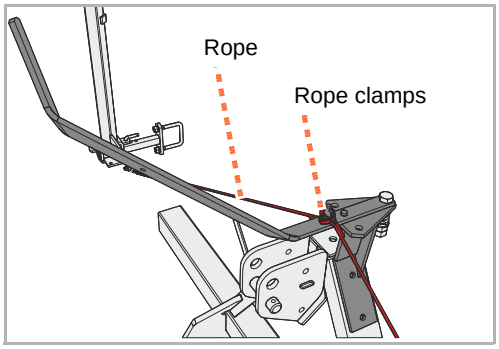
In case of wear



- Release the bolt at the bracket
- Pull out the disc with the bearing and replace it
- Firmly re-tighten the bolt on the holder

Mechanical track marker [+]

If required, at least once a season

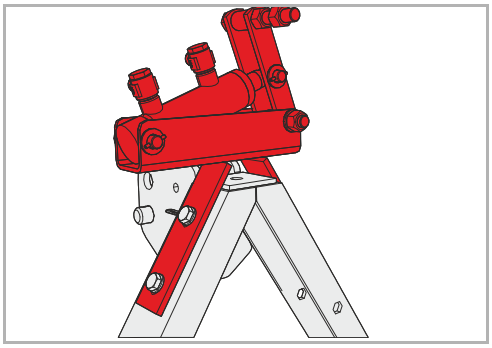


After heavy stress the rope at track marker can be lengthened or show damages. You should therefore retighten the cable as required or at least check the cable once a season.

- Checking the rope clamp
- Check the rope

Hydraulic changeover of track markers [+]

If there is a defect



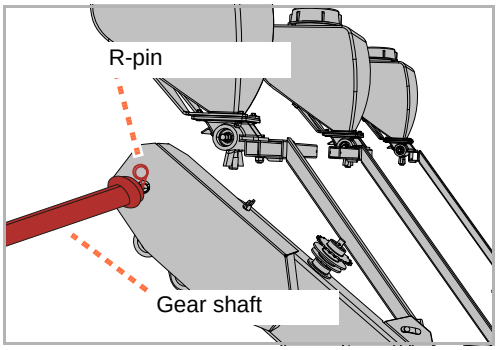
If the hydraulic change-over of the track markers is defective, arrange the replacement by a qualified garage.

Granule distributor [+]

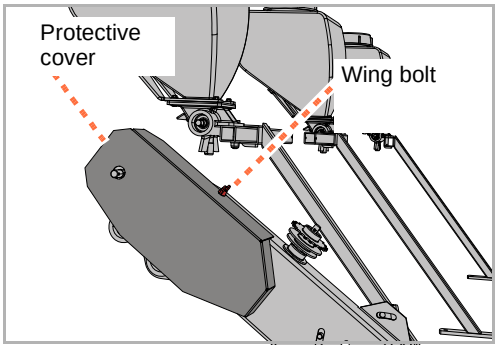
Gear wheels, chain

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

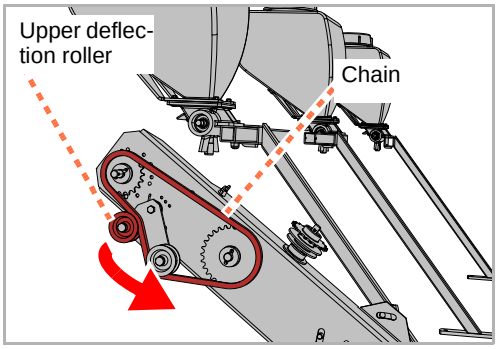
In case of wear



- 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

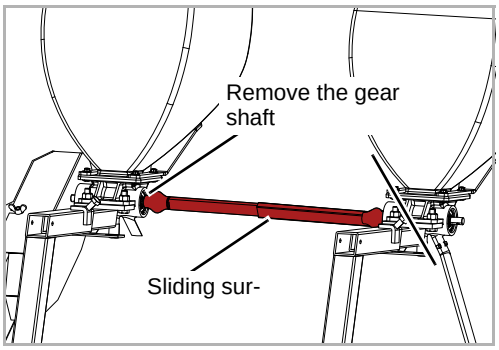
To replace the chain wheel:

- 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

Lubricating the gear shaft

After heavy use

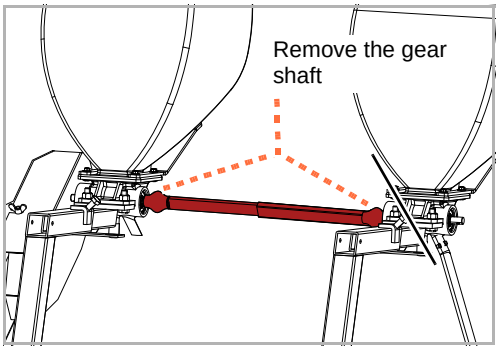


- Remove the R-pin on both sides of the gear shaft
- Remove the gear shaft
- Apply grease to sliding surfaces with a brush
- Reattach the gear shaft

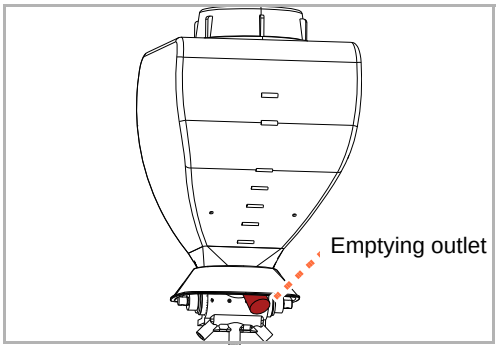
Replacing the metering wheels

If they are worn

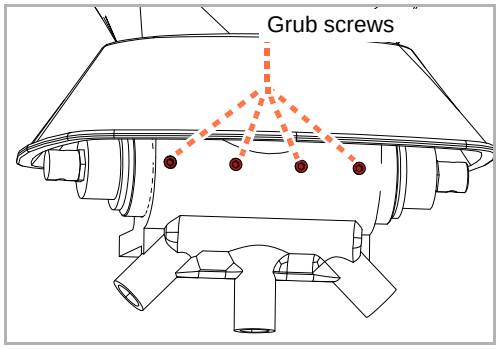
Regularly check the metering wheels for wear. The metering wheels are visible at the bottom of the granule hopper. Worn out metering wheels must be changed. Worn metering wheels can result in an incorrect application rate.



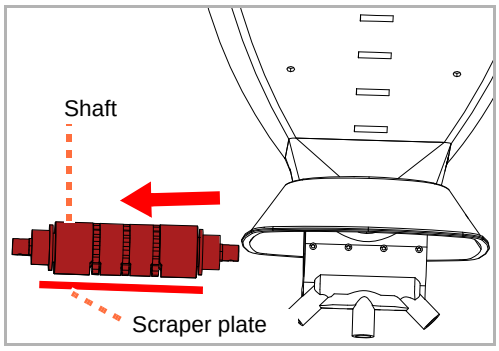
- Remove R-pin on gear shaft
- Remove the gear shaft



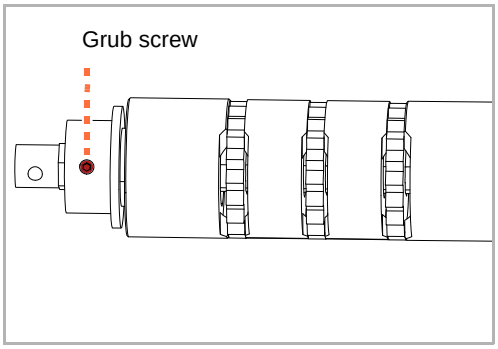
- Place a container underneath
- Unscrew the emptying outlet



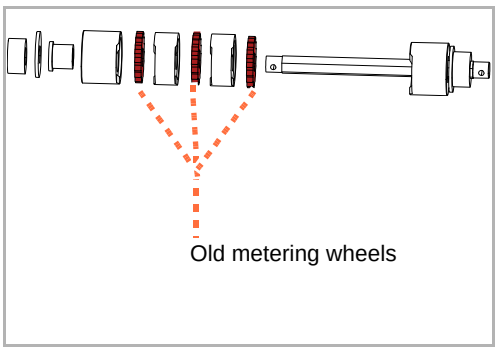
- Release the grub screws



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

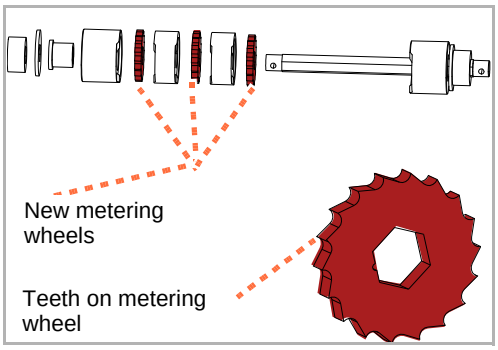


- Release the grub screw

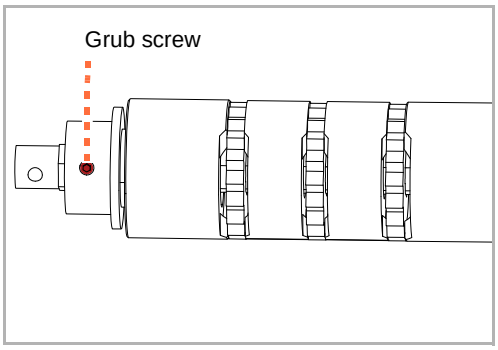


- Remove the components from the shaft and lay them on a clean support surface in the same order and the identical position as when fitted

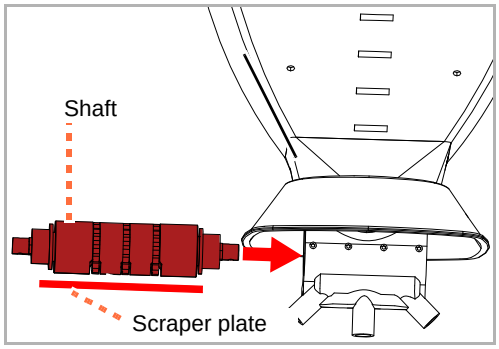
When fitting the new metering wheels, note the position of the teeth. The position of the teeth on the new metering wheels must match the position on the old metering wheels.



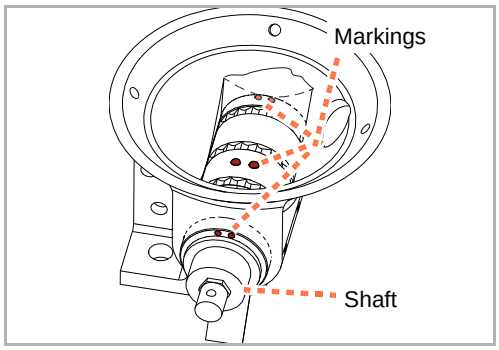
- In the same order and using new metering wheels, slide the components back onto the shaft



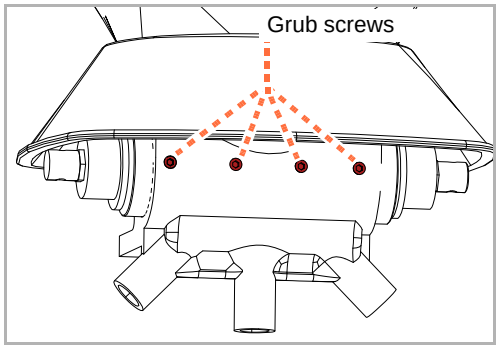
- Tightly fasten the grub screw



- 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.



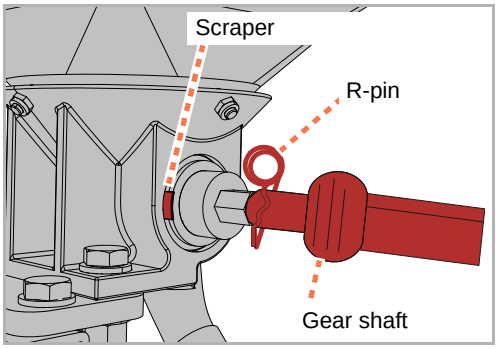
- Carefully tighten the grub screws
- When doing so, check occasionally that the shaft is still able to turn slightly

Scraper

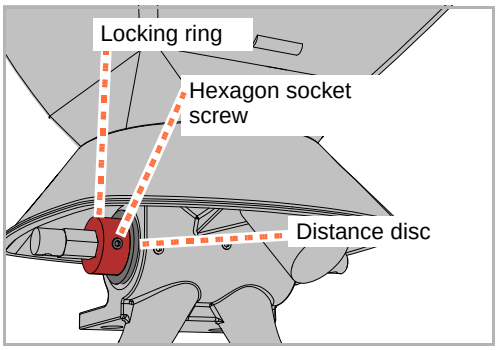
The scraper must be adjusted when it is worn.

2 sowing units

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



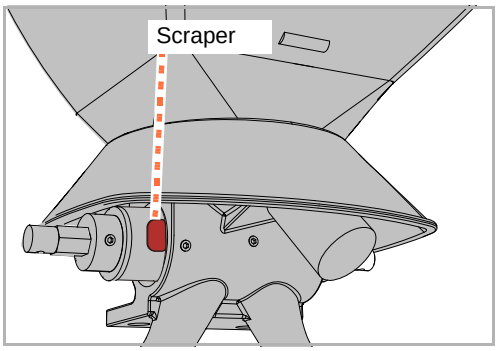
- Remove the R-pin from the gear shaft
- Remove the gear shaft



- 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

Faults can often be eliminated in a fast and easy manner. Before calling Customer Service, refer to the table below to check whether you can eliminate the fault yourself.

Rigid frames

Fault	Cause	Remedy
2.50 m – 3.50 m rigid		
Track marker double-acting: • Not activating, or only slowly	Control unit at the tractor defective	Contact manufacturer
	Hydraulic pump defective	Contact manufacturer
	Hydraulic coupling not plugged in correctly	Plug in the hydraulic coupling correctly
	Throttle in cylinder is contaminated	Inform the Customer Service
Track marker single-acting: • Not activating, or only slowly • Both track marker arms fold at same time	Control unit at the tractor defective	Contact manufacturer
	Hydraulic pump defective	Contact manufacturer
	Hydraulic coupling not plugged in correctly	Plug in the hydraulic coupling correctly
	Throttle in cylinder is contaminated	Inform the Customer Service
	Defective change-over valve	Inform the Customer Service
4.00 m – 6.50 m rigid		
Track marker single-acting: • Not activating, or only slowly	Control unit at the tractor defective	Contact manufacturer
	Hydraulic pump defective	Contact manufacturer
	Hydraulic coupling not plugged in correctly	Plug in the hydraulic coupling correctly
	Throttle in cylinder is contaminated	Inform the Customer Service
• Both track marker arms fold at same time	Defective change-over valve	Inform the Customer Service

Hydraulically foldable frame, 6.00 m

Fault	Cause	Remedy
Track marker double-acting: • Not activating, or only slowly	No voltage	Check the power supply
	Control unit at the tractor defective	Contact manufacturer
	Hydraulic pump defective	Contact manufacturer
	Throttle in cylinder is contaminated	Inform the Customer Service
	Hydraulic coupling not plugged in correctly	Plug in the hydraulic coupling correctly
	Filter in control block contaminated	Inform the Customer Service
	Hydraulic valve defective	Inform the Customer Service
Side sections • Cannot be extended • Cannot be folded in	No voltage	Check the power supply
	Control unit at the tractor defective	Contact manufacturer
	Hydraulic pump defective	Contact manufacturer
	Hydraulic coupling not plugged in correctly	Plug in the hydraulic coupling correctly
	Filter in control block contaminated	Inform the Customer Service
	Hydraulic valve defective	Inform the Customer Service
	Transport locking device locked	Unlock transport locking device
Track marker or outer wings: • can be actuated hydraulically, although the switch is in position “OFF”	Hydraulic valve defective	Inform the Customer Service
	Hydraulic line not properly connected	Inform the Customer Service

Seeding technology

Fault	Cause	Remedy
Seed is not deposited	Coulter is clogged	Remove clogging
	Seed hopper empty	Fill seed hopper
	Wrong seed disc	Install the correct seed disc for the seed
Seed is not placed correctly • Bare patches • Doubles / rupture	Scraper not set correctly	Readjust the scraper
	Wrong seed disc	Install the correct seed disc for the seed

When the service life of your machine is over, it must be properly disposed of. Please observe the currently valid disposal regulations.

Metal parts
All machine components can be sent for scrap metal recycling.

Plastic parts
All plastic parts are marked and can be recycled.

Tyres
Tyres can be sent to tyre recycling facilities.

Oil
Collect fluid from the hydraulic system in a suitable container and dispose of it at an old oil collection point.

Electronics
PCBs or terminals are disposed of as electronic scrap. If there is no special waste handling facility in your area, you can return the electronic component to the manufacturer for proper disposal. It will then be disposed of in an environmentally-friendly manner.

Granule
Dispose of the remaining granules in accordance with applicable regulations.

EC Conformity Declaration

In accordance with EC Directive 2006/42/EC



Type plate and CE symbol

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declares under its sole responsibility that the following product complies with EC Directive 2006/42/EC:

VP 1000/1000F series and accessories

Kverneland Group Soest GmbH
Soest, 08.09.2015



Hasan Kesek
CEO and authorised person for compiling technical documentation

Copy of the type plate

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