

SD2001MP series / SD3001MP series

Operating manual

Original operating manual

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Language	EN
From machine number	ACKSDxx230
Model	
Reference number	A139518640

Identification of the machine

Operating manual valid from machine number	

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	SD2001MP series / SD3001MP series
Working width	
Weight	
Machine number	
Accessories	
Supplier address	
Manufacturer address	Kverneland Group Soest GmbH Coesterweg 42 D-59494 Soest Germany Tel. +49 (0) 2921/974-0

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Target group

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

Safety

Study the contents of this operating manual carefully, which are relevant for your activity, before initial operation or assembly of the machine. Always read through the safety instructions in the chapter “Safety” and observe the warning information in the individual chapters. In this way, you will achieve optimum work results and operational safety.

For the employer

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

The following are included in this training:

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

Regular instruction sessions

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

Instruction

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

Other applicable documents

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

EC Declaration of Conformity	Integral part of this operating manual → Chapter »EC Declaration of Conformity«, page 148
Spare parts list	Integral part of the delivery with this machine
Operating manual for the electronic control system	E-BAS software E-COM-SINGLE software
Operating manual of the weighing system manufacturer [+]	Integral part of the delivery with this machine
Operating manual of the PTO shaft manufacturer	Integral part of the delivery with this machine
Operating manual for the terminal [+]	For example, IsoMatch Tellus

Symbols

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

- A bullet point accompanies each item in a list

▸ A triangle indicates operating functions which must be performed

→ An arrow indicates cross-references to other text passages

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

Pictograms

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



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

- Moderate to serious injury
- Fatal injury

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



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

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



This symbol indicates information, tips and notes on operation.



This symbol indicates tips for assembly or adjustment work.



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

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

Before folding out only

▸ Release the locking mechanism for transport

▸ Actuate the control unit

For your safety

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

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

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

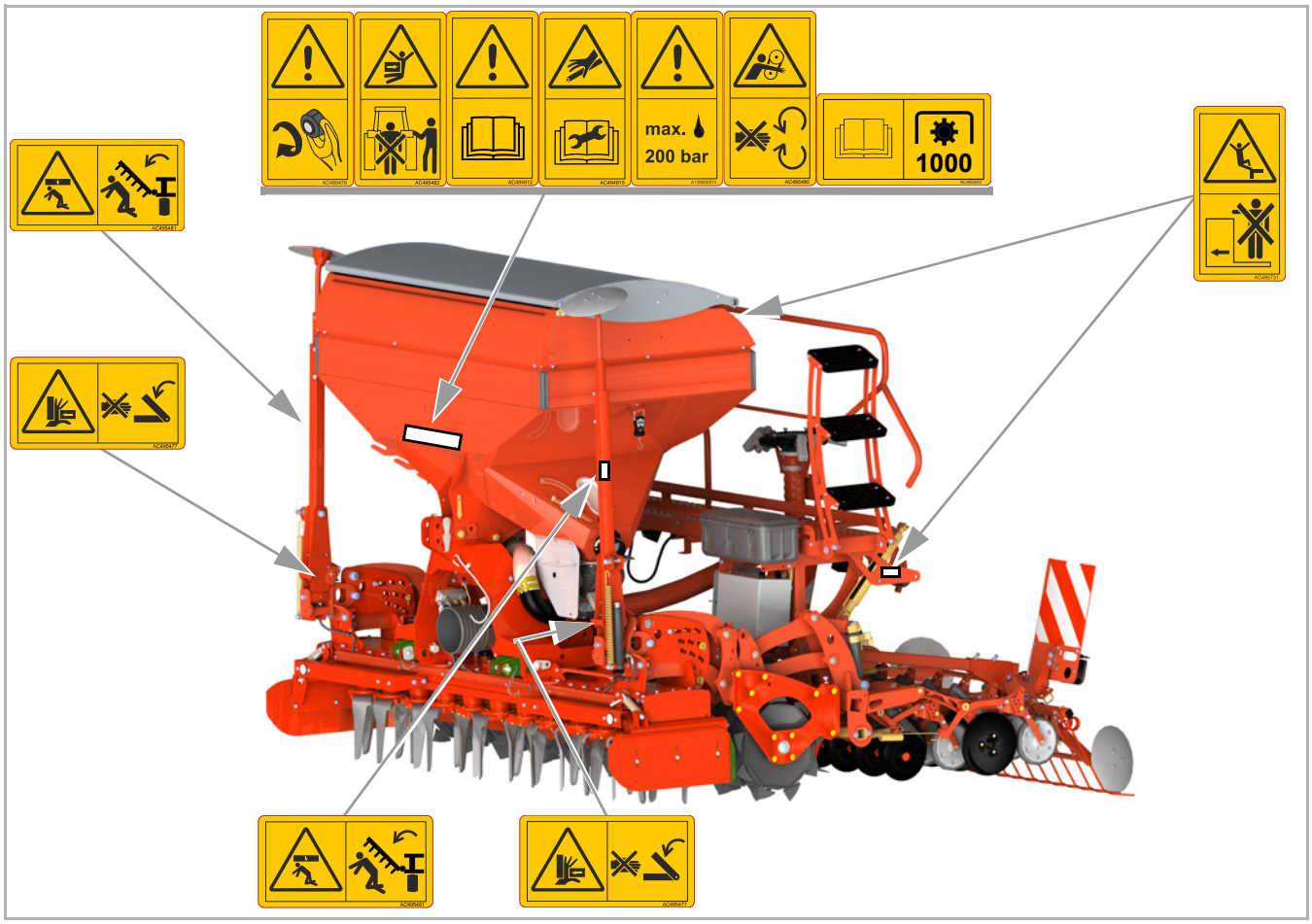
For the employer

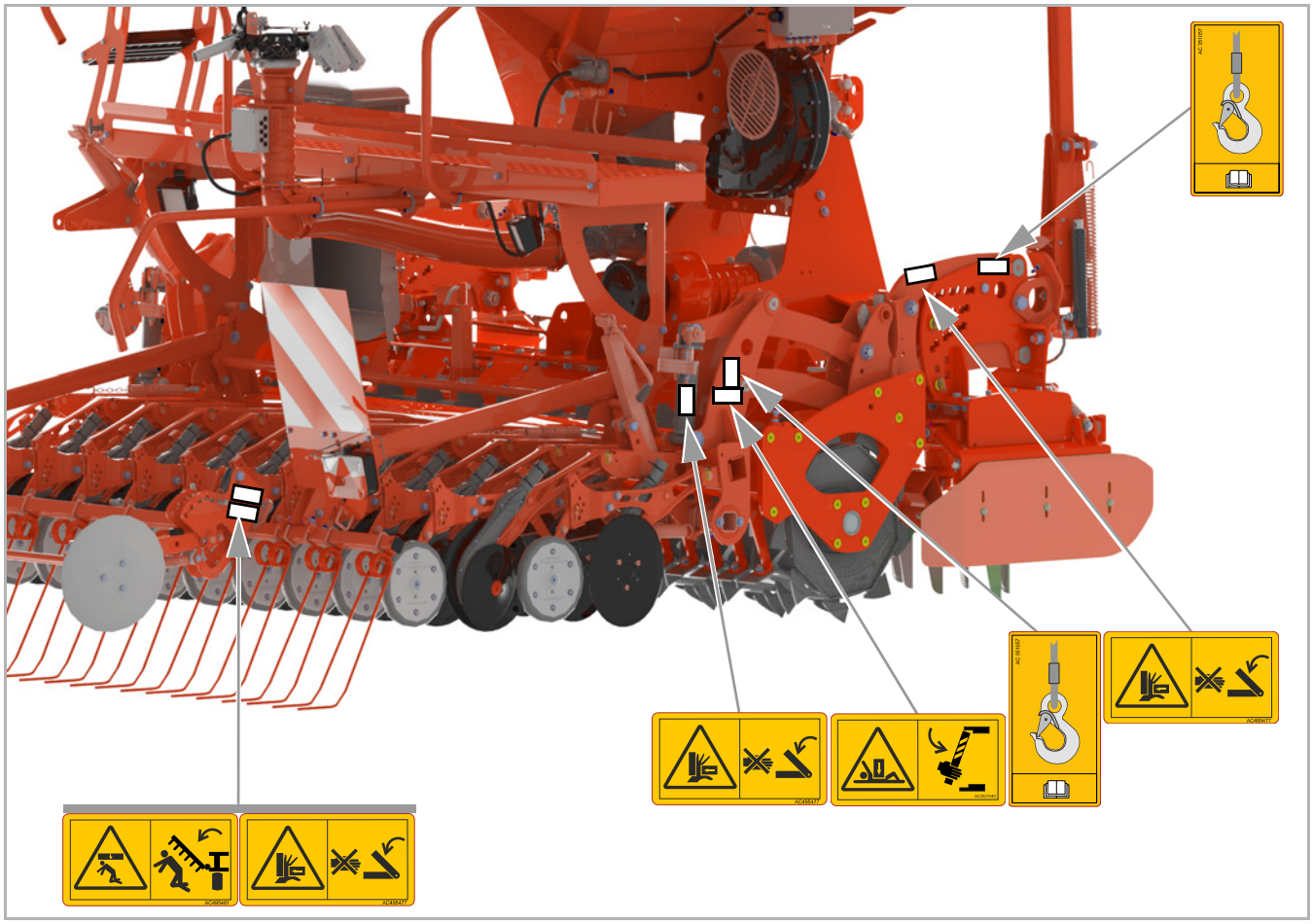
Regularly provide the following information to all persons who work with the machine:

- Information about the safety instructions
- Working in accordance with the statutory regulations

Warning signs

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





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.



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



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.



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



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



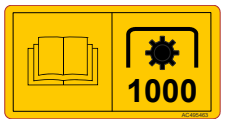
Stay clear of the slewing range
There is serious risk of injury in the slewing range due to swivelling or folding machine components.



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



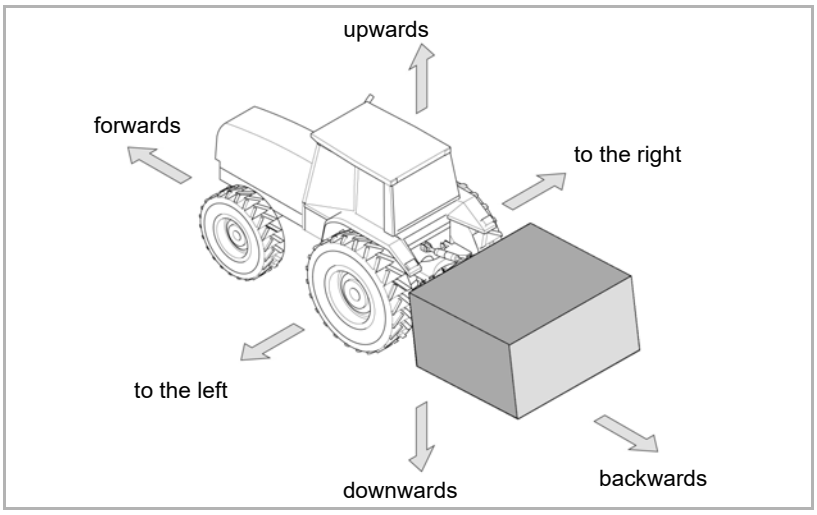
Risk of tipping
The machine or parts can tip over. Before entering the hazard area, attach supporting legs. To uncouple, use the supports provided and position the machine on firm ground.



Checking the PTO speed
The PTO speed is 540, 850 or 1000 rpm, depending on the type of machine.

Definitions

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



Who is authorised to operate the machine?

Only qualified personnel
Only qualified persons who have been informed of the dangers associated with handling the machine are permitted to operate, service or repair the machine. As a rule, such persons are trained and experienced in agricultural work or have been thoroughly trained in a similar activity.

General safety information

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

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

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

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

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

Operating a faulty machine can cause accidents or damage.

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

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

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

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

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

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

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

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

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

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

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

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

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

Coupling

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

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

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

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

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

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

Hydraulics

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

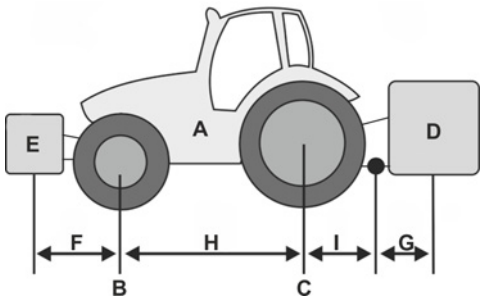
High pressures in the hydraulic system
The hydraulic system is under high pressure. Regularly check all pipes, hoses and screw-on connections for leaks and externally visible damage. Use suitable tools only when looking for leaks. Eliminate damage immediately. Oil escaping under pressure may result in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

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

Electrics

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

Calculation of axle loads



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

You calculate:

- Total weight
- Axle loads
- Minimum ballast

For this calculation, the following data is required:

From the tractor's operating manual:

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

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

From the documentation from the tyre manufacturer

- Tyre load-bearing capacity

From the operating manual

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

Measurements

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

Calculation

You can calculate the values using the formulas.

Ballast with front weights

Ballast with front weights on rear-mounted machines:

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

Ballast with rear weights

Ballast with rear weights on front-mounted machines:

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

Front axle load

Actual front axle load (J) in kg

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

Total weight

Actual total weight (K) in kg

$$K = E + A + D$$

Rear axle load

Calculating the actual rear axle load (L) in kg

$$L = K - J$$

Summary

The following conditions must be fulfilled:

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

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



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

Road transport

Ensure that the condition of the machine conforms to traffic regulations

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

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

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

Close the ball valves

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

Check tyre pressures

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

Check hitch pins

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

Check trip ropes for the quick release coupling

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

Take altered driving and braking performance into account

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

Adapted driving speed

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

Putting the machine into operation

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

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

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

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

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

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

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

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

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

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

Uncoupling

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

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

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

Care and maintenance

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

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

When performing all care work and maintenance work:

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

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

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

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

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

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

Further regulations

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

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

- This chapter contains general information on your machine and the range of application
- Definitions
- Proper use
- Characteristics
- Component designations
- Technical data

Range of application

The machine is semi-mounted on a soil cultivating device and is designed for the application of suitable seed following ploughing or mulching.
In this way, the combination of seeding machine and soil cultivating device means that the soil preparation and seeding are carried out in one pass. Thanks to different equipment options, it is suitable for different ground types. The prerequisite is always a soil condition that allows cultivation and seeding. With some soil types, wetness or drought, for example, can make cultivation or seeding impossible.

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.

Mulch seeding

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

Direct seeding

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

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

Perfected design
Robust material combined with an optimised construction, flexible modular design and favourable centre of gravity all make this efficient and precision machine a reliable and sturdy work implement.

Exact metering
The original pneumatic system ensures precision metering.

Quick conversion
Conversion from normal to fine seed is fast and does not require any tools.

Electronic control system
The machine is equipped with an electronic control system.

Coulters
Suffolk coulters or CX-II seed coulters can be selected to suit the field conditions.

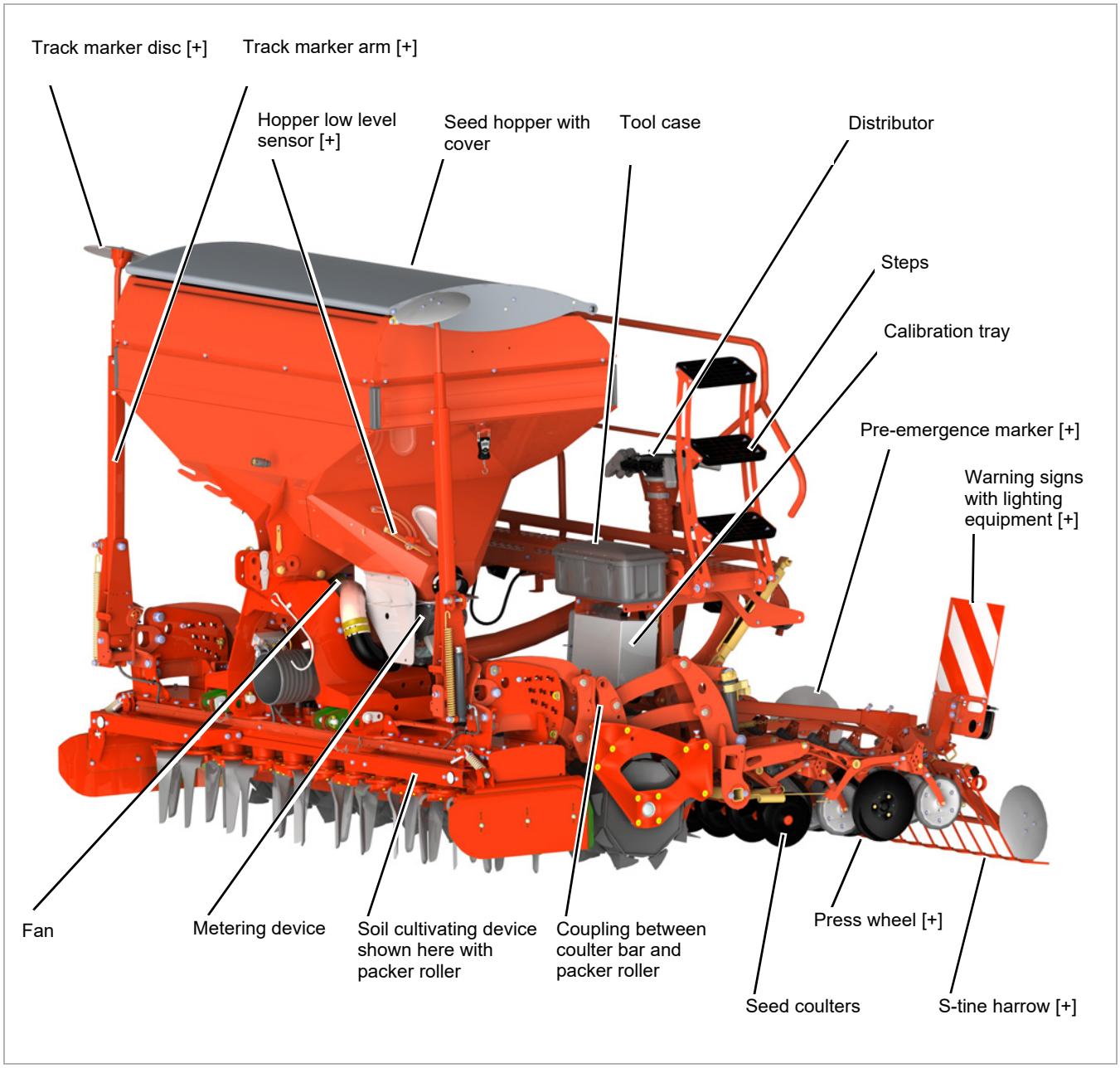
Constant depth control
The soil cultivating device's packer roller is used to achieve constant depth control, independently of the ground profile.

High rate of work
The simple design of the machine makes high performance/output at driving speeds of 12 km/h possible.

Obstruction-free work
In the case of crop residues on the field, the CX-II seed coulters prevent the seeding machine from becoming easily obstructed.

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

Assemblies


Track marker disc [+]
Track marker arm [+]
Hopper low level sensor [+]
Seed hopper with cover
Tool case
Distributor
Steps
Calibration tray
Pre-emergence marker [+]
Warning signs with lighting equipment [+]
Fan
Metering device
Soil cultivating device shown here with packer roller
Coupling between coulter bar and packer roller
Press wheel [+]
Seed coulters
S-tine harrow [+]

Technical data

General

	SD2001MP series			SD3001MP series		
	3.00 m	**3.50 m**	**4.00 m**	**3.00 m**	**3.50 m**	**4.00 m**
Coulters						
Type of coulter	Suffolk coulter/CX-II seed coulter					
Number of coulters	20 / 24	24 / 28	26 / 32	20 / 24	24 / 28	26 / 32
Row spacing [cm]	12,5 / 15,0	12,5 / 14,6	12,5 / 15,4	12,5 / 15,0	12,5 / 14,6	12,5 / 15,4
Number of rows with Suffolk coulters	2 or 3					
Number of rows with CX-II seed coulters	2					
Height [m] of the machine in the transport position without lifting height of tractor						
Top edge of the hopper with hopper extension	2,51			2,64		
Track marker [+]	2,65	2,90	3,15	2,65	2,90	3,15
Width [m]						
Machine in transport position	3,00	3,50	4,00	3,00	3,50	4,00
Machine in work position	3,12	3,62	4,12	3,12	3,62	4,12
Depth [m]						
Depending on equipment	Up to 3.35			Up to 3.35		
Total weight [kg]						
When configured with Suffolk coulters, approximately	840	925	1020	875	960	1050
When configured with CX-II seed coulters, approximately	1180	1270	1350	1220	1300	1390
Seed hopper						
Fill level [m] / with hopper extension	2,17 / 2,36			2,29 / 2,48		
Hopper volume [l] / with hopper extension	1100 / 1400			1600 / 2000		
Maximum hopper filling, approximately [kg of wheat] / with hopper extension	830 / 1050			1200 / 1500		

Others

Tractor		
	Minimum tractive effort in conjunction with the soil cultivating device [kW/m]	30
	PTO [rpm] Design	1000 1 3/8", 6-part
Angular gearbox [+]		
	Gear oil	SAE 90
	Fill quantity [l]	0,7
Hydraulics		
	Maximum permitted operating pressure [bar]	200
Control valves, base machinery with hydraulic fan drive		
	Single-acting	2
	Double-acting	0
	Pressureless return line, maximum 10 bar	1
Hydraulic fan drive		
	Displacement of the hydraulic motor [ccm]	6
	Minimum feed line pressure [bar]	150
	Oil flow rate [l/min]	30
	Maximum fan speed [rpm]	4500

Electronic control system		
	Power supply [V]	12
	Fuse [A]	30
	Protection class	IP 65
Terminal		
	→ Operating manual for the terminal	
E-BAS, E-COM [+]		
	Power supply [V]	12
	Main fuse [A]	60
	Secondary fuse [A]	25
Power consumption of various electrical consumers		
	Metering device [W/unit]	180
	Tramline control system [W/unit]	20
	Half-width shut-off [W/unit]	20
	Electrically actuated hydraulic valve controls [W/unit]	25
	Working lights with LEDs [W/pc]	18
Noise level [dBA]		
	Fan at 4200 rpm Driven by electric motor. Maximum value, measured on the enveloping curve. The noise level may change due to the tractor.	98

Terminals

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

FOCUS 3



Terminal with colour display
→ “FOCUS 3” operating manual

IsoMatch Tellus GO



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

IsoMatch Tellus



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

External terminals

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

Software

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

Scope of delivery

Soil preparation and seeding technology
The machine is supplied completely assembled for the areas of soil preparation and seeding. If parts of the machine have not been fitted, 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.

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

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

Coupling

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

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

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

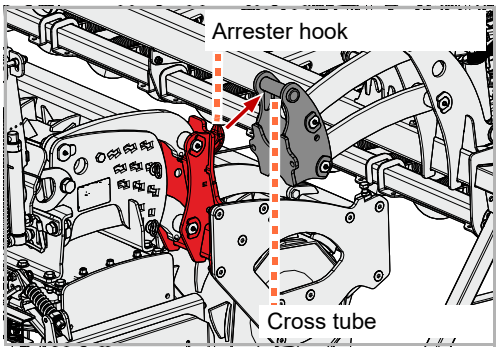
The seeding machine consists of a seed hopper and a coulter bar.

Prerequisites:

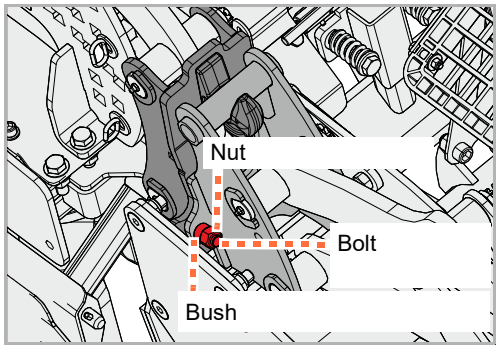
- The seeding machine must be attached to the soil cultivating device by an authorised specialist workshop and the combination must comply with the manufacturer's requirements for the type of machine.
- Supporting legs secure the coulter bar.
- The soil cultivating device is coupled to the tractor in accordance with the manufacturer's specifications.
- The soil cultivating device's PTO shaft is attached to the tractor.

→ Operating manual from the PTO shaft manufacturer and operating manual for the soil cultivating device, see »Other applicable documents«, page 5

Coulter bar



- Align the tractor, with the soil cultivating device and the seeding machine attached, in front of the coulter bar.
- Lower the soil cultivating device and seeding machine until the arrester hooks on the right and left are located below the cross tubes.
- Drive slowly backwards until the arrester hooks are positioned under the cross tubes.
- Carefully lift the machine until the cross tubes are positioned in the arrester hooks.



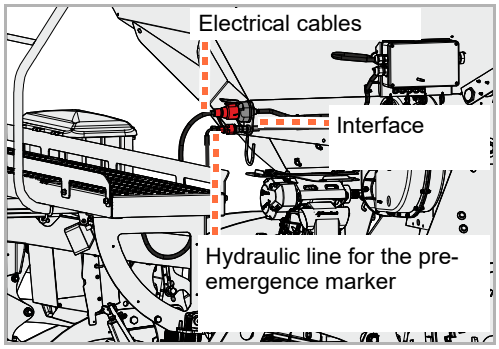
- Secure them on each side of the machine using two bolts, bushes and nuts.
- Tighten the bolts to a torque of 120 Nm.

Connecting

After coupling, make the following connections:

- Electrics
- Hydraulics

Hydraulic lines and electrical cables

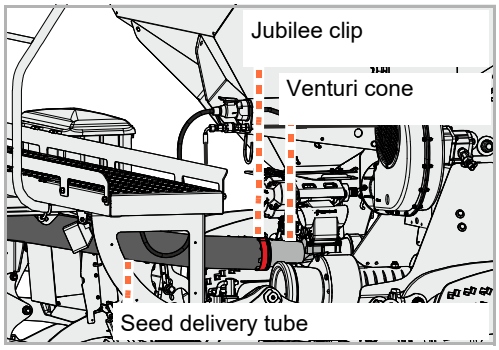


- Connect the hydraulic line for the pre-emergence marker to the interface.
- Connect the coulter bar's electrical control cable to the interface.
- Route the hydraulic line for the coulter bar lifting system along the hopper to the tractor and connect it.
- Route the hydraulic lines for the coulter pressure adjustment along the hopper to the tractor and connect it.
- Route the electrical cable for the road transport lighting equipment along the hopper to the tractor and connect it.

→ Chapter »Hydraulic system«, section , page 32

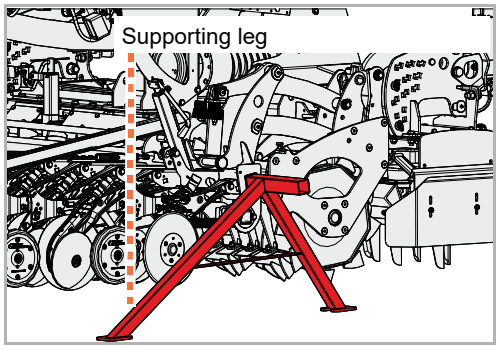
- Check all connections to ensure they are working properly.

Seed delivery tube



- Attach the seed delivery tube to the venturi cone and secure with the jubilee clip.

Supporting legs



- Slightly lift the soil cultivating device with the seeding machine and coulter bar.
- Remove the support legs.

Fan drive

The fan can be driven:

- Via a PTO shaft
- Hydraulic

→ Chapter »Hydraulic system«, section »Hydraulic fan drive«, page 36

The fan is driven by an angular gearbox with freewheel assembly, which is attached to the soil cultivating device's gearbox.



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

Check the hydraulic hoses and hydraulic couplings
Before making connections, check all hydraulic hoses for damage. Check all hydraulic couplings for firm seating after connecting them.
Defect hydraulic tubes or poorly seated hydraulic couplings can initiate unforeseen movements on the machine or lead to accidents.

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



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

Do not exceed the maximum fan speed
The fan speed must not exceed 5,000 rpm for hydraulic fan drives.
At higher speeds the fan can be destroyed by explosion, causing serious damage to the machine.

Familiarising yourself with the hydraulic system

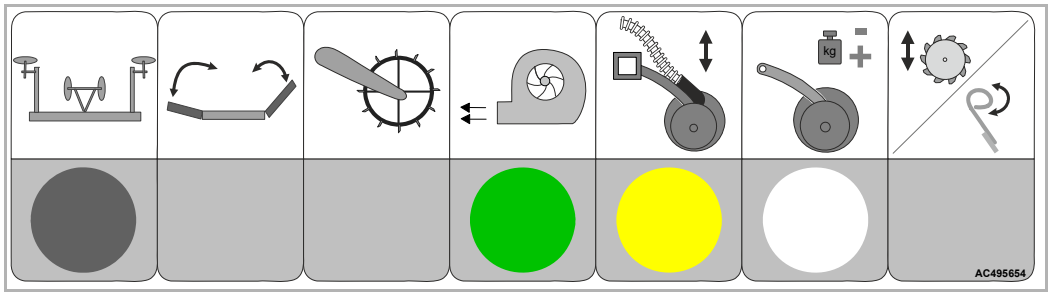
Connection to the tractor

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

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

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

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

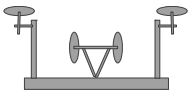
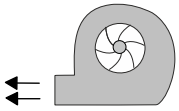
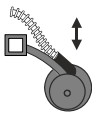
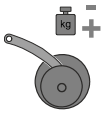


Control valves

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

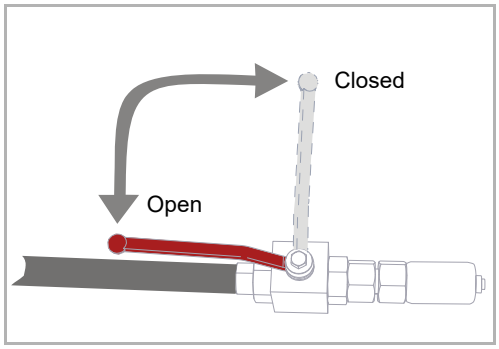
The hydraulic fan drive should be connected to a control valve with a high-priority supply on the tractor. The fan drive speed does not drop when the control unit is activated to raise or lower the machine.

- Connect the hydraulic hoses.

Symbol	Function	Control valves		Colour coding
		Single-acting	Double-acting	
	Track marker [+] Pre-emergence marker [+]	x		Grey
	Hydraulic fan drive and pressureless return line	x		Green
	Lifting or lowering the coulter bar		x	Yellow
	Hydraulic coulter pressure adjustment [+]		x	White

If ball valves are present:

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



Working with the hydraulics

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

Check the following:

- The connection to the electronic control system is suitable

Lifting or lowering

The machine can be lifted into transport position or lowered into work position with the corresponding control unit on the tractor.

Folding the track markers [+]

The track markers can be lifted into the transport position or lowered into the work position using the corresponding control unit on the tractor.

Machines with E-BAS software

For machines with E-BAS software, the track markers are changed using a hydraulically actuated valve.

Machines with E-COM software

For machines with E-COM software, the track markers are changed using a electrically actuated valve.

The track markers are controlled via the software.
→ Operating manual for the software, section »Other applicable documents«, page 5

- If the track marker is folded in before an obstacle, the metering device continues to operate.

Hydraulic fan drive

The oil flow is directed to the flow control valve and is thus regulated according to the speed of the hydraulic motor. This constant fluid rate results in a specific rotational speed of the hydraulic fan drive. You control this speed via the electronic control system.

Technical data

:

Hydraulic fan drive		Values
Hydraulic motor	Displacement [ccm] Drive speed [rpm]	6 4300
Oil supplies	Minimum feed line pressure [bar] Maximum return line pressure [bar] Maximum return line pressure in leak-off oil line [bar] Oil flow rate [l/min]	150 10 < 1 30
Fan	Maximum fan speed [rpm]	5000

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

Abbreviations

The following abbreviations are used for the various connection lines:

- Feed line (P)
- Return line (T)
- Control line (LS)
- Leak-off oil line (D)

Line diameters



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

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

Prerequisites

Prerequisites for the hydraulic fan drive on the tractor:

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

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.

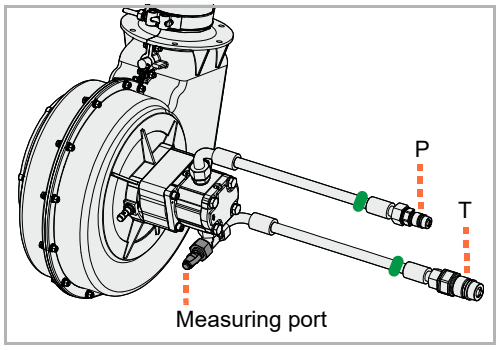
Wear ear protection
Wear ear protection when working near the fan.
Noise can cause temporary or permanent hearing impairment.

The basic settings for the flow control valve must be made only during initial operation or when changing the tractor.

Settings at the flow control valve
Only set the flow control valve when the tractor motor is turned off.
Failure to observe this instruction can result in damage to the machine.

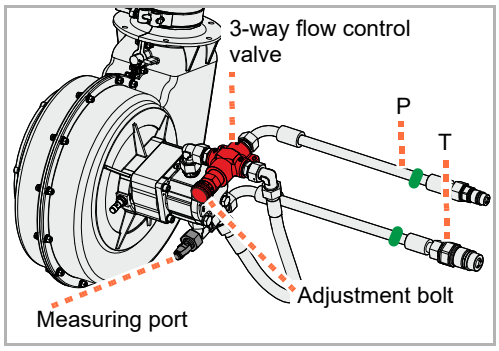
For tractors with flow control valve

Without 3-way flow control valve on the machine



- Activate the fan's speed counter.
- Actuate the control unit on the tractor.
- Set the required rotational speed via the quantity of oil at the tractor.
- Check the current return line pressure at the measuring port.

With a 3-way flow control valve on the machine

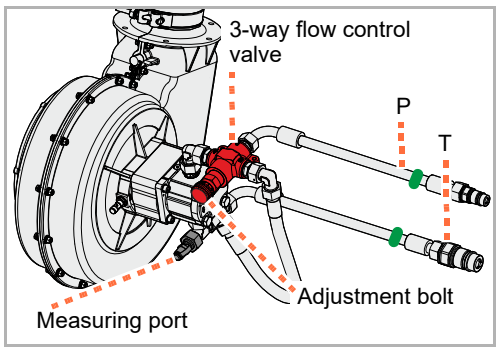


- Fully open the 3-way flow control valve.

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

- Activate the fan's speed counter.
- Actuate the control unit on the tractor.
- Set the required rotational speed via the quantity of oil at the tractor.
- Check the current return line pressure at the measuring port.

For tractors without a flow control valve and without a regulating pump



- Activate the fan's speed counter.
- Set the required speed using the adjustment screw at the 3-way flow control valve.
- Check the current return line pressure at the measuring port.

Power Beyond [+]

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



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

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



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

Prerequisites on the tractor:

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

Prerequisites on the machine:

- 2-way flow control valve

Calculation of the remaining conveying capacity

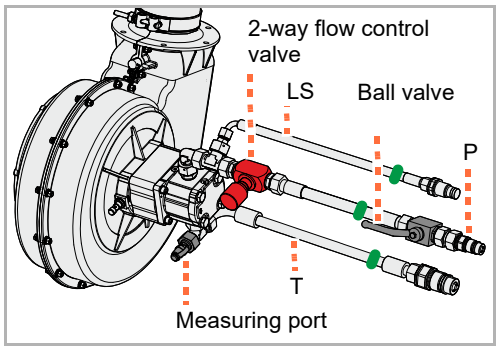
The conveying capacity of the tractor's hydraulic pump determines the working speed of the consumers. The higher the conveying capacity, the faster the working speed of the consumers.
Power Beyond allows the operation of other consumers in parallel to the permanent consumer, but does not increase the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

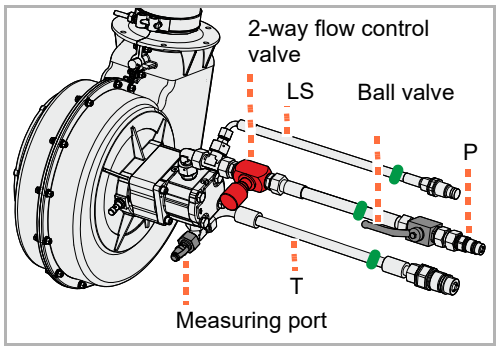
The hydraulic couplings and hydraulic plug may differ depending on the tractor. Contact your dealer before changing the tractor.
→ Chapter »Hydraulic fan drive«, section »Line diameters«, page 37



- Close the ball valve at the feed line (P).
- Implement the connections in the following sequence:
  - 1. Return line (T)
  - 2. Control line (LS)
  - 3. Feed line (P)
- Activate the fan's speed counter.

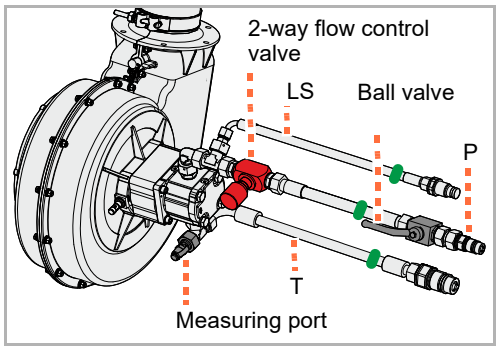
Operation

The speed only usually has to be set during initial operation 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).
- Use the adjusting screw on the 2-way flow control valve to adjust the desired speed.
- Check the current return line pressure at the measuring port.

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

Initial operation with cold oil:

- The fan speed will continue to alter automatically until the hydraulic oil has reached operating temperature.
- The setting is only complete once the fan speed remains stable.
- Constantly check the fan speed during the settings at the electronic control system.

→ Operating manual for the software, section »Other applicable documents«, page 5

Repeated commissioning

Repeated initial operation with cold oil:

- The fan speed is slightly higher in the warming up process.
- The fan speed is attuning after a short period of time to the value adjusted at the initial commissioning.

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

- Coulter bar
- Coulter pressure adjustment
- Seed coulters
- Press wheels
- S-tine harrow
- Track marker
- Pre-emergence marker
- Shut-off valves
- Hopper low level sensor
- Reduction head
- Air stream and regulating flap
- Metering device and calibration test
- Ventilation opening
- Seed

Prerequisites for the preparation work:

☑ Machine is coupled to the tractor and all connections are properly made.

☑ Machine is in the work position.

☑ The machine frame is parallel to the ground.

☑ Handbrake in tractor is applied.

☑ Metering device is turned off.

The following applies for all work:

▸ Secure the machine.

▸ Lower the machine to its work position.

▸ Turn off the metering device via the terminal.

→ Operating manual for the software, section »Other applicable documents«, page 5

▸ Implement the settings as required.

▸ Bring the machine into the transport position.

Work switch

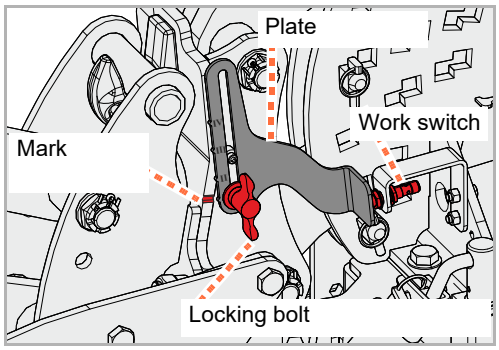
The work switch automatically switches the metering device and additional functions on and off.

The work switch setting must be adapted to the lifting height of the packer roller.

Setting the work switch
The work switch must always be set in synchronisation with the lifting height of the packer roller.
An incorrect setting may result in damage to the machine or poor performance.

Prerequisite:

- The machine is lifted.



- Read the scale value for the packer roller's lifting height.
- Release the locking bolt on the metal sheet.
- Move the metal sheet in such a way that the scale value on the marking has the same value as the scale value that is read on the packer roller.
- Maintain a distance of 2 mm between the work switch and the metal sheet.
- Secure the locking bolt.
- Apply the same setting on the other side of the machine.

If you change the lifting height of the packer roller, you must readjust the metal sheet setting.

Coulter bar

The correct distance between the coulter bar and the ground leads to optimum seed results.

The coulter bar is adjusted either mechanically via a crank or hydraulically via a hydraulic cylinder with spacers.

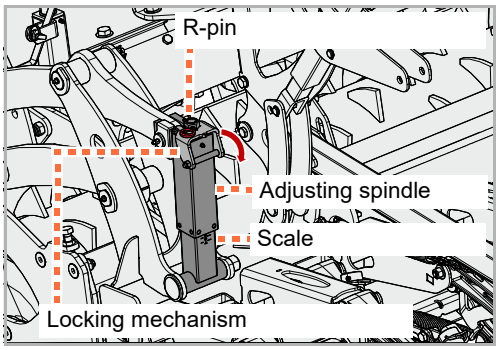
Mechanical adjustment

Suffolk coulters

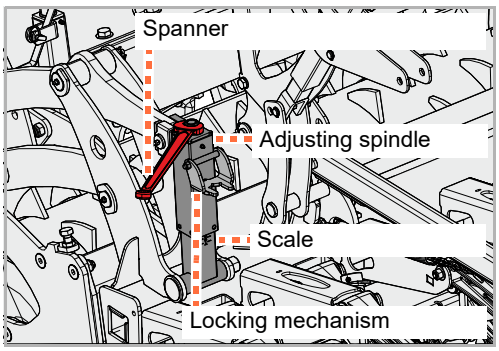
If the machine is equipped with Suffolk coulters, you must move the crank for the coulter rail adjustment into a predefined position.

Prerequisite:

- The machine is lifted.



- Remove the R-pin.
- Swivel the locking mechanism downwards.



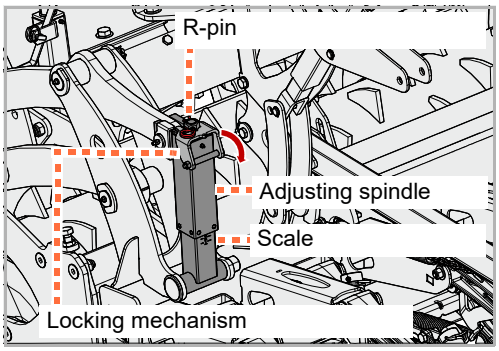
- Using the spanner, set the adjusting spindle to scale value 3.
- Swivel the locking mechanism upwards and secure with the R-pin.
- Apply the same setting on the other side of the machine.

CX-II seed coulters

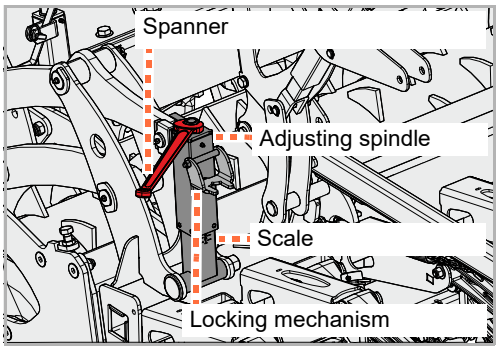
If the machine is equipped with CX-II seed coulters, set the working depth of the coulter bar variably. The working depth changes by 12 mm per scale value on the crank.

Prerequisite:

- The machine is lifted.



- Remove the R-pin.
- Swivel the locking mechanism downwards.



- Using the spanner, move the crank in the required direction.

High scale value	Setting for shallow working depth
Low scale value	Setting for deep working depth

- Swivel the locking mechanism upwards and secure with the R-pin.
- Apply the same setting on the other side of the machine.

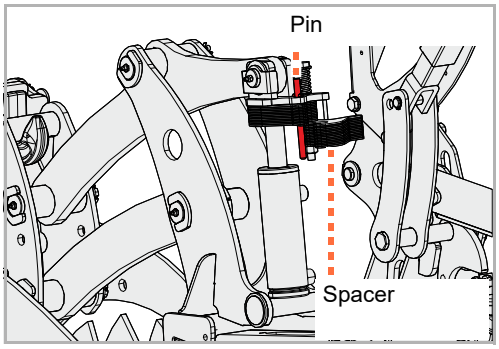
Hydraulic adjustment

Suffolk coulters

If the machine is equipped with Suffolk coulters, you must move the hydraulic coulter bar lifting system into a predefined position.

Prerequisite:

- The machine is lifted.
- The coulter bar is lifted completely.



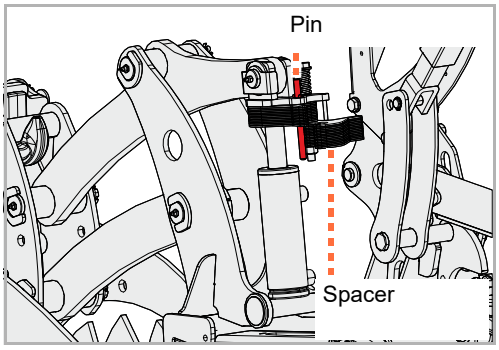
- Remove the pin.
- Starting from the top, swivel in 14 spacers.
- Insert the pin.
- Apply the same setting on the other side of the machine.

CX-II seed coulters

If the machine is equipped with CX-II seed coulters, set the working depth of the coulter bar variably. Each spacer alters the working depth by 3 mm.

Prerequisite:

- The machine is lifted.
- The coulter bar is lifted completely.



- Remove the pin.
- Starting from the top, swivel in the spacers corresponding to the desired working depth for the CX-II seed coulters.

More spacers	Setting for shallow working depth
Fewer spacers	Setting for deep working depth

- Insert the pin.
- Apply the same setting on the other side of the machine.

Working depth

Suffolk coulter

The working depth of the Suffolk coulters is set using the coulter pressure.

CX-II seed coulter

Even with the same coulter pressure setting, the working depth can differ depending on ground type. The press wheel sinks deeper into light soil than heavy soil. Therefore, at each location, carry out tests to find the optimum combination of central coulter pressure adjustment and press wheel setting.

The working depth of the CX-II seed coulter can be adjusted by setting the press wheel settings to

- Shallow and normal working depths
- Deep working depths
- Extremely deep working depths

The press wheel can also be rigidly or freely fastened to the CX-II seed coulter.

Rigid adjustment:

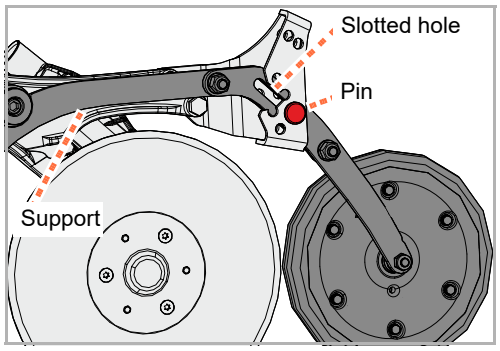
- At optimum soil conditions, the seed coulter operates quietly at a consistent working depth.
- With stony or cloddy soil, the seed coulter is lifted first due to the foreign bodies, then the press wheel which lifts the seed coulter even further.

Flexible setting

- With optimum soils, the press wheel does not optimally guide the seed coulter.
- With stony and cloddy soil, the seed coulter is lifted first due to the foreign bodies, then the press wheel which does not lift the seed coulter any further.

To adjust the settings for the CX-II seed coulters, it is advisable to lift the machine and to relieve the load on the central coulter pressure adjustment. After the settings have been made, re-set the central coulter pressure adjustment as required.

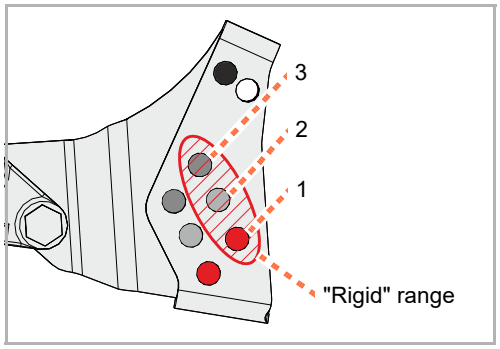
Rigid



There is an elongated hole on the press wheel bracket. For a rigid setting, the pin is inserted through the slotted hole.

The choice of hole in the perforated plate determines the working depth.

- Release the pin.
- Lift or lower the press wheel until the required hole in the perforated plate is positioned in the area of the slotted hole.



Position 1	Standard setting for shallow and normal working depth
Position 2	Setting for deep working depth
Position 3	Setting for extremely deep working depth

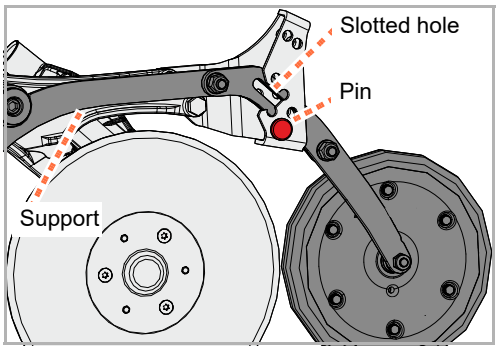
- Insert the pin and secure.
- Make the same adjustments to all coulters.

Cracker roller

When using a cracker roller, you must set a different position for the rear coulters than is used for the front coulters

Coulter on the front row	Coulter on the rear row
Position 2	Position 1
Position 3	Position 2

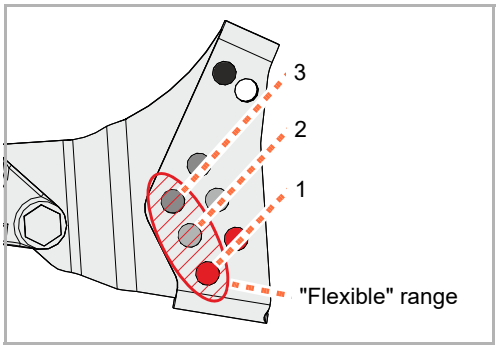
Flexible



There is an elongated hole on the press wheel bracket. For a flexible connection, the pin is inserted below the press wheel holder.

The choice of hole in the perforated plate determines the working depth.

- Release the pin.
- Lift or lower the press wheel until the required hole is positioned below the bracket.



Position 1	Standard setting for shallow and normal working depth
Position 2	Setting for deep working depth
Position 3	Setting for extremely deep working depth

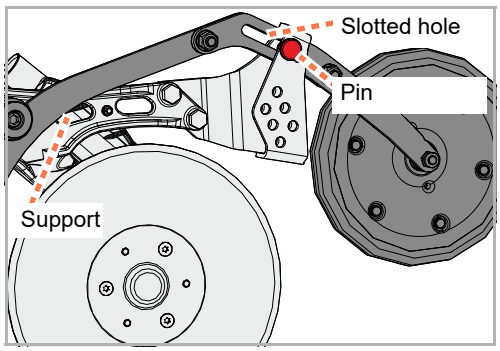
- Insert the pin and secure.
- Make the same adjustments to all coulters.

Cracker roller

When using a cracker roller, you must set a different position for the rear coulters than is used for the front coulters

Coulter on the front row	Coulter on the rear row
Position 2	Position 1
Position 3	Position 2

Press wheel not in use



If sowing conditions demand so, you can fully lift the press wheel.

- Release the pin.
- Lift the press wheel. The hole for the parking position in the perforated plate must be positioned in the area of the slotted hole.
- Insert the pin and secure.
- Make the same adjustments to all coulters.

Coulter pressure adjustment

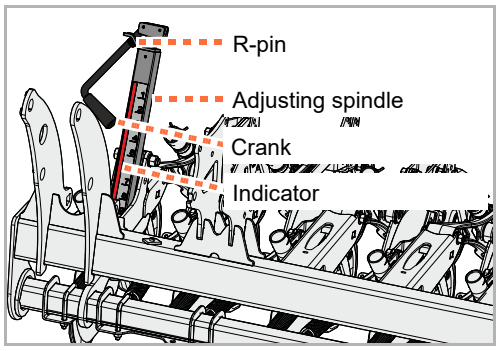
The coulter pressure can be adjusted centrally and, for Suffolk coulters, can also be adjusted on the individual seed coulters. Adjusting the coulter pressure affects the deposit depth.

Using the central coulter pressure adjustment, the pressure on the seed coulters can be set uniformly for all coulters. The central coulter pressure can be adjusted:

- Mechanically
- Hydraulically

Mechanical

With the adjusting spindle, the coulter pressure across the entire coulter bar can be centrally adjusted.



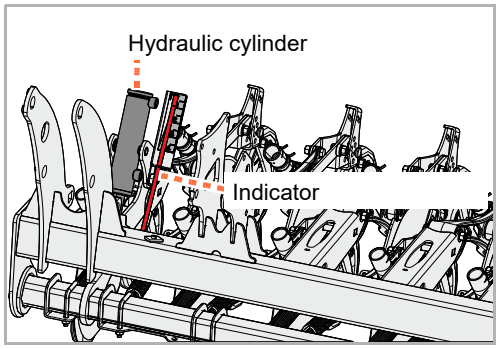
- Remove the R-pin from the crank.
- Swivel the crank into the work position.
- Adjust the coulter pressure via the spindle.

Low scale value	Lower coulter pressure
High scale value	Higher coulter pressure

- Swivel the crank into the parking position and secure it using the R-pin.

Hydraulic [+]

You can use the hydraulic coulter pressure adjustment to change the pressure while sowing.



- Adjust the hydraulic cylinder using the tractor's control unit.

Low scale value	Lower coulter pressure
High scale value	Higher coulter pressure

Individually on the Suffolk coulter

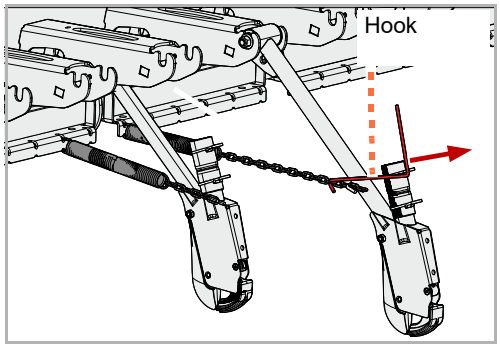
The pressure should be less on the front coulters than at the rear, because the rear coulters also cover the seed rows of the front coulters with soil. This applies in particular for

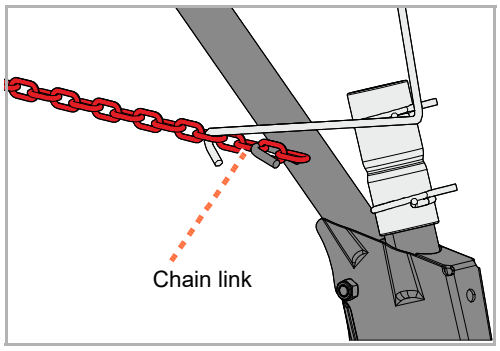
- light soil
- Narrow row spacings, or
- high drive speeds

On the coulters that are running in the tractor track, increase the coulter pressure in such a way that the seed is at the same deposit depth as it is with the other coulters.

The pressure of individual coulters is set by attaching the coulter spring. For this, use the hook supplied.

Lift the sowing unit from the ground. The tension in the springs is then relieved and they can be more easily repositioned.





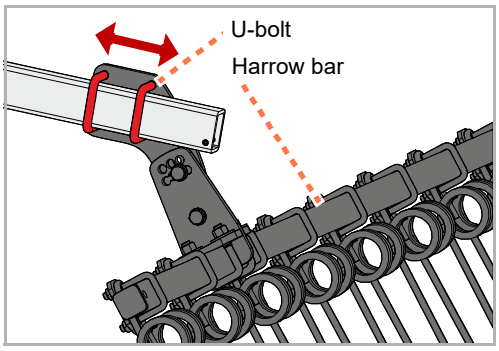
- Un-hook the tension chain with the hook.
- Hook on in the required chain link.

S-tine harrow or finger-tine harrow [+]

The setting options are the same for the S-tine harrow and finger-tine harrow. The S-tine harrow is used as an example; the information also applies for the finger-tine harrow.
You can make various settings to the S-tine harrow and finger-tine harrow:

- Free space for the seed coulter
- Inclination angle
- Bearing pressure

Free space for the seed coulter



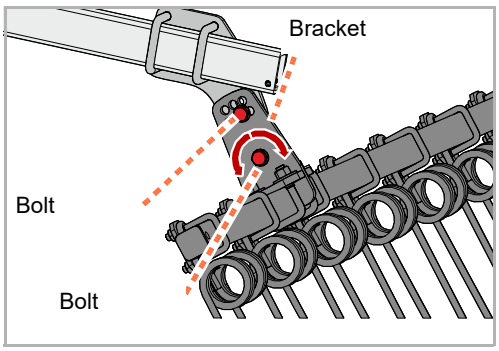
The seed coulters must not come into contact with the components of the harrow when they are moved upwards.

- Set the seeding machine down on the ground in the work position.
- Undo the U-bolts.
- Set the harrow bar so that the seed coulters have sufficient free space.
- Tighten the U-bolts.
- Make the same setting on both sides.

Inclination angle

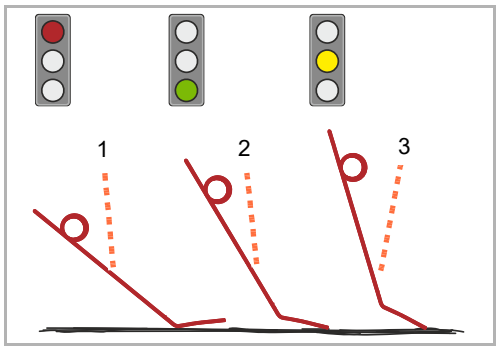
Depending on the quantity and type of crop residues, you can alter the inclination angle by up to 45° (7 x 5°).

Light soil and soil without crop residues	=	Steeper inclination angle
Heavy soil and soil with crop residues	=	Flatter inclination angle



- Loosen the bolts.
- Remove the upper bolt.
- Set the inclination angle.
- Reinsert the upper bolt.
- Tighten all the bolts firmly.
- Make the same setting on both sides.

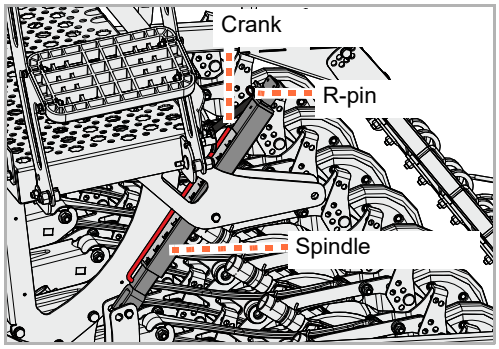
For S-tine harrows, the inclination angle must be set correctly. The angle set must not be too flat or too steep. If an incorrect angle is chosen, the harrows experience a higher degree of wear than is necessary.



1	2	3
Flat angle	Optimum angle	Steep angle
The harrow becomes worn at the angled point	The harrow becomes worn at its end	The harrow becomes very worn and is prone to clogging from crop residues. Depending on the agronomic conditions, this position may be necessary.

Setting the bearing pressure

Depending on the soil conditions, you may have to regulate the pressure to make the depth adjustment for the seed-covering harrow.

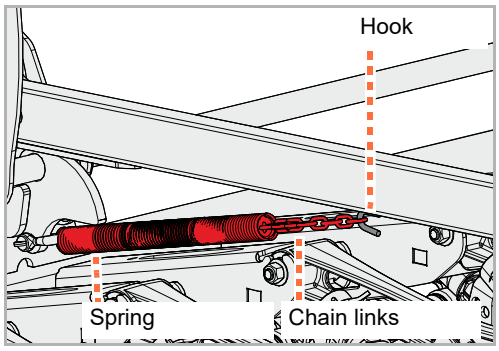


- Remove the R-pin from the crank.
- Swivel the crank into the work position.
- Use the spindle to adjust the height and bearing pressure as required.

Low scale value	Heavy soil
Average scale value	Light soil
High scale value	Out of operation

- Swivel the crank into the parking position and secure it using the R-pin.

The pressure can also be changed by altering the position of the spring under the harrow holder.

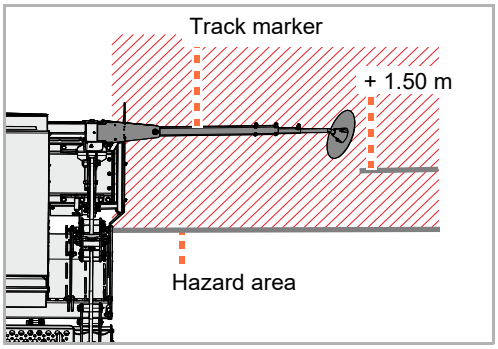


- Remove the R-pin from the crank.
- Swivel the crank into the work position.
- Set the spindle so that the load on the spring is relieved.
- Unhook the spring's chain links from the hook.
- Hook the chain links onto the hook in the required position.
- Use the spindle to adjust the height and bearing pressure.
- Swivel the crank into the parking position and secure it using the R-pin.

Track marker [+]

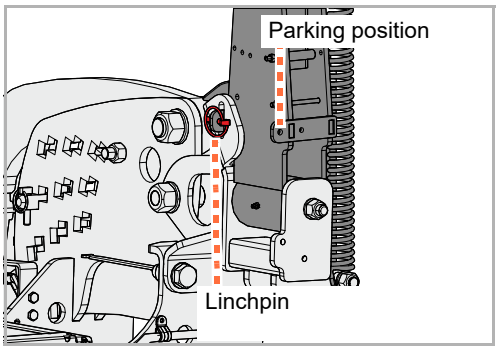
Unfold the track markers before making settings. The procedure for folding out depends on the machine equipment.

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



Frame width [m]	Hazard area [m]
3,00	3,00
3,50	3,25
4,00	3,50

Secure the track marker
Hold the track marker when removing the transport locking device. Position yourself in a way that ensures you cannot be hit if the track marker unfolds accidentally.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.



Folding from the transport position into the work position:

- Press the folded in track marker arm to the centre of the machine.
- Remove the linchpin.
- Move the linchpin into the parking position.
- Fold out the track marker using the control unit on the tractor.

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

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



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

Setting to tractor centre

You will need the following information:

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

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

Calculation

Length of the track markers for tractor centre =

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

Example



Row spacing of the seeding machine	12.5 cm
Working width of the seeding machine	300.0 cm

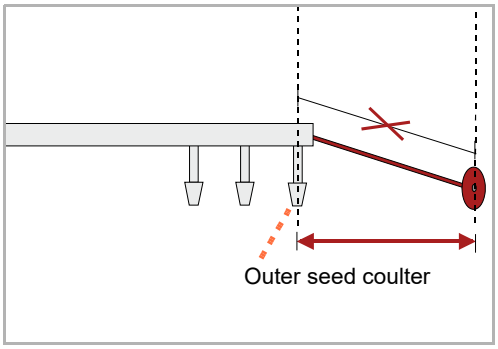
$$\frac{12{,}5 + 300{,}0}{2} = 156.25$$

In this example, the calculated length of the track markers is 156.25 cm.

Settings

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

On the machine, the track marker is far removed from the coulter. To determine the correct length of the track marker, it is advisable to lay in place, for example, a batten in the extension of the coulter, and in that way, determine the measuring point at the height of the track marker.

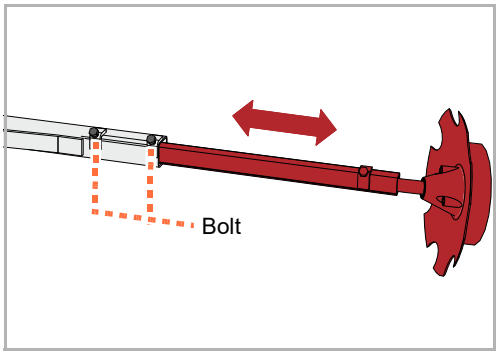


Right track marker arm:

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

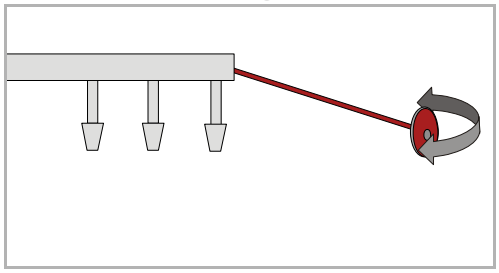
Lefttrack marker arm:

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



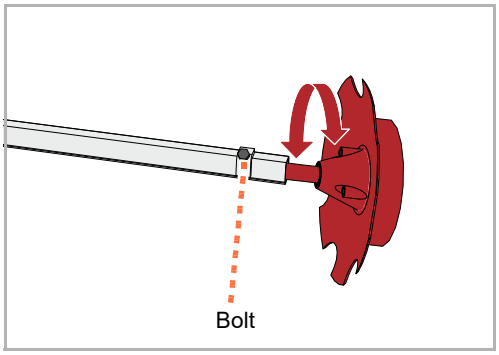
- Loosen the bolts.
- Set the length as required.
- Re-tighten the bolts.

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



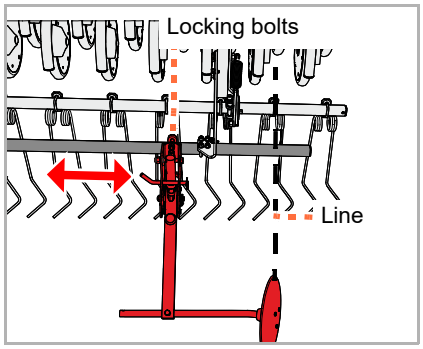
Set the marker disc in its inclination angle so that the tracks can later be clearly seen in the field. The track markers must not “dig”.

- Release the bolt.
- Set the inclination angle as required.
- Retighten the bolt.

Pre-emergence marker [+]

Pre-emergence markers mark the tramlines for care work and are controlled via the software.

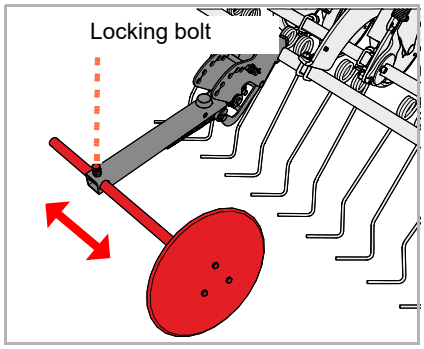
Coarse tuning



- Release the clamping bolts.
- Slide the holder outwards until the centre of the holder is three to four row spacings away from the line that is to be marked.
- Retighten the locking bolts.
- Set the second holder accordingly.

The pre-emergence marker will lower when the seed rows for setting up the tramline are blocked.

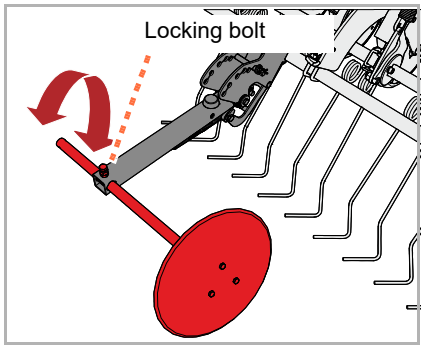
Fine adjustment



- Release the locking bolt.
- Pull the retaining arm out until the pre-emergence marker passes behind the blocked seed rows.
- Retighten the locking bolt.
- Set the second retaining arm in the same way.

Setting the inclination angle

Use the bolt on the retaining arm to set the inclination angle of the discs. In doing so, ensure that this does not alter the fine adjustment.

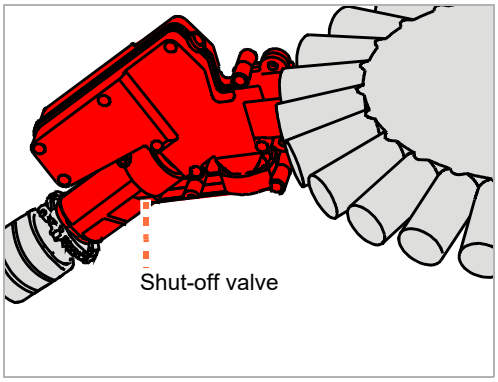


- Release the locking bolt.
- Set the inclination angle and retighten the locking bolt.
- Set the second retaining arm in the same way.

Shut-off valves [+]

Shut-off valves regulate the setting up of tramlines. The shut-off valves block the seed flow to the coulters.

- The number of shut-off valves depends on the tyre width.
- The position of the shut-off valves depends on the track width of the spraying/fertilising tractor



If the track width or tyre width of the tractor changes, contact your dealer. You may need to have additional shut-off valves installed or have different coulters blocked.

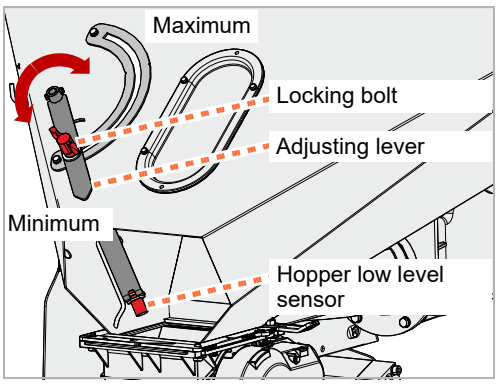
Hopper low level sensor [+]

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

The size of the residue depends on:

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

Only adjust the hopper low level sensor when the hopper is empty
The area in which the hopper low level sensor is to be adjusted must be free of both seed and fertiliser.
If there is fertiliser or seed in the area, the hopper low level sensor may be damaged.



- Release the locking bolt.
- Set the required residue at the adjusting lever.
- Tighten the locking bolt.

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

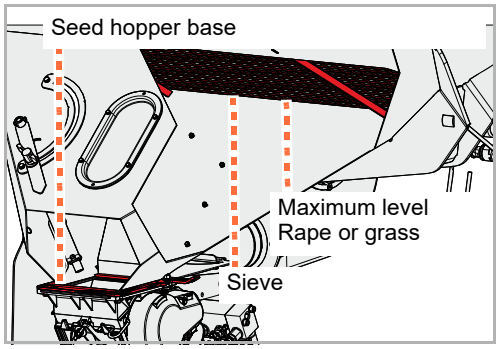
At low application rates that do not cover the hopper low level sensor at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".
→ Operating manual for the software, section »Other applicable documents«, page 5

Filling with seed

Observe maximum fill level
The maximum fill level depends on the seed. The maximum fill level must always be observed. Fill up rape and grass to the top edge of the sieve in the seed hopper, but no further.
If the max. fill level is exceeded, this can result in patchy seeding.

- Minimum seed hopper fill level:

For grain	30 cm above the base of the seed hopper
For rape or grass	5 cm above the base of the seed hopper



- Maximum seed hopper fill level:

For grain	Top edge of the seed hopper
For rape or grass	Top edge of the sieve in the seed hopper

Dressed seeds

Dressing only in accordance with manufacturer's instructions
Dress seeds only in accordance with the manufacturer's instructions and observe all relevant safety precautions when dressing and handling dressed seeds.
Never dress seeds:

- In the machine
- By hand
- When filling the seed hopper

Failure to observe is a health hazard.

For fine seeds, note the following:
Glutinous dressing agents can have a negative influence on metering accuracy.

If you intend to dress the seeds yourself, you must observe the dressing manufacturers safety information.

Road transport

You must not drive on roads with a full seed hopper or full fertiliser hopper. The maximum permissible axle load must not be exceeded.

Comply with permissible axle loads
Road transport must only take place up to the maximum permissible axle load of the tractor.
A filled seed hopper or fertiliser hopper influences the driving performance of the tractor if overloaded and can cause accidents during road transport.
→ Maximum permissible weights: Chapter »Safety«, section »Calculation of axle loads«, page 15
→ Maximum permissible weights: Chapter »Getting to know the machine«, section »Technical data«, page 24

Reducing the air stream

During the seeding, fine seed, such as rape or grass may be blown out of the seed furrow by the fan. If this is the case, you must reduce the fan's air stream by

- Changing the speed on the fan
- Closing the regulating flap

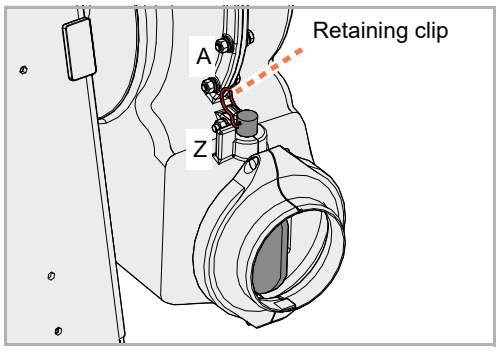
Rotational speed at the fan

If you reduce the fan speed, the air stream is reduced.

- Reduce the fan speed at the tractor's flow control valve to a minimum of 3750 rpm.
- Check whether the fan is running evenly. Otherwise, increase the fan speed.
- Check that no seed remains in the delivery tubes.
- Otherwise, increase the fan speed again.

Regulating flap

The regulating flap on the fan regulates the airflow for the seed. The default setting is “ON”. If seed is being blown out of the seed furrow, close the regulating flap.



- Fold the retaining clip upwards and turn it.

CLOSED	=	Z
OPEN	=	A

- Fold the retaining clip downwards until it engages.

Metering device

The metering device is controlled via the software. Information about settings made to the metering device is displayed on the terminal.
→ Operating manual for the software, section »Other applicable documents«, page 5

Maximum application rate

Before the calibration test, define the application rate.

The application rate is dependent on:

- The machine's equipment
- The diameter of the distribution system
- The working width
- The driving speed
- The rotor



The greater the driving speed, the lower the possible application rate. When the application rate increases, you should therefore reduce the driving speed.
Failure to observe leads to poor work results.

The maximum conveying capacity for this machine is 32.0 kg/min.

Calculation

You can use the following formula to calculate the maximum application rate:
Maximum application rate =

$$\frac{\text{Maximum conveying capacity x 600}}{\text{Driving speed x Working width}}$$

Example



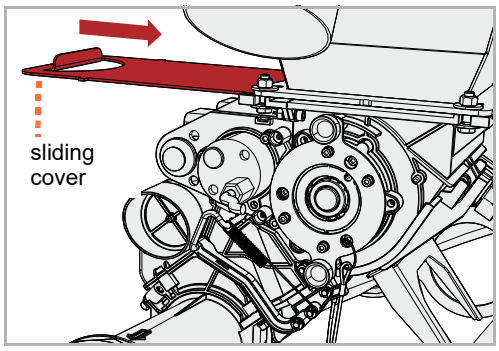
Example

Maximum conveying capacity of the seeding machine	32.0 kg/min
Driving speed of the seeding machine	12.0 km/h
Working width of the seeding machine	4.00 m

$$\frac{32.0 \times 600}{12.0 \times 4.00} = 400{,}0$$

In this example, the calculated maximum application rate is 400.0 kg/ha.

Preparing the machine



- Machine in work position.

→ Chapter »Hydraulic system«, section »Lifting or lowering«, page 35

- Secure the tractor against rolling away and being started without authorisation.
- Close the sliding cover on the metering device. No more seed can flow from the seed hopper into the metering device.
- Fill the seed hopper with enough seed for the calibration test.
- Select a program using the software:

Program	Operations
New calibration test	• Open the flap for the calibration test • Install the suggested rotor • If required, install an auxiliary plate
Saved calibration test	• Select the calibration test • Install the corresponding rotor • If required, install an auxiliary plate

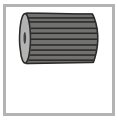
- Set up the calibration test with the software.

→ Operating manual for the software, section »Other applicable documents«, page 5

You can set the height of the sensor for the level indicator in the seed hopper. At low application rates that do not cover the level indicator at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".

→ Operating manual for the software, section »Other applicable documents«, page 5

New calibration test



The software gathers information about the adjustment made to the metering device:

- Number of the rotor that is to be used
- Information about whether the auxiliary plate is to be installed in the metering device

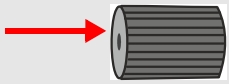
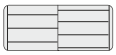
Depending on the information obtained from the software, the following adjustments can be made to the metering device:

Rotor	Auxiliary plate	What to do?
Rotor number correct	not necessary	nothing
	necessary	Install the auxiliary plate
Rotor number incorrect	not necessary	Replace the rotor
	necessary	Replace rotor and install auxiliary plate

Rotor

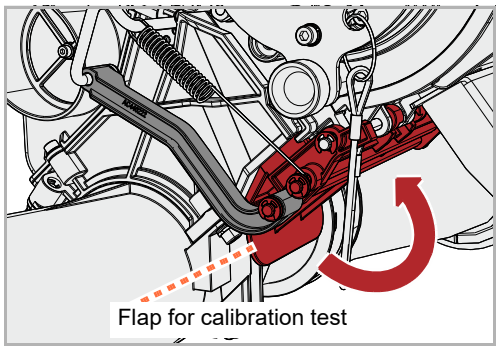
1...5

Number of the rotor. The number can be found on the side of the rotor.

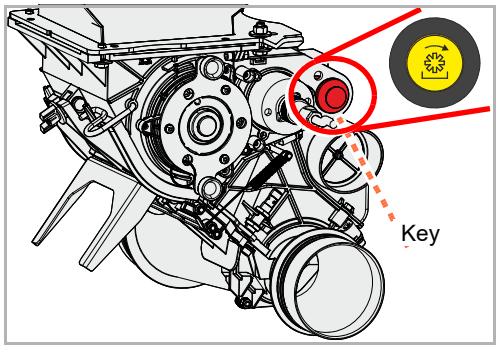
Number 	Rotor
1	
2	
3	
4	
5 [+]	

The rotor is selected by the software. The rotors have different shapes and functions. Guide pins located on rotors 3 to 5 must be inserted into a guide groove in the metering housing.

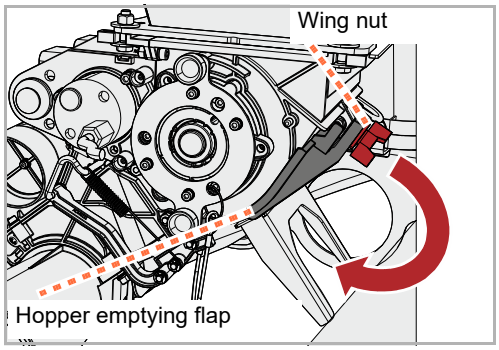
Removal



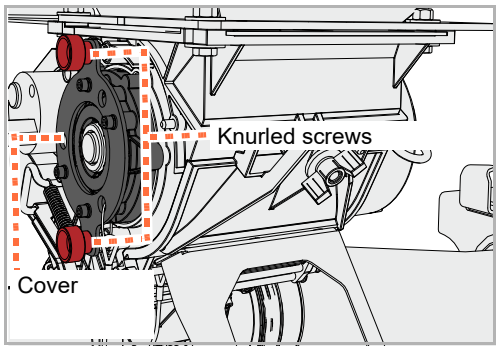
- Place a catch pan under the metering device.
- Switch on the terminal.
- Switch off the headland management.
- On the metering device, open the flap for the calibration test.



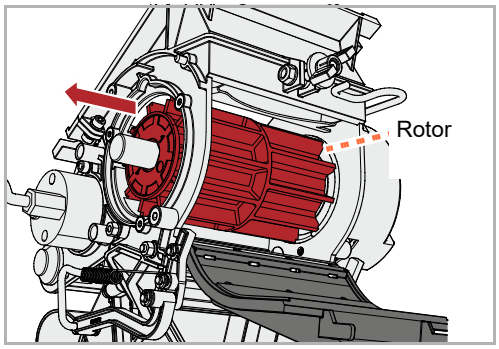
- Press and hold the key on the metering device for at least 3 s and then hold it pressed. The metering device starts and the seed falls into the catch pan.
- Completely empty the metering device.
- Release the key. Metering device stops.



- Close the flap for the calibration test.
- Loosen the wing nut on the metering device's emptying flap and fold it upwards.
- Open the hopper emptying flap.

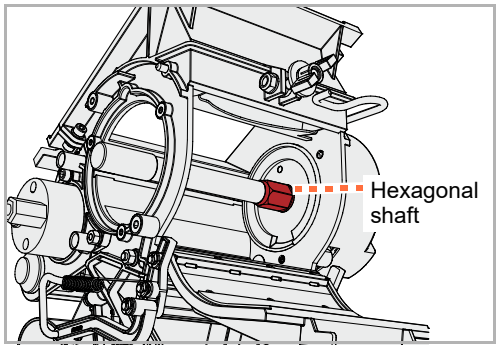


- Release the knurled screw on the cover.
- Remove the cover. The cover is secured by means of a cable.

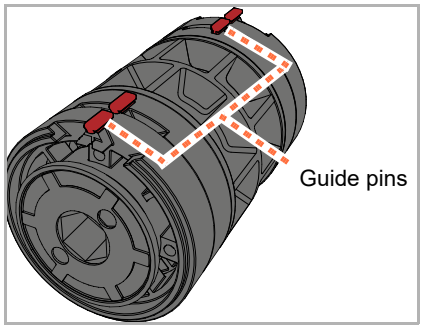


- Gently turn the rotor back and forth and remove it.

Install

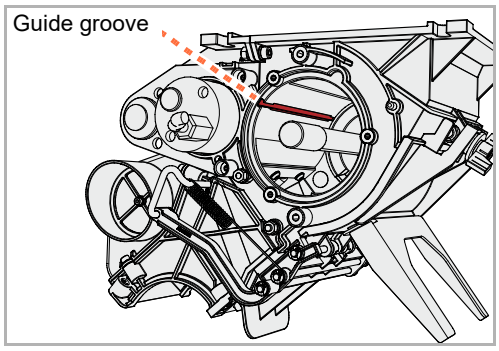


- Using the software, choose the selected rotor with the appropriate number.
- Slide the rotor onto the hexagonal shaft by turning it slightly.

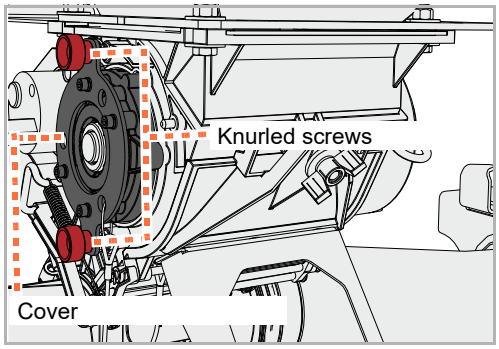


Guide pins located on rotors 3 to 5 must be inserted into a guide groove in the metering housing.

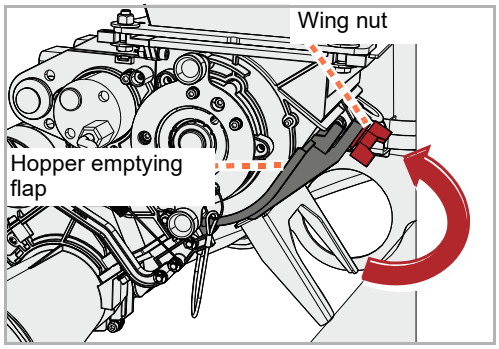
Installing rotors 3 to 5:



- Carefully slide the rotor into the guide groove and onto the hexagonal shaft.



- Refit the cover and secure it using knurled screws.



- Close the emptying flap and secure it with the wing nut.

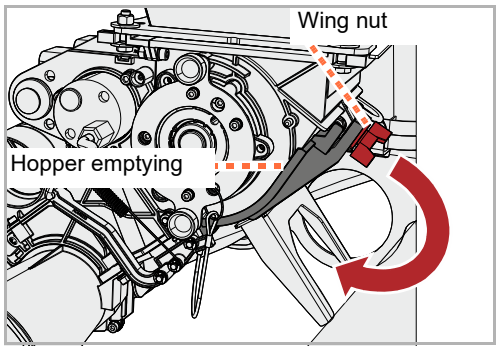
Auxiliary plate

The auxiliary plate is located in the metering housing. It cannot be seen from the outside. The software gathers information about whether the auxiliary plate is to be installed or removed.

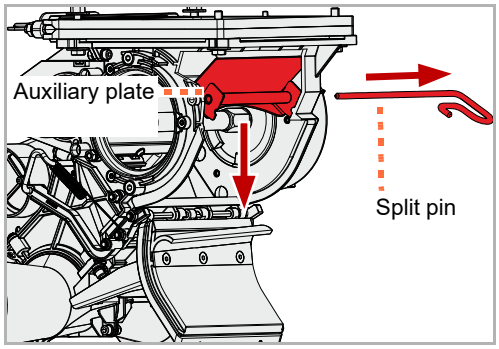
Depending on the seed, it may be necessary to fit the auxiliary plate. The auxiliary plate prevents the drive motor from being overloaded.

The auxiliary plate can only be removed once the rotor has been removed.
→ Chapter »Preparation for sowing«, section »Rotor«, page 68

Removal



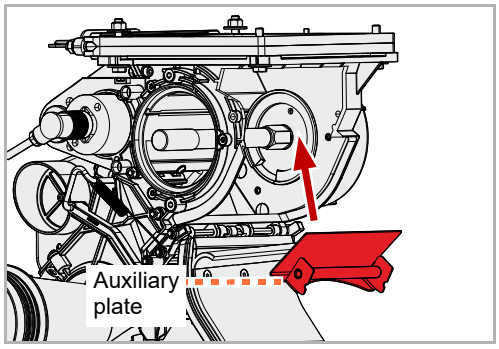
- Loosen the wing nut on the metering device's emptying flap and fold it upwards.
- Open the hopper emptying flap.



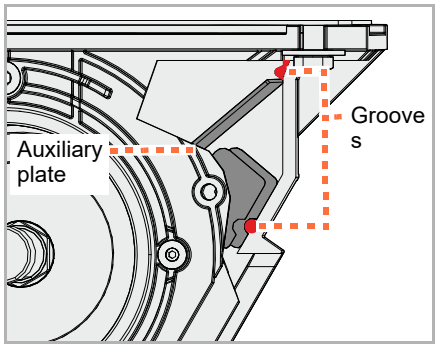
- Pull out the split pin.
- Remove the auxiliary plate.
- Insert the split pin.
- Close the emptying flap.

Install

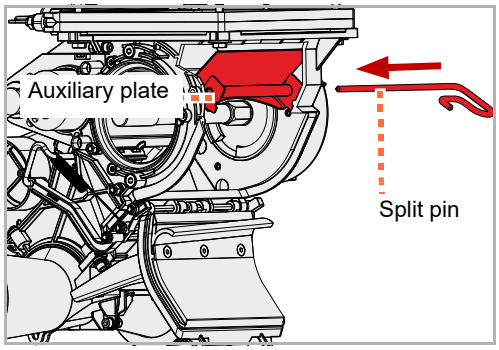
The auxiliary plate can only be installed once the rotor has been removed.
→ Chapter »Preparation for sowing«, section »Rotor«, page 68



- Open the hopper emptying flap.
- Pull out the split pin.
- Insert the auxiliary plate.

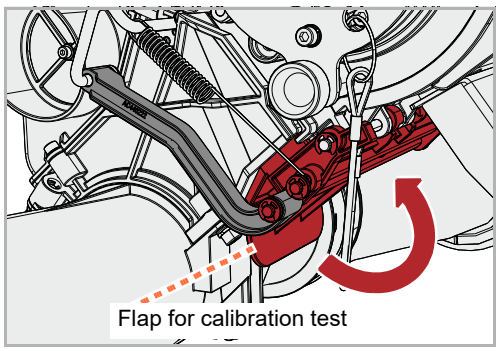


- There are grooves in the metering housing. For the correct installation, place the auxiliary plate correctly into the grooves.

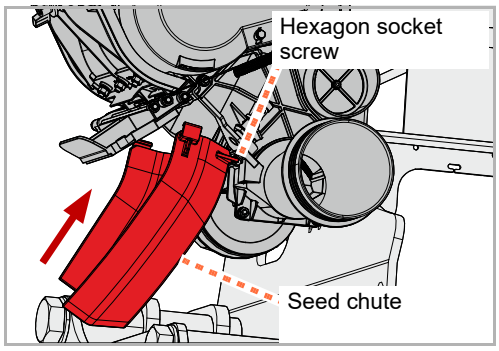


- Insert the split pin and use it to fasten the auxiliary plate.
- Insert the rotor.
- Fit the cover and secure it using knurled screws.
- Close the emptying flap.

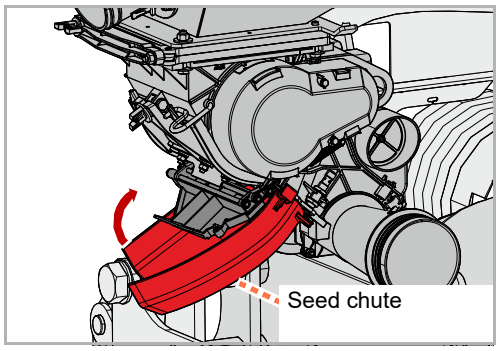
Calibration test



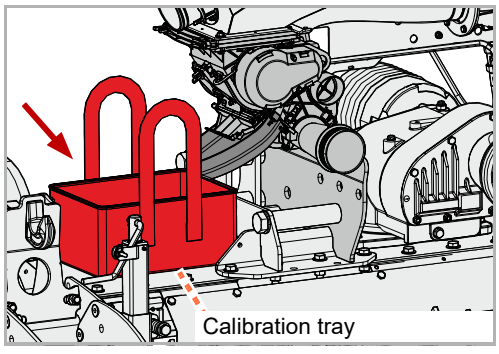
- On the metering device, open the flap for the calibration test.



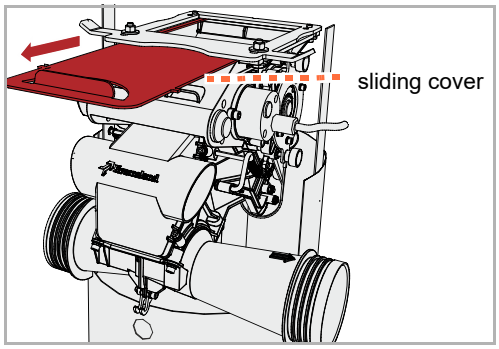
- Take the seed chute and calibration tray from the tool case.
- Fit the seed chutes onto the hexagon socket screws.



- Swivel the seed chute upwards and lock it in place.



- Place the calibration tray below the seed chute.



- Open the sliding cover on the metering device. The seed can once again flow from the seed hopper into the metering device.

Start via software

You can either use the terminal to start the calibration test, or start it manually at the metering device itself.
→ Operating manual for the software, section »Other applicable documents«, page 5

Manual start

You can start the metering device manually. A key is located directly on the metering device.



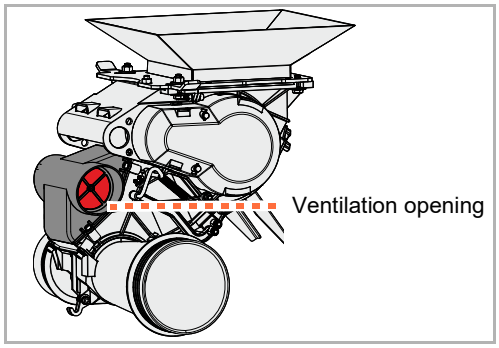
- Press the key. The metering device starts.

Pause	Press the key again
End pause	Press the key again

After the calibration test, weigh any collected seed or fertiliser and enter the result in the software.
→ Operating manual for the software, section »Other applicable documents«, page 5
→ Supplied electronic scales, section »Electronic scales«, page 77

Checking the ventilation openings

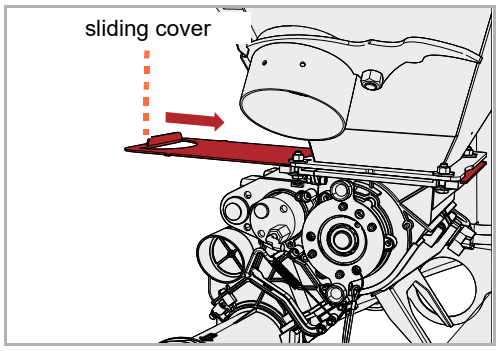
Ventilation openings on the metering device
Before carrying out the seeding work, check and clean the two ventilation openings.
A poorly cleaned ventilation opening may lead to incorrect metering.



- Check the ventilation openings on both sides.
- Clean the ventilation openings on both sides.

Work stoppage

For longer work stoppages, for example when starting seeding work on the next day:

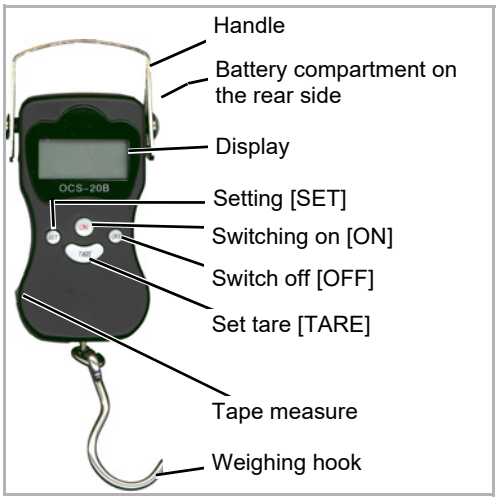


- Close the sliding cover on the metering device. No more seed can flow from the seed hopper into the metering device.
- Empty the metering device and remove the rotor.

→ Empty the metering device, chapter »Operation«, section »Emptying the metering device«, page 104

Electronic scales

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



Technical data

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

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

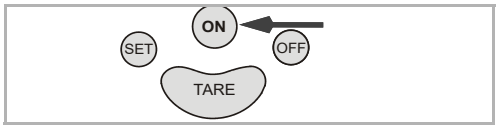
Weighing the calibration test

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

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

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

Switching on

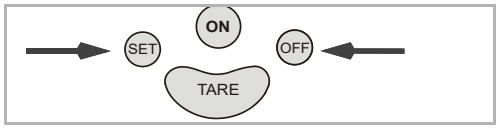


- Hold the implement vertical.
- Press the "ON" key.

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

Settings

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



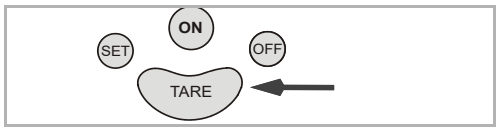
- Press the "SET" key until the required unit appears in the display.
- Press the "OFF" key.

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

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

Tare setting

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



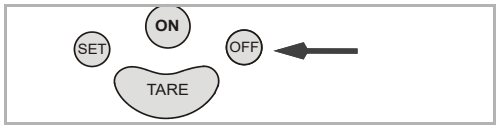
- Suspend the hopper from the weighing hook and wait until an arrow appears at the bottom of the display.
- Press the "TARE" key.

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

The weight is displayed.

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

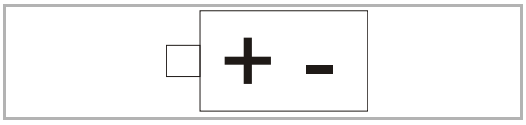
Switch off



- Press the "OFF" key.

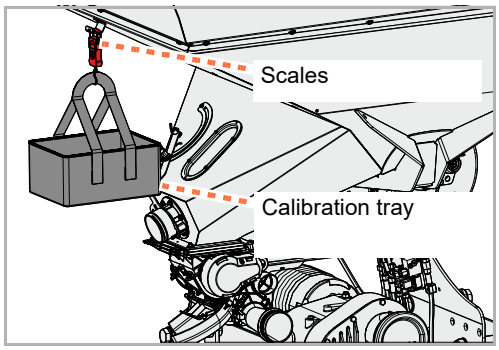
After roughly 60 seconds of no activity, the device switches off automatically.

Changing the batteries

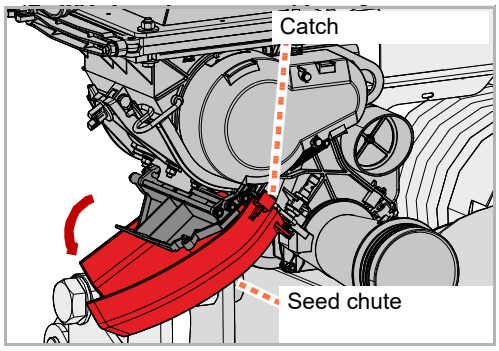


The device indicates when the batteries are low. You must then replace the batteries. Battery type CR2032, 3 V.. Take any used batteries to a special disposal point for batteries. Under no circumstances should you put them in the normal household waste.

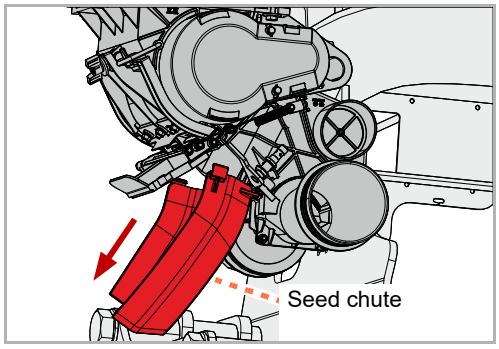
- Open the battery compartment with the Phillips screwdriver.
- Remove the batteries, taking careful note of the installation position.
- Insert the new batteries, ensuring the correct installation position.



- Take the scale out of the tool case and suspend it on the hopper.
- Hang the calibration tray onto the scale and weigh it.
- After weighing, place the calibration tray and scale back into the tool case.



- Open the detents on the seed chute and rotate the seed chute downwards.



- Remove the seed chute and return it to the tool case.
- Return the seed chute to the tool case.
- On the metering device, close the flap for the calibration test.

Safety

Before transporting the machine on public roads, read the following safety instructions. Observing the safety instructions prevents 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
- The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
- The seed hopper must be empty for transport
- Close the hopper with the cover

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

Prior to road transport



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

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

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

Securing the track markers
Mechanical securing mechanisms are located on the track markers. The mechanical securing mechanisms prevent the track markers from folding out unintentionally.
Accidents may result if the track markers fold out while travelling on the road.

Check the lighting equipment for road transport
The lighting equipment for road transport must be clean and in good working order.
Road transport lighting equipment which is dirty or does not function correctly can cause serious accidents.



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

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

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

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



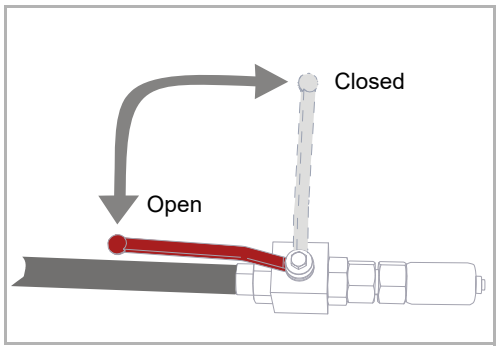
Comply with permissible axle loads
Road transport must only take place up to the maximum permissible axle load of the machine.
A filled seed hopper or fertiliser hopper influences the driving performance of the machine if overloaded and can cause accidents during road transport.
→ Maximum permissible weights: Chapter »Getting to know the machine«, section »Technical data«, page 24

Transport position

If the machine is in the work position, the machine must be lifted and folded in to the transport position.

Ball valve

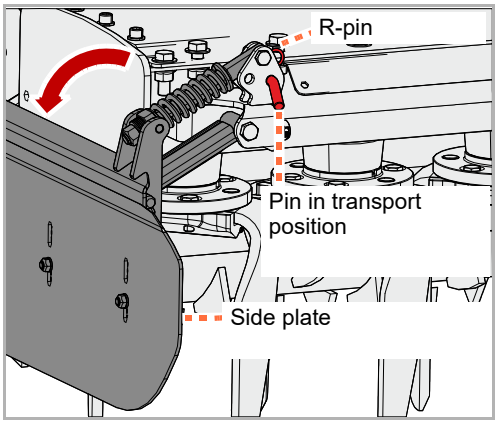
Depending on the version, ball valves are provided on the hydraulic lines.



- Open the ball valve.
- Using the control unit on the tractor, fold the machine into its transport position.
- Close the ball valve.

Soil cultivating device

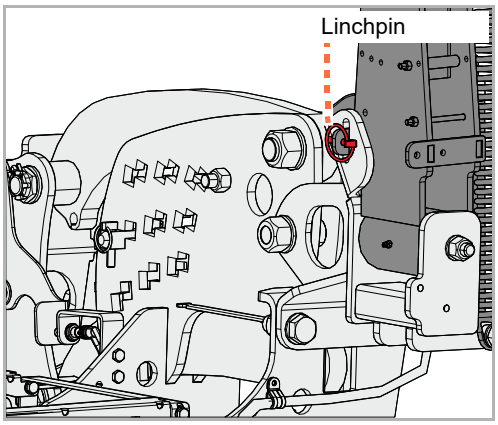
Move the soil cultivating device's side plates into the transport position.



- Remove the R-pin.
- Lift the side plate and remove the pin.
- Move the pin into the transport position.
- Allow the side plate to swing downwards.
- Secure the pin with the R-pin.
- Apply the same setting on the other side of the machine.

Track marker [+]

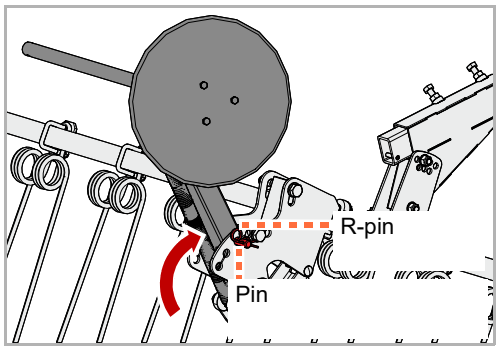
Fold up and secure the track marker for transport.



- Using the tractor's control unit, move the track marker into the transport position.
- Secure the track marker with the linchpin.
- Apply the same setting on the other side of the machine.

Pre-emergence marker [+]

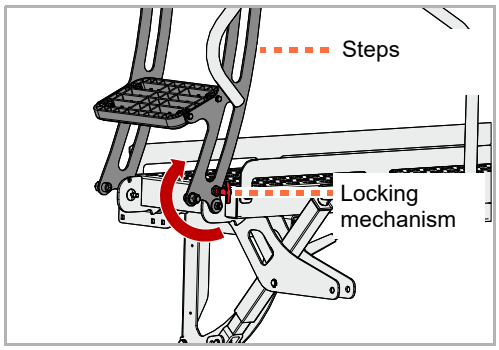
Fold up and secure the pre-emergence marker for transport.



- Remove the R-pin from the pin.
- Remove the pin.
- Fold up the pre-emergence marker and secure with the pin.
- Secure the pin with the R-pin.

Steps

Fold up and secure the steps for transport.



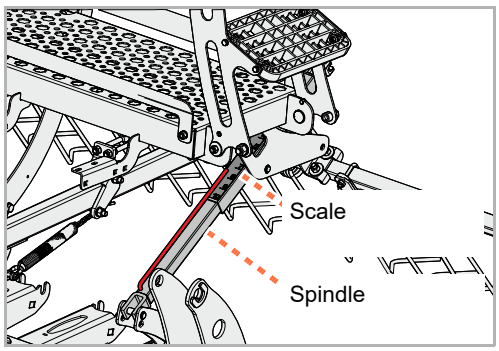
- Open the locking mechanism.
- Fold up the steps.
- The locking mechanism locks.

Seed-covering harrow

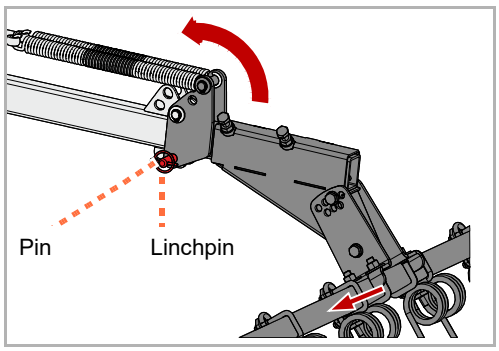
Seeding machines taller than 3.00 m
When transporting the machines on a low loader, for example, fold up the seed-covering harrow.

Prerequisite:

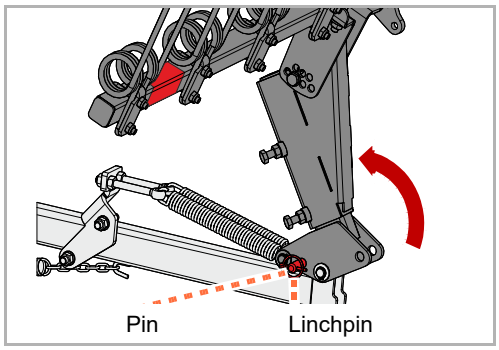
- The machine is lifted.



- Release the crank from the spindle.
- Set the spindle to a scale value above 7.
- Secure the crank to the spindle.



- Remove the linchpin.
- Push the harrow bar downwards.
- Remove pin.



- Grip the seed-covering harrow in the area indicated and fold it up.
- Lock the finger harrow with pins.
- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.

Road transport



Only drive with an empty seed hopper
Road transport should only be undertaken with an empty seed hopper.
A seed hopper which is not empty influences the driving behaviour of the machine and can cause accidents when driving on roads.

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

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

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

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

Ensure clear visibility
Check the immediate vicinity before driving off. Always 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:

- ☑ When hitching to the lower link balls, these are locked against sideways movement
- ☑ Track markers are secured
- ☑ The steps folded in and secured
- ☑ The pre-emergence marker is folded in and secured
- ☑ The emptying flaps on the metering devices and hoppers are closed
- ☑ The lighting equipment and warning signs are attached and operational
- ☑ All safeguards for parts that might be a traffic hazard have been attached
- ☑ All functions of the software are not active
- ☑ The operating terminal is deactivated
- ☑ The permissible load in the seed hopper and fertiliser hopper has not been exceeded

Before carrying out work:

- Secure the machine.
- Lower the machine to its work position.
- Turn off the metering device via the terminal.

→ Operating manual for the software, section »Other applicable documents«, page 5

Seed hopper



Using steps
Only use the steps provided to climb onto the platform.
Climbing onto the platform without using the steps can cause accidents.



Remove seed
Remove all seed residue from the hopper when changing seed types.
Remaining seed can contaminate the new seed.

Changing the seed type

Before adding a different seed type to the seed hopper, remove all old seed residue from:

- Seed hopper
- Metering device

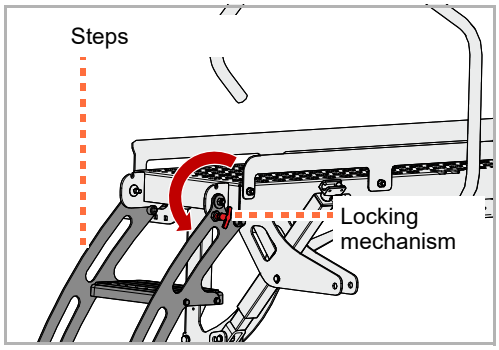
→ Chapter »Operation«, section »After sowing«, page 104

Before filling with another seed type, close the metering device flaps again.

Before filling

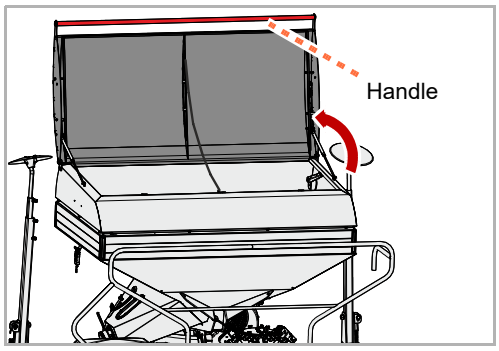
Steps

The steps must be unfolded for filling.



- Open the locking mechanism.
- Unfold the steps.
- The locking mechanism locks.

Cover



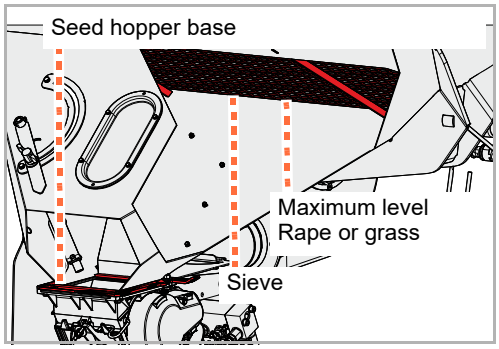
- Take hold of the cover by the handle and open the hopper.
- Inspect the seed hopper for foreign bodies and remove them.

Filling

Observe maximum fill level
The maximum fill level depends on the seed. The maximum fill level must always be observed. Rape and grass should only be filled to the top of the partition between the chambers of the metering device.
If the max. fill level is exceeded, this can result in patchy seeding.

- Minimum seed hopper fill level:

For grain	30 cm above the base of the seed hopper
For rape or grass	5 cm above the base of the seed hopper



- Maximum seed hopper fill level:

For grain	Top edge of the seed hopper
For rape or grass	Top edge of the sieve in the seed hopper

You can set the height of the sensor for the level indicator in the seed hopper. At low application rates that do not cover the level indicator at its lower position, it makes sense to deactivate the alarm with ID 08-04 "Hopper low level".
Operating manual for the software, section »Other applicable documents«, page 5

Big Bag

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

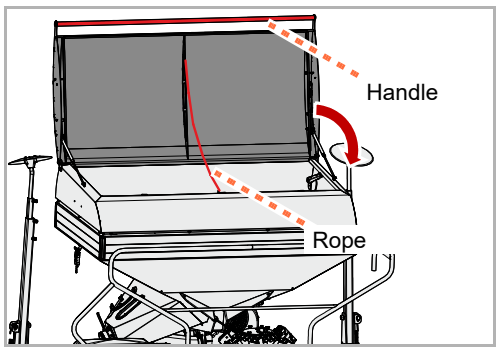


Do not stand underneath or next to Big Bags when they are lifted
Standing under or near lifted Big Bags is dangerous. Maintain a sufficient distance and observe the behaviour of the load.
By swinging, the Big Bag could hit people and cause them to fall. This could result in injuries.

- Fill the seed hopper in the normal manner. Note the fill level.

After filling

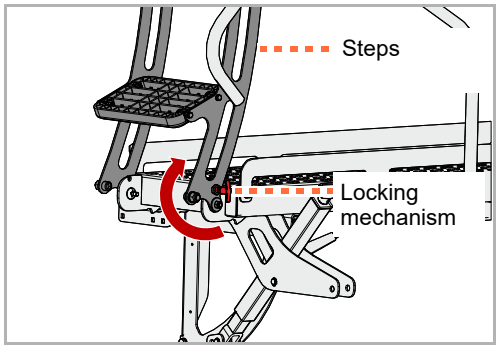
Cover



- Pull on the rope for the cover.
- Take hold of the handle and close the hopper.

Steps

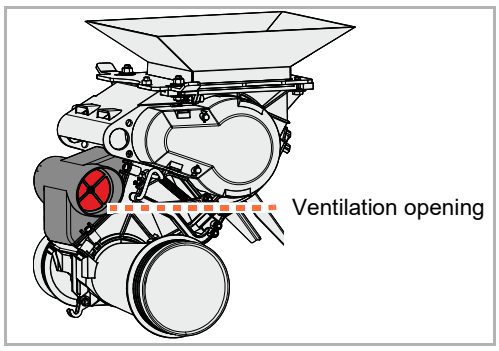
Fold up and secure the steps for the work.



- Open the locking mechanism.
- Fold up the steps.
- The locking mechanism locks.

Checking the ventilation opening

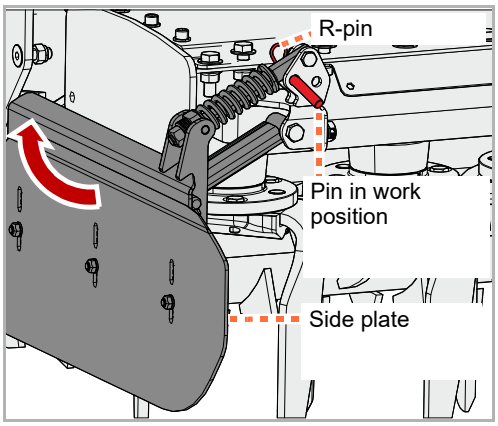
Ventilation opening
Before carrying out the seeding work, check and clean the two ventilation openings.
Otherwise, irregularities in the metering accuracy cannot be excluded.



- Check the ventilation openings on both sides.
- Clean the ventilation openings on both sides

Soil cultivating device

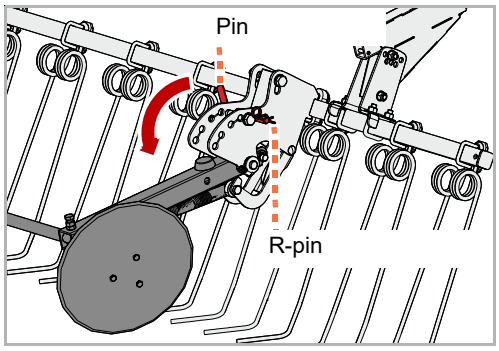
Move the soil cultivating device's side plates into the work position.



- Remove the R-pin.
- Lift the side plate and remove the pin.
- Move the pin into the work position.
- Allow the side plate to swing downwards.
- Secure the pin with the R-pin.
- Apply the same setting on the other side of the machine.

Pre-emergence marker [+]

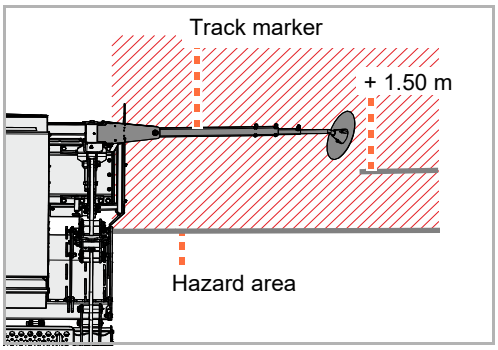
Unfold the pre-emergence markers in the work position.



- Remove the R-pin from the pin.
- Remove the pin.
- Unfold the pre-emergence marker.
- Insert the pin into the parking position.
- Secure the pin with the R-pin.
- Apply the same setting on the other side of the machine.

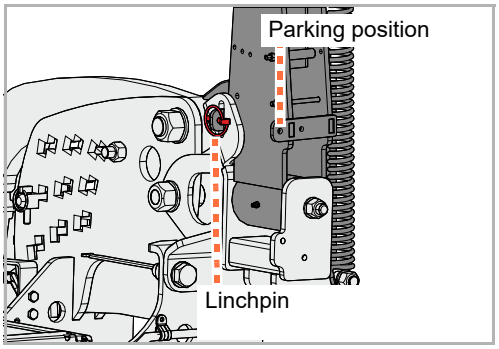
Track marker [+]

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



Frame width [m]	Hazard area [m]
3,00	3,00
3,50	3,25
4,00	3,50

Secure the track marker
Hold the track marker when removing the transport locking device. Position yourself in a way that ensures you cannot be hit if the track marker unfolds accidentally.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.



Folding from the transport position into the work position

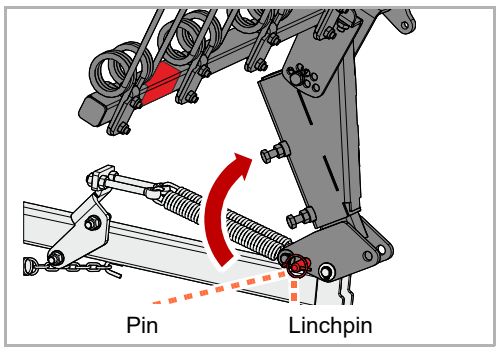
- Press the folded in track marker arm to the centre of the machine.
- Remove the linchpin.
- Move the linchpin into the parking position.
- Apply the same setting on the other side of the machine.
- Fold out the track marker using the control unit on the tractor.

Seed-covering harrow [+]

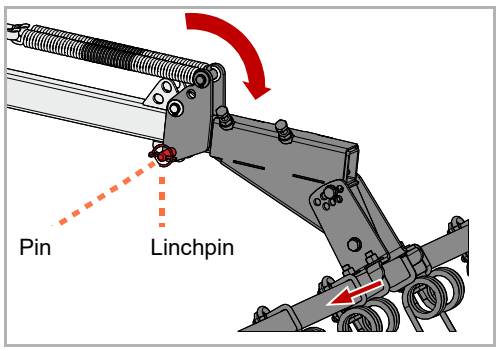
For seeding machines taller than 3.00 m
When transporting the machines on a low loader, for example, fold up the seed-covering harrow.

Prerequisite:

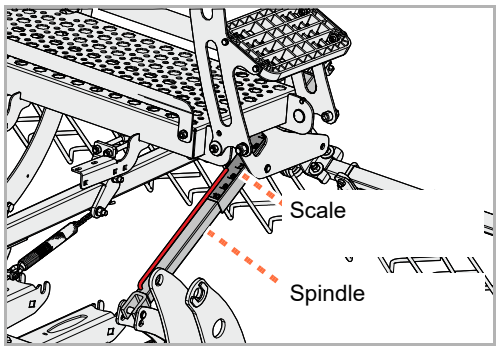
- The machine is lifted.



- Remove the linchpin.
- Remove pin.
- Grip the seed-covering harrow in the area indicated and unfold it.



- Push the harrow bar downwards.
- Lock the finger harrow with pins.
- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.



- Release the crank from the spindle.
- Set the spindle to the scale value for the work position.
- Secure the crank to the spindle.

Deposit depth

To ensure optimum grain deposit, the deposit depth must be checked. The deposit depth is determined by the setting of the coulter bar and by the coulter pressure.

→ Chapter »Preparation for sowing«, section »Work switch«, page 44
→ Chapter »Preparation for sowing«, section »Working depth«, page 48

If the coulter pressure is suitable for the soil conditions, no further coulter pressure settings are required.

The seeding machine is designed for seed placement under normal agronomic conditions.

The maximum depth at which the seed is deposited depends on the soil type, moisture content and driving speed, as well as other factors. The maximum deposit depth can only be determined in the field.

Checks

Carry out the inspection using the checklist:

Before sowing

- ☑ Have all the connection lines been checked?
- ☑ Is the electronic control system working correctly?
- ☑ Have all counters of the electronic control system been reset to zero before the first operation?
- ☑ Has the correct tramline rhythm been set?
- ☑ Are the shut-off valves OK and is the track width of the spraying/ fertilising tractor set?
- ☑ Correct reduction head in the main distributor?
- ☑ Half-width shut-off properly set?
- ☑ Application rate set?
- ☑ Are the emptying flaps closed?
- ☑ Flap for the calibration test closed?
- ☑ Ventilation opening cleaned?
- ☑ Regulating flap properly set?
- ☑ Seed hoses checked for tangles or kinks?
- ☑ Coulters and seed pipes checked for clogging?
- ☑ Steps folded in?
- ☑ Are the track markers set and folded out?
- ☑ Pre-emergence marker activated?

Test drive

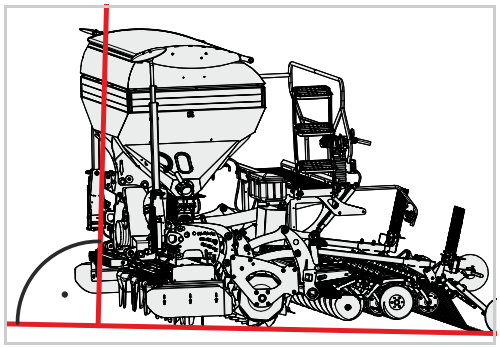
Riding on the machine is strictly prohibited
Never transport persons or objects on the machine.
Riding on the machine is life-threatening and strictly prohibited.

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.

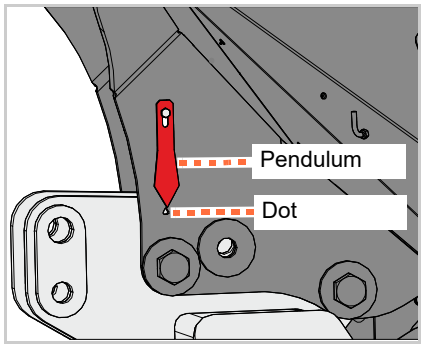
After completing all preparatory work, take a test drive. Lower the machine to its work position.

Machine in work position

Check the work position
In the field, check whether the machine is vertical to the ground.
An incorrectly set machine will not sow properly. Gaps and an uneven field progression may be the consequence.



- Lower the machine to its work position. The machine must be vertical to the ground surface while you work.



A pendulum is attached to the machine for guidance. The machine is vertically aligned if the tip of the pendulum points towards the dot.

Performing the test drive

- First perform a test drive in the work position at working speed (5–15 km/h).
- Adjust the soil preparation tools, if necessary.

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

After the test drive

After the test 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:

- Seed deposit depth

→ Chapter »Preparation for sowing«, section »Working depth«, page 48

- Setting the coulter pressure

→ Chapter »Preparation for sowing«, section »Coulter pressure adjustment«, page 52

- Adjusting the seed-covering harrow

→ Chapter »Preparation for sowing«, section »S-tine harrow or finger-tine harrow [+]«, page 54



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

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

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

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

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

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



Switch on the alarm for fan speed
When sowing using the software, always switch on the "RPM" alarm.
Otherwise, the metering device may start while the fan drive is switched off..

Sowing

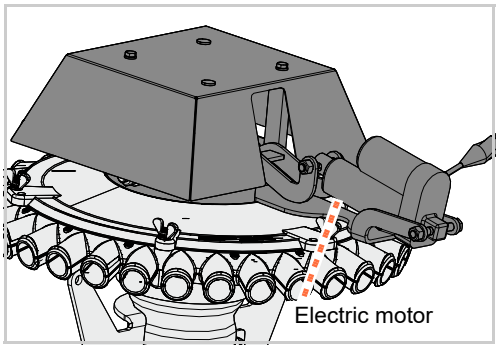
Folding the track markers in and out, as well as the headland, work, and transport positions for the machine are described in detail in the chapter »Hydraulic system«.

During sowing, access the required information from the electronic control system.

Before each sowing, check the input values via the electronic control system.

Seeding with half working width [+]

For even and symmetrical rhythms, e.g. 4S or 6S, sowing with half working width is required at the start of the field.



The electrical half-width shut-off disconnects the machine on the left-hand side from the seed supply. Seed is only applied on the right-hand side of the machine.

The software controls the electrical half-width shut-off.
→ Operating manual for the software, section »Other applicable documents«, page 5

Work position and cultivation

- Switch on the terminal.
- Fold the machine into its work position.

→ Chapter »Hydraulic system«, section »Lifting or lowering«, page 35

- Switch on the fan.
- Begin seeding work.

Electronic control system
As soon as the metering device is driven, the electronic control system automatically shows the desired information. Depending on the control system, the display will show:

- The current application rate [kg/ha]
- The current driving speed information
- All information shown in relation to the rate of work
- Details about the speed and rotor

Working speed

During sowing, monitor the working speed. The possible working speed within the range of 5 – 15 km/h depends on the application rate.

Where the soil is loose and the working speed is too high, the front seed rows can easily be covered by too much soil by the rear coulters. Drive a bit slower or change the sowing depth.

Working lights [+]



Avoiding dazzle
The working lights may also dazzle traffic in the distance. Also be aware of traffic near the field when using the working lights.
Dazzling other vehicles may cause accidents.

- Turn the working lights on using the software.

Track marker [+]

Lifting a track marker arm, e.g. to avoid obstacles, interrupts the metering device drive.

When lifting the machine, the track marker arm must be folded in as far as possible. This automatically switches the control block to the other track marker.

- Make the necessary settings on the software if there are obstacles

→ Operating manual for the software, section »Other applicable documents«, page 5

When the track marker arm is again lowered to the work position, the metering device drive automatically restarts.

Turning

The machine is lifted before the turning procedure.

- Throttle the engine back just before reaching the field edge and raise the seeding machine while still driving.
- After the turn, lower the seeding machine approx. 1 m ahead of where you want to begin sowing.

Electronic control system
At the headland the tramline rhythm is advanced one sequence.

This position remains in memory even if the power is switched off. After power supply has been re-established, continue sowing with the same settings.

Following an interruption in the voltage, always check the displayed trip and correct if necessary. Depending on the type of tractor, the tractor may accidentally advance when switched on.

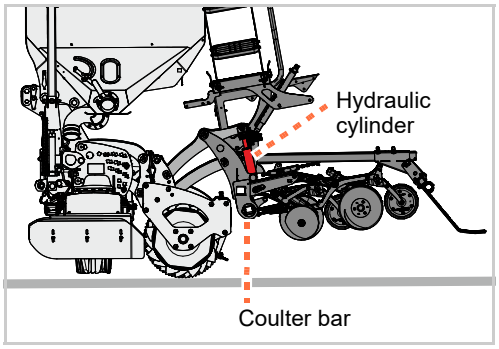
When lifting or lowering, the tractor control unit must remain activated for a few more seconds. Several functions have been combined, and must be performed by the machine alone, e.g. changing the track marker.

Hydraulic coulter bar lifting [+]

With the hydraulic coulter bar lifting system, you can increase the lifting height of the coulter bar in order to create more free space above the ground.

You can use the hydraulic coulter bar lifting system:

- When manoeuvring the machine on the headland
- When preparing the field using only the soil cultivating device
- When travelling on the road



- Extend the hydraulic cylinder for the hydraulic coulter bar lifting system using the tractor's control unit.

Checks during sowing

During sowing, use the checklist to examine the following:

☑ Constant PTO speed during the seeding

☑ Constant fan speed during the seeding

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

☑ Deposit depth

☑ Free seed pipes

☑ Free ventilation openings

☑ Unimpeded switching of the shut-off valves

☑ Unimpeded flow of the seed through the shut-off valves

☑ For rape:
Unimpeded seed flow

☑ For glutinous seed due to the inclination to bridge:
Unimpeded seed flow

☑ Seed sufficiently covered with soil

☑ S-tine harrow or finger-tine harrow working correctly

After sowing

After sowing

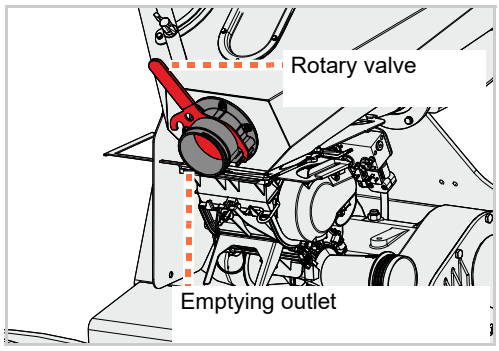
- Parking the machine
- Empty the seed hopper
- Emptying the metering device

Parking the machine

- ▸ Switch the PTO or hydraulic fan drive off.
- ▸ Park the tractor and machine on even ground.
- ▸ Turn off the metering device via the terminal.

→ Operating manual for the software, section »Other applicable documents«, page 5

Emptying the seed hopper

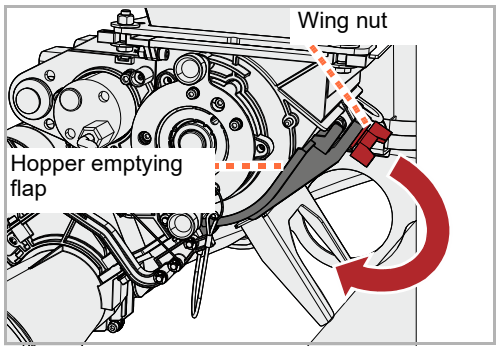


- ▸ Place a catch pan under seed hopper.
- ▸ Turn the hose onto the emptying outlet.
- ▸ Open the rotary valve on the seed hopper.
- ▸ Catch the seed.
- ▸ Close the rotary valve on the seed hopper.

Emptying the metering device

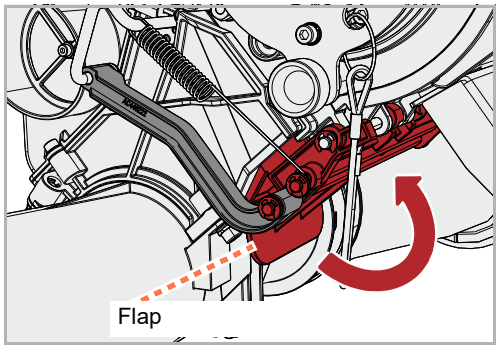
After emptying the seed hooper, there is seed in the metering device again. The metering device must be emptied when a seed change takes place or the machine is being parked up.

If the catch pan is sufficiently large to pick up the rest of the seed, you can empty the metering device over the emptying flap. However, the flap cannot be closed against the force of the seed running out.

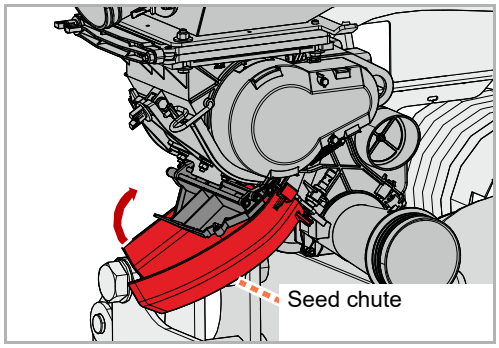


- ▸ Place a catch pan under the metering device.
- ▸ Loosen the wing nut and fold it upwards.
- ▸ Open the emptying flap and let the seed flow out.

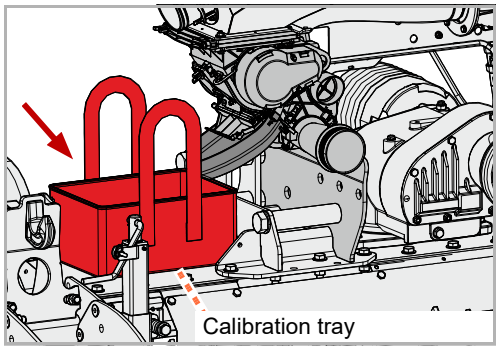
Controlled emptying of the metering device:
To check the seed flow out of the metering device more thoroughly, proceed as you would in a calibration test.



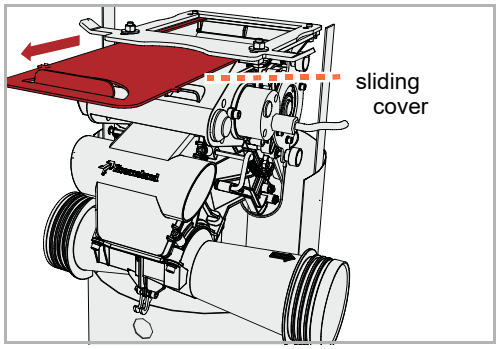
- On the metering device, open the flap for the calibration test.



- Remove the seed chute and calibration tray from the tool case.
- Hook the seed chute onto the metering device.

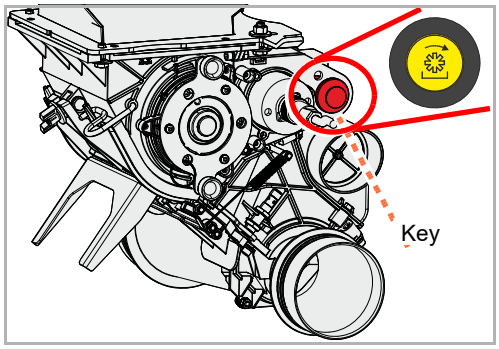


- Place the calibration tray below the seed chute.

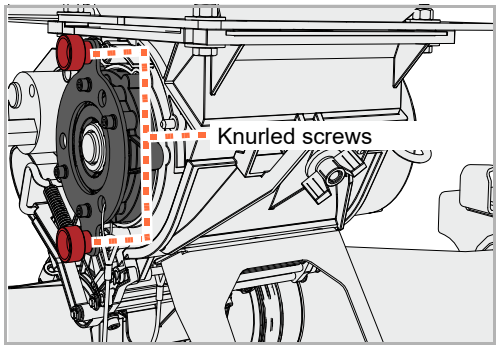


- Open the sliding cover on the metering device. The seed can once again flow from the seed hopper into the metering device.

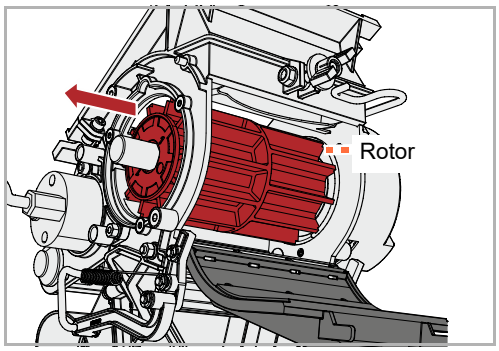
- Switch on the terminal.
- Switch off the headland management.



- Press and hold the key on the metering device for at least 3 s and then hold it pressed. The metering device starts and the seed falls into the calibration tray.
- When the calibration tray is full, release the key. Metering device stops.
- Empty the calibration tray and place it below the metering device again.
- Repeat the process until the metering device has completely emptied.



- Release the knurled screw on the cover.
- Remove the cover. The cover is secured by means of a cable.



- Gently turn the rotor back and forth and remove it.
- Clean the rotor and check it for wear.
- Install the corresponding rotor.
- Attach the cover and secure it using knurled screws.
- Close the emptying flap and secure it with the wing nut.

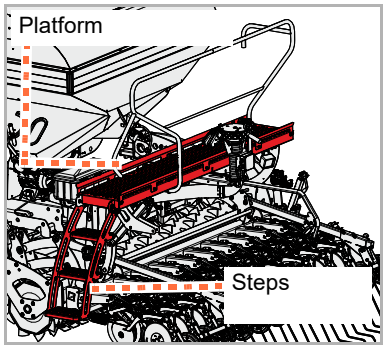
Cleaning

A high-pressure cleaner, for example, can be used for cleaning.

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

Before cleaning, remove the seed from the metering devices and the seed hopper.
→ Chapter »Operation«, section »After sowing«, page 104

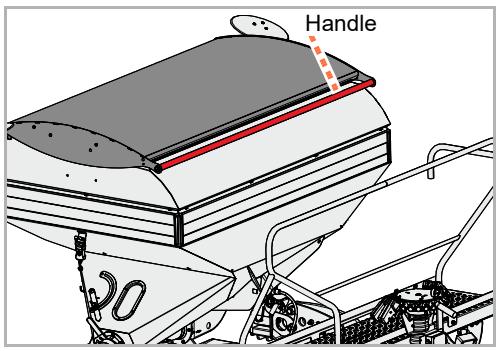
Steps, platform, seeding machine



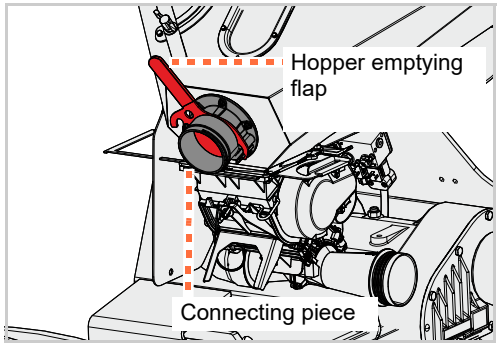
Cleaning steps and platform
The steps and the platform must be thoroughly cleaned after every operation in the field.
Dirt build-up presents an increased risk of accidents and injury.

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

Prior to cleaning



- Pull on the handle for the cover and close the hopper.

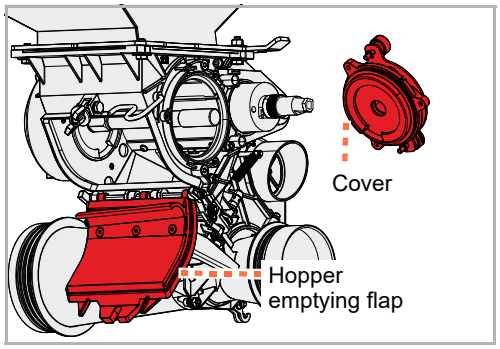


- Open the seed hopper emptying flap.
- Remove the rotor.

→ Chapter »Preparation for sowing«, section »Rotor«, page 68

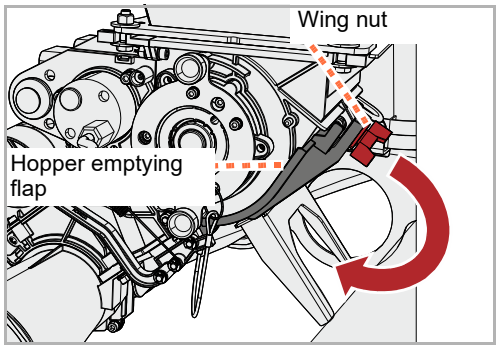
After cleaning

- Open the cover and check the seed hopper for humiditiy. Wipe dry if necessary.
- Open the cover and emptying flap on the metering device and leave to dry.



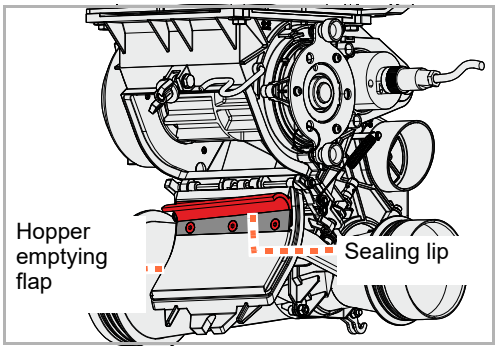
Metering device

Under no circumstances may a high-pressure cleaner be used for the following cleaning operations.



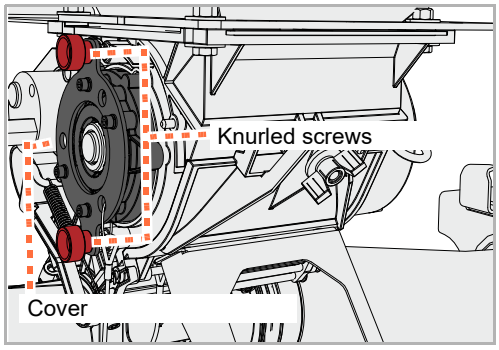
- Loosen the wing nut and fold it upwards.
- Open the hopper emptying flap.

Sealing lip

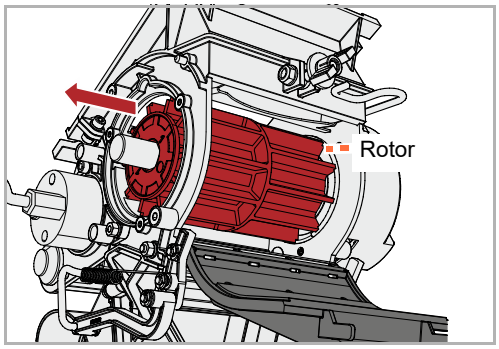


- Clean the sealing lip.
- Replace the sealing lip if it is worn or deformed.

Metering device rotor and interior



- Loosen the knurled screws.
- Remove the cover. The cover is secured by means of a cable.



- Turn the rotor slightly and remove it.
- Clean the rotor.
- Replace the rotor with a new rotor if it is worn or deformed.
- Blow out the interior of the metering device with compressed air or clean it with a dry brush.
- Loosen any caked-on residue with a suitable tool.

Seed coulters, seed hoses and seed hopper



Wear breathing protection
When blowing out, breathing protection must be worn, especially when dressed seeds were used.
Dressing dust can be harmful to your health.

- Blow out the seed coulters, seed hoses and the seed hopper with compressed air.

Care

To ensure that the machine has a long service life, we recommend applying a protective coat of oil after the end of the season and during storage. Use only approved and biodegradable oil, e.g. rapeseed oil.



Before applying the oil, cover the tyres of the transport wheels and the wheel packers. The oil can damage the tyres.

Implements

Before parking, check the depth adjustment:

- Track eradicator
- Coulter bar

If you park the machine in the work position, these tools should not be set so deep that they support the weight of the machine during parking.

Parking and securing the machine



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

- Ensure that the machine is lowered onto a level and stable surface
- Use support legs to stabilise the machine

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

Emptying the seed hopper

▸ Empty the seed hopper.

→ Chapter »Operation«, section »After sowing«, page 104

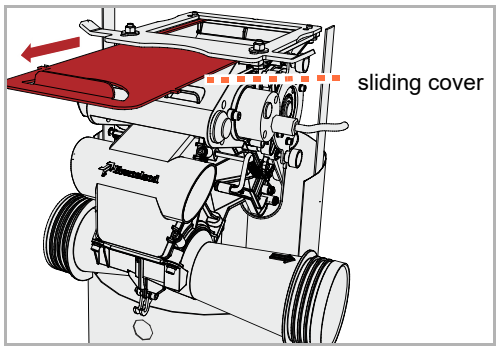
▸ Close the cover on the empty seed hopper.

Emptying the metering device

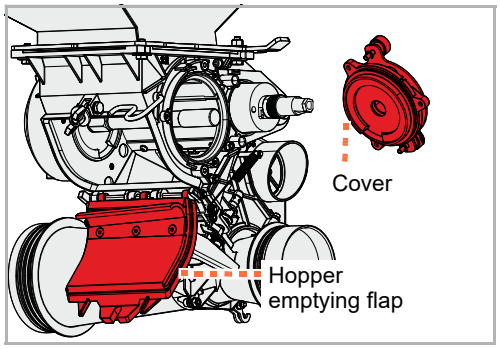
- Empty the metering device.

→ Chapter »Operation«, section »After sowing«. Page104

Storing the seeding machine with the metering device open
When storing out-of-season, leave the cover and the emptying flap on the metering device open. Humidity or rodents may damage the metering device.
Otherwise, damage to the machine may be caused as a result.



- Open the sliding cover.



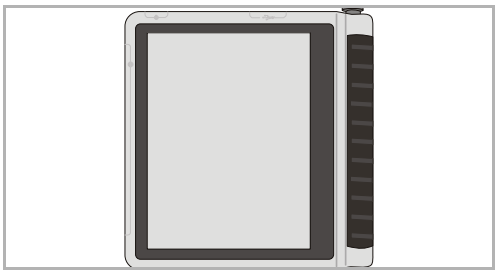
- Open the hopper emptying flap.
- Remove the cover.
- Remove the rotor and store it in toolbox.

Track eradicator [+]

The track eradicators for the soil cultivating device must not be in contact with the ground when the machine is parked up.

- Adjust the track eradicator upwards.

Terminal [+]



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

Storing the machine

After cleaning, the machine should be stored in transport position in a dry location and on a level and stable surface.
→ Section »Securing the machine«, page 117

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

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

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.
Insufficient technical knowledge or the use of unsuitable tools can cause accidents.

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

- Deactivated PTO
- 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.



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

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

Protective measures when handling oils or lubricants

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



Avoid skin contact
Avoid skin contact with these materials.
Contact can result in skin damage.

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

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

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



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

General information

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



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

Fundamentals

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

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

Securing the machine

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

- Lower the tools.



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.

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

Working under the machine



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

- Mechanically secure the machine against lowering.

Maintenance intervals

The specifications relate to an average usage of the machine in normal working conditions. For heavy use, e.g. in contract work, or in extreme operating conditions, such as heavy dust generation, the maintenance intervals are shorter.

	After the first hours of operation	Daily	After 40 hours of operation	After 250 hours of operation	After heavy use	Once per season	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Cleaning	Page
General														
Retighten all bolts	•				•	•								120
Visual inspection	•	•												
Bearing					•	•			•					125
Hose connections						•				•				
Pivot points (frame, track markers)		•	•						•	•				125
Track marker [+]					•	•			•	•				127
Hydraulics														
Hydraulic hoses every 6 years											•			131
Hydraulic hoses in general							•	•			•			131
Hydraulic fan drive						•				•				
Electronic control system														
Sensors						•				•				128
Seed coulters														
Suffolk coulter					•	•				•	•			
CX-II coulter					•	•				•	•			

	After the first hours of operation	Daily	After 40 hours of operation	After 250 hours of operation	After heavy use	Once per season	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Cleaning	Page
Metering device														
Sealing lip			•					•		•	•			128
Rotor				•				•		•	•			128
Ventilation		•								•			•	128
Fan														
Angular gearbox						•	•		•	•	•			
Fan drive wheel								•			•			
Drive shaft			•						•					

Screw connections

Re-tightening the bolts

All bolts must be retightened:

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

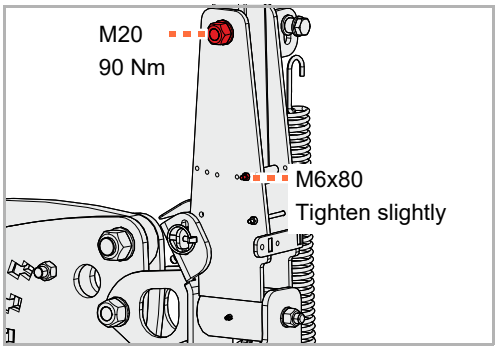
Tightening torques, general

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

Bolt size	Bolt quality		
	„8.8“	„10.9“	„12.9“
	Tightening torques in Nm		
M6	9,9	14	17
M8	24	34	41
M10	48	68	81
M12	85	120	145
M16	210	290	350
M20	425	610	710
M24	730	1050	1220
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

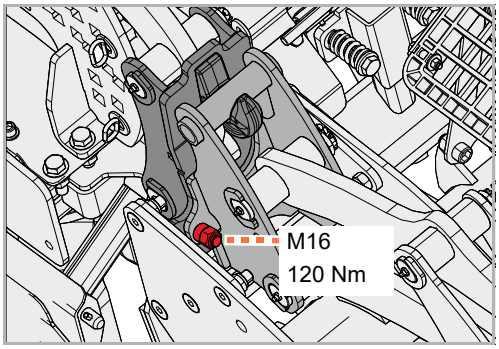
Tightening torques, special

Track marker arm



Bolt	Tightening torque
M20	90 Nm
M6x80	Tightened slightly

Coulter bar



Bolt	Tightening torque
M16	120 Nm

Lubricating the bearings

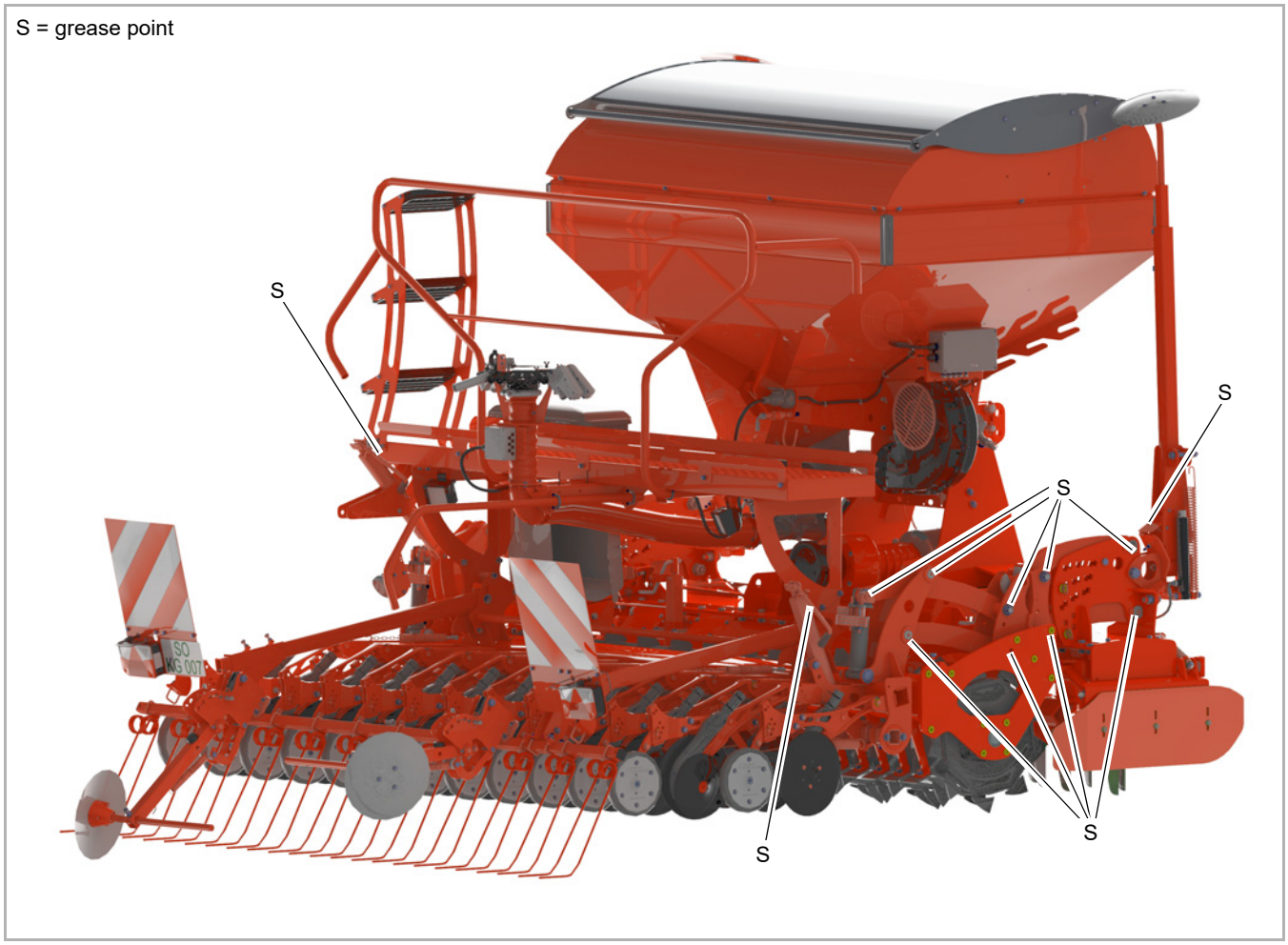
The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

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

Do not lubricate maintenance-free bearings.

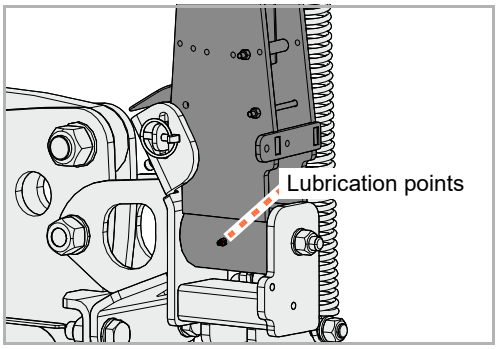
Overview of lubrication points

S = grease point



Track marker [+]

Every 40 hours of operation

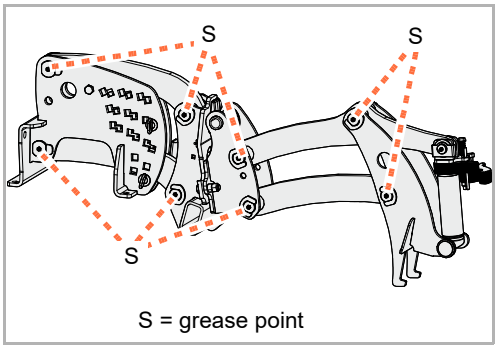


Each track marker has one lubrication point on each side of the machine.

- Fold out and lower the machine.
- Fold in the track marker.
- Lubricate the lubrication points on the pivot points.

Parallelograms

Every 40 hours of operation

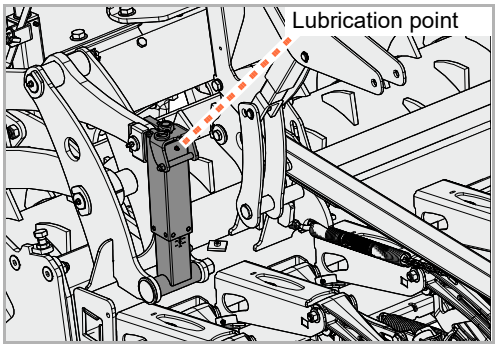


Each parallelogram, formed by the hitch, the packer roller and the coulter bar, has eight lubrication points on each side of the machine.

- Lubricate the lubrication points.

Coulter bar lifting system [+]

Once per season

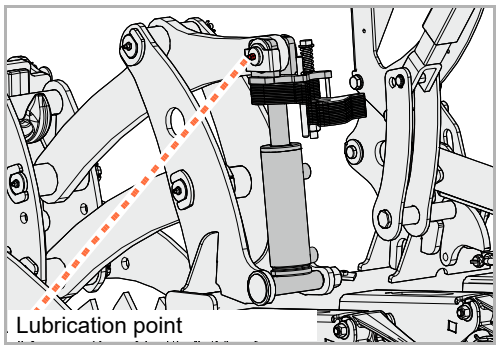


Each coulter bar lifting system has one lubrication point on each side of the machine.

Mechanical adjustment

- Lubricate the lubrication point.

Hydraulic adjustment

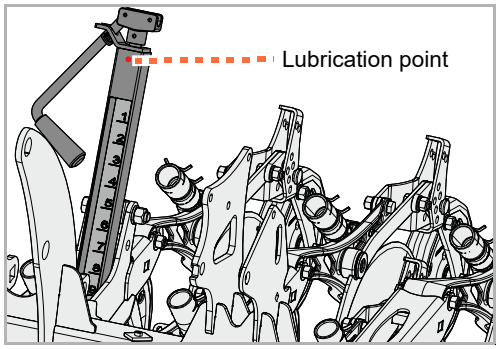


- Lubricate the lubrication point.

Coulter pressure adjustment

Once per season

The spindle for the coulter pressure adjustment has a lubrication point.

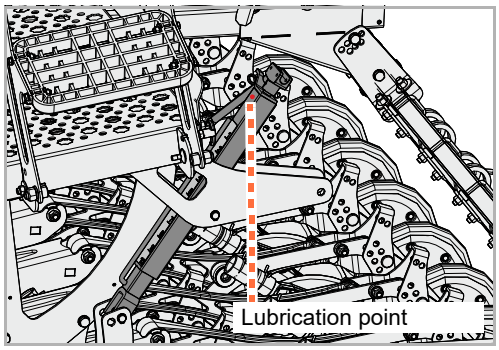


- Lubricate the lubrication point.

Depth adjustment for the seed-covering harrow

Once per season

The depth adjustment spindle for the seed-covering harrow has a lubrication point.



- Lubricate the lubrication point.

PTO shaft

A number of maintenance tasks must be performed at various intervals for the PTO shaft. You must perform the following:

- Greasing
- Lubrication

The individual maintenance tasks are described in detail in the PTO shaft manufacturer's instructions.

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

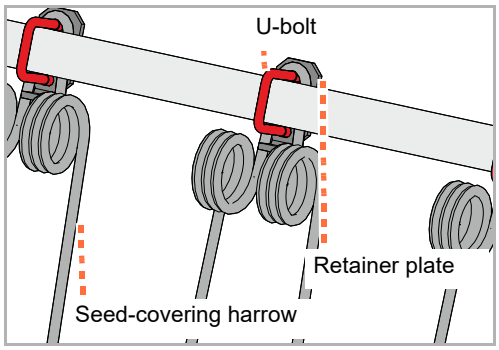
Seed-covering harrow

- Replace the seed-covering harrow

Replacing the seed-covering harrows

If the seed-covering harrows are worn, they must be replaced. It is possible to replace individual seed-covering harrow.

In case of wear



- Undo the U-bolts.
- Remove the U-bolt and the retainer plate.
- Remove seed-covering harrows and replace with new units.
- Insert the retainer plate and U-bolts and tighten securely.

Track marker [+]

Track marker, general

General maintenance work on the track markers includes:

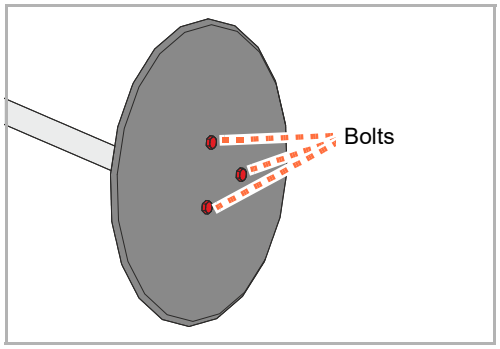
- Replacing the disc
- Lubricate bearings

Risk of injury through cutting
Wear protection gloves. Cover discs with a blanket or something similar.
When working without protection gloves and a cover, cutting injuries may occur if someone touches the discs.

Replacing the disc

In case of wear

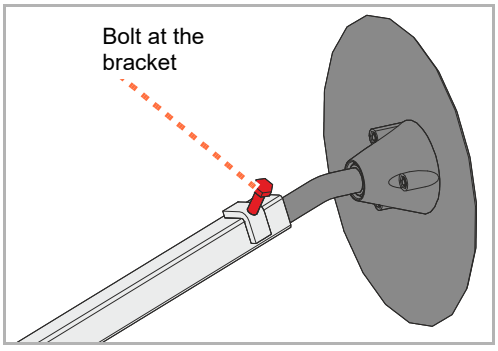
If a disc is defective, replace it.



- Release the bolts and remove the disc.
- Replace the disc.
- Fit the bolts with the washers.
- Tighten the bolts securely.
- Retighten the bolts again after the first two hours of operation.

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.

Metering device

Before you start the work, you must remove any remaining seed from the seed hopper and from the metering device.

→ Empty the seed hopper and the metering device, chapter »Operation«, section »After sowing«, page 104

You must regularly check the following on the metering device:

- Ventilation

→ Check the ventilation, chapter »Preparations in the field«, section »Checking the ventilation opening«, page 91

- Sealing lip

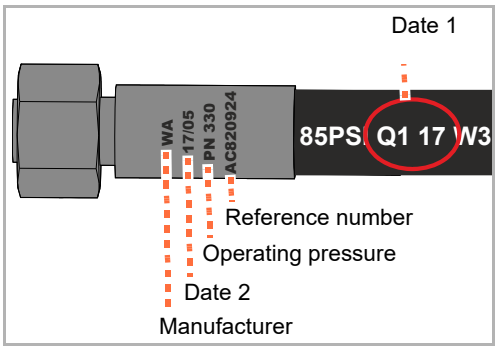
→ Check the sealing lip, chapter »Cleaning and care«, »Sealing lip«, page 109

- Rotor

→ Check the rotor, chapter »Cleaning and care«, section »Metering device rotor and interior«, page 109

Hydraulic hoses

Hydraulic hoses can age without any externally visible signs. In accordance with international regulations, the hydraulic hoses must be replaced every 6 years.



The hydraulic hoses have codes both on the hose and on the swaging which give the production date of the hydraulic hose.

Designation	Meaning	Illustrative example
Date 1	Production date of hydraulic hose	1st quarter of 2017
Manufacturer	Abbreviation of assembly manufacturer	-
Date 2	Production date of hydraulic hose assembly	May 2017
Operating pressure	Maximum operating pressure	330 bar
Reference number	Reference number of hydraulic hose	-

The period of six years is calculated beginning on the production date of the hydraulic hose.

Replacing the hydraulic hoses

Every 6 years or if required

All pressure must be released from the hoses.
→ Chapter »Hydraulic system«, page 32

Sensors

If required

This section contains information concerning setting and sensor replacement.

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

Operation sensor	E-BAS or E-COM
RPM sensor	X
Radar sensor [+]	X
Shut-off valve sensors [+]	X
Sensors on the metering shafts	X
Track marker sensors	X
Hopper low level sensor [+]	X
Travel sensor	X

All sensors must be adjusted in the workshop, if necessary.

The seeding machine is connected to the soil cultivating device

- The coulter bar
- The seed hopper

If you only want to use the soil cultivating device, uncouple the coulter bar. The seed hopper is screwed to the soil cultivating device and remains semi-mounted.

Removable seed hopper [+]
If the seeding machine is equipped with a removable seed hopper, you can remove the seed hopper from the soil cultivating device.

Coulter bar

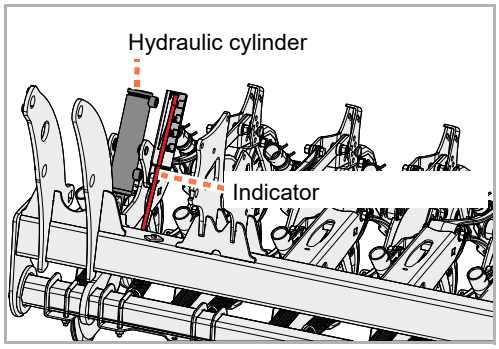
Uncoupling

Prerequisite:

- The soil cultivating device and seeding machine are attached to the tractor.
- The tractor is secured against rolling away.
- The machine is lifted.
- Never stand between the tractor and the machine during coupling.
- Actuate the three-point power lift system slowly and carefully.

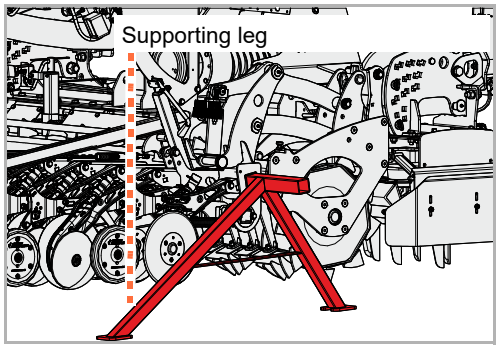
For machines with hydraulic coulter pressure adjustment:

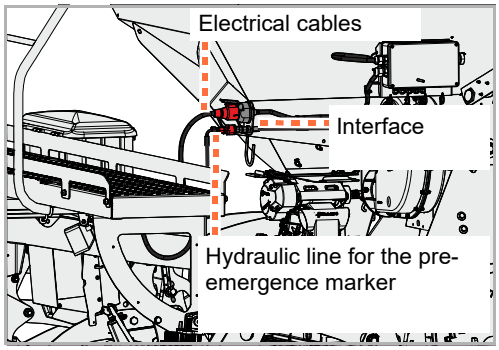
▶ Completely retract the hydraulic cylinder for the coulter pressure adjustment.



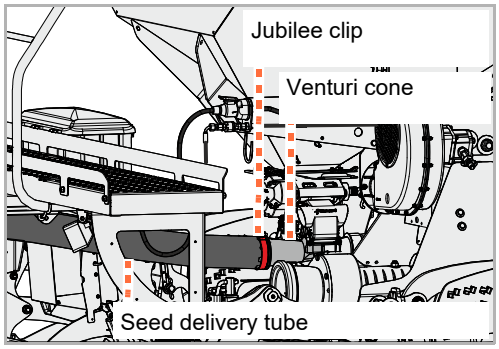
▶ Slightly lift the soil cultivating device with the seeding machine and coulter bar.

▶ Use the rear supporting legs on the right and left sides.

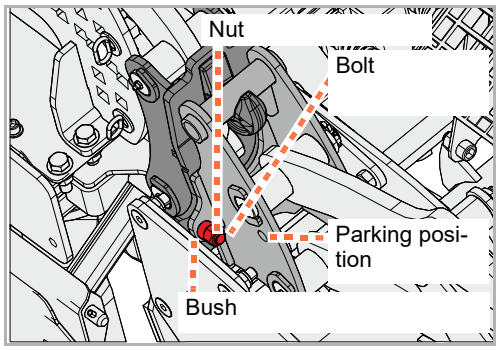




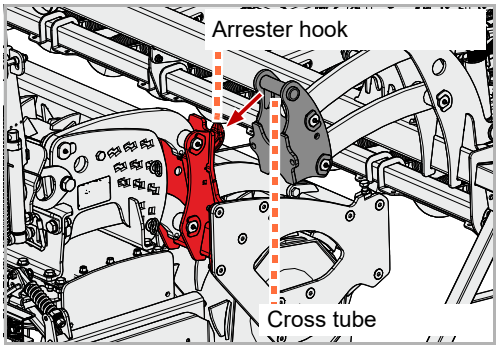
- Uncouple the hydraulic line for the pre-emergence marker from the interface.
- Uncouple the coulter bar's electrical control cable from the interface.
- Remove the hydraulic line for the coulter bar lifting system that runs along the hopper to the tractor and set it aside on the platform.
- Remove the hydraulic lines for the coulter pressure adjustment that run along the hopper to the tractor and set them aside on the platform.
- Remove the electrical cable for the road transport lighting equipment that runs along the hopper to the tractor and set it aside on the platform.



- Undo the jubilee clip.
- Uncouple the seed delivery tube from the venturi cone and set it aside on the coulter bar.



- Remove two bolts, two bushes and two nuts from each side of the machine.
- Keep the bolts, bushes and nuts in the parking position.

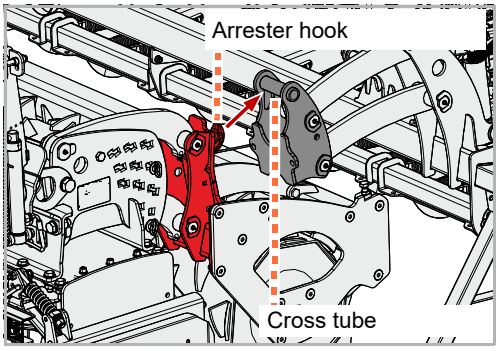


- Carefully lower the machine until the arrester hooks release the cross tubes.
- Drive the tractor slowly forwards until the arrester hooks are located in front of the cross tubes.
- Lift the soil cultivating device and the seeding machine, and continue to drive forwards.
- Uncouple the soil cultivating device from the tractor in accordance with the manufacturer's specifications.

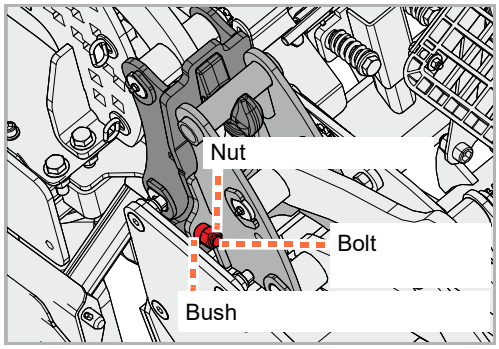
Coupling

Prerequisite:

- The soil cultivating device and the seeding machine's seed hopper are attached to the tractor.
- The tractor is secured against rolling away.
- The machine is lifted.
- Never stand between the tractor and the machine during coupling.
- Actuate the three-point power lift system slowly and carefully.

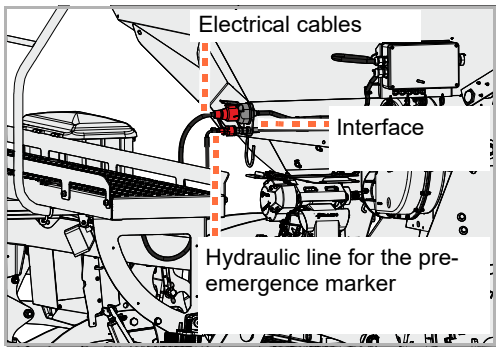


- Align the tractor in front of the coulter bar with the soil cultivating device attached.
- Lower the soil cultivating device and seeding machine until the arrester hooks on the right and left are located below the cross tubes.
- Drive slowly backwards until the arrester hooks are positioned under the cross tubes.
- Carefully lift the machine until the cross tubes are positioned in the arrester hooks.



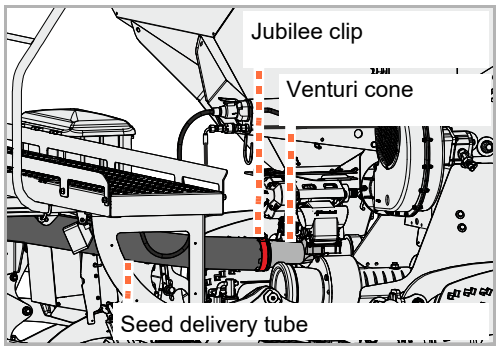
- Secure them on each side of the machine using two bolts, bushes and nuts.
- Tighten the bolts to a torque of 120 Nm.

Hydraulic lines and electrical cables



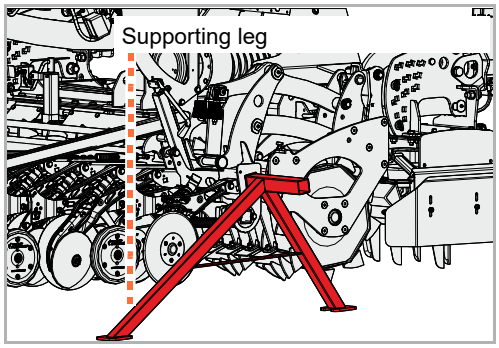
- Connect the hydraulic line for the pre-emergence marker to the interface.
- Connect the coulter bar's electrical control cable to the interface.
- Route the hydraulic line for the coulter bar lifting system along the hopper to the tractor and connect it.
- Route the hydraulic lines for the coulter pressure adjustment along the hopper to the tractor and connect it.
- Route the electrical cable for the road transport lighting equipment along the hopper to the tractor and connect it.

Seed delivery tube



- Attach the seed delivery tube to the venturi cone and secure with the jubilee clip.

Supporting legs



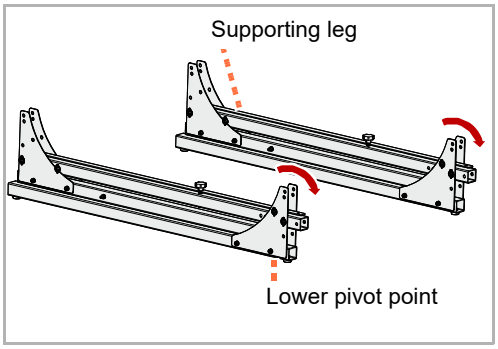
- Slightly lift the soil cultivating device with the seed hopper and coulter bar.
- Remove the support legs.

Seed hopper

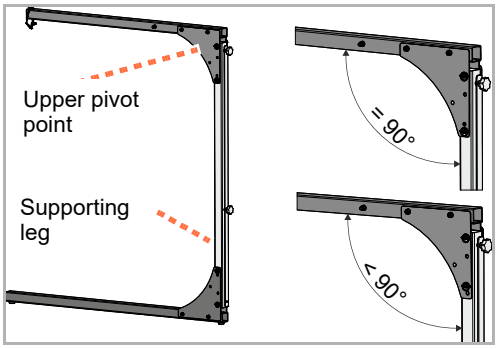
Uncoupling

Prerequisite:

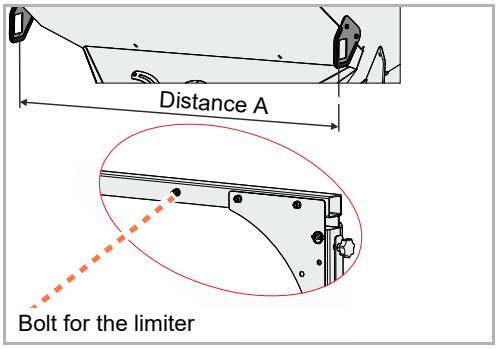
- The soil cultivating device and the seeding machine's seed hopper are attached to the tractor.
- The tractor is secured against rolling away.
- The machine is lifted.
- Never stand between the tractor and the machine during coupling.
- Actuate the three-point power lift system slowly and carefully.



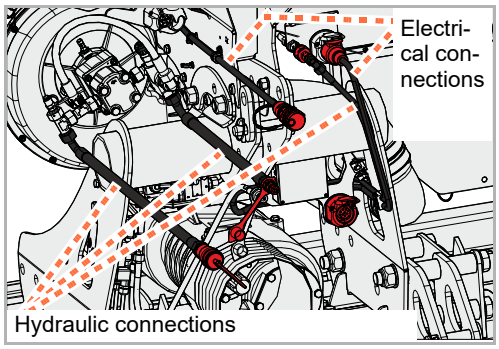
▸ Erect both supporting legs for the seed hopper in the area of the lower pivot point.



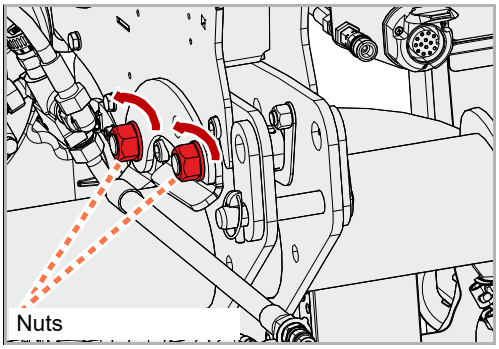
▸ Erect both supporting legs in the area of the upper pivot point.
▸ Select an angle of 90° if the tractor and the soil cultivating device are connected to a hydraulic top link.
▸ Select an angle of less than 90° if the tractor and the soil cultivating device are connected to a mechanical top link.



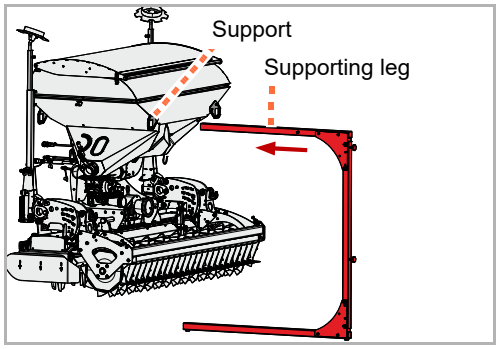
▸ If the distance A is greater than 1.30 m, remove the bolt for the limiter.



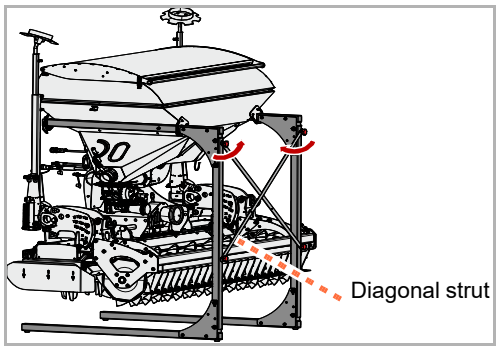
- Disconnect the electrical connections.
- Disconnect the hydraulic connections.



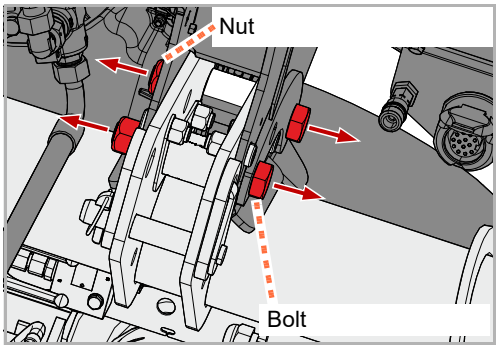
- Loosen the nuts for the bolts on the top link connection far enough that they can subsequently be removed by hand.



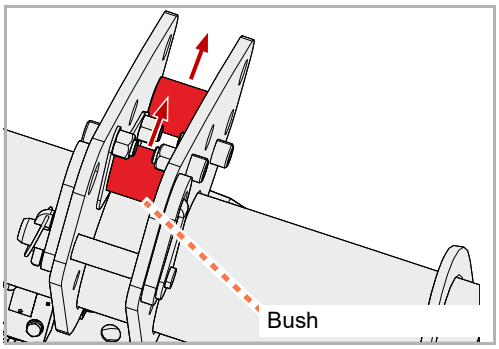
- Insert both supporting legs into the supports on the seed hopper.
- Secure the supporting legs using pins and lynch pins.



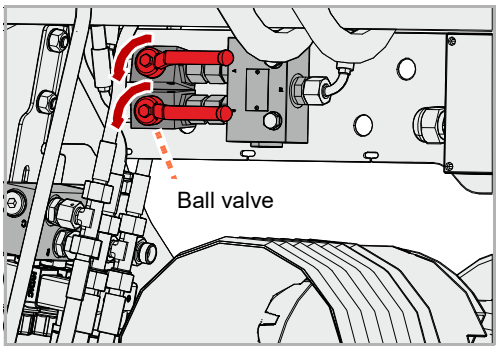
- Take the diagonal struts out of the parking position and connect both supporting legs to each other.



- Remove the nuts and bolts from the top link connection.
- Lower the soil cultivating device and seed hopper using the three-point hydraulic system.
- Set the seed hopper down on the supporting leg.
- Drive the soil cultivating device forward using the tractor.
- Park the soil cultivating device on the ground.



- Remove the bushes from the connections on the soil cultivating device.
- Store the bushes, bolts and nuts in the toolbox.

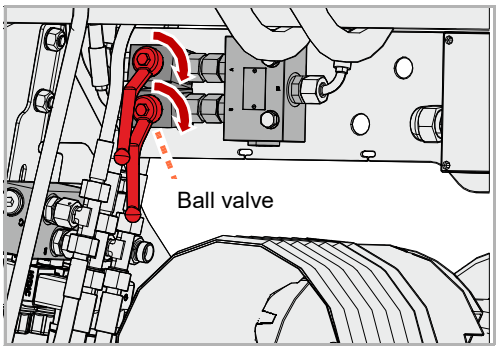


- Open the ball valves below the top link connection for the track marker.

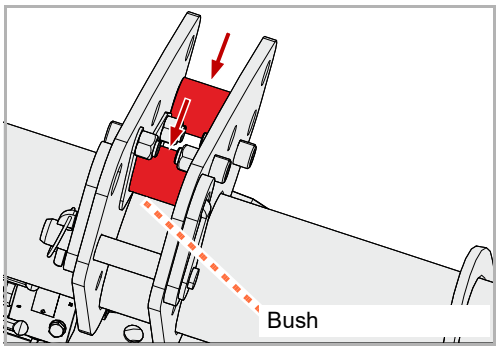
Coupling

Prerequisite:

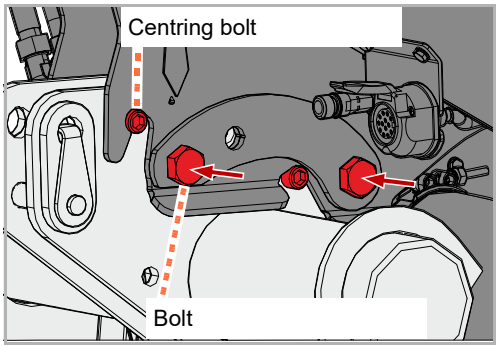
- The soil cultivating device is attached to the tractor.
- The tractor is secured against rolling away.
- The machine is lifted.
- Never stand between the tractor and the machine during coupling.
- Actuate the three-point power lift system slowly and carefully.



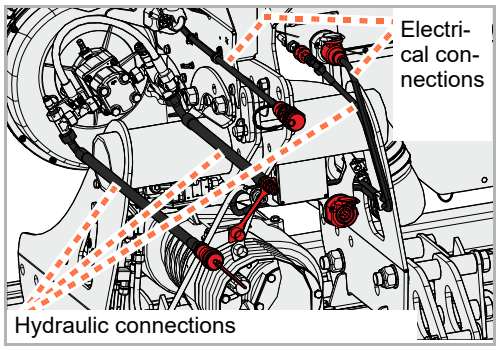
- Close the ball valves below the top link connection for the track marker.



- Remove the bushes, bolts and nuts from the toolbox.
- Insert the bushes into the connections for the soil cultivating device.



- Move the soil cultivating device below the seed hopper and lift it. The centring bolts position the seed hopper on the top link connection of the soil cultivating device.
- Insert bolts and secure with nuts.
- Loosen the diagonal struts and move to the parking position.
- Remove both supporting legs from the supports on the seed hopper.



- Connect the electrical connections.
- Connect the hydraulic connections.

Faults can often be eliminated in a fast and easy manner. In the event of hydraulic problems, first check:

- Are the hydraulic hoses properly connected?
- Is the control unit at the tractor defective?
  If so, contact your dealer.
- Is the hydraulic pump of the tractor defective?
  If so, contact your dealer.

Before calling customer service, refer to the table below to check whether you can eliminate the fault yourself.

Hydraulics

Fault	Cause	Remedy
Hydraulic fan drive		
Hydraulic fluid overheating	Insufficient oil reserve in the reservoir: The returning oil is mixed with the low quantity of oil in the tank and thus becomes hot	Have an additional oil cooler fitted
	The control of the pump at the tractor faults because of excessive oil flow in a closed hydraulic system	Have the pump and the control unit at the tractor checked
Hydraulic motor intermission	Unfavourable return path for the hydraulic oil	Choose another connection point for the pressureless return line
	Oil reserve on the tractor too low	Have a larger oil tank fitted
	Additional control valve was actuated	Do not actuate during work
Hydraulic motor provides insufficient speed	Flow control valve is incorrectly set	Check the flow control valve and reset it
	Tractor does not supply enough oil or oil pressure insufficient	• Have hydraulic pump checked • Have the pressure limiting valve checked
Valve lever trips out of the catch	Pressure peaks in the feed line Shutdown pressure too low	Check the drive capacity of the pneumatic system
	Feed line pressure too high	Have piping fitted by repair specialist
Fan does not run at required speed	Pneumatic lines not completely closed	Completely close the seeding machine's pneumatic system

Fault	Cause	Remedy
The hydraulic motor shaft seal was pressed out	Return line pressure too high	Reduce the return line pressure to a maximum of 10 bar
	Feed and return lines have been switched	Refit lines correctly and connect hydraulic links cleanly
Fluid leaking from the hydraulic motor	Worn or reversed shaft seal	Insert a new shaft seal

Others

Fault	Cause	Remedy
Track marker unfolds very fast	Throttle in the hydraulic line missing	Have a throttle fitted
	Throttle in the hydraulic line is rated too large	Have the throttle replaced
Track marker unfolds too slowly or not at all	Throttle in the hydraulic line is blocked	Have the throttle cleaned
	Throttle in the hydraulic line is rated too small	Have the throttle replaced
	Stop valve defective	Have the shut-off valve replaced
Both track markers unfold simultaneously	Defective change-over valve	Have the change-over valve replaced
	Both hydraulic valves open at the same time	Check the setting in the control system
Pre-emergence marker does not move	Throttle in the hydraulic line is blocked	Have the throttle cleaned
	Change-over valve not being actuated	Look for cause in electrical system
	Transport locking device not open	Open the transport locking device

Fan

Fault	Cause	Remedy
Increasing rpm drop to approximately half-speed	Pulse only being provided by one cam	Correct the speed sensor setting
Speed sensor only registering half the actual speed	Pulse only being provided by one cam	Correct the speed sensor setting
Speed sensor shows no reading	No voltage	Check the electrical wiring and fuses
	No pulse given	Correct the RPM sensor setting
	Sensor defective	Check the RPM sensor and replace it if necessary
	Defective hydraulic system	Check the hydraulic system

Terminal

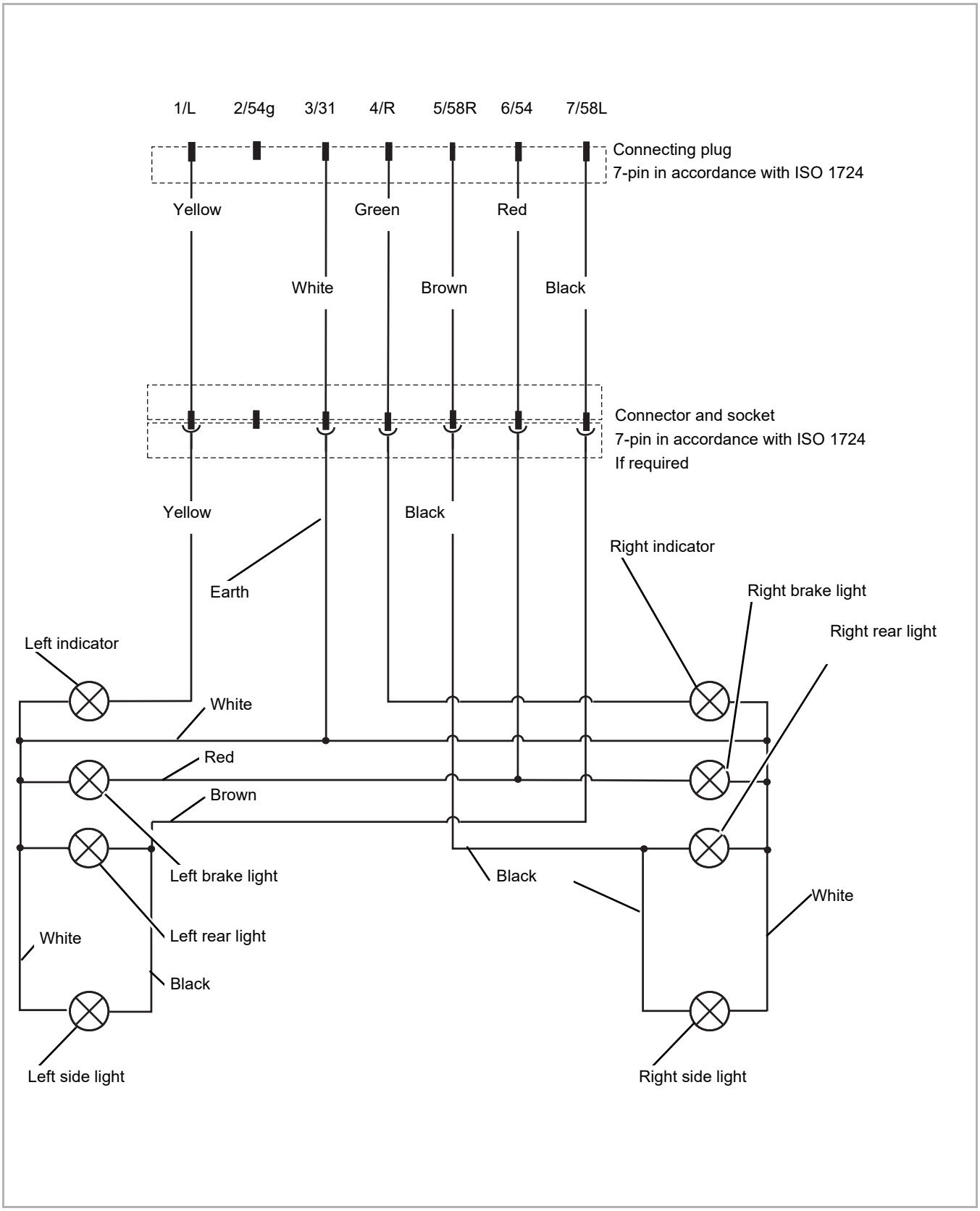
Fault	Cause	Remedy
Terminal does not receive any pulse	Power supply interrupted	Connect the power cable if the power supply was disconnected Check the voltage: The supply voltage must be 12 V
	Fuse defective	Replace fuse
Shut-off valves or the drive motor are not receiving any pulses	Cable defective	Software Check the shut-off valves and the motors in the diagnostics menu. Contact Customer service as required

Seeding technology

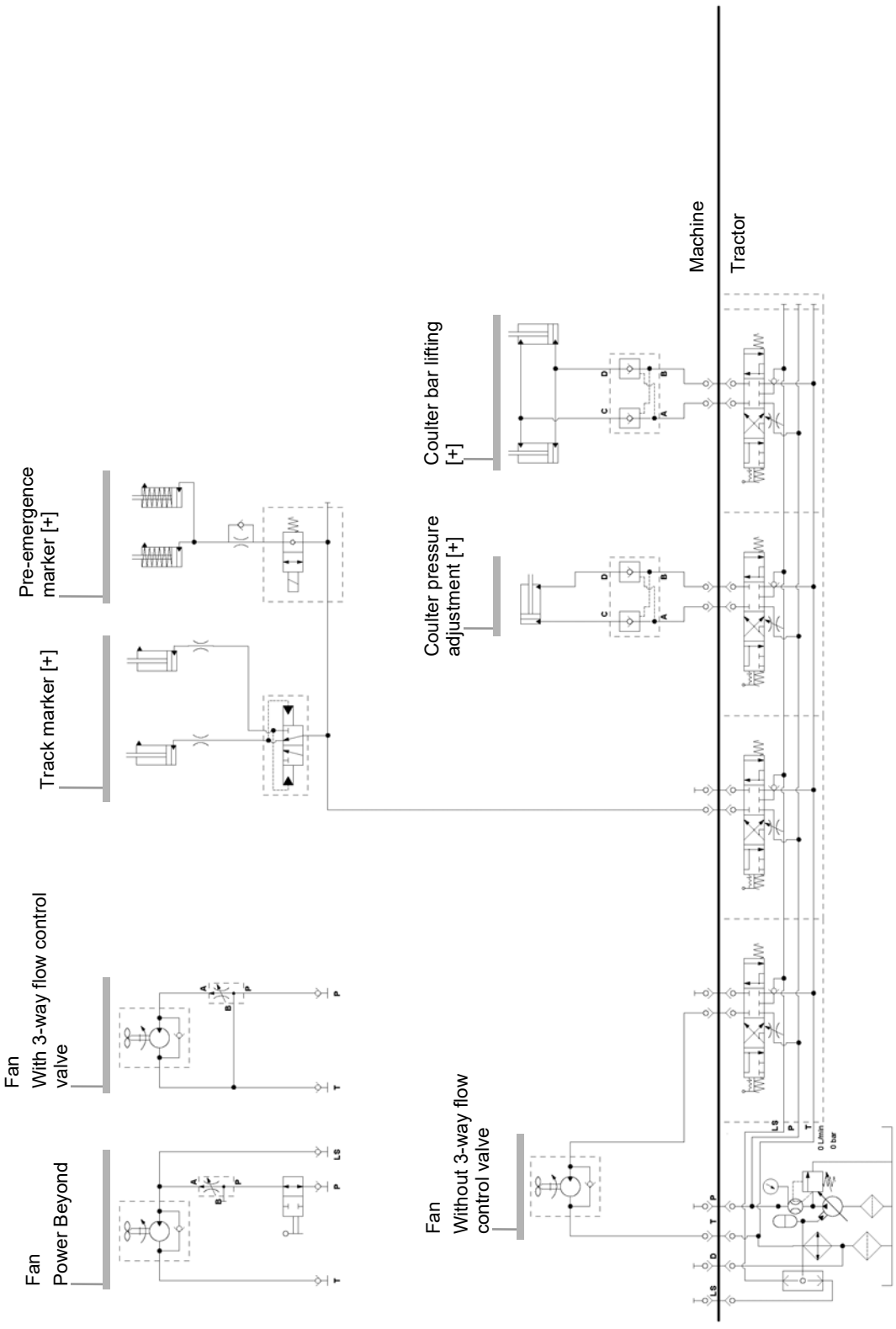
Fault	Cause	Remedy
No tramlines are set up	Shut-off valve not switching	Replace the shut-off valve
	Control defective	Check the control system
Sowing unit for generation of the tramline is staying blocked on each run	Shut-off valve blocked	Clean the shut-off valve
	Foreign bodies in the main distributor	Remove foreign bodies
Seed volume changes by itself	Moisture in seed	Empty the seed hopper overnight
	The rotor on the metering device is stuck	Clean the rotor
For fine seed: The amount of seed does not fall below 4 – 5 kg/ha	Sealing lip on the metering device is defective	Replace the sealing lip
	Sealing lip is not positioned correctly on the rotor	Position the sealing lip properly
Distributed seed volume too large or too small	Incorrect adjustment value	Correct adjustment value
	Error when weighing the seed	• Ensure functioning of the scale • Use a sufficiently exact scale, no bathroom scales • Do not take hopper weight into account
	Sliding cover above the metering device is closed	Open the sliding cover
Distributed seed volume too low	For fine seed: Cells in the rotor are contaminated	Clean the cells with the brush
Some seed rows run aground later on	The rear section of the seed coulters has sown too deep	Set the top link correctly
No seed arriving at any coulter	Venturi cone clogged	Remove the clogging and ensure the correct engine speed
	Fan is not switched on	Switch on the fan
	Metering device not powered	Check the metering device's drive
	No speed signal present	Check the speed sensor (radar sensor)
	Seeds with highly adhesive husks block the removable sieve	Temporarily fold the removable sieve to the side

Fault	Cause	Remedy
Seed hose is clogged with seed	Seed tubes are clogged, e.g. with soil	Clean the clogged seed tubes
	For normal seed: Regulating flap at the fan is set to fine seed	Set the regulating flap to normal seed
	Hose is twisted, sagging or kinked	Check the hoses outside of the seed hopper Shorten the hoses if required
	Fan speed is too low	Ensure correct fan speed
Seed-covering harrow working too deeply	Pressure too high	Reduce the pressure
	Depth setting incorrect	Correct the depth setting
Seed-covering harrow blocked	Seed-covering harrow angle too steep	Select different setting

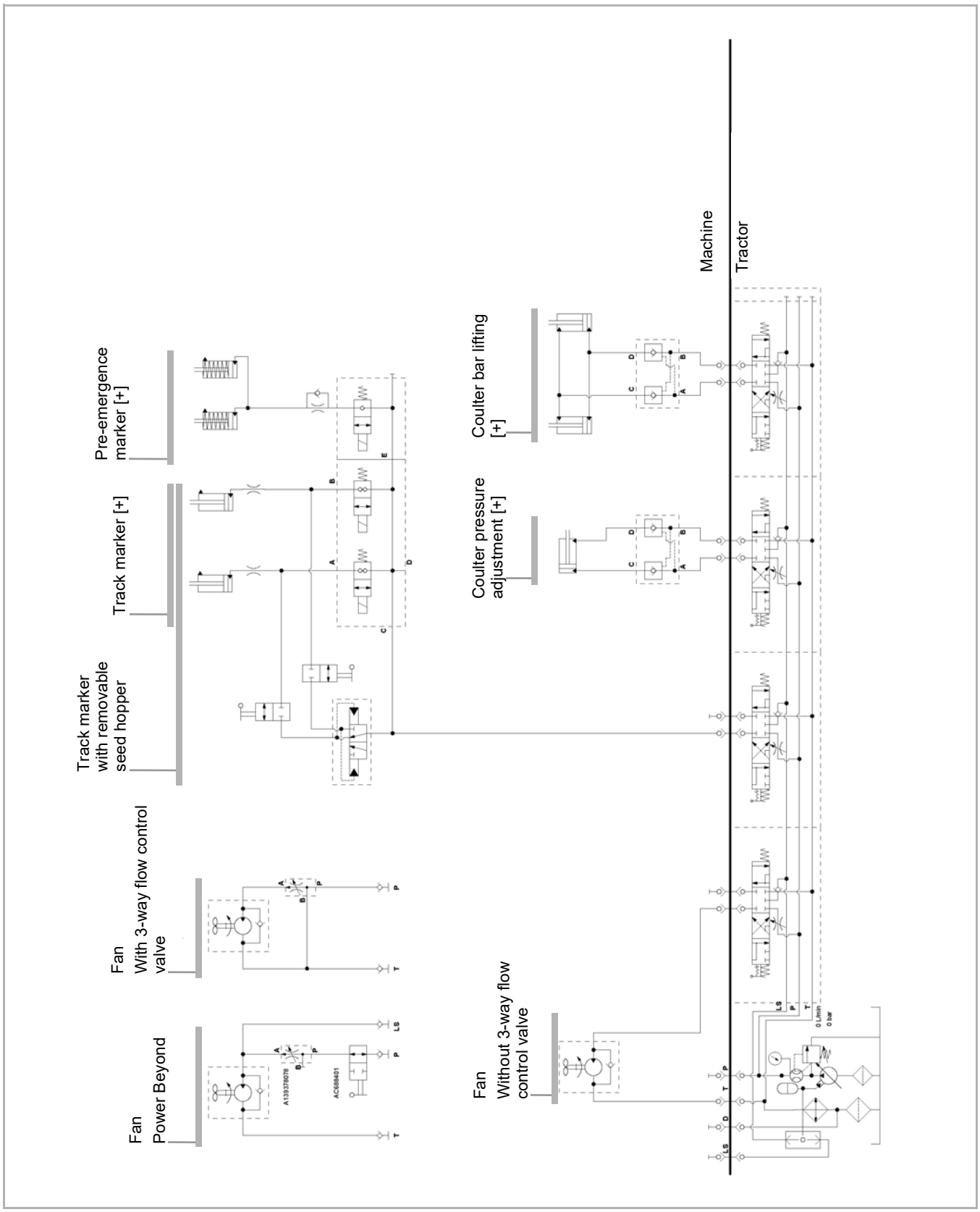
Lighting circuit diagram



Hydraulic circuit diagram E-BAS



Hydraulic circuit diagram E-COM



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

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

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

Tyres
Tyres can be sent to tyre recycling facilities.

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

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

EC Declaration of Conformity

Conforms to EC Directive 2006/42/EC

We

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declare with sole responsibility that the product

Type plate and CE symbol



SD2001MP series and SD3001MP series in all equipment variants and its accessories

Type: e-drill

Valid from machine number: ACKSDxx230

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

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

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

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Soest, 20.05.2016



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Copy of the type plate

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