

Series PP1000

Operating manual

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From machine number	→ Next page
Model	rigid
Reference number	A139155040

Identification of the machine

Operating manual valid from machine number	ACKPPxx197

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

Designation	Series PP1000
Working width	
Weight	
Machine number	
Accessories	
Address of dealer	
Address of manufacturer	Kverneland Group Soest GmbH Coesterweg 42 D-59494 Soest Germany Tel. +49 (0) 2921/974-0

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Table of contents

Preliminary information 5
- Safety 5
- Instruction 5
- Other applicable documents 5
- Symbols 6

Safety 7
- Warning signs 7
- Definitions 14
- Who is authorised to operate the machine? 14
- Coupling 15
- Centre of gravity 16
- Road transport 18
- Putting the machine into operation 19
- Uncoupling 20
- Care and maintenance 21
- Further regulations 22

Getting to know the machine 23
- Definitions 23
- Range of application 23
- Characteristics 24
- Component designations 25
- Technical data 32

Delivery and assembly 36

Coupling the machine 37
- Prerequisites 37
- Coupling 39
- Connecting 46

Hydraulic system 47
- Connection to the tractor 47
- Hydraulic fan drive [+] 49
- Power Beyond [+] 51
- Operation 54

Preparing for operation 55
- Track marker [+] 55
- Row spacing 60
- Sowing units 60
- Setting of the sowing distance 72
- Setting the negative pressure 76
- Seeding heart 78
- Emptying the seed hopper 83
- Changing the seed type 84
- Ground clearance 85
- Fertiliser coulters [+] 86
- Fertiliser hopper [+] 87
- Emptying the fertiliser hopper 98
- Granule distributor [+] 100

Electronic scales 113
- Technical data 113
- Safety 114
- Switching on 114
- Settings 114
- Tare setting 114
- Weighing 115
- Switch off 115
- Changing the batteries 115
- CE symbol 115

Driving on the road 116
- Transport position 117
- Track marker [+] 129
- Connecting 131
- Road transport 132

Preparations in the field 134
- Track marker 134
- Seed hopper 134
- Fertiliser hopper [+] 134
- Hydraulic frame ballasting[+] 135
- Negative pressure 137
- Test drive 142

Operation 144
- Sowing 145
- Mechanical hectaremeter[+] 146
- After sowing 147

Cleaning and care 148
- Care 152

Parking and storage 153
- Storing the machine 159

Maintenance 160
- General information 162
- Maintenance intervals and setting work 166
- Secure the machine 170
- Lubricating work 170
- Wheels 175
- Pin connection to the tractor 176
- Sensors 177
- Hydraulic hoses 177
- Seed discs 178
- Vacuum interrupter 178
- Chain 181
- Timing belt for e-drive 182
- Metering device 187
- Granule distributor [+] 190
- Clean Air 201

Refitting 204

Table of contents

Eliminating faults **211**
IsoMatch Tellus 211
Fertiliser application 212
Hydraulic fan drive 212

Disposal **213**

EC Declaration of Conformity **214**

Index **216**

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 214
Spare parts list	Integral part of the delivery with this machine
Operating manual of the PTO shaft manufacturer	Integral part of the delivery with this machine
Operating manual for the electronic control system [+]	For example, “PSD-e-drive-II-Software”
Operating manual for the terminal [+]	For example, IsoMatch Tellus

Symbols

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

- A bullet point accompanies each item in a list

▸ A triangle indicates operating functions which must be performed

→ An arrow indicates cross-references to other text passages

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

Pictograms

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



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

- Moderate to serious injury
- Fatal injury

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



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

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



This symbol indicates information, tips and notes on operation.



This symbol indicates tips for assembly or adjustment work.



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

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

Before folding out only

▸ Release the locking mechanism for transport

▸ Actuate the control unit

For your safety

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

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

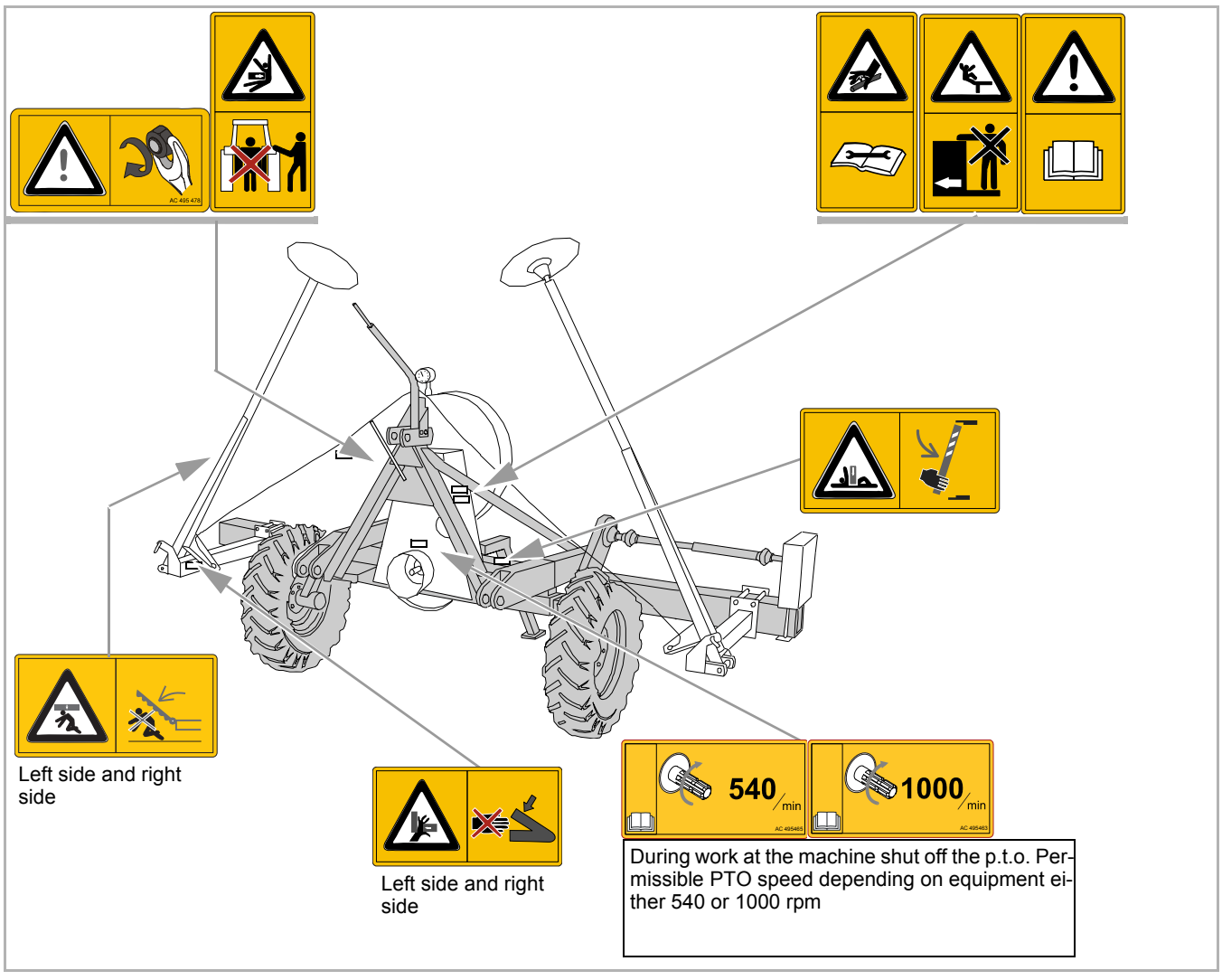
Numerous risks can result from handling agricultural machines in the wrong way. Therefore, always work with particular care and never under time pressure.

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

Warning signs

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

Frames rigid, 3.00 m

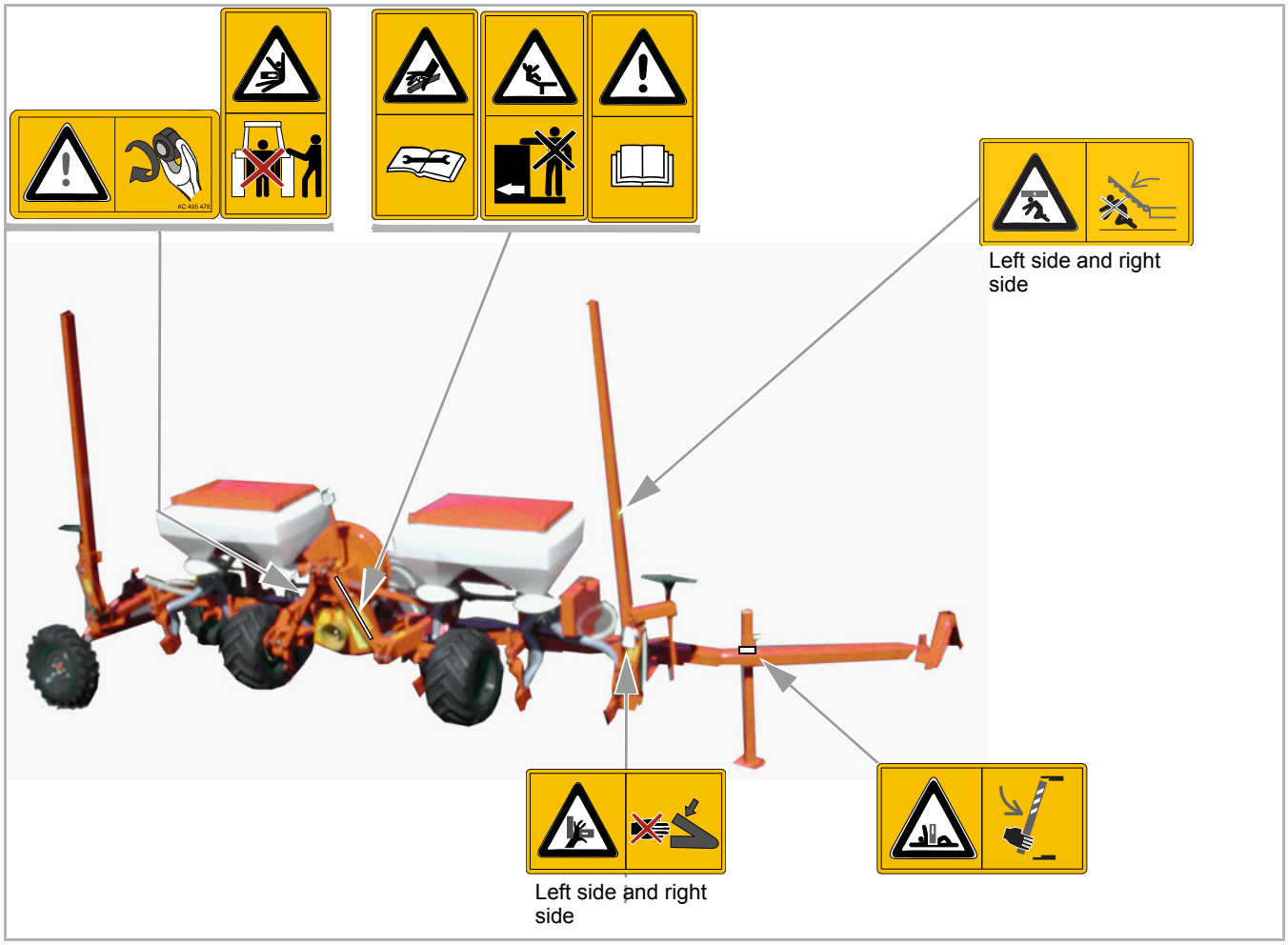


Left side and right side

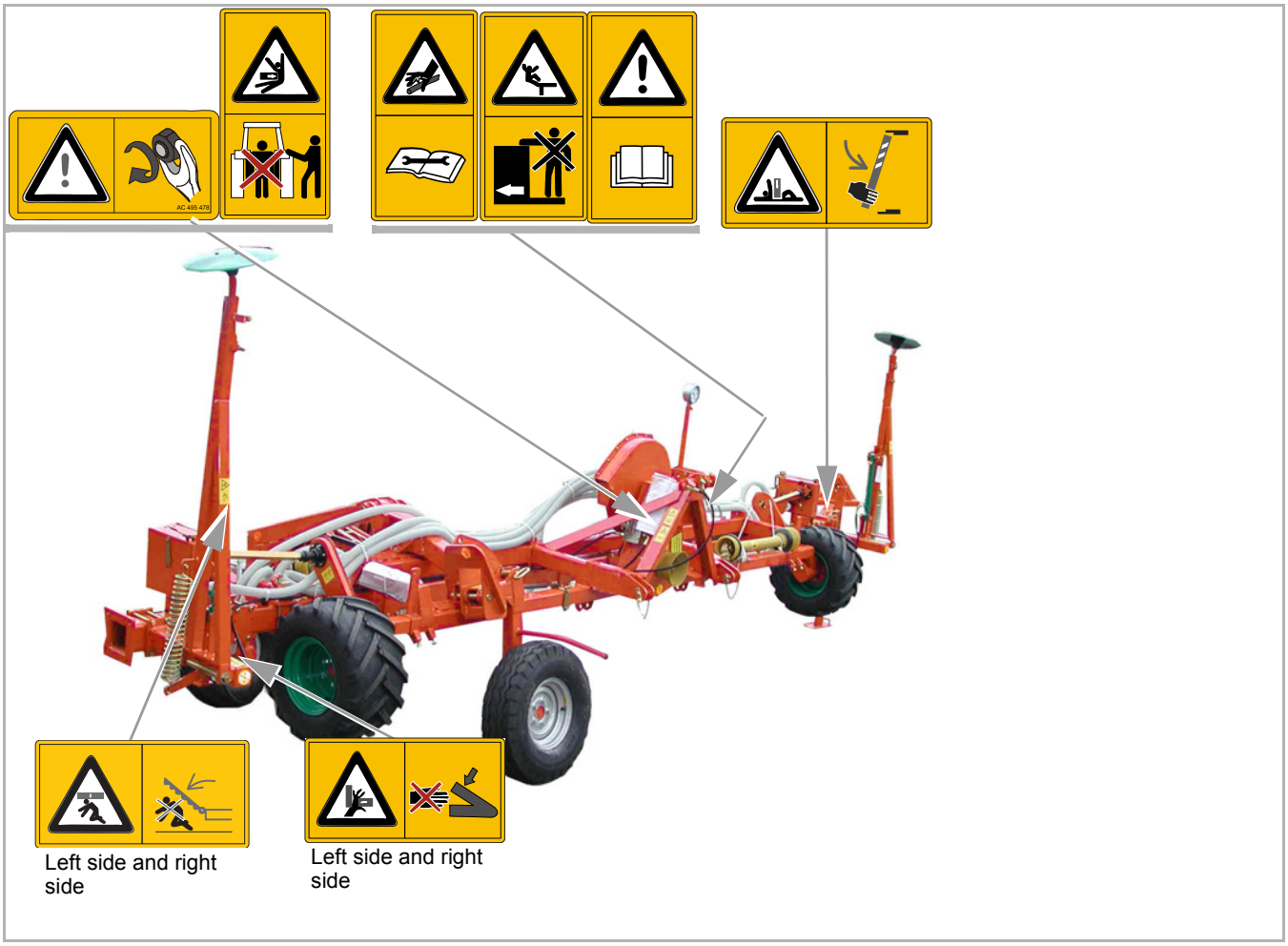
Left side and right side

During work at the machine shut off the p.t.o. Permissible PTO speed depending on equipment either 540 or 1000 rpm

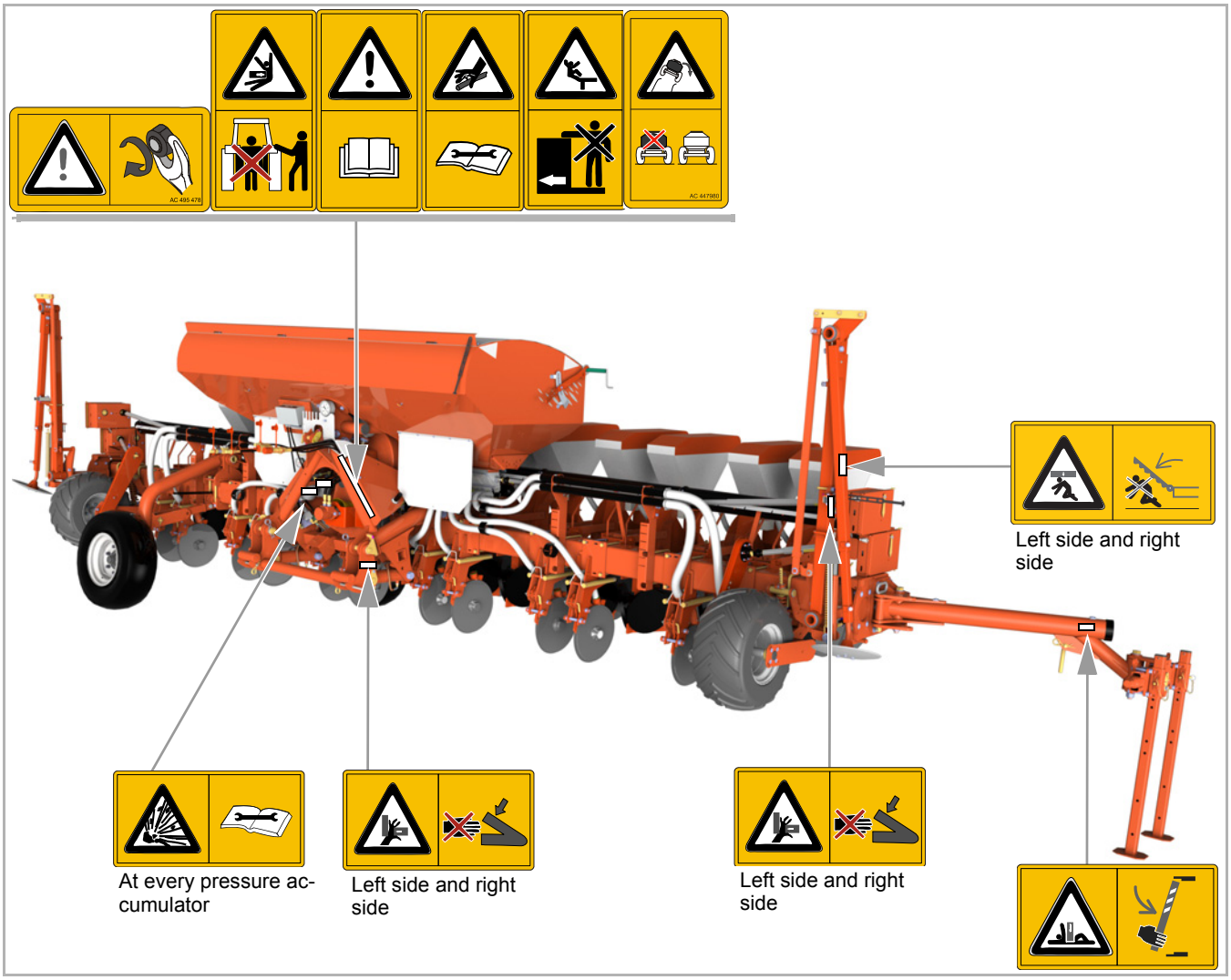
Frames rigid, 4.50 m



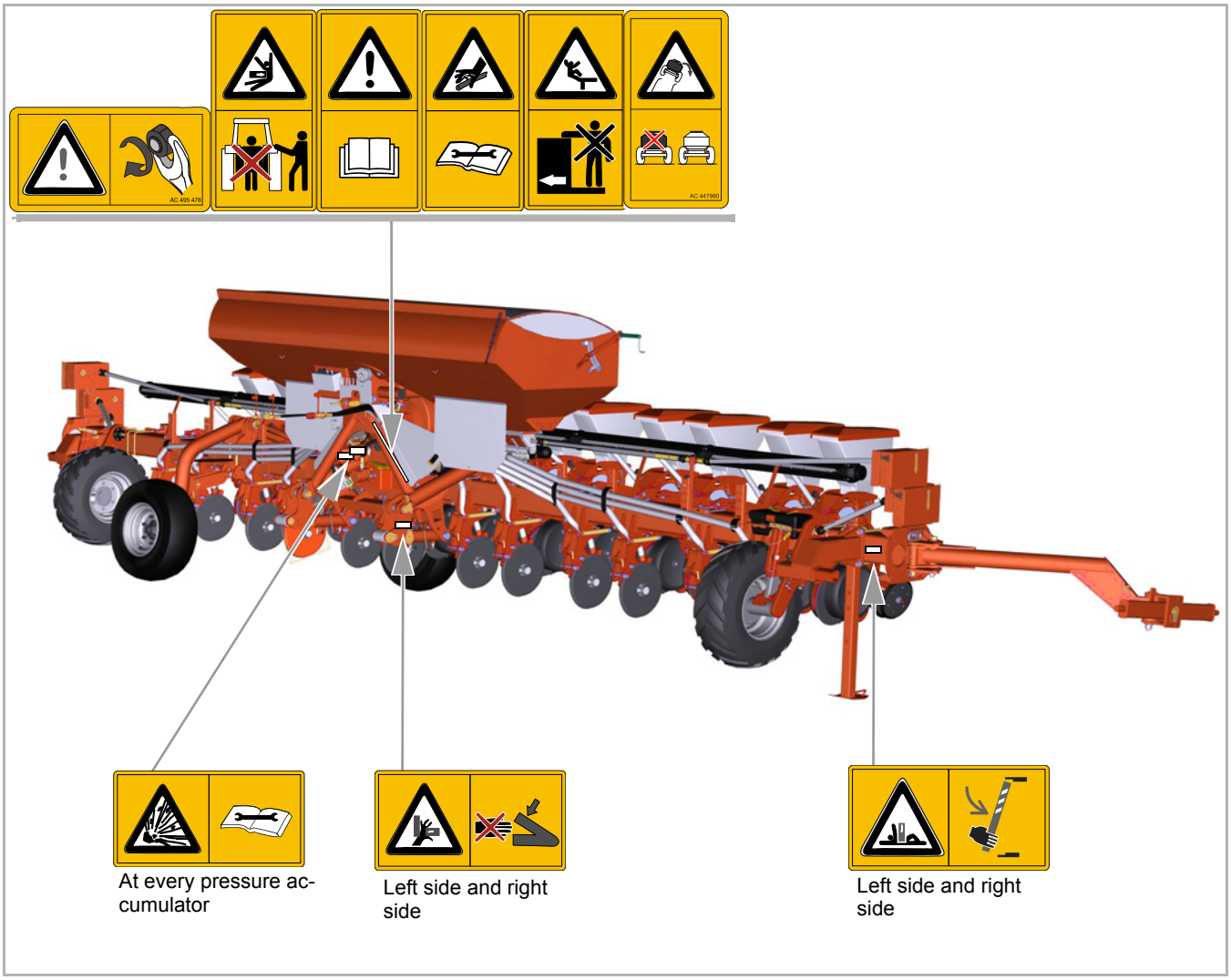
Frames rigid, 6.10 m and 9.30 m



RS frame, 7.60 m



Frames rigid, 8.30 m



Meaning



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



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



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



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



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



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



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



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



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



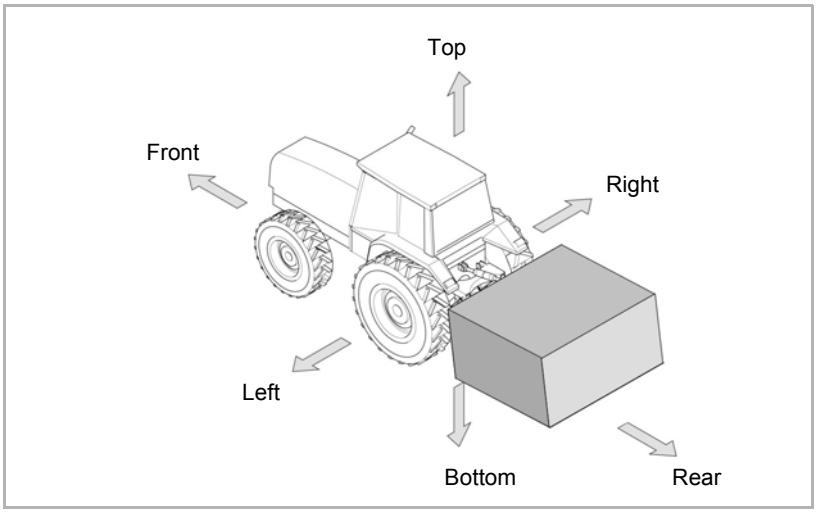
Retightening bolts
After the first hours of operation, all bolts must be checked and tightened if necessary. Screw connections might have come loose due to vibrations.



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

Definitions

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



Who is authorised to operate the machine?

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

Coupling

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

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

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

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

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

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

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

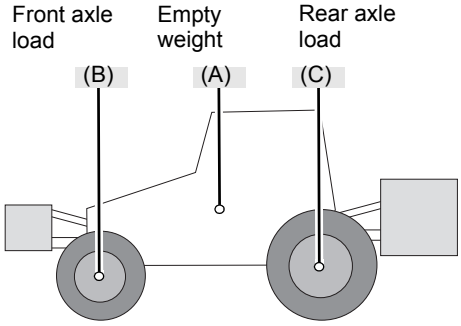
Centre of gravity

Observe the total weight, axle loads, tyre load-bearing capacity and minimum added weight specifications
The machine's front or rear attachment must not exceed the tractor's permissible total weight, its permissible axle load or its tyre load-bearing capacity. In order for steering capability to be maintained, the front axle must bear at least 20% of the tractor's empty weight.

The following can be easily calculated:

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

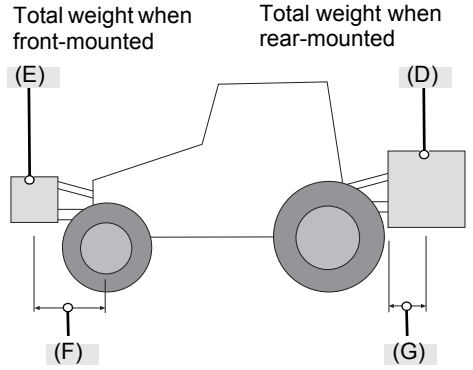
For this calculation, the following data is required:



Data from the tractor's operating manual:

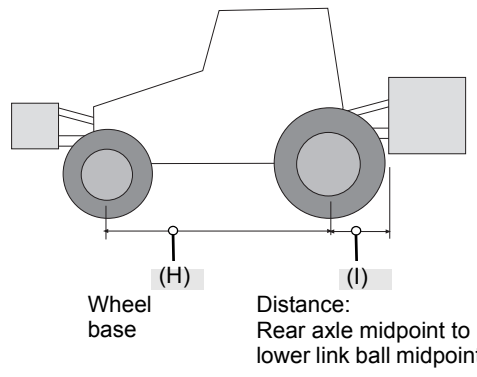
- (A)Empty weight
- (B) Front axle load
- (C) Rear axle load

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



Data from this operating manual:

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



Data which you can determine by measuring:

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

Calculation

The measured values can now be inserted into the formulae.

Ballast with front weights

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

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

Ballast with rear weights

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

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

Front axle load

Calculation of the actual front axle load

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

Total weight

Calculation of the actual total weight

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

Rear axle load

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

Tyre load-bearing capacity

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

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

Summary

Check if the following conditions are met:

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

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



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

Road transport

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

- Lighting, warning and protective devices must be fitted
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed

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

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

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

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

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

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

Putting the machine into operation

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

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

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

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

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

Height of machine and overhead power lines
If a height of 4.00 m is exceeded during folding in and out, under no circumstances perform machine folding operations in proximity to live overhead power lines! Danger of electrocution! Should the machine come into contact with a live overhead power line:

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

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

Check the immediate vicinity
Before 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 at regular intervals and tightened if necessary. bolts can come loose unnoticed while operating. This can result in damage to the machine or accidents.

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

Uncoupling

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

- Secure the tractor against rolling away
- Never stand between the tractor and the machine during uncoupling.
- Actuate the three-point power lift system slowly and carefully
- Make sure the machine is standing on a secure and level surface
- Only uncouple the hydraulic hoses if the tractor and machine hydraulic system is depressurised

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

Care and maintenance

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

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

When performing all care and maintenance work:

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

It is only possible to guarantee work safety during care or maintenance work through observing these regulations.

Turn off the power supply
Prior to carrying out work on the electrical system, disconnect the system from the power supply. Systems being supplied with electrical power can cause damage to equipment and personal injury.
Replacing hydraulic hoses
Replace hydraulic hoses every six years. Hydraulic hoses can age without any externally visible signs. Defective hydraulic lines can cause serious or fatal injuries.

Caution when cleaning with a pressure washer
The machine can be cleaned using either water or a steam jet. Only use low pressure to clean bearings, fans, signal distribution boxes, plastic parts and hydraulic hoses. Excessive pressure can cause damage to these parts.

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

Further regulations

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

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

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

- Definition of agronomic terms
- Range of application
- Characteristics
- Component designations
- Technical data

Definitions

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

Seeding after ploughing

Seeding after completion of turning the soil with the plough.

Seeding after seedbed preparation

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

Mulch seeding

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

Direct seeding

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

Range of application

The machines with rigid frames are precision seeding machines and designed for the application of suitable seed with the simultaneous application of fluid fertiliser. For the various seeds different seed discs are available. The machines perform seeding after preparation of the seedbed is complete. Mulch seeding is also possible with mulch seeding equipment on the sowing units.

The large fertiliser hopper and large working width provide you with a powerful machine.

Proper use

Any application other than or beyond this, e.g. as a means of transport, for stump pulling, or to transfer power to other objects is considered improper use. The manufacturer and dealer are not liable for damage caused by improper use. The risk is borne solely by the user.

Characteristics

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

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

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

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

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

Suitability for various soils
The pressure of the sowing unit on the ground can be increased or decreased. Therefore, the seeding machine is suitable for various kinds of soil. The follow-on rubber V press wheel can be set in 3 steps.

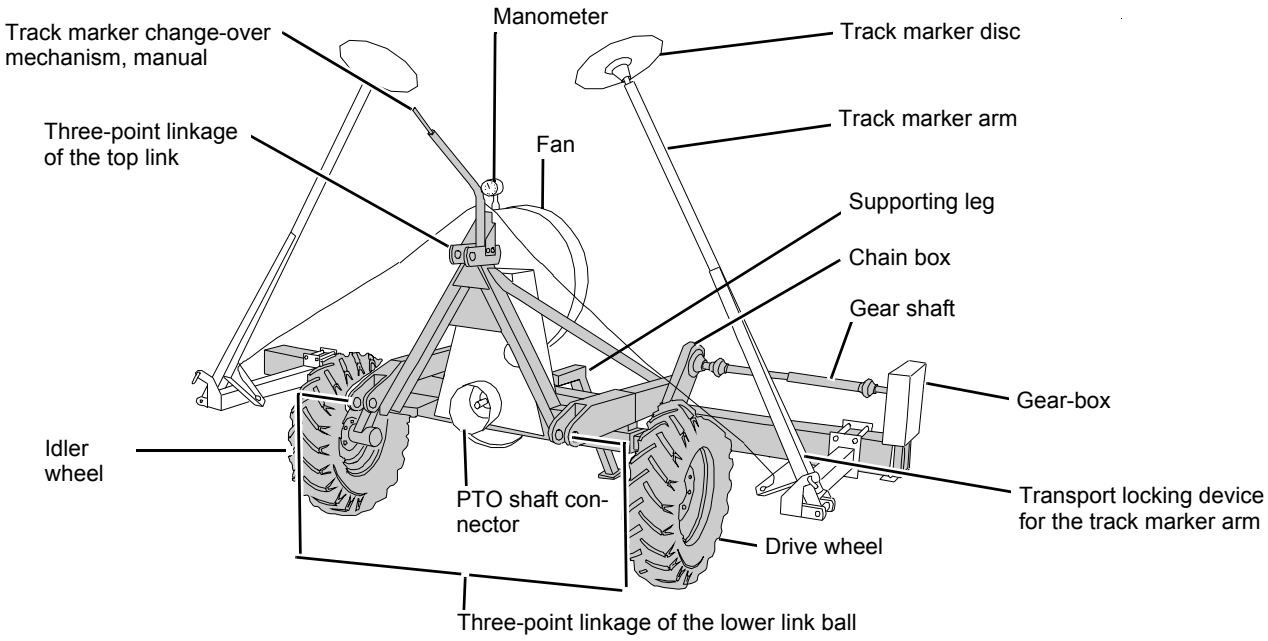
Highly economic efficiency
The machine can be used for mulch seeding and, under certain conditions, also for seeding after ploughing.

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

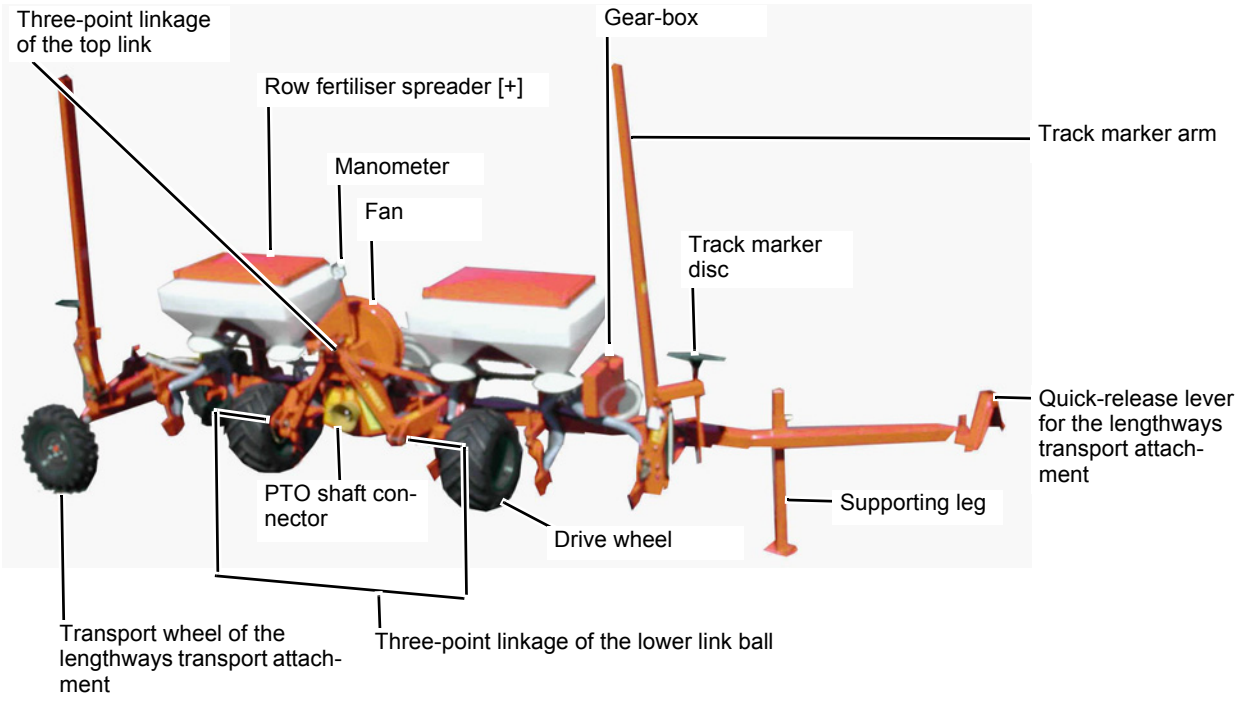
Safety
The machine is constructed in accordance with EU regulations, for maximum possible safety of operation. The machine bears the CE mark.

Component designations

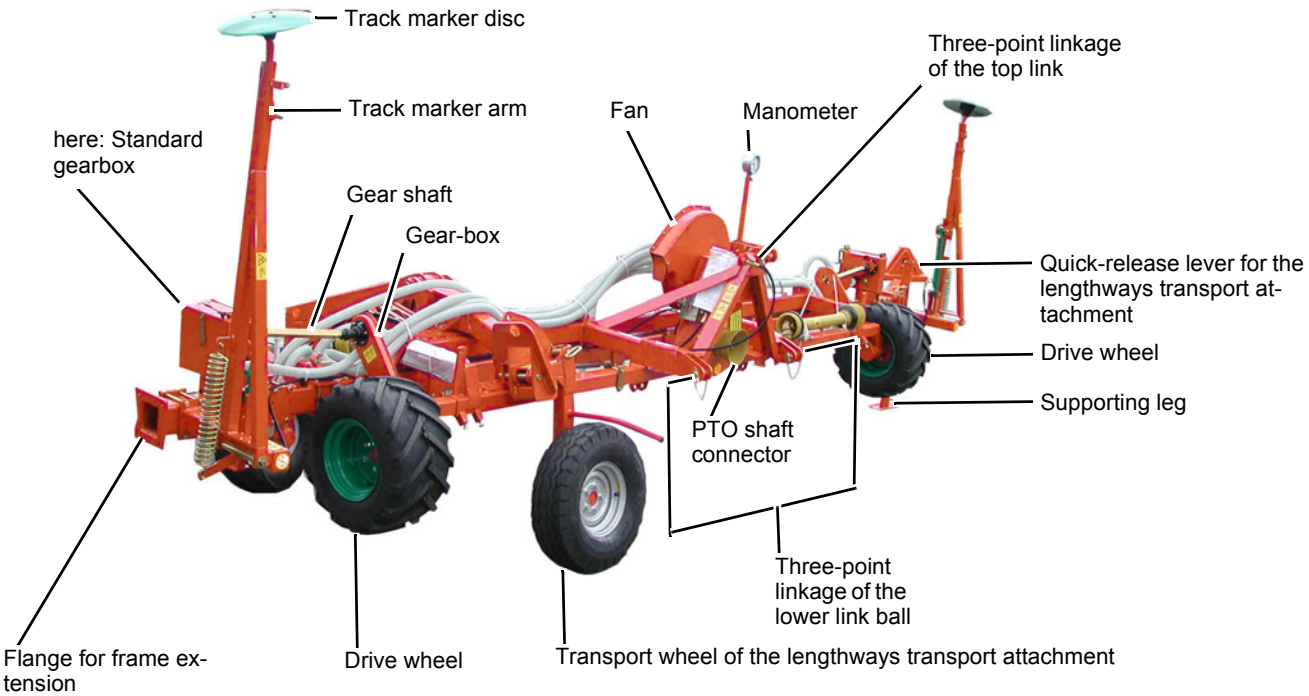
Frames rigid, 3.00 m



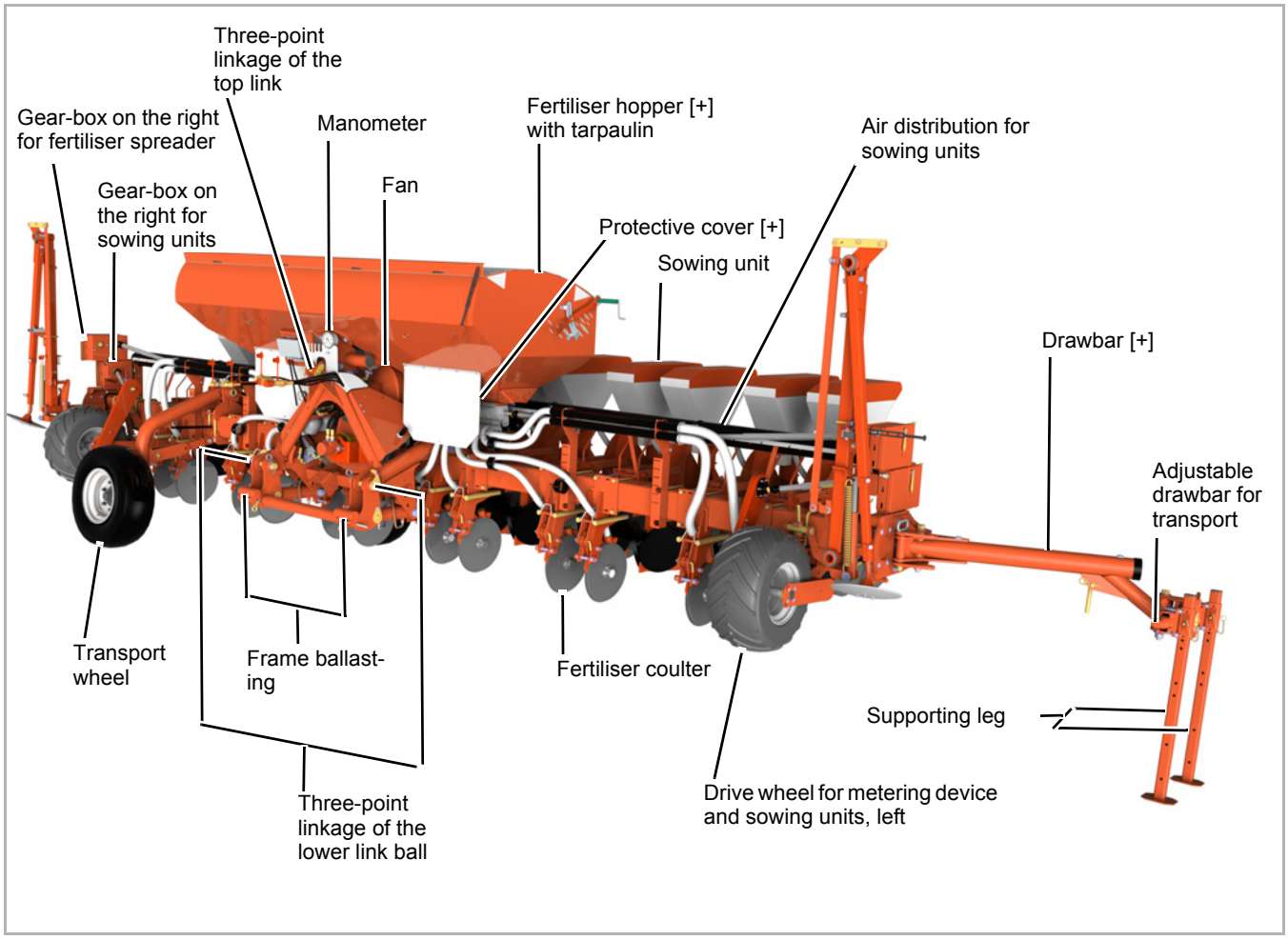
Frames rigid, 4.50 m



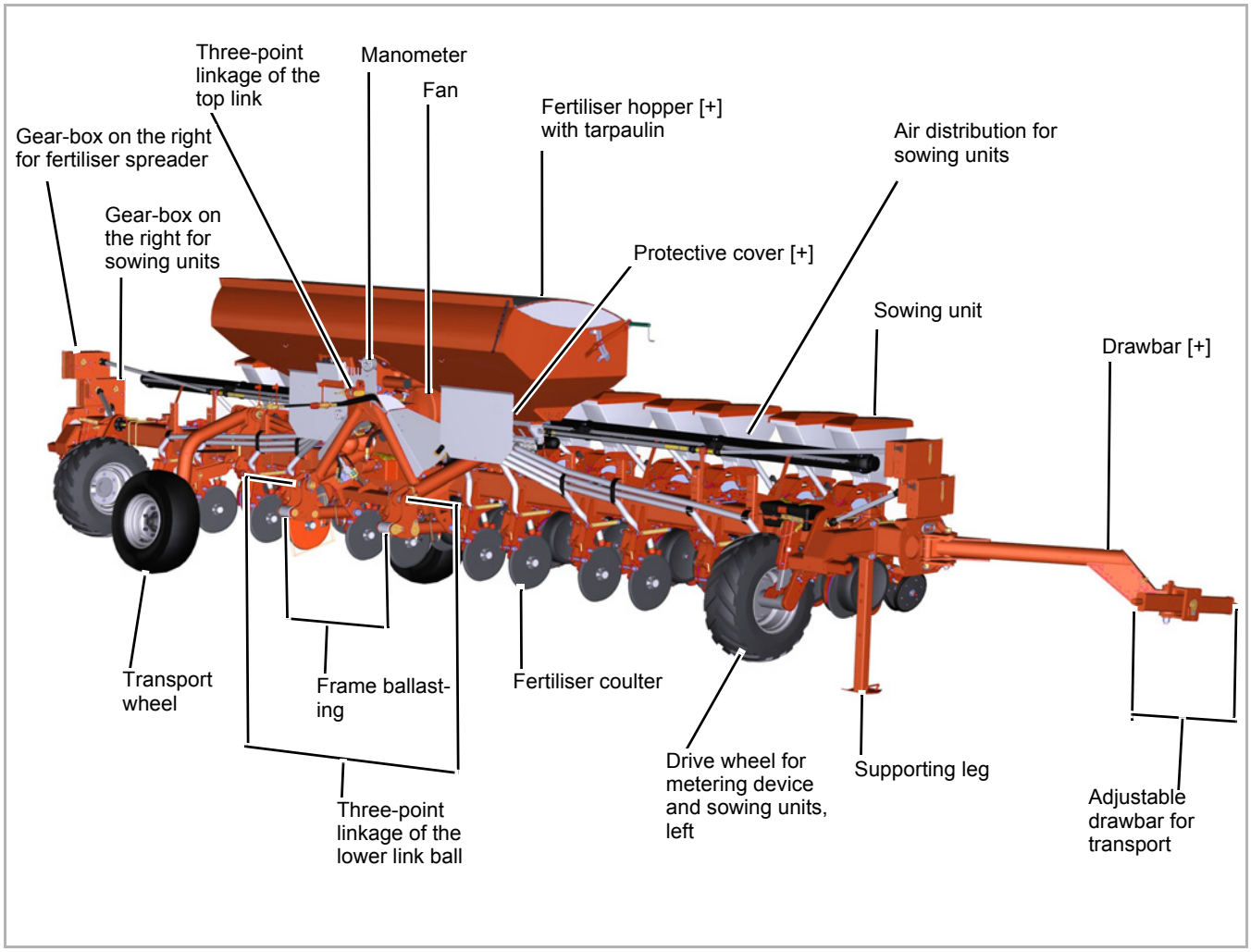
Frames rigid, 6.10 m and 9.30 m



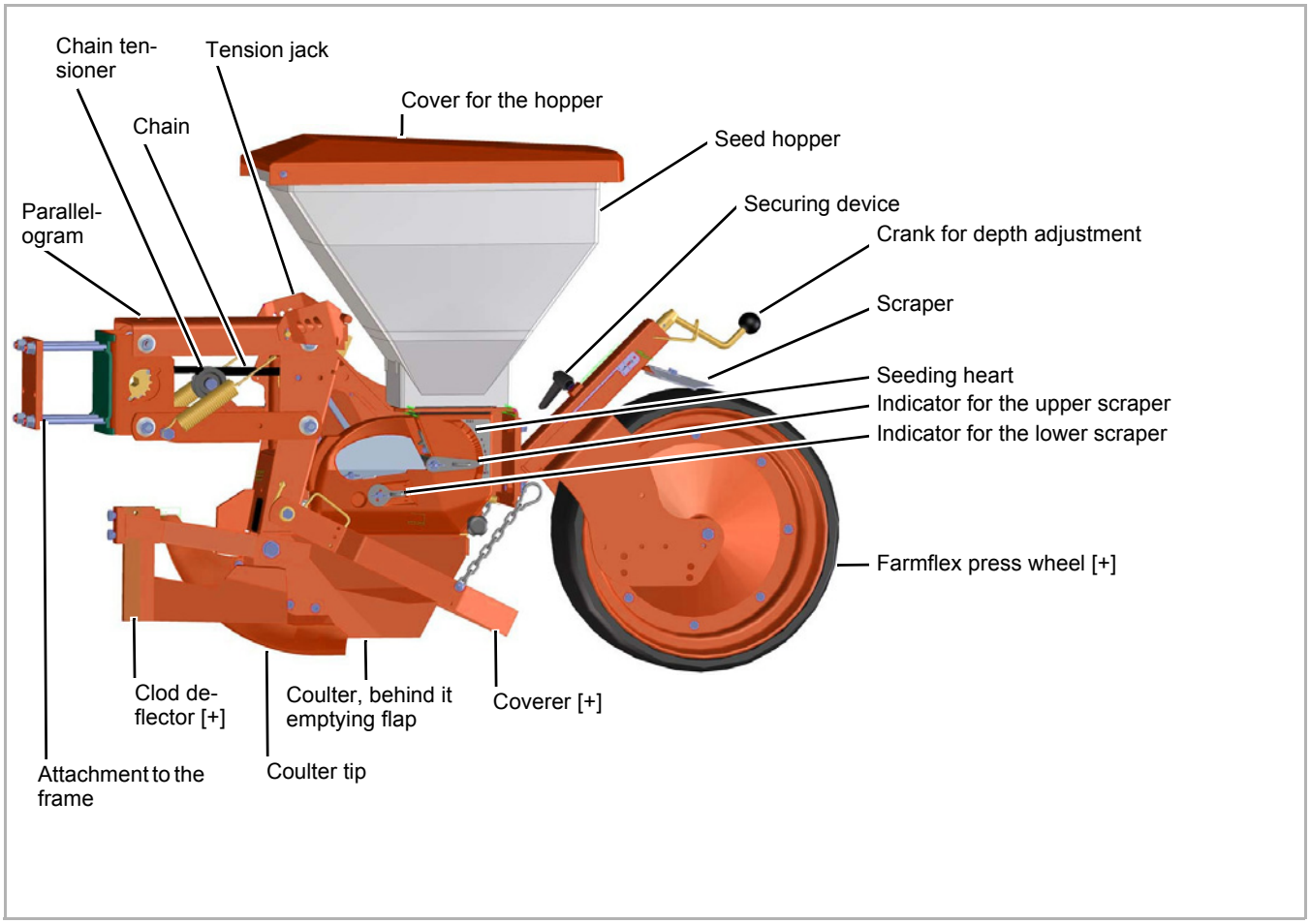
RS frame, 7.60 m



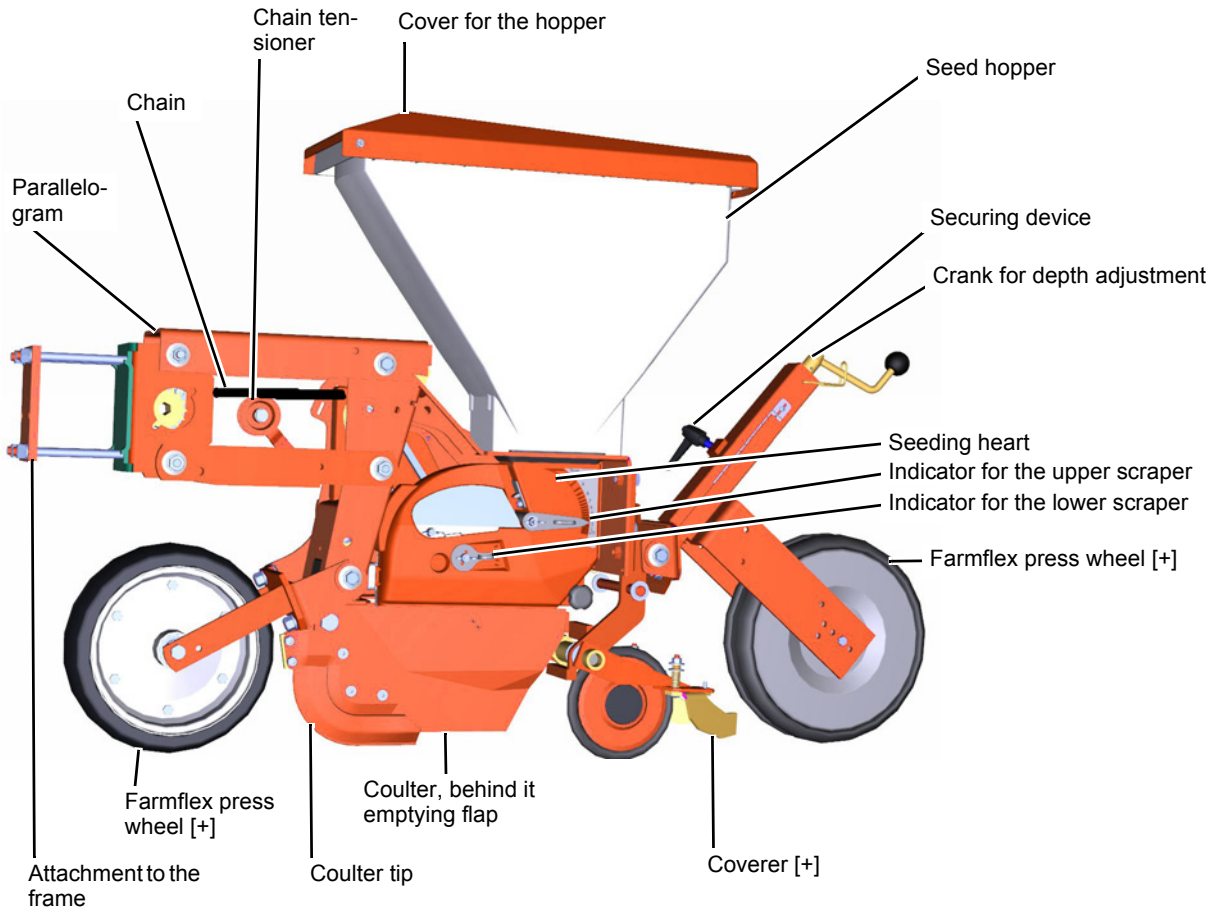
Frames rigid, 8.30 m



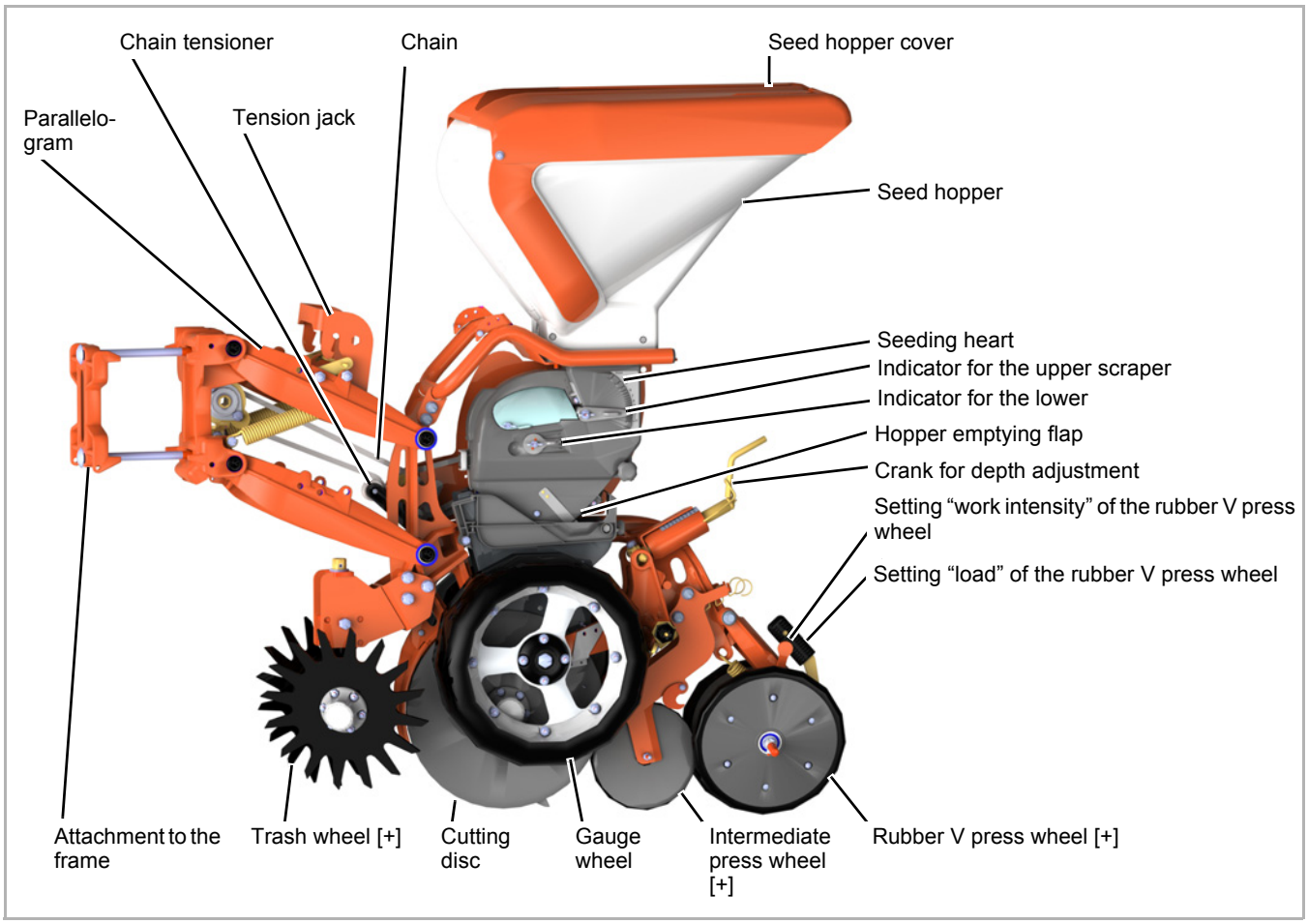
Sowing unit – normal seed



Sowing unit – Tandem



Sowing unit – HD II



Technical data

Frame

Frame type	Frames rigid				Frames rigid	
Maximum frame width	**3.00 m**	**4.50 m**	**6.10 m**	**9.30 m**	**7.60 m**	**8.30 m**
Height [m]						
Transport position, with track marker	2,50	2,50	2,50	2,50	2,32	2,32
Width [m]						
Transport position with lengthways transport attachment	3,00 –	4,50 2,50	– 2,50	– 2,50	– 3,00	– 3,00
Work position, without track marker	3,00	4,50	6,10	9,30	7,60	8,30
Depth [m]						
Transport position with lengthways transport attachment	2,20 –	2,20 5,00	– 6,80	– 9,70	– 9,10	– 9,80
Total weight [kg], without sowing units						
Frame with lengthways transport attachment	370 –	470 540	– 975	– 1250	– 1345	– 1380
Total weight [kg], with x/HD-sowing units						
Frame	4/890	6/1320	8/2015	12/2810	18/3665	18/3720
Frames with fertiliser spreaders and fertiliser coulters					18/4285	18/4320
Centre of gravity [cm] dimension “G”						
depending on equipment, approximately					92	92
Tyre pressure [bar]						
7,00 – 12 8 PR	4,5	4,5	4,5	4,5	–	–
7,00 – 12 AS	2,0	2,0	2,0	2,0	–	–
26.00 x 12	1,4	1,4	1,4	1,4	1,4	1,4
10.0/75-15.3 AS	–	–	–	–	4,0	4,0
10.0/75-15.3 AW	–	–	–	–	5,2	5,2
Possible track widths of the machine [m]						
	1,50-1,90		4,10-4,46			
Fan drive						
At the 540 drive	540				–	–
With 1000 rpm drive	1000				850	850

Frame type	Frames rigid				Frames rigid	
Maximum frame width	**3.00 m**	**4.50 m**	**6.10 m**	**9.30 m**	**7.60 m**	**8.30 m**
Fertiliser hopper [+]						
Fill level [m]	1,20	1,20	1,20		1,95	1,95
Hopper volume [l]	440	440	880		2000	2000
Physical condition of the fertilisers	dry, granulated					
Calibration of the fertiliser	1-6 mm					
PTO shaft type						
Between tractor and machine	W2200					
Mechanically driven granule distributor [+]						
Hopper volume [l]	33					
Number of outlets	2 or 3					
Fill level • Minimum [l]	Up to the first mark					
• Maximum	Roughly 1 cm below the edge of the hopper					
Electrically driven granule distributor [+]						
Hopper volume [l]	17					
Number of outlets	1					
Fill level • Maximum	Roughly 1 cm below the edge of the hopper					

Sowing unit

Normal seed

Weight [kg]	
Without seed; the weight depends on the sowing unit equipment	Around 75
Volume [l]	
Seed hopper	30

HD II

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

Other

Hydraulic fan drive, flow rate [l/min]	
Frames rigid	27,0
Frames rigid	64,2
Control valves	
Track marker	1x double acting
Frame ballasting	1x double acting
Hydraulic fan drive	1x single acting 1x pressureless return line
Noise level [dBA]	
Fan at 4200 rpm Driven by electric motor. Maximum value, measured on the enveloping curve. The tractor can change the noise level	98
Electronic control system	
Power supply [V]	12
Fuse [A]	30
Protection class	IP 65
Terminal	
→ Operating manual for the terminal	
Power consumption of various electrical consumers	
Sowing unit drive [W/unit]	50
Microgranule distributor drive [W/unit]	50
Electrically actuated hydraulic valve controls [W/unit]	25
Working lights with LEDs [W/set]	18
Sowing unit drive [W/unit]	50

Scope of delivery

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

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

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

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

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

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



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

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

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

Prerequisites

The machine can have been parked in the transport position or work position. The prerequisites for coupling then differ in each case. Check prior to coupling whether the applicable prerequisites have been met.

Coupling for travelling by road is described in the applicable chapter.
→ Chapter »Driving on the road«, page 116

Frames rigid, 3.00 m

The machine was parked in a work position:

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

If the prerequisites have not been met:

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

Frames rigid, 4.50 m

The machine was parked in a work position with or without the lengthways transport attachment:

- The machine is positioned on a firm surface
- The transport wheels have been detached
- The drawbar has been detached

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

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

If the prerequisites have not been met:

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

Frames rigid, 6.10 m and 9.30 m

The machine was parked in a work position with or without the lengthways transport attachment:

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

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

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

If the prerequisites have not been met:

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

RS frame, 7.60 m and 8.30 m

The machine can have been parked in the transport position or work position. The prerequisites for coupling then differ in each case. Check prior to coupling whether the applicable prerequisites have been met.

The machine was parked in a work position:

- The machine is positioned on a firm surface, and both supporting legs are in the lower position
- The transport wheels are in a lifted position
- The drawbar is in a folded position and secured

The machine was parked in a transport position:

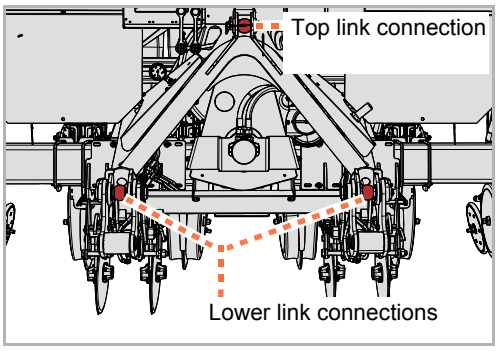
- The machine is positioned on a firm surface, and the left supporting leg near the drawbar is in the lower position
- The transport wheels are in the lowered position

If the prerequisites have not been met:

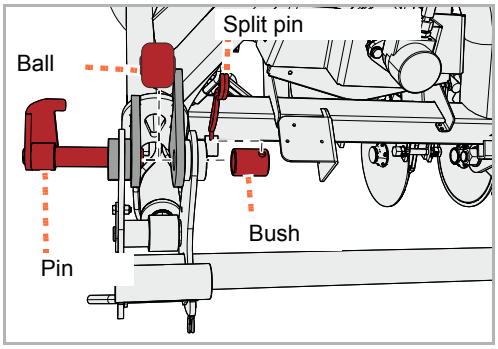
- Prepare the machine in such a way that the prerequisites are met

Coupling

Balls



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



- Remove the split pin and bush
- Pull the pin out far enough that the ball fits in the opening
- Push the pin back in
- Fit the bush and secure the pin with the split pin

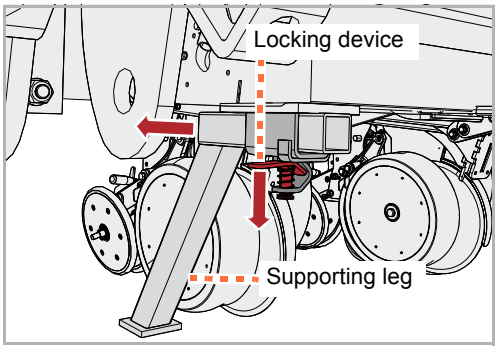
Top link and lower link ball

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

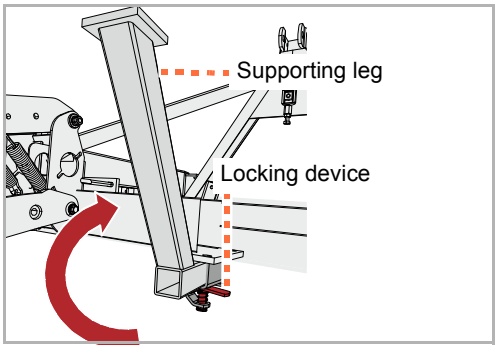
Without lengthways transport attachment

Machines without a lengthways transport attachment have a supporting leg that has been attached approximately at the middle of the machine. The supporting leg must be placed into the transport position when machines are coupled.

Supporting leg



- Lift the machine
- Press the securing mechanism downwards
- Pull out the supporting leg and remove it



- Turn the supporting leg 180° and reinsert. Take care that the securing mechanism locks in place.

With lengthways transport attachment

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

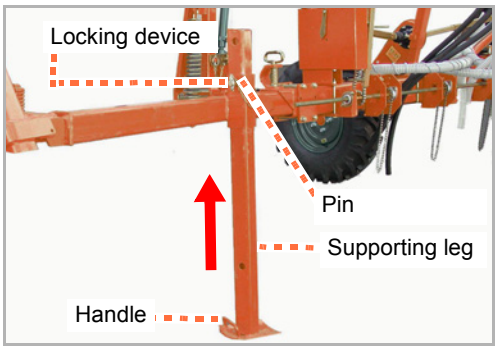
Coupling for travelling by road is described in the applicable chapter.
→ Chapter »Driving on the road«, page 116

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

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

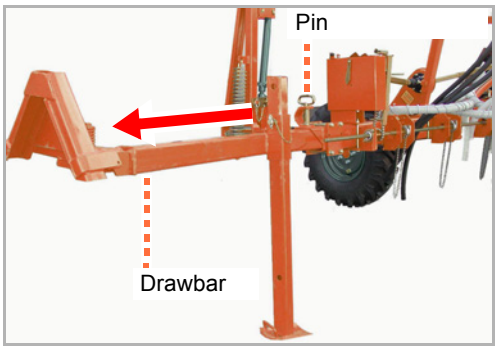
Frames rigid, 4.50 m

Supporting leg



- Lift the machine
- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg upwards using the handle and secure with the pin
- Secure the pin

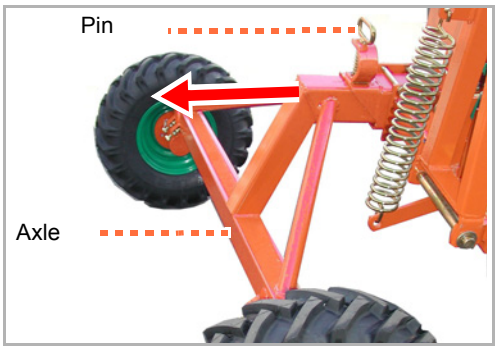
Drawbar



You need to remove the drawbar in its work position.

- Pull the pin upwards and turn it to the right until the securing mechanism is supported
- Pull out the drawbar

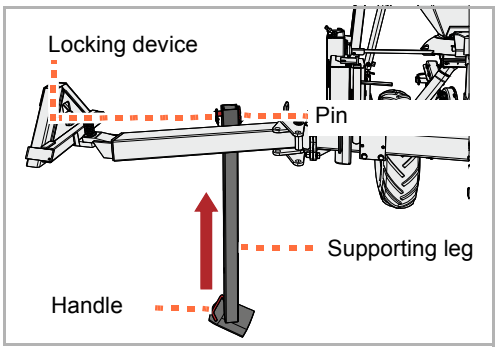
Transport wheels



- Pull the pin upwards and turn it to the right until the securing mechanism is supported
- Pull out the axle along with the transport wheels

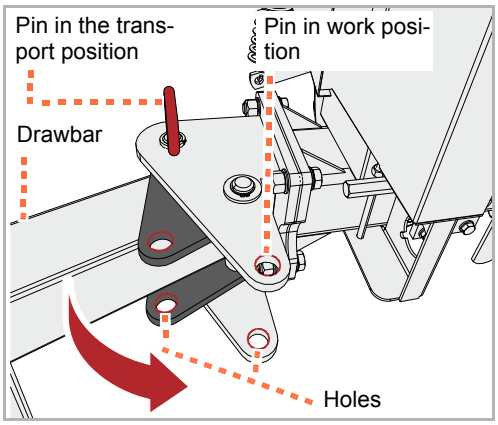
Frames rigid, 6.10 m and 9.30 m

Supporting leg



- Lift the machine
- Remove securing mechanism at the pin
- Push the supporting leg upwards using the handle and secure with the pin
- Secure the pin

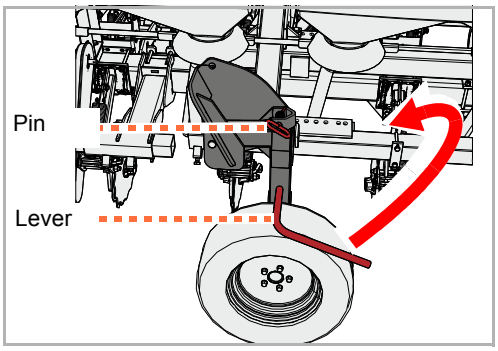
Drawbar



The drawbar must be folded and secured while in its work position.

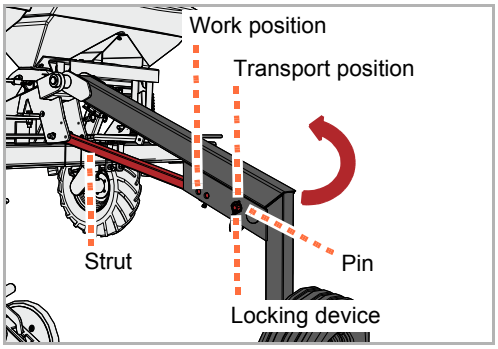
- Remove securing mechanism at the pin
- Remove the pin
- Fold in the drawbar. Also ensure that the holes are positioned above one another
- Secure the drawbar while in its work position using the pin
- Secure pin using the securing mechanism

Transport wheels



Right transport wheel

- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Swivel the transport wheel downwards in the direction of the arrow using the lever and secure with the pin

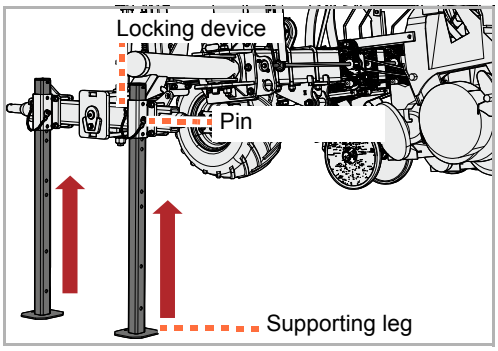


Left transport wheel

- Remove securing mechanism at the pin
- Remove pin while in the transport position
- Swivel the transport wheel upwards
- Secure strut in the work position using the pin
- Secure the pin

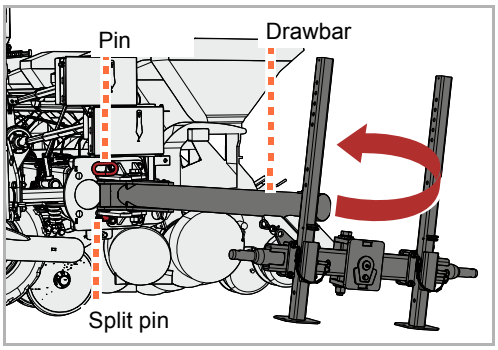
RS frame, 7.60 m

Supporting legs



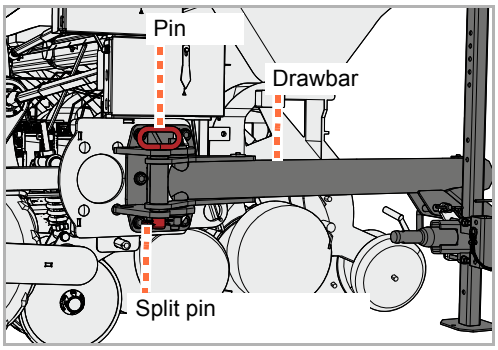
- Lift the machine
- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg upwards and secure with the pin
- Secure pin using the securing mechanism
- Push the second supporting leg upwards in the same way

Drawbar



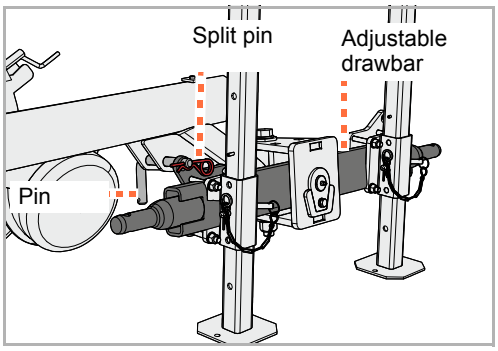
The drawbar must be folded and secured while in its work position.

- Remove the split pin from the pin
- Remove the pin
- Fold in the drawbar



- Secure drawbar using the pin
- Use a split pin to secure the pin

Adjustable drawbar

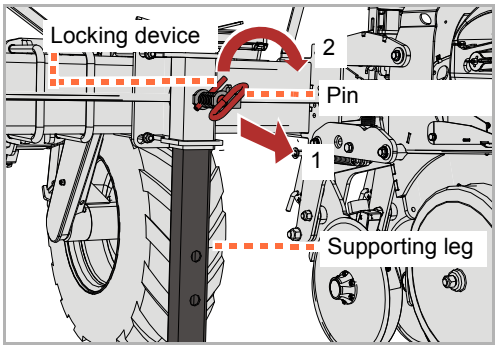


The adjustable drawbar must be folded and secured while in the work position.

- Fold in the adjustable drawbar and secure it using the pin
- Use a split pin to secure the pin

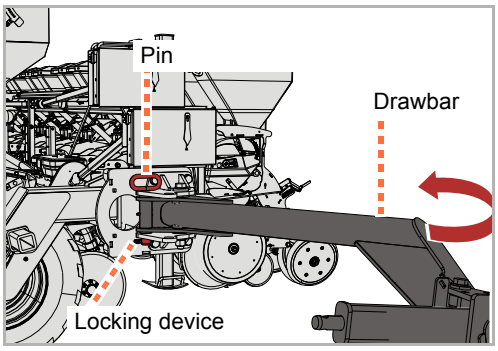
RS frame, 8.30 m

Supporting leg



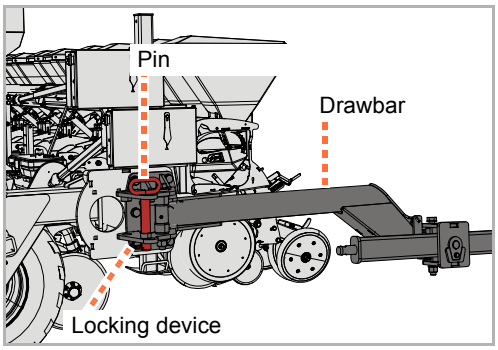
- Lift the machine
- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Push the supporting leg upwards and secure with the pin
- Push the second supporting leg upwards in the same way

Drawbar



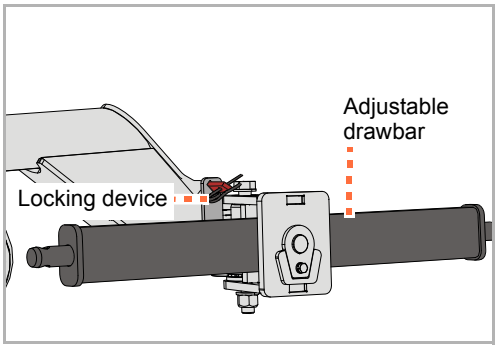
The drawbar must be folded and secured while in its work position.

- Remove securing mechanism at the pin
- Remove the pin
- Fold in the drawbar



- Secure drawbar using the pin
- Secure pin using the securing mechanism

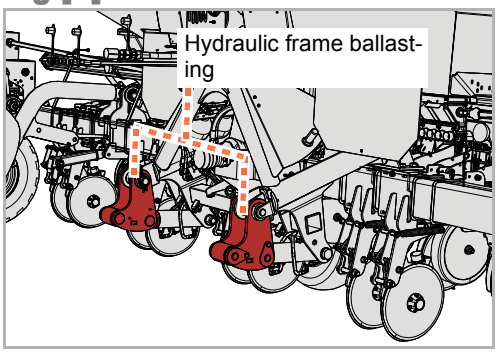
Adjustable drawbar



The adjustable drawbar must be folded and secured while in the work position.

- Fold adjustable drawbar and secure using securing mechanism

Hydraulic frame ballasting [+]



Hydraulic frame ballasting is activated later, while in the field.

Connecting

After coupling, make the following connections:

- Electrical connections
- Hydraulic connections

Electrics

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

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

▶ Check all connections to ensure they are working properly

Hydraulics

→ Chapter »Hydraulic system«, from page 47

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

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

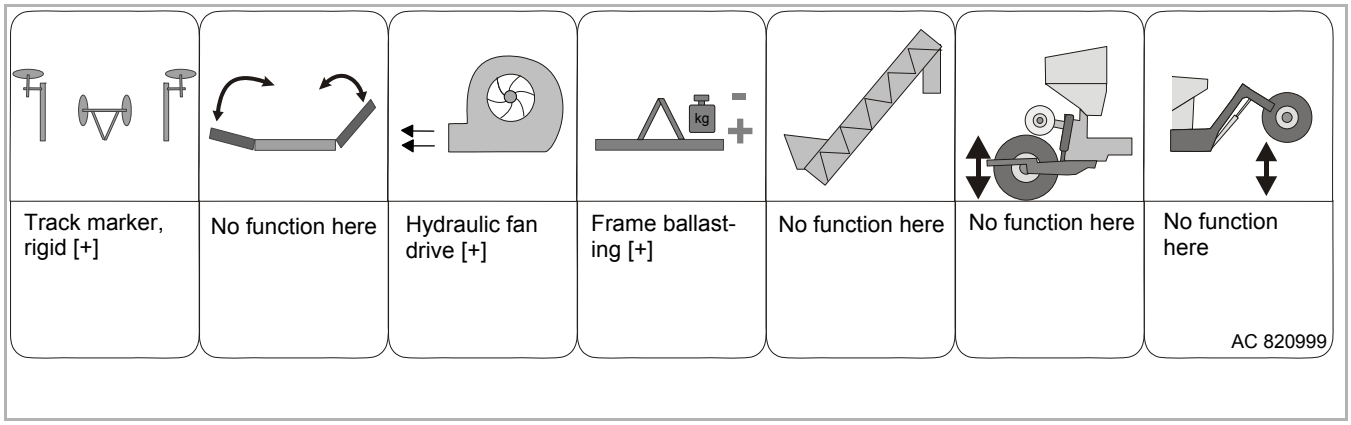
Securing the control units
In the transport position, secure the control units on the tractor to prevent accidental operation.
Accidental actuation of the control units can trigger unpredictable movements on the machine and cause accidents.

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

Connection to the tractor

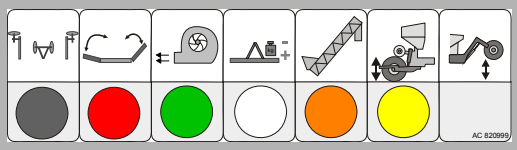
The machine must be connected to the tractor's hydraulic system.

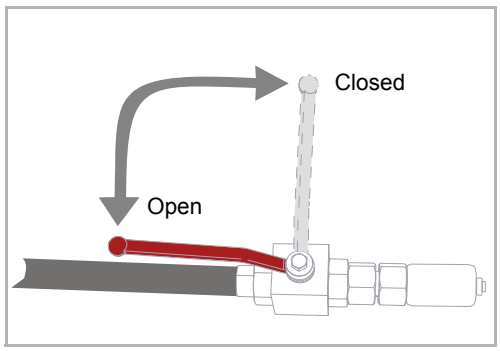
The hydraulic hoses are colour-coded so that you can assign the functions to the individual hydraulic hoses more easily. The functions available on your machine are labelled on the label with coloured dots.



Control valves

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

Function 	Control valves		Colour coding
	Single-acting	Double-acting	
Track marker	x		Grey
Hydraulic fan drive pressureless return line, maximum 10 bar	x		Green
Frame ballasting [+]		x	Yellow



If ball valves are present:

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

Hydraulic fan drive [+]

The hydraulic fan drive is controlled by a hydraulic pump.

Technical data

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

Hydraulic pump	Values
Hydraulic motor [ccm]	
Frames rigid	50
Frames rigid	80
Displacement [l/min] at 5400 rpm at fan	
Frames rigid	30
Frames rigid	60

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

Line diameters



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

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

Prerequisites

Prerequisites for the hydraulic fan drive on the tractor:

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

Fan speed

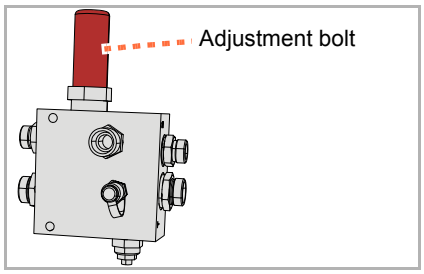
Checking the hydraulic connections
Prior to operation, carefully check the hydraulic hose connections and the hoses themselves.
Hot hydraulic fluid under pressure can squirt from insufficiently tightened or damaged hydraulic hoses, resulting in serious injury.

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

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

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

Tractors with flow control valve

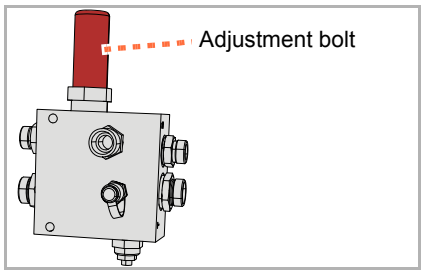


- Fully open the 3-way flow control valve

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

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

Tractors without flow control valves, without regulating pumps



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

Power Beyond [+]

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



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

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



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

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

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

Prerequisites

Prerequisites for the use of Power Beyond:

Equipment

The tractor is equipped with:

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

The machine is equipped with:

- A flow control valve

Calculation of the remaining conveying capacity

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

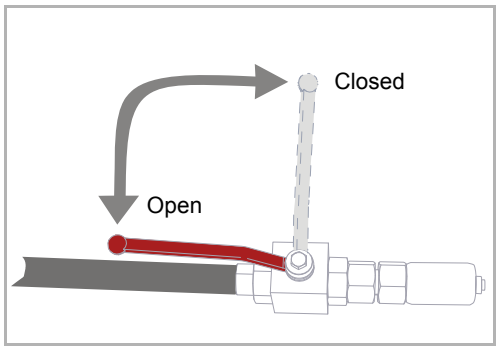
Example:

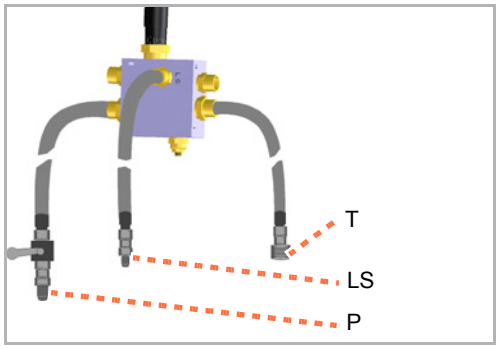
Conveying capacity of the hydraulic pump	100 l/min
Quantity of oil required for permanent consumer	40 l/min
Quantity of oil required for other consumers	70 l/min
Quantity of oil lacking	10 l/min
Reduction of the working speed to	60 %

Connection to the tractor

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

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

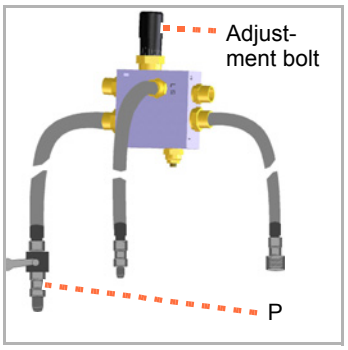




- Make connections in the following sequence:
  - 1. Return line (T)
  - 2. Control line (LS)
  - 3. Feed line (P)
- Activate the fan speed counter (depending on the available display unit or monitor)

Operation

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

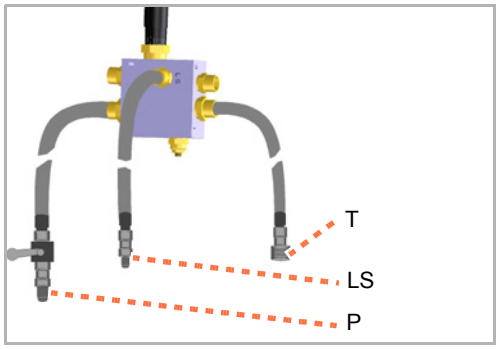


- Open the ball valve at the feed line (P)

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

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

Uncoupling



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

Operation

Initial commissioning

For the initial commissioning with cold oil the following applies:

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

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

→ Operating manual for the electronic control system

Repeated commissioning

For the repeated commissioning with cold oil the following applies:

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

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

- Track marker
- Sowing units

Prerequisites for the preparation work:

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

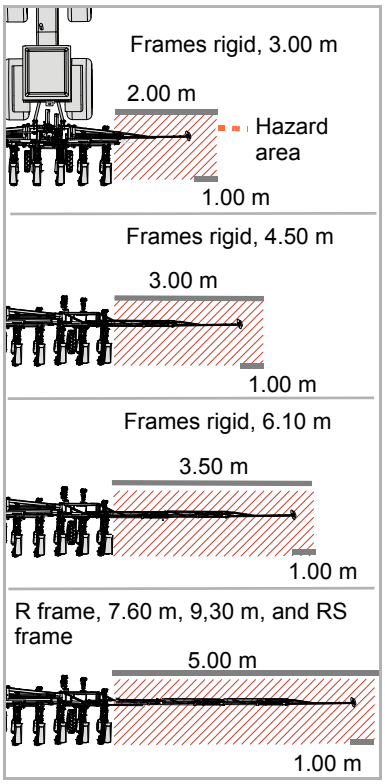
Track marker [+]

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

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

Folding out

Hazard area



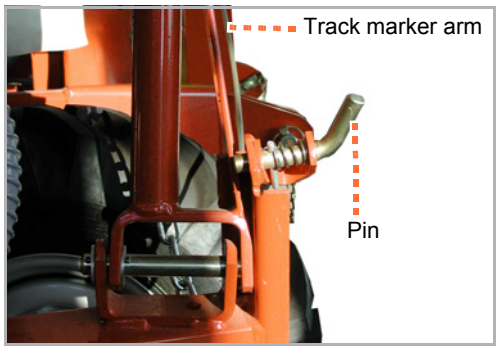
No persons in the hazard area
No persons, animals or any objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out can be seriously or fatally injured.

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

Transport locking device

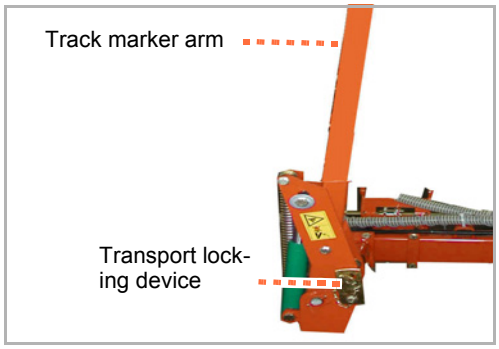
Depending on the type of frame different transport guards are available. The transport locking devices have to be released at both track markers before being folded out.

Frames rigid, 3.00 m



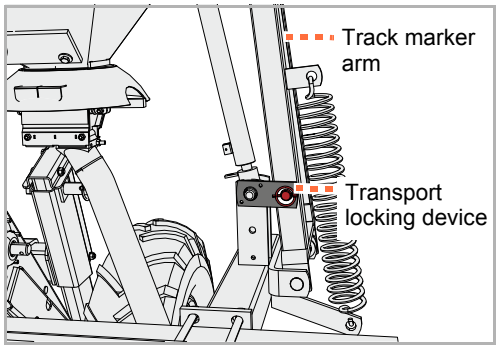
- Press against the track marker arm with one hand
- Pull the pin backwards and turn it to the right until the securing mechanism is supported

Frames rigid, 4.50 m



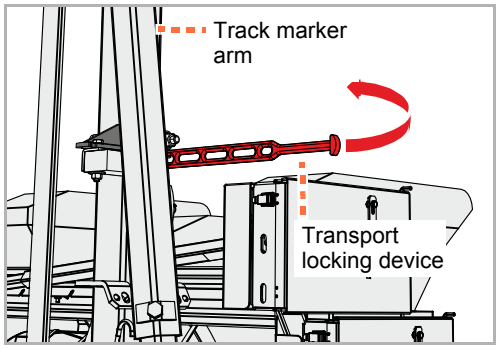
- Press against the track marker arm with one hand
- Remove the transport locking device from the pin

Frames rigid, 6.10 m



- Press against the track marker arm with one hand
- Remove the transport locking device from the pin

RS frame, 7.60 m and 8.30 m



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

Without electronic control system

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

With an electronic control system

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

→ “PSD-e-drive-II-Software” operating manual

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

Calculation

Length of the track markers for tractor centre =

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

Example:

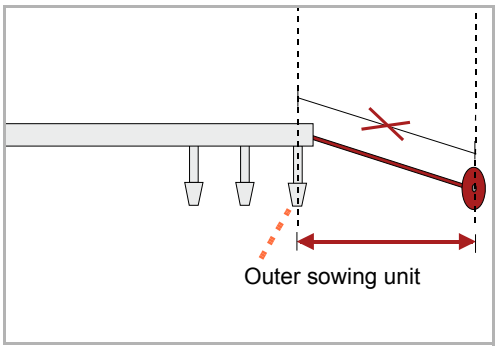
Row spacing of the seeding ma- 75.0 cm
chine

Working width of the seeding ma-900.0 cm
chine

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

Setting

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



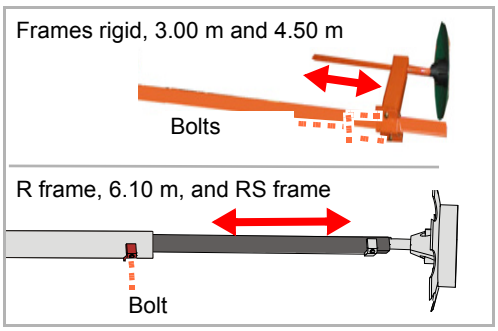
Measure out the calculated track marker length on the ground, never directly on the track marker arm. That would introduce inaccuracies.

Right track marker arm:

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

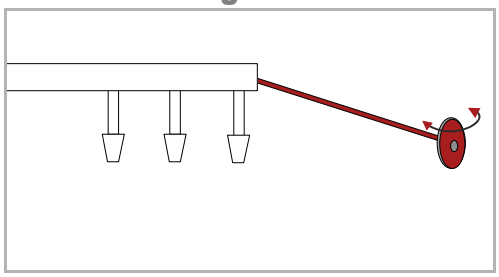
Lefttrack marker arm:

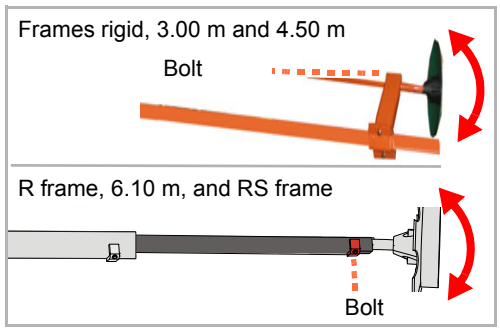
- Begin the measurement in the centre of the outer left coulter



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

Inclination angle





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

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

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

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

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

Row spacing

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

Sowing units

Before carrying out work on the sowing units, the machine must be parked securely.
→ Chapter »Maintenance«, section »Secure the machine«, page 170

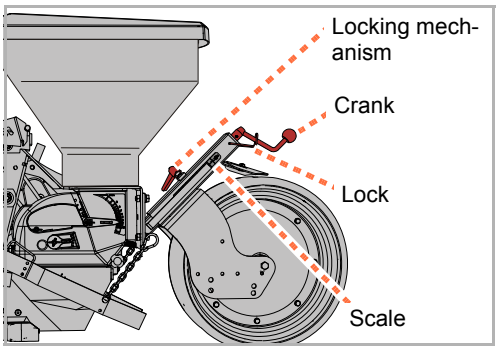
Working depth

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

Prerequisites:

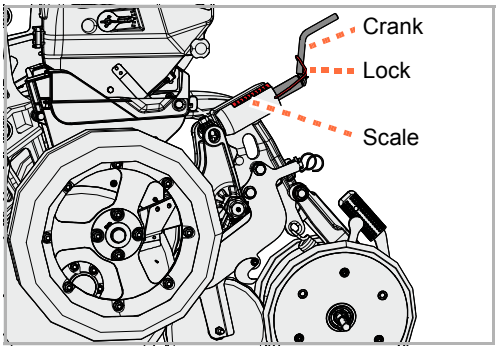
- The machine is coupled to the tractor
- Machine is completely extended, lifted and secured
- Handbrake in tractor is applied
- Tractor and machine are secured against rolling away

Normal seed, Tandem



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

HD II



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

Normal seed

Load [+]

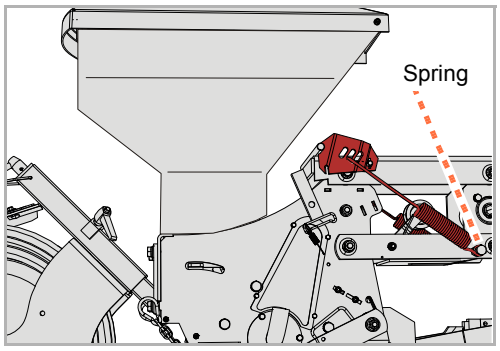
In addition to its own weight an individual sowing unit can be loaded via the springs with up to 100 kg.

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

Springs

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

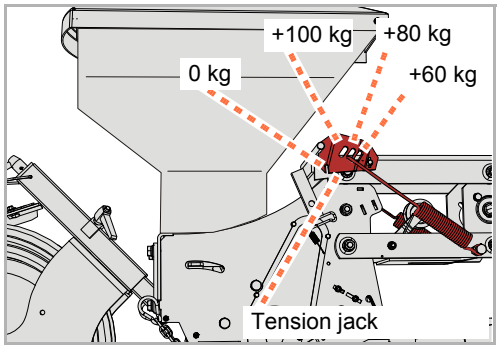
- Attach the springs if necessary



Loading

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

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



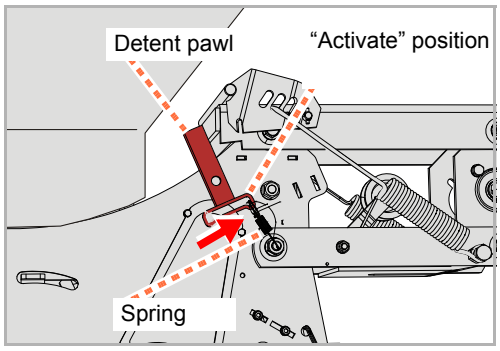
Lifting device [+]

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

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

Activate

- Push the spring on the detent pawl forward, to the “Activate” position



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

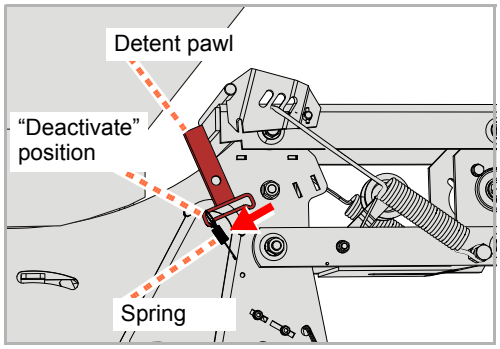
Emptying the seed hopper
The seed hopper and the seeding heart must be emptied before lifting.
If there is seed in the seed hopper, seed falls uncontrolled to the ground.



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

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

Deactivate

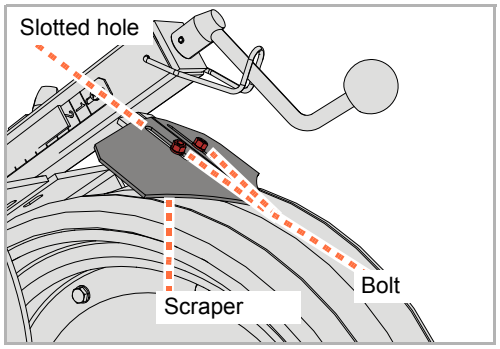


- Push the spring on the detent pawl backwards, to the “Deactivate” position
- Raise the detent pawl

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

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

Scraper

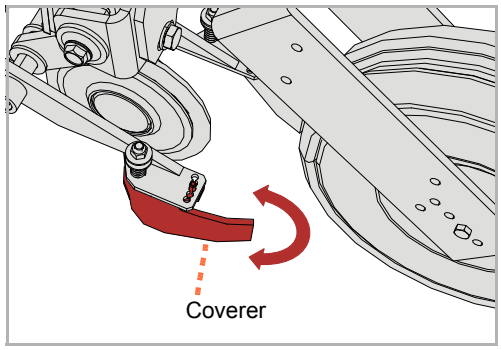


- Release the nuts and bolts
- Shift the scraper in the slotted hole
- Tighten the nuts and bolts

Tandem

Intermediate press wheel

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



- Press the coverer down and adjust as desired

HD II

Load [+]

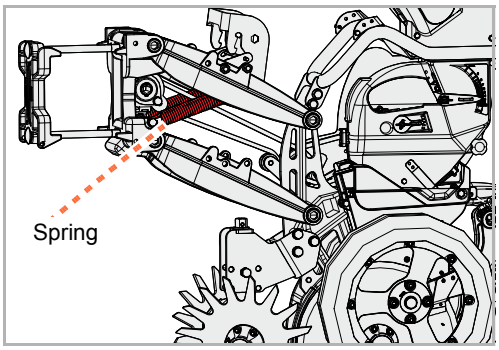
In addition to its own weight an individual sowing unit can be loaded via the springs with up to 100 kg.

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

Springs

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

- Attach the springs if necessary

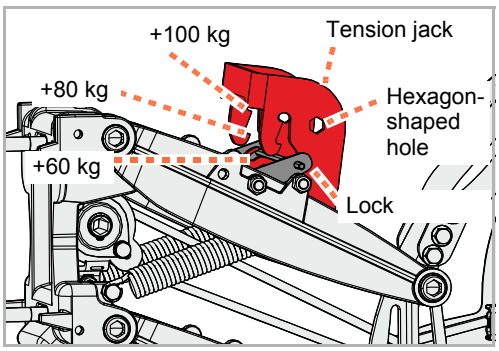


Loading

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

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

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

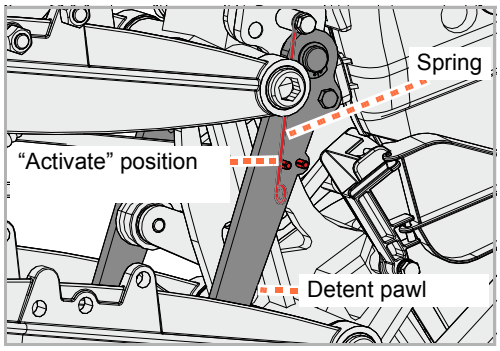


Lifting device [+]

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

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

Activate



- Push the spring on the detent pawl forward, to the “Activate” position

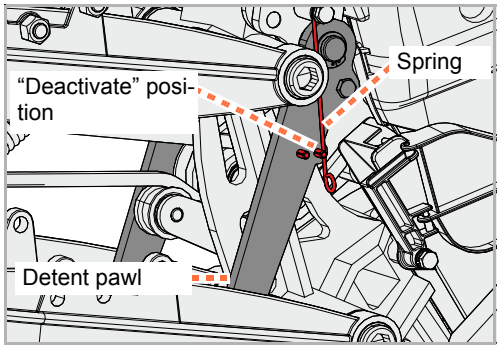
Avoid additional loading
When a load is set, it places an additional burden on the sowing units.
When a load is set, the lifting device may be damaged.

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

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

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

Deactivate



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

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

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

Rubber V press wheel [+]

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

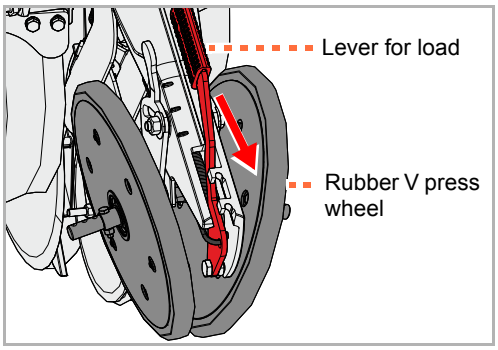
You can make various settings to the rubber V press wheels:

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

Load

The load can be set in three stages:

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



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

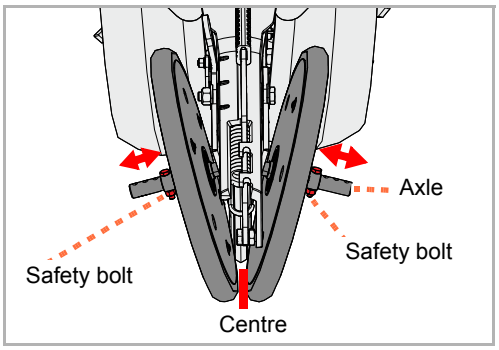
Distance

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

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

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

Perform the same setting on both sides.

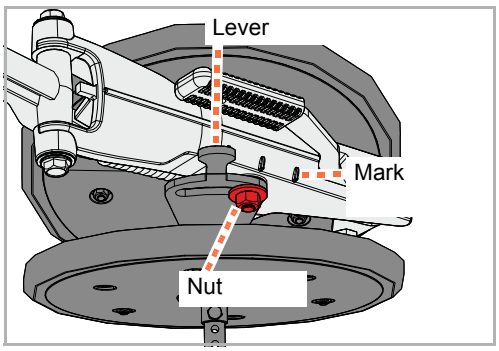


- Remove the safety bolt from each rubber V press wheel
- Shift the rubber V press wheel on the axle as required
- Secure the rubber V press wheel again with the safety bolt

Inclination angle

Setting of the inclination angle is infinitely variable:

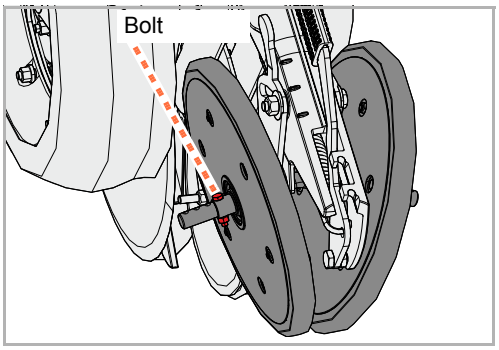
Lever position	Rubber V press wheel position	Effect
Front	Further apart	Heavy covering of the furrow
Rear	Closer together	Less covering of the furrow



- Release nut
- Move the lever to the desired position. Use the markings for orientation.
- Retighten the nut
- Make adjustments to all rubber V press wheels in the same way.

Replacement

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



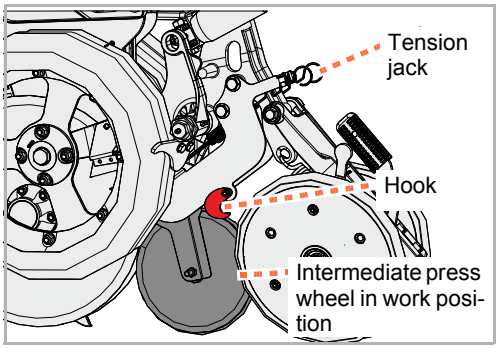
- Remove the safety bolt from each rubber V press wheel
- Replace the rubber V press wheel and secure it again with the safety bolt

Intermediate press wheel

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

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

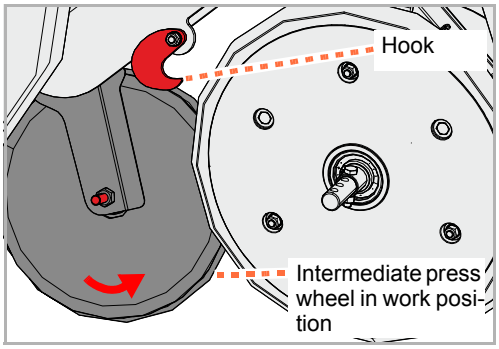
Printing



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

Lifting

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

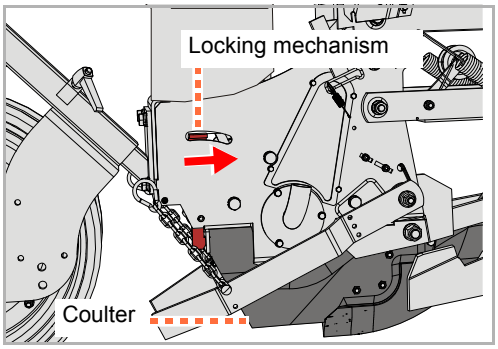


- Lift the intermediate press wheel and secure with the hook

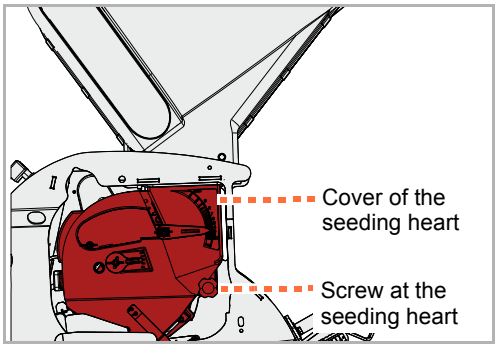
Seed disc

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

Normal seed

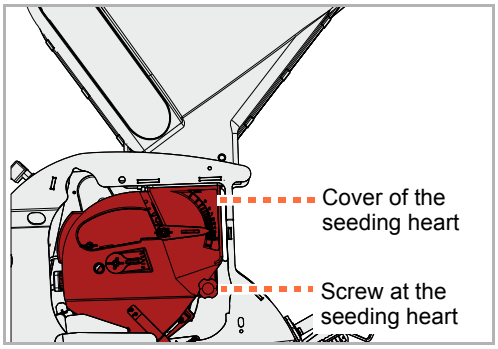


- Release the locking mechanism for the coulter
- Fold down the coulter



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

HD II

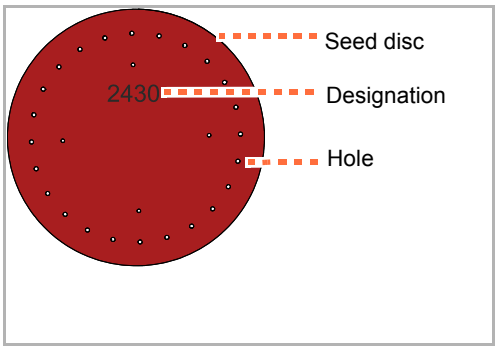


- Release the bolt, remove the cover of the seeding heart

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

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

Example



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

Deliverable seed discs

Extract of the available seed discs:

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

Replacement

→ Chapter »Refitting«, section »Seed discs«, page 204

Setting of the sowing distance

The sowing distance can be changed by:

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

→ Operating manual for the electronic control system

The desired distance of the grains must be known for the settings.

Calculating the sowing distance

If the number of grains per hectare is known, the sowing distance can be calculated with a formula.

$$\text{Sowing distance [cm]} = \frac{1.000.000}{\text{Grains/ha x row spacing [m]}}$$



Example

Grains/ha = 100,000
Row spacing [m] = 0.75

$$\text{Sowing distance [cm]} = \frac{1.000.000}{100{,}000 \times 0.75} = 13.3 \text{ cm}$$

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

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

Fill with seed



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

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



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

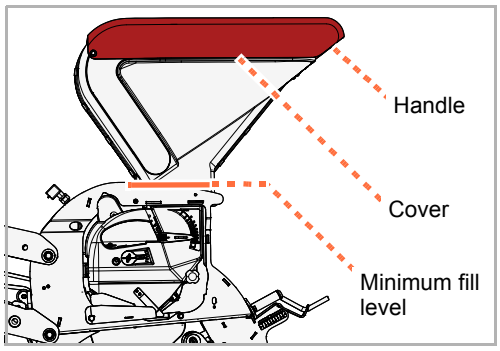
Checking the seed hopper
Before filling, check seed hopper for foreign bodies.
Foreign bodies can cause significant damage to the seed discs and incorrect seeding results.

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

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

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

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



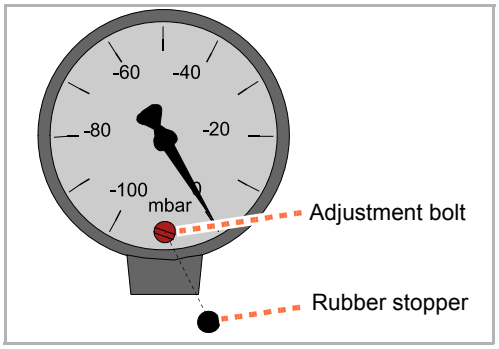
- Open cover at handle
- Inspect the seed hopper for any foreign bodies and remove them
- Fill with seed up to the minimum fill level
- Close the cover

Setting the negative pressure

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

- Seed
- Thousand grain weight (TGW)
- Velocity

Manometer



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

If the needle is not at “0”:

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

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

→ Chapter »Hydraulic system«, section »Hydraulic fan drive [+]«, page 49

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

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

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

Fan

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



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



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



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

Seeding heart

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

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

- Implementation
- Checking the settings

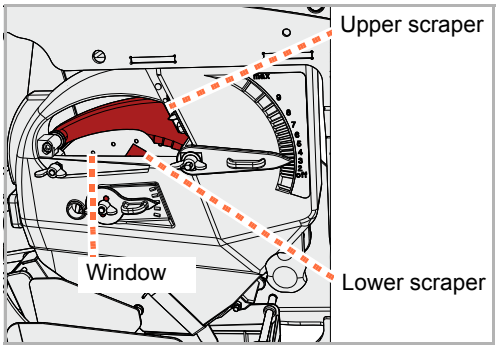
The following must be adjusted:

- Scraper and
- Baffle plate

Preparations

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

Scraper



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

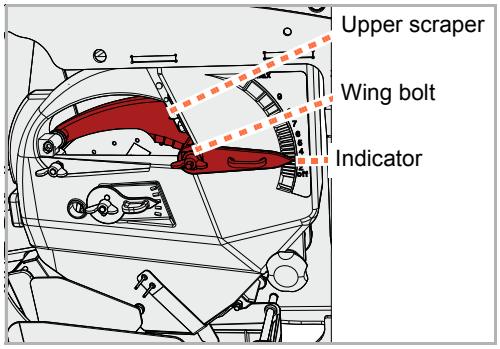
The setting is made with:

- One upper scraper
- One lower scraper

Upper scraper

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

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

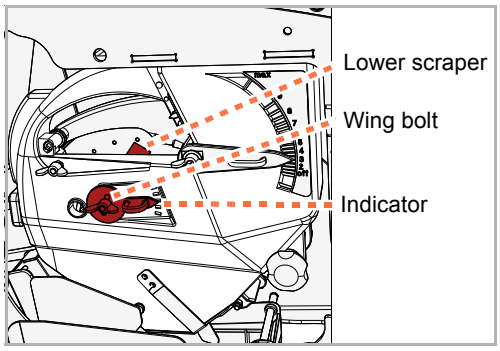


- Release wing bolt
- Lift the indicator and determine the correct setting
- Let the indicator engage
- Tighten the wing bolt

Lower scraper

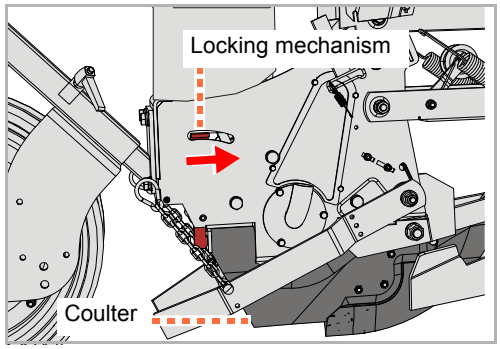
The lower scraper removes doubles that have not been detected by the upper scraper.

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



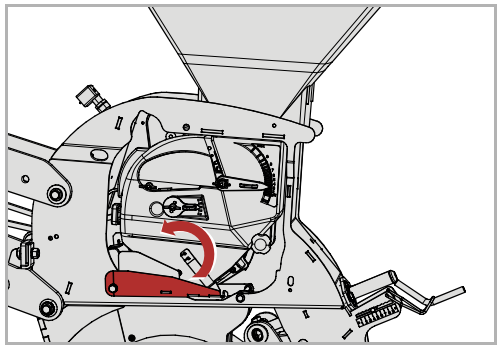
- Release wing bolt
- Raise the indicator and look for the correct setting.
  Adjust the lower scraper so that it sits close to the bottom edge of the holes in the seed disc.
- Let the indicator engage
- Tighten the wing bolt

Normal seed



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

HD II



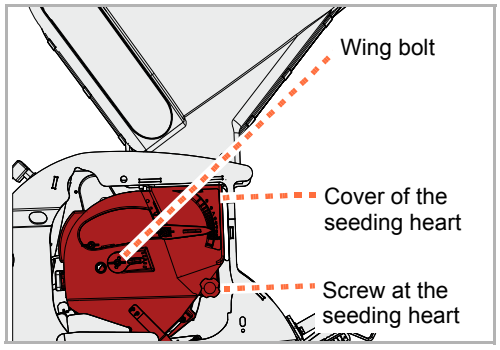
- Fold the guard plate up

For broad beans or even larger seed:

For larger seed, the lower scraper can be removed:

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

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



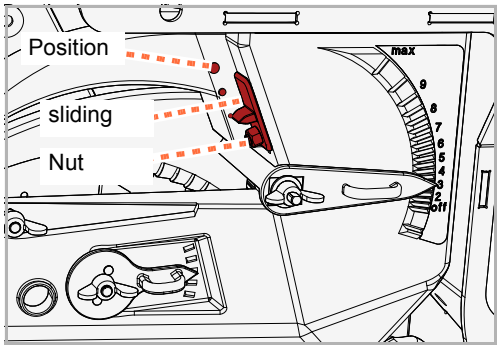
Baffle plate

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

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

The following settings serve as reference values:

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



- Release nut
- Shift the sliding cover as desired
- Tighten the nut

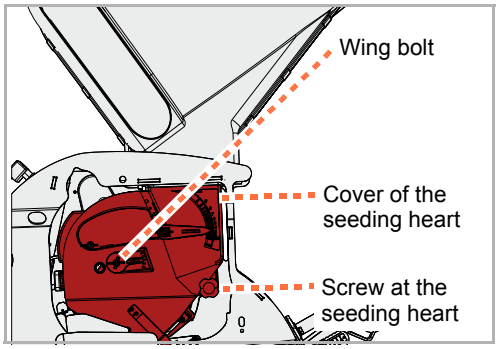
Rape

If you wish to apply rape, you must fit the appropriate seed disc and install the baffle plate for rape. Other seed discs and the universal baffle plate are not suitable for rape.

Check the seed disc and baffle plate
When seeding rape, you must check on each seed row whether the seed disc and the baffle plate for rape have been fitted.
Seeding with the wrong seed disc and wrong baffle plate will result in incorrect grain deposit.

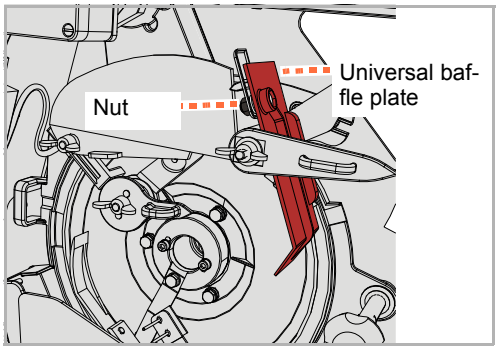
→ “Conversion for rape” assembly instructions

After seeding rape



In order to apply other seeds, you must fit the appropriate seed disc and the universal baffle plate.

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



Release the nut and replace the baffle plate for rape with the universal baffle plate

Checks

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

Prerequisites:

- ☑ The seed disc is adapted to the seed
- ☑ Upper and lower scraper are set
- ☑ The baffle plate is set
- ☑ The seed hopper of the first sowing unit is filled with enough seed
- ☑ There is a sufficiently large catch pan below the seeding heart of the first sowing unit
- ☑ The machine is lifted

▸ Start the sowing units via the electronic control system

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

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

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

▸ Fill sufficient seed into all seed hoppers

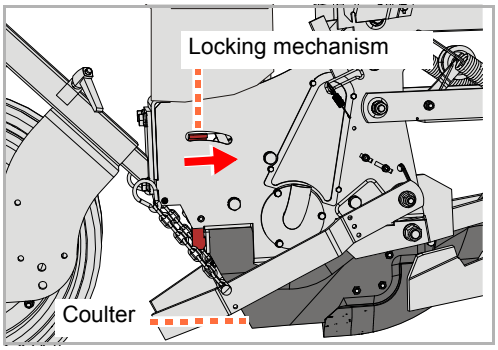
▸ Check each sowing unit

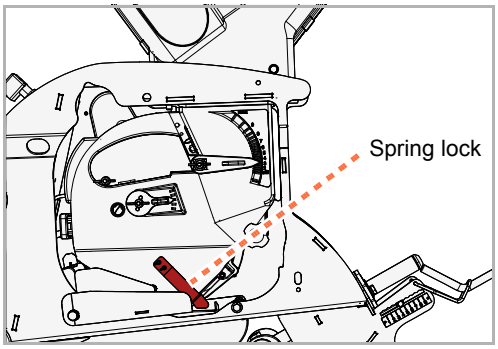
Emptying the seed hopper

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

Normal seed

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

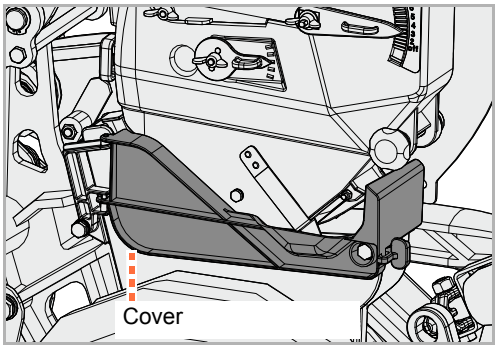


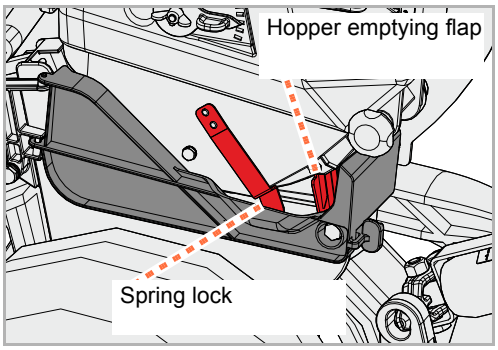


- Place a catch pan under the sowing unit
- Pull the spring lock. The hopper emptying flap is now folding downwards.
- Empty all of the seed
- Close the emptying flap. Ensure that the emptying flap and spring lock engage safely.

HD II

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





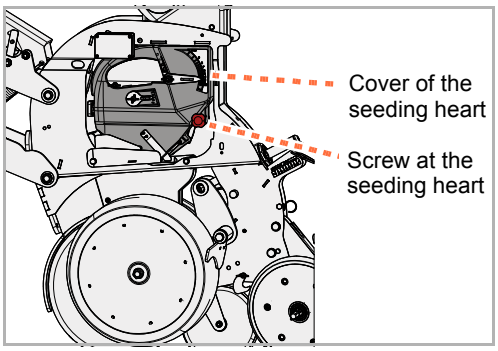
- Place a catch pan under the sowing unit
- Pull the spring lock. The hopper emptying flap is now folding downwards.
- Empty all of the seed
- Close the emptying flap. Ensure that the emptying flap and spring lock engage safely.

Changing the seed type

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

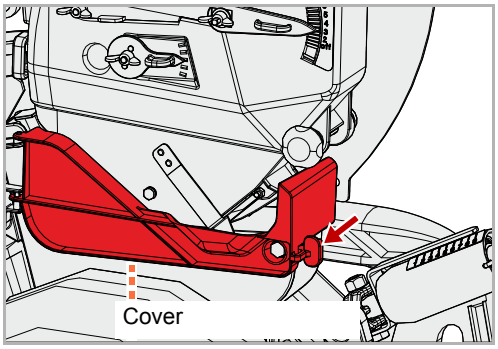
- Empty the seed hopper, as described above

Normal seed I

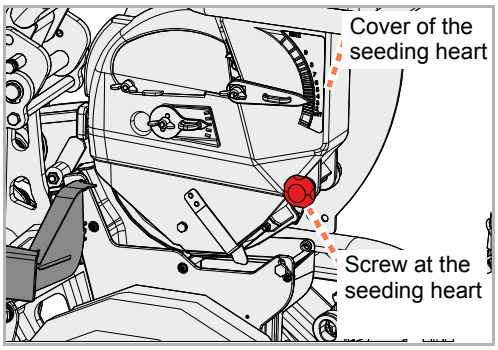


- Release bolt at the seeding heart
- Remove the cover of the seeding heart and check for remaining seed

HD II



- Unlock and open the cover



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

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

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

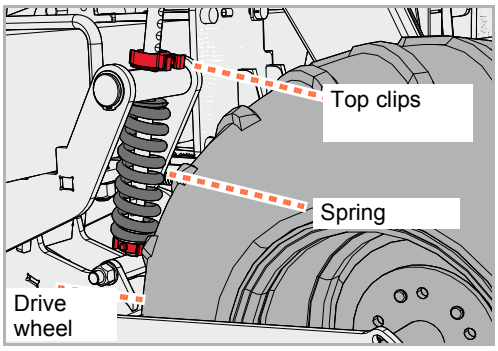
Ground clearance

RS frame, 7.60 m

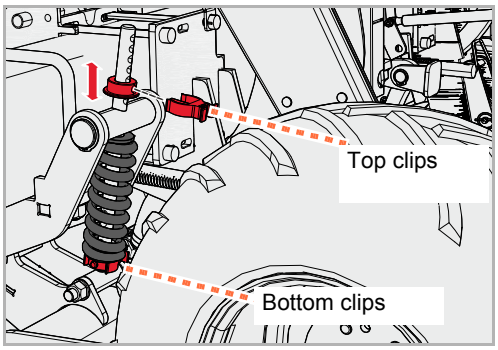
The ground clearance of the frame should be between 40 and 50 cm. You can adjust the clearance using the drive wheels.
It is important to check this value on the field, as the ground conditions on the field have a significant effect on the ground clearance.

- Set the attached machine down on solid ground
- Switch off the hydraulic frame ballasting [+]

→ Chapter »Preparing for operation«, section »Hydraulic frame ballasting [+]«, page 45

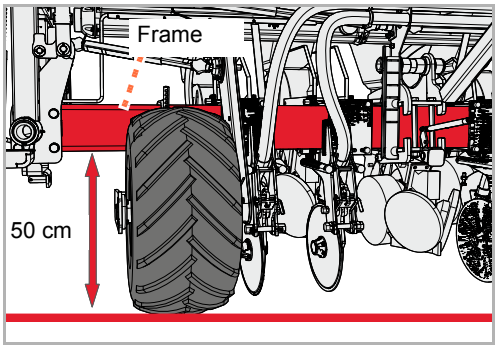


- Raise or lower the machine until the springs on the drive wheels no longer press against the clips at the top

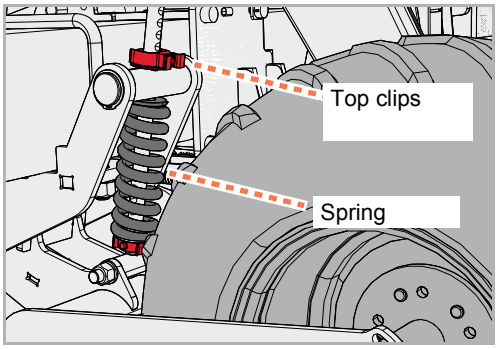


- Remove the top clips from the drive wheels

In order to achieve the correct ground clearance, you may also have to remove and move the bottom clips.



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



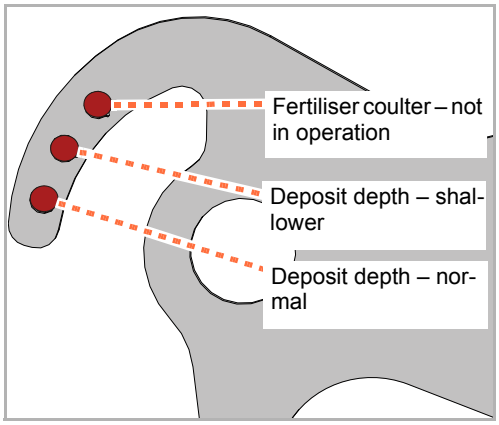
- Fit the top clips such that the spring has no play

Fertiliser coulters [+]

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

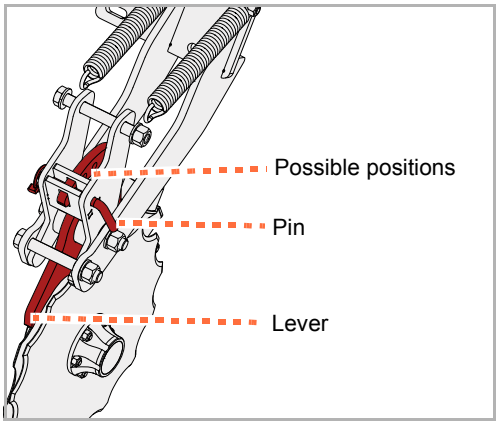
Sowing depth

The deposit depth can be adjusted in 3 positions.



Position	Selection
Fertiliser coulter – not in operation	You are not applying any fertiliser and the fertiliser coulters should not run in the ground
Deposit depth – shallower	You have relatively light soil and would like to apply the fertiliser at a shallower depth
Deposit depth – normal	You have average to heavy soil

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



- Remove pin
- Using the lever, adjust the working depth as required
- Re-fit the pin and secure it with the split pin

Fertiliser hopper [+]

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

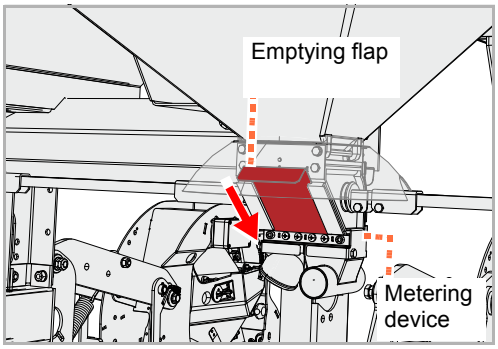
Observe maximum fill level
In the field, the fertiliser hopper can be filled up to the rim. The hopper cover must be able to close.
If the fill level is exceeded, the machine will be overloaded and the metering devices will wear considerably faster.

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

Frames rigid

The metering devices have emptying flaps and stoppers. Before filling with mineral fertilisers, the emptying flap and the stoppers must be closed.

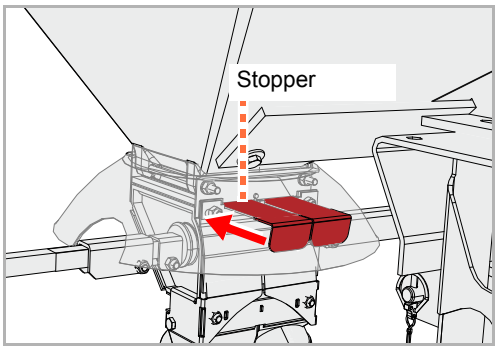
Emptying flap



Every metering device has emptying flaps.

- Close the emptying flap on all metering devices

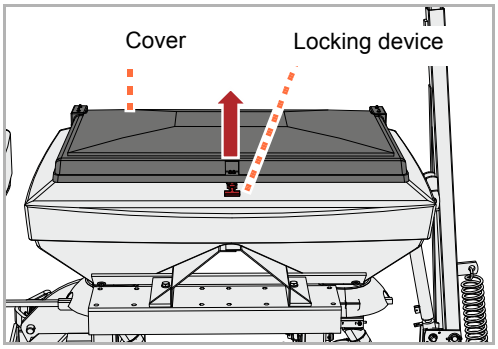
Stopper



Every metering device has stoppers.

- Close the stopper at all metering devices

Cover



The fertiliser hopper is protected by a cover.

- Releasing the lock
- Open the cover

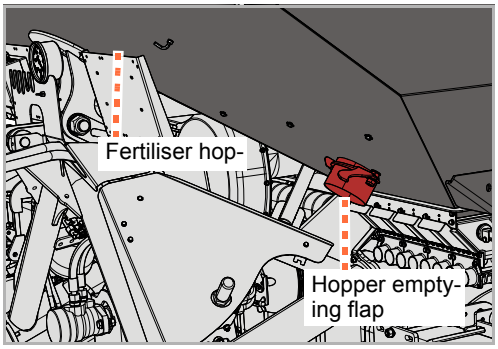
Checking

- Inspect the fertiliser hopper for foreign bodies and remove them

Frames rigid

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

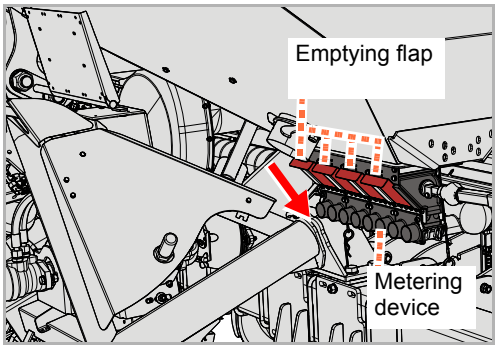
Emptying flaps



There are emptying flaps on the fertiliser hopper.

- Close the emptying flaps on all fertiliser hoppers

Emptying flap

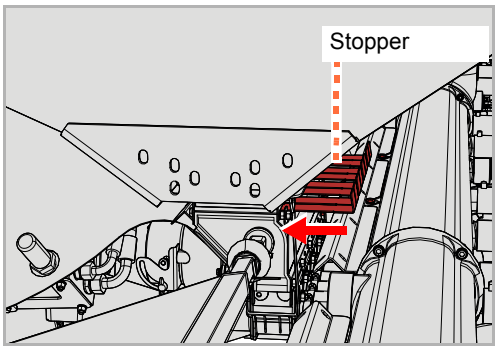


Every metering device has emptying flaps.

- Close the emptying flap on all metering devices

Stopper

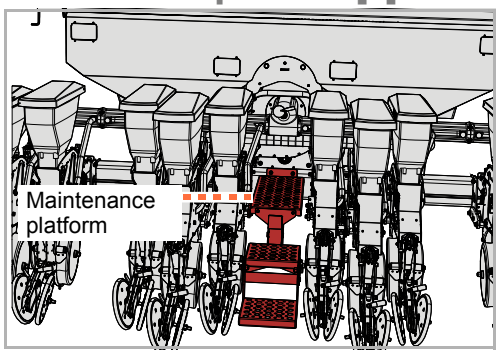
Every metering device has stoppers.



- Close the stopper at all metering devices

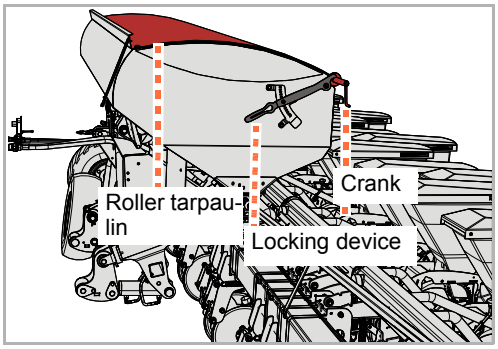
Maintenance platform [+]

A maintenance platform is located between the sowing units at the centre of the machine.



Cover

The fertiliser hopper is protected by a roller tarpaulin.



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

Checking

- Inspect the fertiliser hopper for foreign bodies and remove them

Big Bag

Take particular care when filling with a Big Bag. The load can sway, and even standing underneath the lifted Big Bag is dangerous.

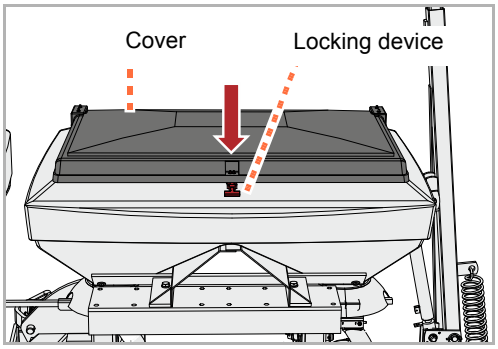
Do not stand under or near Big Bags when they are lifted
Standing under or near Big Bags that have been lifted is dangerous. Maintain a sufficient distance and observe the behaviour of the load.
By swinging, the Big Bag could hit people and cause them to fall. This could result in injuries.

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

After filling

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

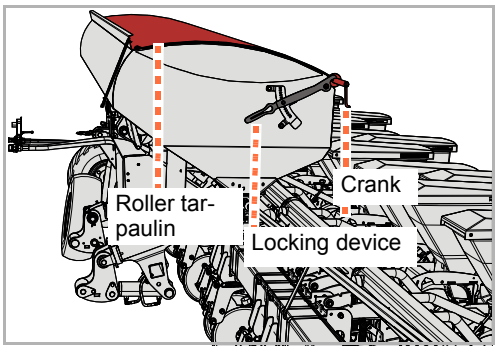
Frames rigid



The fertiliser hopper is protected by a cover.

- Close the cover
- Secure the cover with the securing mechanism

Frames rigid



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

Setting the application rate

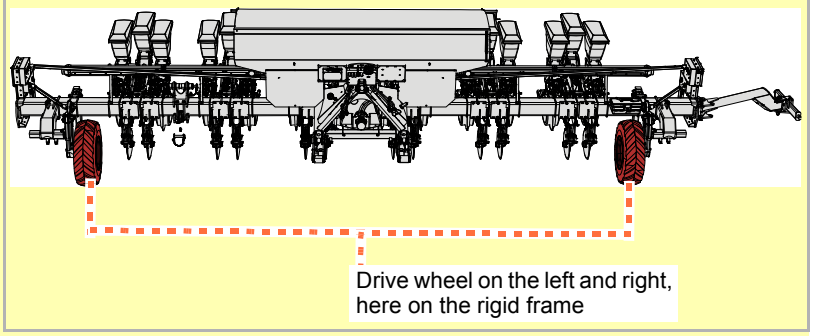
e-drive

→ “PSD-e-drive-II-Software” operating manual

Mechanical

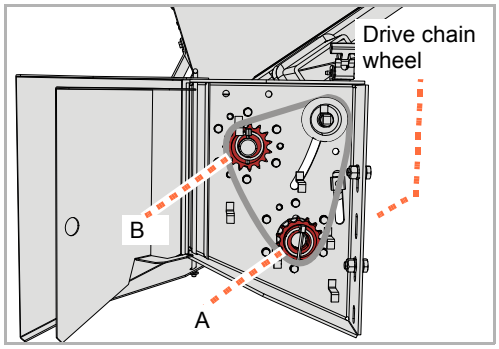
The application rate is set with chain wheels. Refer to the table to determine, which combination yields the desired application rate. The details are for reference only and can significantly deviate from the actual values, depending on the type of fertiliser. Therefore, always perform a calibration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

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



Frames rigid

Normal cell wheel 4.0 mm



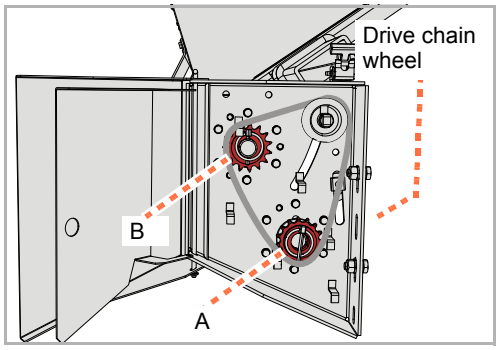
Drive chain wheel 17

Application rate [kg/ha]

Chain wheel		Row spacing [cm]										[kg/10 m]
A	B	37,5	40	45	50	55	60	65	70	75	80	
13	30*	180	169	150	135	123	113	104	97	90	85	0,068
13	25	217	203	180	162	148	135	125	116	108	102	0,081
15	25	250	234	208	187	170	156	144	134	125	117	0,094
15	22	284	266	237	213	194	177	164	152	142	133	0,106
18	22	341	319	284	256	232	213	197	183	170	160	0,128
18	20	375	351	312	281	256	234	216	201	187	176	0,141
18	18	416	390	347	312	284	260	240	223	208	195	0,156
20	18	463	434	386	347	316	289	267	248	231	217	0,174
22	18	509	477	424	382	347	318	294	273	255	239	0,191
25	18	578	542	482	434	394	362	334	310	289	271	0,217
22	15	611	573	509	458	416	382	352	327	305	286	0,229
25	15	694	651	578	521	473	434	400	372	347	325	0,260
27*	15	750	703	625	562	511	469	432	402	375	351	0,281
25	13	801	751	667	601	546	501	462	429	400	375	0,300
30*	15	833	781	694	625	568	521	481	446	416	390	0,312
28*	13	897	841	748	673	612	561	518	481	449	420	0,336
30*	13	961	901	801	721	655	601	554	515	481	451	0,360

* = These chain wheels are an accessory

Normal cell wheel 4.0 mm

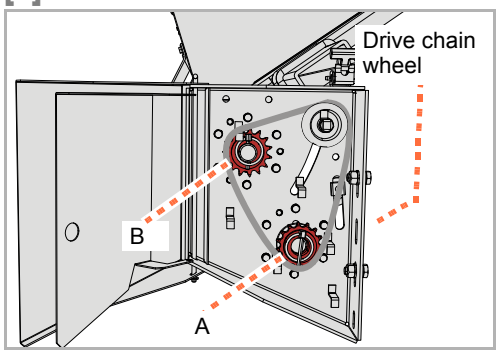


Drive chain wheel 28
Drive chain wheel 28 permits reduced application rates.

Application rate [kg/ha]

Chain wheel		Row spacing [cm]										[kg/10 m]
A	B	37,5	40	45	50	55	60	65	70	75	80	
13	30*	110	103	91	82	75	68	63	59	55	51	0,04
13	25	131	123	110	99	90	82	76	70	66	62	0,05
15	25	152	142	126	114	103	95	88	81	76	71	0,06
15	22	172	162	144	129	118	108	99	92	86	81	0,06
18	22	207	194	172	155	141	129	119	111	103	97	0,08
18	20	228	213	190	171	155	142	131	122	114	107	0,09
18	18	253	237	211	190	172	158	146	135	126	119	0,09
20	18	281	263	234	211	192	176	162	151	140	132	0,11
22	18	309	290	258	232	211	193	178	166	155	145	0,12
25	18	351	329	293	263	239	219	203	188	176	165	0,13
22	15	371	348	309	278	253	232	214	199	185	174	0,14
25	15	421	395	351	316	287	263	243	226	211	198	0,16
25	13	486	456	405	365	332	304	281	260	243	228	0,18

Coarse cell wheel 7.5 mm [+]



Drive chain wheel 17
The coarse cell wheel allows higher application rates.

Application rate [kg/ha]

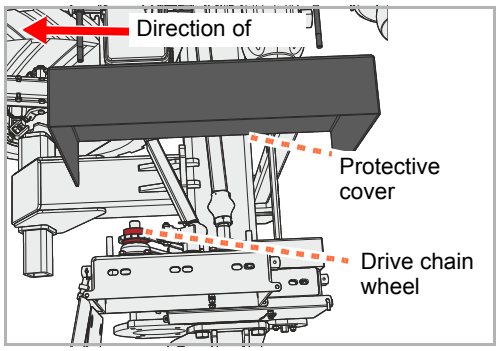
Chain wheel		Row spacing										[kg/10 m]
A	B	37,5	40	45	50	55	60	65	70	75	80	
13	30*	321	301	268	241	219	201	185	172	161	151	0,120
13	25	385	361	321	289	263	241	222	206	193	181	0,145
15	25	445	417	371	334	303	278	257	238	222	208	0,167
15	22	505	474	421	379	345	316	292	271	253	237	0,190
18	22	606	569	505	455	413	379	350	325	303	284	0,227
18	20	667	525	556	500	455	417	385	357	334	313	0,250
18	18	741	695	618	556	505	463	428	397	371	347	0,278
20	18	824	772	686	618	561	515	475	441	412	386	0,309
22	18	909	849	755	679	618	566	523	485	453	425	0,340
25	18	1029	965	858	772	702	643	594	551	515	483	0386
22	15	1087	1019	906	815	741	679	627	582	544	510	0,408
25	15	1235	1158	1029	926	842	772	713	662	618	579	0,463
25	13	1425	1336	1188	1069	972	891	822	764	713	668	0,535
30*	15	1482	1390	1235	1112	1011	926	855	794	741	695	0,556
28*	13	1596	1497	1330	1197	1088	998	921	855	798	748	0,599
30*	13	1710	1604	1425	1283	1166	1069	987	916	855	802	0,641

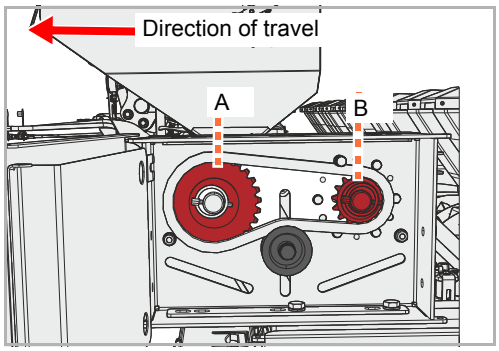
* = These chain wheels are an accessory

Frames rigid
Coarse cell wheel 7.5 mm [+]

The coarse cell wheel allows higher application rates.

The table applies to a drive chain wheel 15.
The drive chain wheel is located behind the protective cover.





Chain wheel “A” is the first chain wheel as seen from the front.

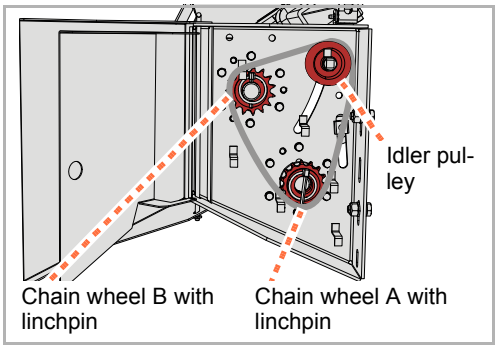
Application rate [kg/ha]

Chain wheel		Row spacing										[kg/10 m]
A	B	37,5	40,5	45,0	50	55	60	65	70	75	80	
13	30*	312	293	260	234	213	195	180	167	156	146	0,117
13	25	374	351	312	281	255	234	216	201	187	176	0,140
15	25	432	405	360	324	295	270	249	231	216	203	0,162
15	22	491	460	409	368	335	307	283	263	245	230	0,184
18	22	589	552	491	442	402	368	340	316	295	276	0,221
18	20	648	608	540	486	442	405	374	347	324	304	0,243
18	18	720	675	600	540	491	450	415	386	360	338	0,270
20	18	800	750	667	600	545	500	462	429	400	375	0,300
22	18	880	825	733	660	600	550	508	471	440	413	0,330
25	18	1000	938	833	750	682	625	577	536	500	469	0,375
22	15	1056	990	880	792	720	660	609	566	528	495	0,396
25	15	1200	1125	1000	900	818	750	692	643	600	563	0,450
27	15	1296	1215	1080	972	884	810	748	694	648	608	0,486
25	13	1385	1298	1154	1038	944	865	799	742	692	649	0,519
30*	15	1440	1350	1200	1080	982	900	831	771	720	675	0,540
28*	13	1551	1454	1292	1163	1057	969	895	831	775	727	0,582
30*	13	1662	1558	1385	1246	1133	1038	959	890	830	779	0,623

* = These chain wheels are an accessory

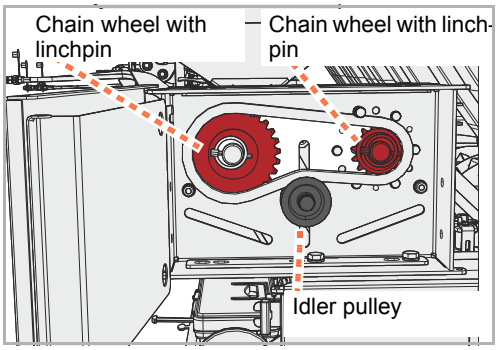
Replacing the chain wheels

Frames rigid



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

Frames rigid



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

Calibration test

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

Prerequisites:

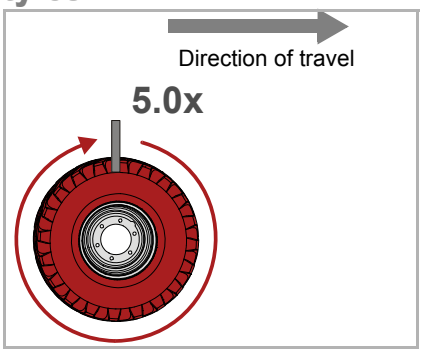
- Fertiliser has been filled into the fertiliser hopper
- A sufficiently large catch pan is positioned under every fertiliser coulter
- The application rate is set through an appropriate combination of the chain wheels
- The machine is lifted

▸ Put a catch pan under every fertiliser coulter

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

▸ Switch on the fan
▸ Turn drive wheel slightly until the fertiliser trickles out of the fertiliser coulters
▸ Empty catch pan and place back under the fertiliser coulters
▸ Mark a point on a tyre with chalk to assist counting the revolutions.

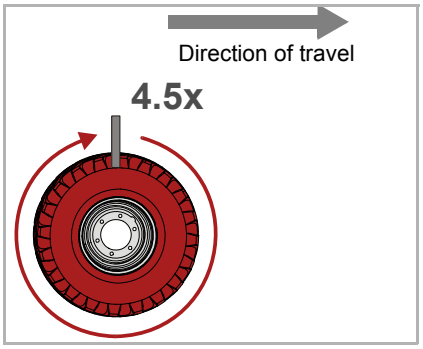
26x12.00 or 7.00x12 tyres.



▸ Turn drive wheel 5.0x. This corresponds to a travelled distance of approximately 10 m.
▸ Weigh the collected fertiliser quantity of each fertiliser coulter separately and compare with the reading “kg/10 m” in the table

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

10.0/75-15.3 tyres.



▸ Turn drive wheel 4.5x. This corresponds to a travelled distance of approximately 10 m.
▸ Weigh the collected fertiliser quantity of each fertiliser coulter separately and compare with the reading “kg/10 m” in the table

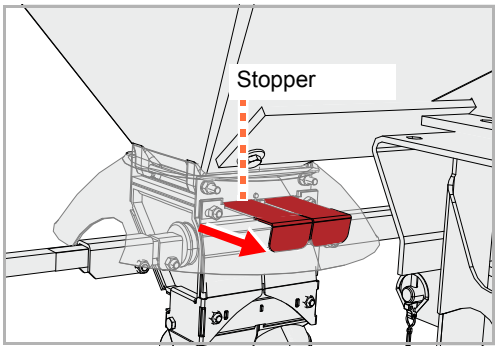
If there are deviations from the desired application rate, make the corresponding correction at the gear-box for fertiliser application.

Emptying the fertiliser hopper

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

Frames rigid

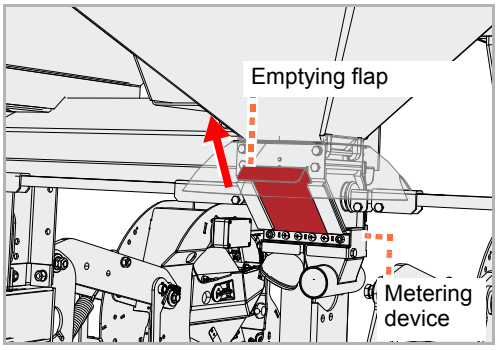
Stopper



Every metering device has stoppers.

- Open the stoppers on all metering devices

Emptying flap



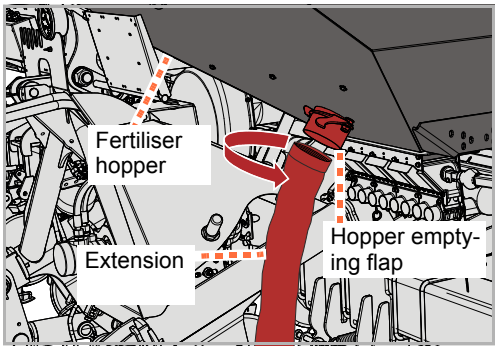
Every metering device has emptying flaps.

- Place a catch pan under the opening
- Open the emptying flap on the metering device

Frames rigid

Large residues

There are emptying flaps on the fertiliser hopper.



- Attach the extension to the emptying flap
- Place a catch pan under the opening
- Open the emptying flap on the fertiliser hopper
- After emptying, close the emptying flap on the fertiliser hopper

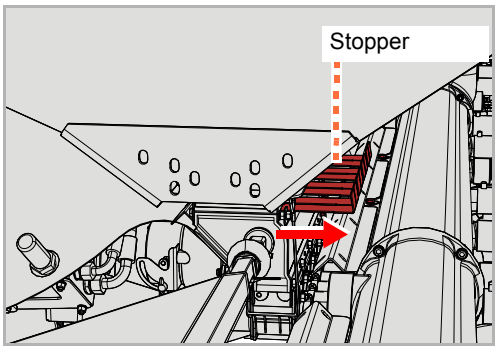
A small amount of residue remains below the emptying flap which can be removed using the emptying flap on the metering device.

Small residues

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

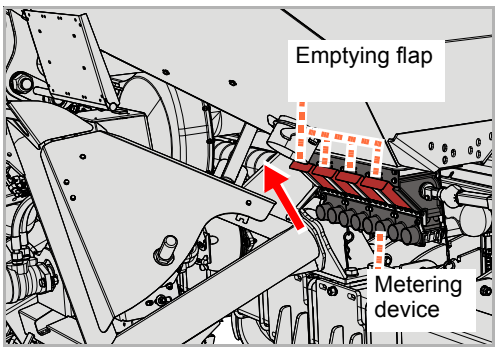
Stopper

Every metering device has stoppers.



- Open the stoppers on all metering devices

Emptying flap

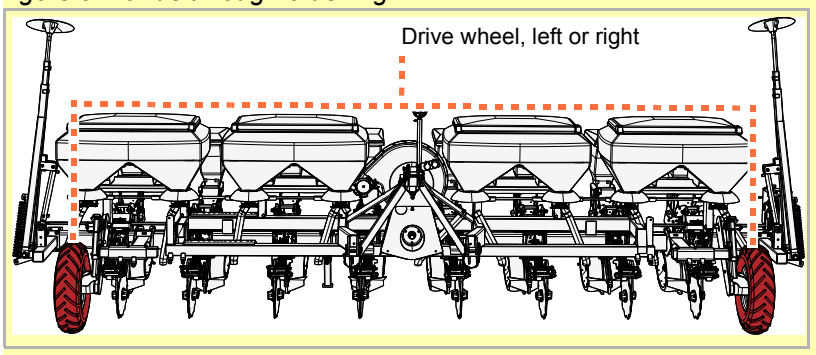


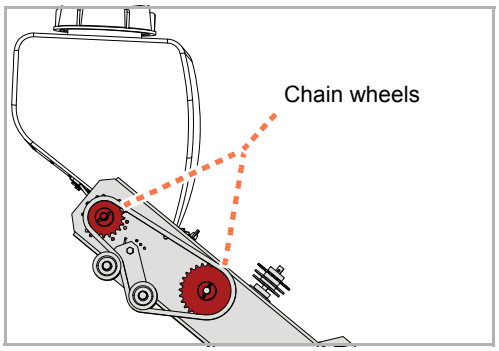
- Place a catch pan under the opening
- Open the emptying flap on the metering device
- After emptying, close the emptying flap on the metering device

Granule distributor [+]

Mechanical drive

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





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

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

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

Chain wheels

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

Crop protection chemical	Chain wheel pair A/B / metering wheel 6 mm [standard]												
[g/100 m]	28/16	28/18	28/20	20/16	20/18	20/20	18/20	16/20	20/28	18/28	16/28	13/28	13/30*
COUNTER	117	104	93	83	74	67	60	53	48	43	38	31	24
COUNTER SG	207	184	166	148	131	118	106	95	84	76	68	55	43
FORCE	92	82	74	66	59	53	47	42	38	34	30	25	20
MICROSTAR	63	56	50	45	40	36	32	29	26	23	20	17	13
PHYSIOSTART	126	112	101	90	80	72	65	58	51	46	41	33	26
UMOSTART	88	79	71	63	56	51	45	40	36	33	29	23	18
VYDATE	84	75	67	60	54	48	43	39	34	31	28	22	17
MESUROL	15,4	13,7	12,3	11,0	9,8	8,8	7,9	7,0	6,3	5,6	5,0	4,1	3,2

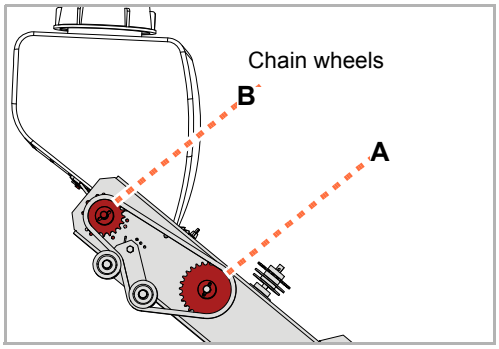
* Additional chain wheels

Example:

Desired application rate: 60 g /100 m

Width of metering wheel: 6 mm

Crop protection chemical: COUNTER



Result:

Combination of chain wheels:

- (A/B) 18/20

→ Table

kg/ha

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 103

g /100 m

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 103

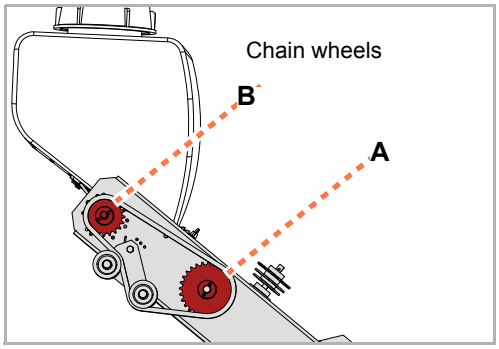
Crop protection chemical	Chain wheel pair A/B / metering wheel 3 mm [+]												
[g/100 m]	28/16	28/18	28/20	20/16	20/18	20/20	18/20	16/20	20/28	18/28	16/28	13/28	13/30*
COUNTER	58,5	52,0	46,5	41,5	37,0	33,5	30	26,5	24,0	21,5	19,0	15,5	12,0
COUNTER SG	103,5	92,0	83,0	74,0	65,5	59,0	53,0	47,5	42,0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

* Additional chain wheels

Example:

Desired application rate: 30 g /100 m

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



Result:
Combination of chain wheels:

- (A/B) 18/20

→ Table

kg/ha

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 103

g /100 m

→ Chapter »Preparing for operation«, section »Calculating the application rate«, page 103

Calculating the application rate

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

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

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

kg/ha

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

Calculation of the application rate in kg/ha:

Row spacing in cm	=	[R]

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



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

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

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

g /100 m

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

Calculation of the application rate in g/100 m:

Row spacing in cm	=	[R]

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



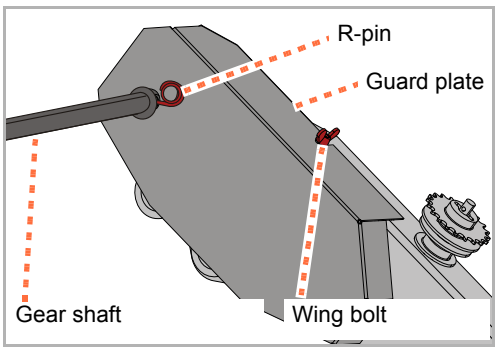
Example: How high is the application rate in g/100 m?

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

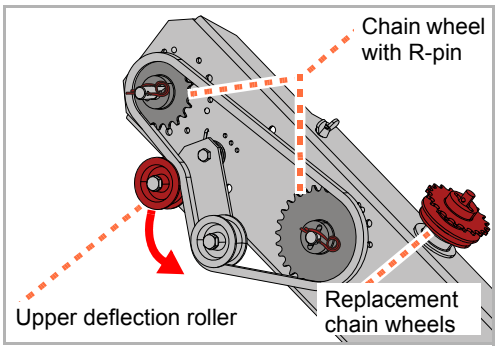
[30] x [25] / 10	=	75 g/100 m

Setting the application rate

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



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



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

Filling the tank

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

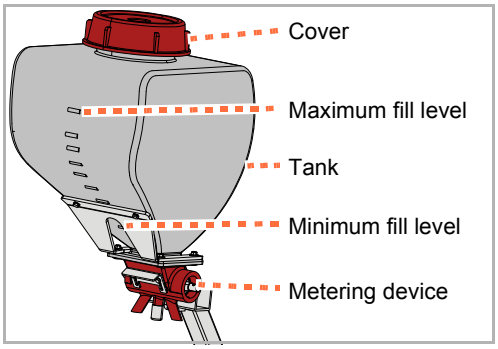
Protection against fine dust
When working in an environment contaminated with dust and other fine particles from crop protection chemicals, it may be necessary to wear a breathing mask and latex gloves. Observe the specific safety instructions issued by the crop protection chemicals manufacturer.
Improper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

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

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

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

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

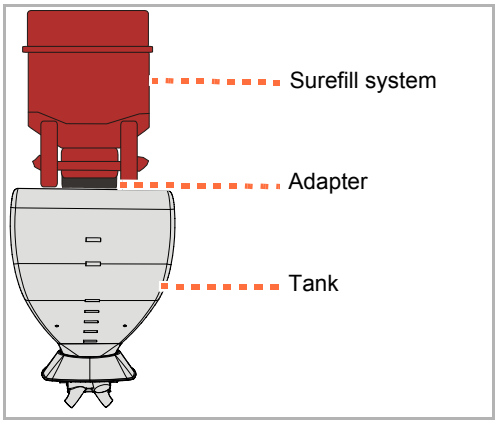


- Unscrew the cap on the tank
- Fill the tank with crop protection chemical from its original packaging. Do not fill to below the minimum fill level or exceed the maximum fill level.
- Refit the cap on the tank

Surefill system [+]

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

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



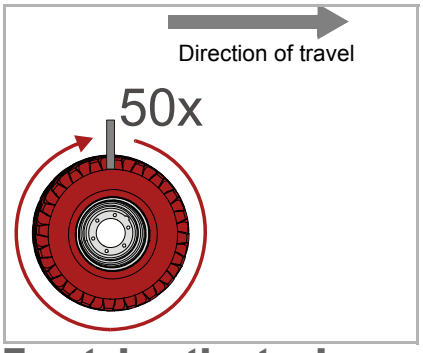
A prerequisite for use of the Surefill system is fitting the tank with an adapter.

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

Calibration test

Prerequisites:

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



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

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

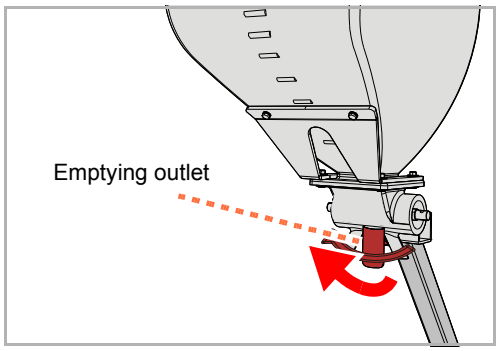
- Simulate a 100 m stretch with 50 revolutions on the drive wheel
- Weigh the applied crop protection chemical

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

Emptying the tank

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

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



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

Electric drive [+]



Secure against accidental switching on
Make sure that nobody switches on the drive for the granule distributor while the settings are being configured.
Turning the gear shaft or the drive wheel may cause injury to fingers or hands through crushing.

Range of potential application rates

You can see the range of potential application rates for the crop protection chemical in the following table. Depending on requirements, use a metering wheel with a cell width of 6 mm for standard output or a metering wheel with a 3 mm cell width for minimum application rates.

You will need the following basic information to choose the correct setting:

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

Which metering wheel you need for a particular range of potential crop protection chemical application rates will be displayed on the screen of the terminal when carrying out the first steps of the calibration test.

→ “PSD software” operating manual

Calculating the application rate

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

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

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

kg/ha

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

Calculation of the application rate in kg/ha:

Row spacing in cm	=	[R]

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



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

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

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

g /100 m

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

Calculation of the application rate in g/100 m:

Row spacing in cm	=	[R]

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



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

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

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

Setting the application rate

The machine has an electric drive on each granule distributor, which is controlled by the machine's electronic control system.

→ “PSD software” operating manual

Filling the tank

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

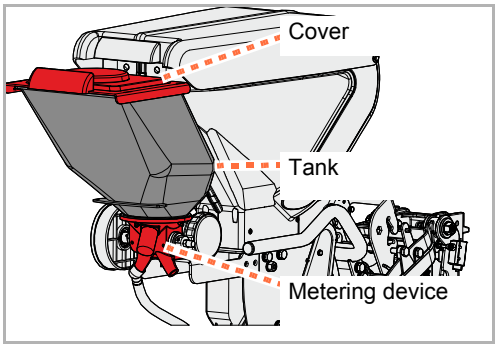
Protection against fine dust
When working in an environment contaminated with dust and other fine particles from crop protection chemicals, it may be necessary to wear a breathing mask and latex gloves. Observe the specific safety instructions issued by the crop protection chemicals manufacturer.
Improper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

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

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

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

Observe the fill level
Do not exceed the filling volume of 18 l for each granule distributor. Observe the minimum and maximum fill level
Exceeding the maximum fill level causes damage to the metering device.

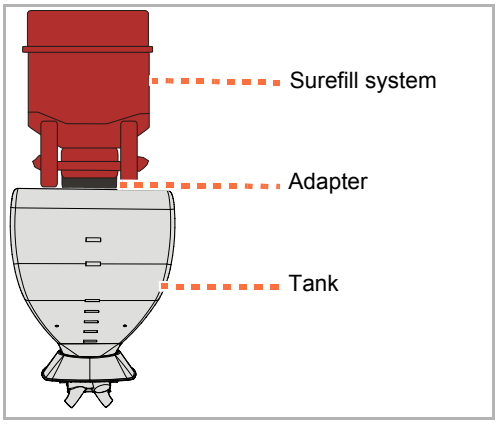


- Open the cover on the tank
- Fill the tank with crop protection chemical from its original packaging. Do not exceed the maximum fill level of 1 cm below the hopper edge.
- Refit the cap on the tank

Surefill system [+]

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

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



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

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

Calibration test

Prerequisites:

- The settings have been configured on the terminal
- For the calibration test, the tanks are filled with the desired crop protection chemical at least as far as the minimum fill level
- A sufficiently large catch pan is positioned under every granule tube
- The machine is lifted

▶ Start the calibration test on the terminal

→ “PSD software” operating manual

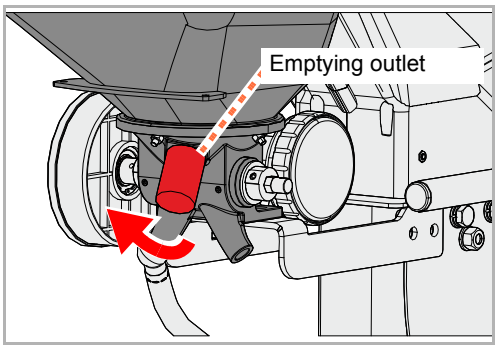
▶ Weigh the applied crop protection chemical

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

Emptying the tank

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

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



▶ Place opened packages or empty original packages in position when emptying the tanks

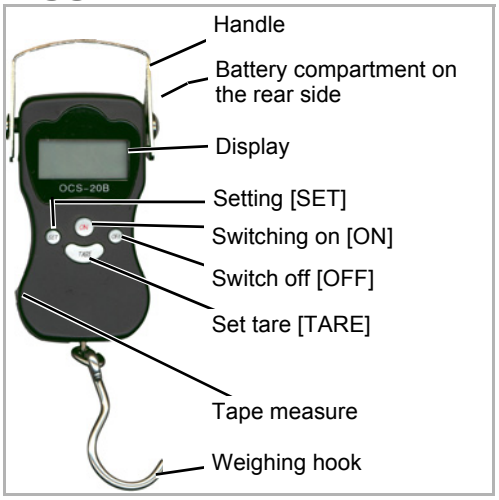
▶ Hold the package opening under the emptying outlet.

▶ Unscrew the emptying outlet

▶ Remove the remaining crop protection chemical from the tank with a brush. Never use this brush for any other purpose.

▶ Screw the emptying outlet back in

Familiarising yourself with the device



Each machine is supplied with electronic scales, which are provided for the purpose of weighing the seed or fertiliser for the calibration test. Please observe the tolerances and weighing range. The scales are not suitable for weighing fine seed such as rape.
→ Section »Technical data«, page 113

Technical data

Temperature range	0 – 50 °C
Maximum length	19 cm
Maximum width	6.5 cm
Weight	140 g
Battery	2x CR2032, 3 V
Weighing range	400 g – 50 kg
Tolerance	20 kg/20 g
	30 kg/20 g
	50 kg/50 g

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

Electronic scales

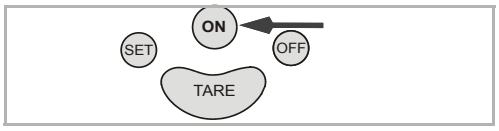
Safety

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

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

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

Switching on

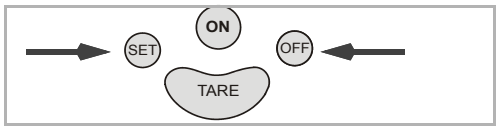


- Press the “ON” key

The scale is calibrated and ready if “0.00 kg”, “0.0 lb” or “0 oz” is displayed.

Settings

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



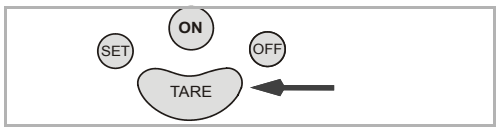
- Press the “SET” key until the desired unit is displayed
- Press the “OFF” key

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

By pressing the “SET” key several times you can display the temperature in °C.

Tare setting

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



- Suspend the container from the weighing hook and wait until a signal sounds
- Press the “TARE” key

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

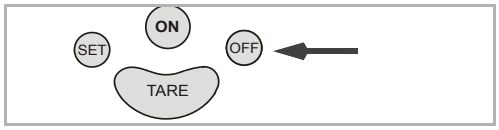
Weighing

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

The weight is displayed.

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

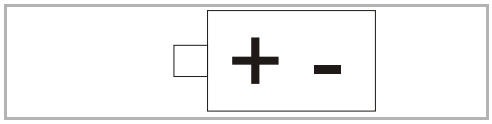
Switch off



- Press the “OFF” key

After roughly 2 minutes of no activity the device switches off automatically.

Changing the batteries



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

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

CE symbol

The device bears the CE mark.

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest

Soest, 15.05.2009

Friedrich Pehle
CEO and authorised person for compiling technical documentation

Safety

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

General

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

- Lighting, warning and protective devices must be fitted
- With the machine folded, all brake, reversing, and turn indicator lights as well as the number plate must be clearly visible. If a clear view is not possible, the lighting equipment and the number plate must be fitted to the attached seeding technology.
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- Transport must only be undertaken with an empty fertiliser hopper. Machines with a fertiliser hopper must not exceed a maximum speed of 25 km/h.
- Transport must only be undertaken with empty tanks on the granule distributor.
- Transport must only be undertaken with empty seed hoppers on the sowing units.

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

Before travelling on the road



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

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

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

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

Transport position

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



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

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

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

Frames rigid, 3.00 m

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

The machine can be in the following positions:

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

The machine was parked in a work position:

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

If the prerequisites have not been met:

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

Frames rigid, 4.50 m

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

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

The machine can be in the following positions:

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

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

The machine was parked in a work position:

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

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

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

If the prerequisites have not been met:

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

Frames rigid, 6.10 m and 9.30 m

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

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

The machine can be in the following positions:

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

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

The machine was parked in a work position:

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

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

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

If the prerequisites have not been met:

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

RS frame, 8.30 m

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

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

The machine can be in the following positions:

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

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

The machine was parked in a work position:

- The machine is positioned on a firm surface, and both supporting legs are in the lower position
- The transport wheels are in a lifted position
- The drawbar is in a folded position and secured

The machine was parked in a transport position:

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

If the prerequisites have not been met:

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

Coupling

Without lengthways transport attachment

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

→ Chapter »Coupling the machine«, section »Coupling« page 39

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

With lengthways transport attachment

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



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

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

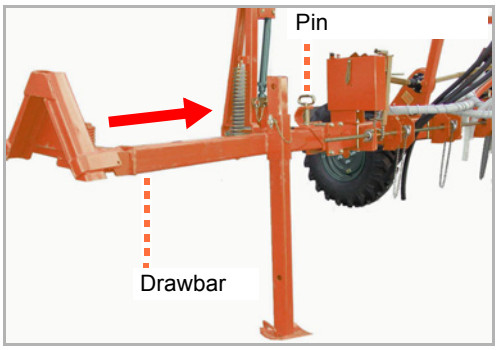
Frames rigid, 4.50 m

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

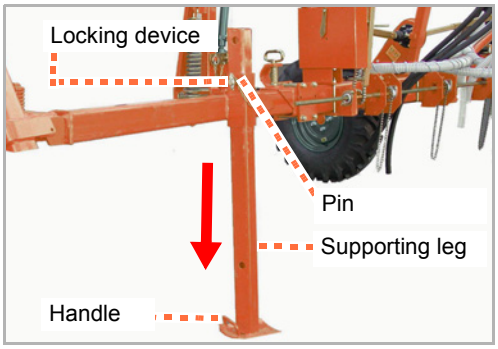
- Couple the machine in its work position

→ Chapter »Coupling the machine«, section »Coupling« page 39

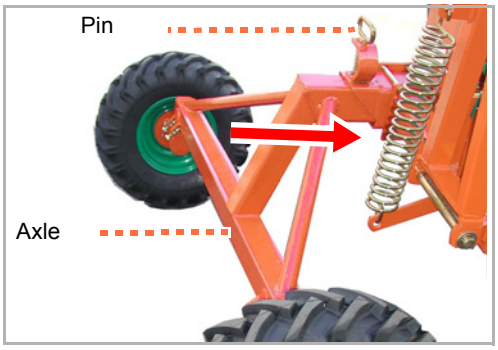
- Lift the machine
- Pull the pin upwards and turn it to the right until the securing mechanism is supported
- Insert the drawbar and secure using the pin



- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg downwards using the handle and secure with the pin
- Secure the pin



- Pull the pin upwards and turn it to the right until the securing mechanism is supported
- Insert the axle along with the transport wheels and secure using the pin



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

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

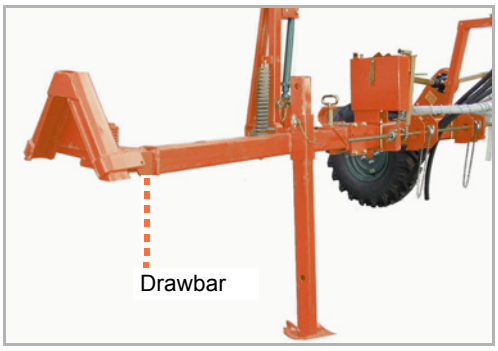
If these instructions are ignored, serious or fatal injuries may occur.

- Lower the machine

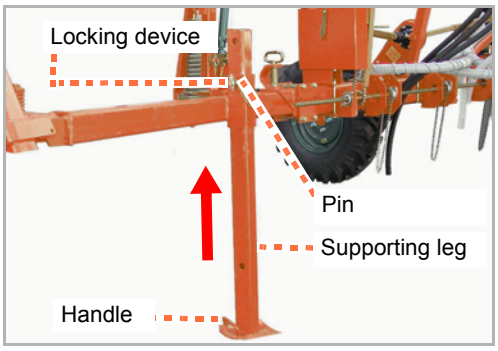
Machines with hydraulic frame ballasting:

- Relieve hydraulic frame ballasting using the control valve at the tractor. The hydraulic cylinders are to be retracted completely.

- Uncouple hydraulic connections
- Uncouple electrical connections
- Uncouple the machine
- Drive tractor in front of the drawbar
- Carry out coupling to the drawbar using the coupling triangle. Ensure that the coupling triangle is securely locked in place



- Lift the drawbar over the lower link ball of the tractor
- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg upwards using the handle and secure with the pin
- Secure the pin



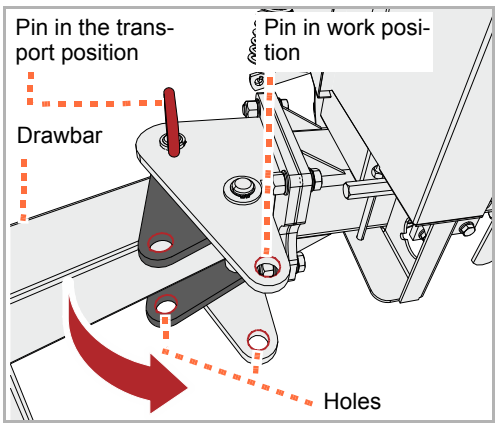
Frames rigid, 6.10 m and 9.30 m

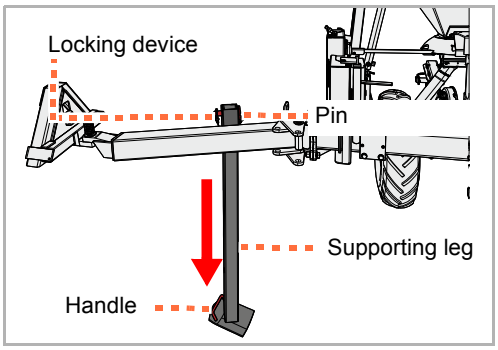
- Couple the machine in its work position

→ Chapter »Coupling the machine«, section »Coupling« page 39

The drawbar and the transport wheels must be folded out and secured while in the transport position.

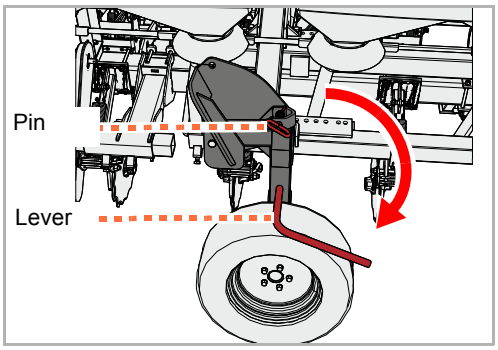
- Lift the machine
- Remove securing mechanism at the pin
- Remove the pin
- Fold in the drawbar. Also ensure that the holes are positioned above one another
- Secure the drawbar while in its work position using the pin
- Secure pin using the securing mechanism





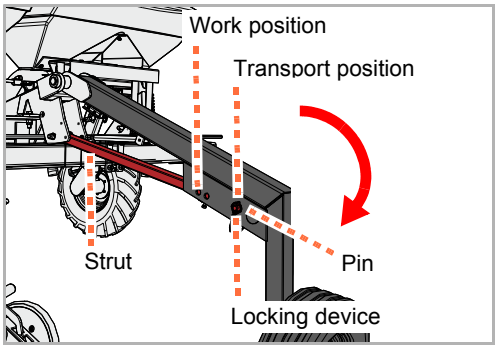
- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg downwards using the handle and secure with the pin
- Secure the pin

Right transport wheel



- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Swivel the transport wheel downwards in the direction of the arrow using the lever and secure with the pin

Left transport wheel



- Remove securing mechanism at the pin
- Remove pin while in the work position
- Swivel the transport wheel downwards
- Secure strut in the transport position using the pin
- Secure the pin

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

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

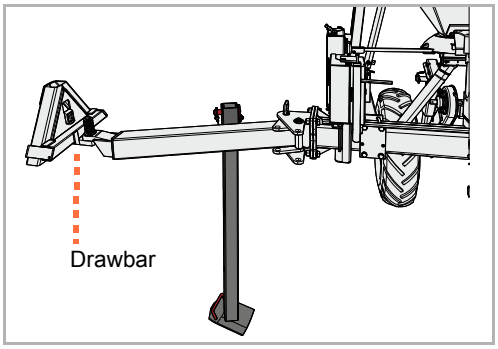
If these instructions are ignored, serious or fatal injuries may occur.

- Lower the machine

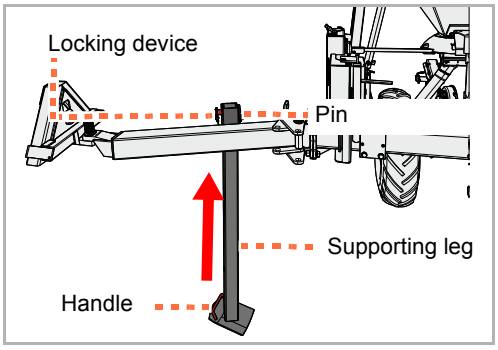
Machines with hydraulic frame ballasting:

- Relieve hydraulic frame ballasting using the control valve at the tractor. The hydraulic cylinders are to be retracted completely.

- Uncouple hydraulic connections
- Uncouple electrical connections
- Uncouple the machine
- Drive tractor in front of the drawbar
- Uncouple hydraulic connections
- Uncouple electrical connections
- Lower machine and uncouple
- Drive tractor in front of the drawbar
- Carry out coupling to the drawbar using the coupling triangle. Ensure that the coupling triangle is securely locked in place



- Lift the drawbar over the lower link ball of the tractor
- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg upwards using the handle and secure with the pin
- Secure the pin



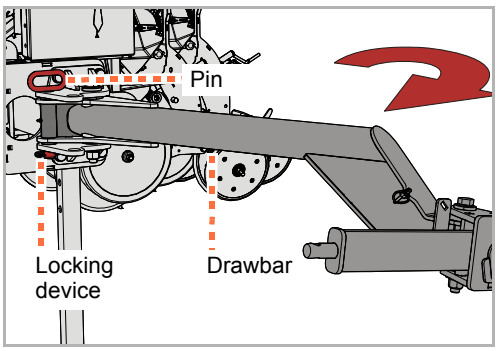
RS frame, 8.30 m

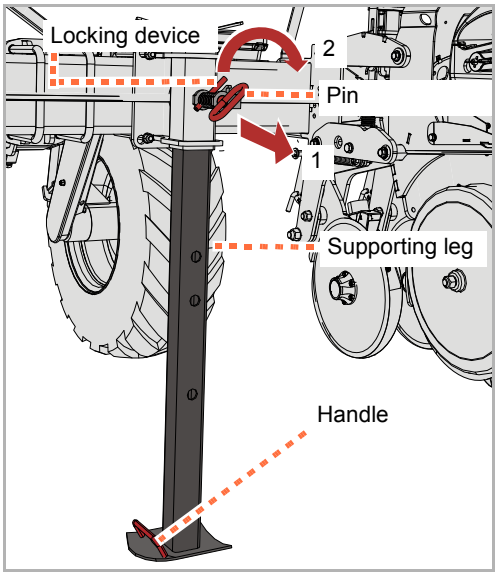
- Couple machine in work position

→ Chapter »Coupling the machine«, section »Coupling« page 39

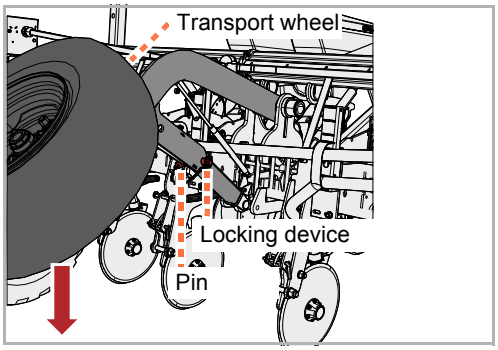
The drawbar and the transport wheels must be folded out and secured while in the transport position.

- Lift the machine
- Remove securing mechanism at the pin and pull out pin
- Swivel the drawbar into the transport position
- Re-insert the pin and tighten

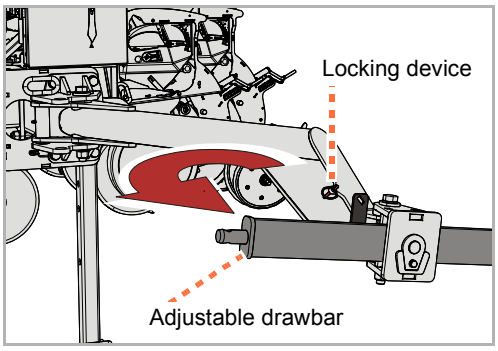




- Hold the left supporting leg near the drawbar at the handle
- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Push the supporting leg downwards and secure in the lower position with the pin



- Remove securing mechanism at the pin and pull out pin
- Swivel the transport wheel downwards
- Re-insert the pin in the lower position and secure
- Swivel the second transport wheel downwards and secure



- Remove securing mechanism
- Swivel the adjustable drawbar into the transport position
- Re-insert the securing mechanism

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

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

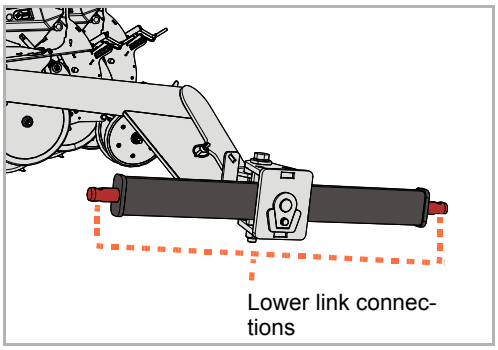
If these instructions are ignored, serious or fatal injuries may occur.

- Lower the machine

Machines with hydraulic frame ballasting:

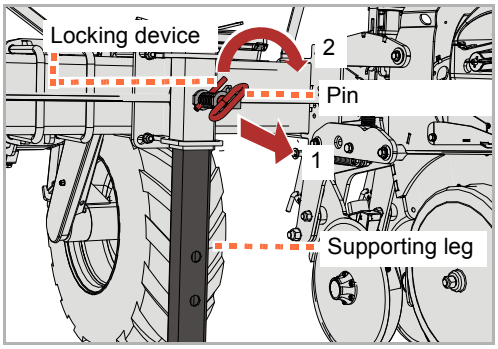
- Relieve hydraulic frame ballasting using the control valve at the tractor. The hydraulic cylinders are to be retracted completely.

- Release top link
- Release lower link ball



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

The supporting leg must be in the upper position.

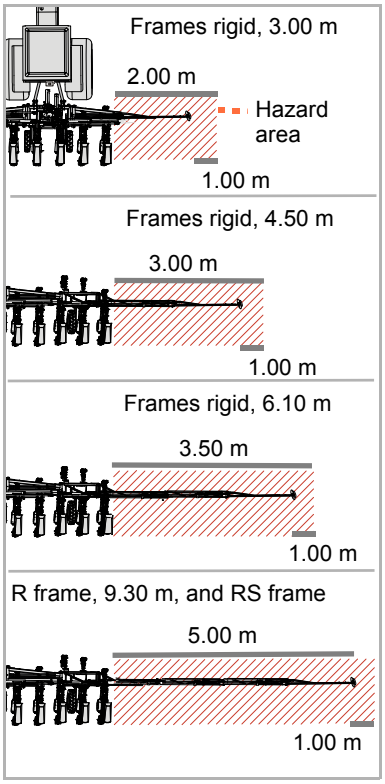


- Lift the machine over the lower link balls of the tractor
- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Push the supporting leg upwards and secure with the pin
- If necessary, push the second supporting leg upwards and secure with the pin

Track marker [+]

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

Hazard area



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

Without electronic control system

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

With an electronic control system

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

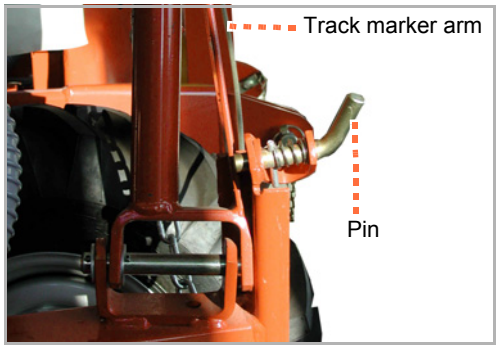
→ “PSD-e-drive-II-Software” operating manual

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

Transport locking device

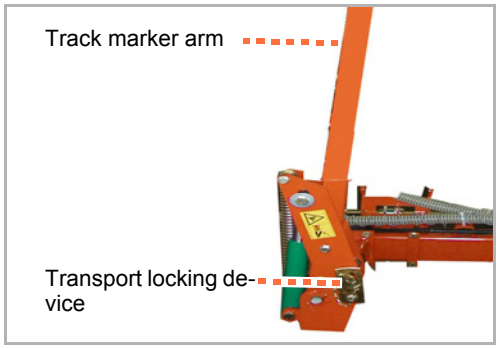
Depending on the type of frame different transport guards are available. The track markers must be secured on both sides prior to travelling by road.

Frames rigid, 3.00 m



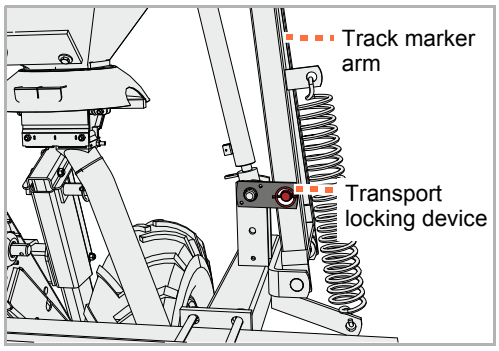
- Press against the track marker arm with one hand
- Pull the pin backwards and turn it to the left until the securing mechanism locks

Frames rigid, 4.50 m



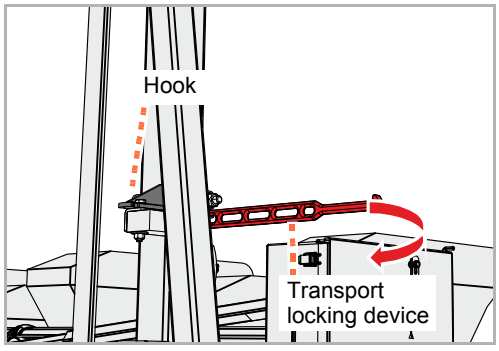
- Press against the track marker arm with one hand
- Push the transport locking device across the pin and secure

Frames rigid, 6.10 m



- Press against the track marker arm with one hand
- Push the transport locking device across the pin and secure

RS frame, 7.60 m and 8.30 m



- Press against the track marker arm with one hand
- Secure the transport locking device to the hook such that the transport locking device sits tightly against it

Connecting

After coupling, make the following connections:

- Electrical connections

Electrics

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

- The lighting of the machine
- Check all connections to ensure they are working properly

Road transport



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

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

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

Adapted driving speed
Always adapt the driving speed to the ambient conditions. Extremely large forces may result under poor road conditions and excessively high speeds and these will severely load or overload the tractor and machine.
Driving without adapting your speed can cause machine damage and accidents.

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

Ensure clear visibility
Check the immediate vicinity before driving off. Always make sure that you have a clear field of vision and, in particular, look out for children within the operating area of the machine.
Persons who could be struck when the machine starts up can be seriously or fatally injured.

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

- ☑ When hitching to the lower link balls, these are locked against sideways movement
- ☑ The track markers are folded in
- ☑ The chassis and support wheels are in the transport position and secured against unintended activation
- ☑ The steps and control platform are folded up
- ☑ The support leg is in its transport position
- ☑ The machine is correctly aligned with ground level
- ☑ 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 integral parts 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
- ☑ The granule distributor tanks are empty
- ☑ The PTO shaft is deactivated

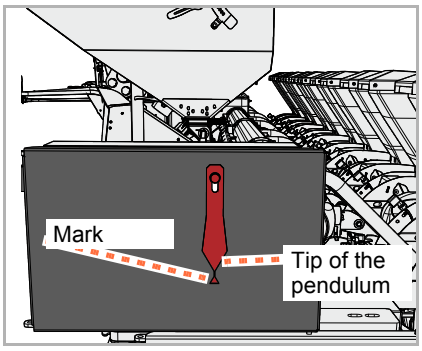
Work position

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

- Move the machine to its work position

→ Chapter »Coupling the machine«, section »Coupling«, page 39

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



For orientation purposes, there is a pendulum on the gear-box. You can carry out adjustments with the aid of the pendulum on a horizontal surface. The tip of the pendulum must be in line with the marking.

Track marker

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

→ Chapter »Preparing for operation«, section »Track marker [+]«, page 129

Seed hopper

- Fill the seed hopper with seed

→ Chapter »Preparing for operation«, section »Seed hopper«, page 134

Fertiliser hopper [+]

- Fill the fertiliser hopper with fertiliser

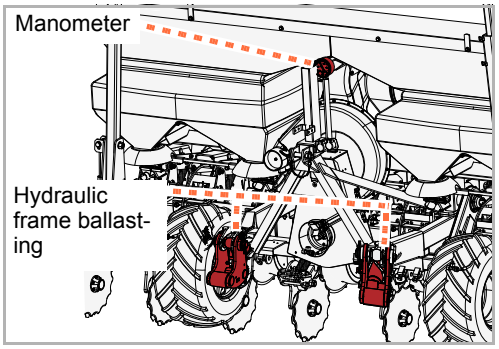
→ Chapter »Preparing for operation«, section »Fertiliser hopper [+]«, page 87

Hydraulic frame ballasting[+]

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

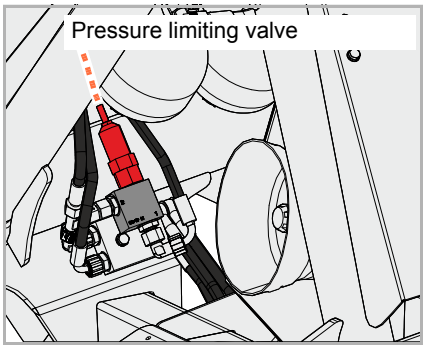
Switch on the hydraulic ballasting when work starts.

Frames rigid



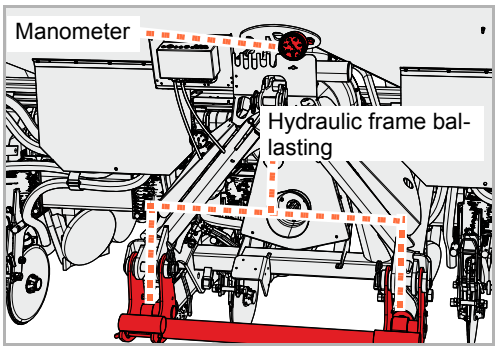
- Lower the machine to its work position
- Actuate the control unit at the tractor for the hydraulic frame ballasting until 130 bar is displayed on the manometer

When raising the machine, the pressure rises to approximately 180 bar. When lowering the machine, the pressure drops back to the set value.



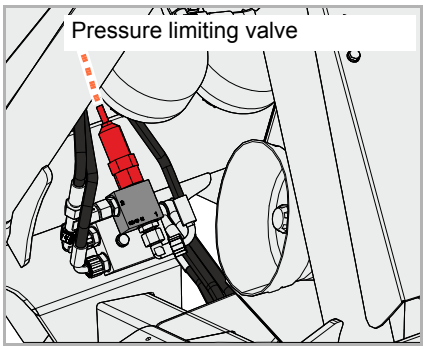
Do not change the adjusted level of the pressure limiting valve
Do not change the pressure setting of the pressure limiting valve.
A pressure limiting valve set to too high a pressure can cause damage to the machine.

Frames rigid



- Lower the machine to its work position
- Actuate the control unit at the tractor for the hydraulic frame ballasting until 70 bar is displayed on the manometer

When raising the machine, the pressure rises to approximately 180 bar. When lowering the machine, the pressure drops back to the set value.



Do not change the adjusted level of the pressure limiting valve
Do not change the pressure setting of the pressure limiting valve.
A pressure limiting valve set to too high a pressure can cause damage to the machine.

Negative pressure

Negative pressure is set differently for the application of:

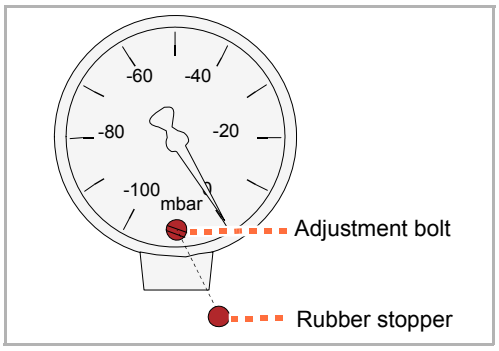
- Seed
- Seed and fertiliser

▸ Select appropriate negative pressure according to the seed

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

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

Manometer



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

If the needle is not at “0”:

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

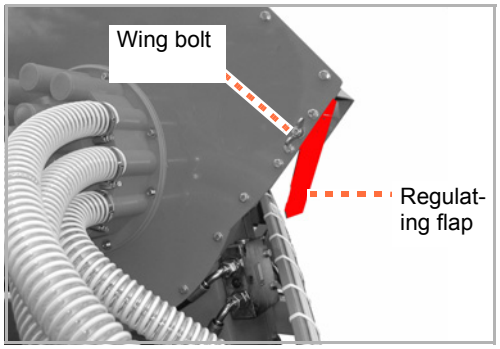
Seed

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

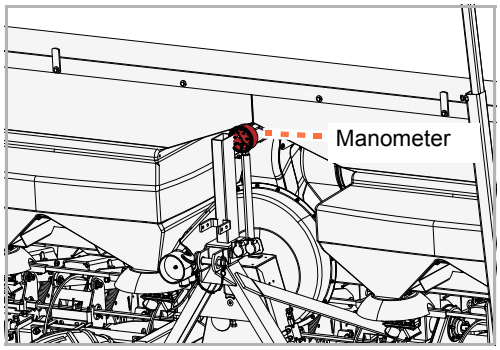
The values in the table are approximations. The exact setting can only be performed on the field.

Seed disc	Seed	Negative pressure [mbar]
1250	Maize narrow sowing	70 -90
1275	Broad beans	90 – 100
2420	Beet	40 – 50
2430	Sunflowers	40 – 50
2465	Big Beans	100
3220	Turnips	40 – 50
3230	Sunflowers	40 – 50
3245	Maize up to TGW 220	50 – 80
3250	Maize up to TGW 320	70 – 90
3255	Maize from TGW 280, broad beans	70 – 100
4820	Beet	40 – 50
4835	Dwarf beans	80
4855	Broad beans with narrow sowing distance	90 – 100
6420	Beet	40 – 50
6430	Soybeans	80
6440	Peas	50 – 90
	Soybeans	80
2420	Chicory	30
3220	Chicory	30

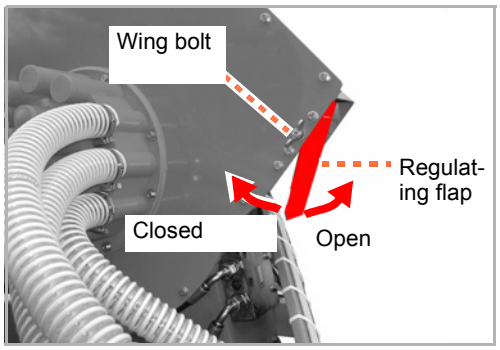
Frames rigid, without fertiliser hopper



- Close the regulating flap



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



If the desired negative pressure is not reached:

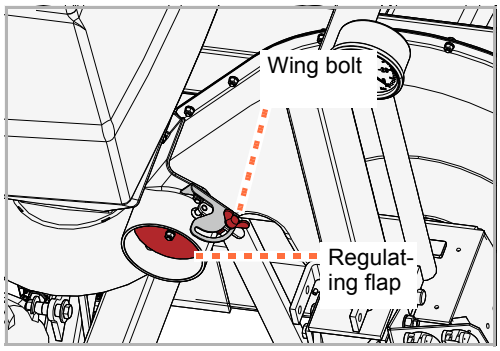
Adjust the flap on the fan. Adjustment can be carried out in an infinitely variable manner.

Open	Minimum negative pressure
Closed	Maximum negative pressure

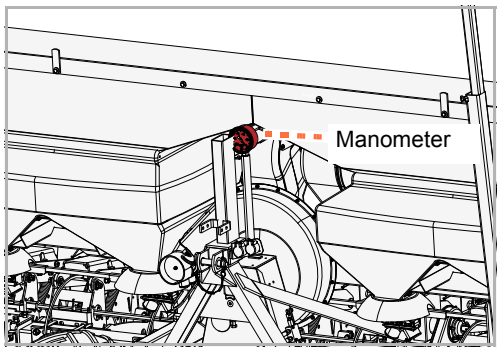
- Release the wing bolt at the metering flap and set the metering flap as desired.
- Fit the metering flap with the wing bolt

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

Frames rigid, with fertiliser hopper



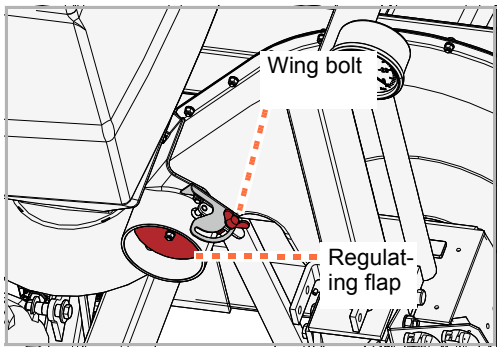
- Close the regulating flap



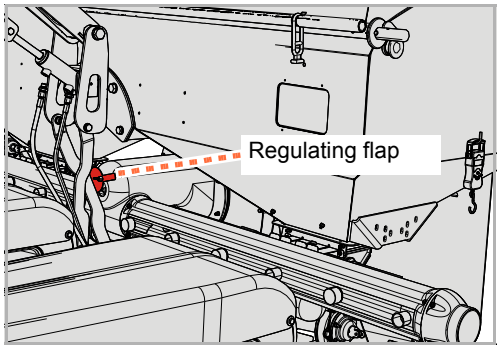
- Switch on the PTO stub shaft on the tractor and select the rotational speed of the PTO stub shaft so that the desired negative pressure is reached on the manometer

Air support [+]

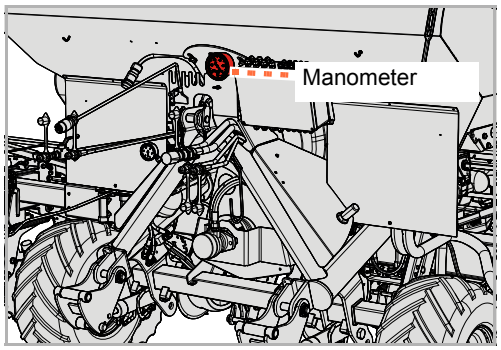
For air support of the outer fertiliser coulter the air flow of the fan is divided. The specified values refer to maize as seed with simultaneous application of fertiliser. Please contact the manufacturer for the use of other seeds.



- Release the wing bolt and set the regulating flap so that the manometer reads 70 – 75 mbar
- Secure the regulating flap with the wing bolt

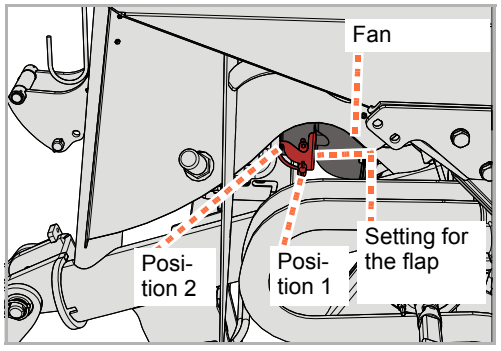


- Close the regulating flap



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

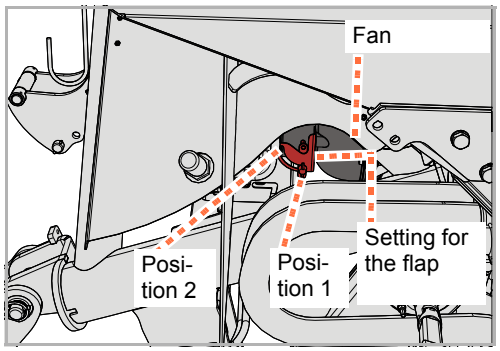
If the desired negative pressure is not reached:



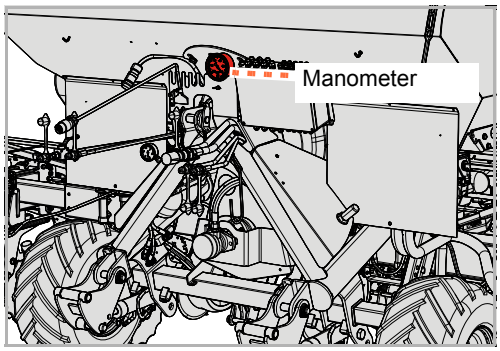
- Adjust the flap on the fan. Adjustment is infinitely variable between position 1 and position 2.

Position 1	Minimum negative pressure
Position 2	Maximum negative pressure

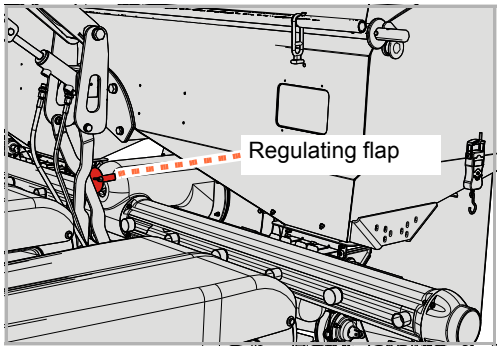
Seed and fertiliser



- Set the flap on the fan to position 1



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



RS frame:

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

Test drive

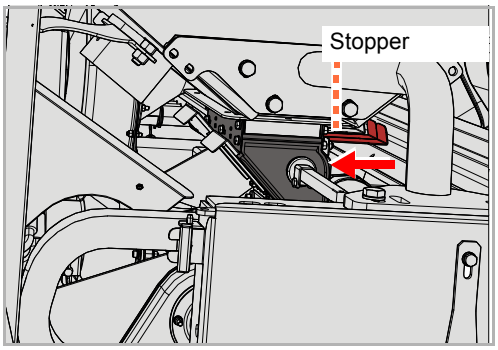
Performing a test drive is essential for evaluating the settings on the machine. Only in this way is it possible to verify the deposit depth for seed and fertiliser reliably.

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

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

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

On machines with a mechanical fertiliser spreader:
If no fertiliser is to be applied during the test drive, you can close the stopper.



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

On machines with mechanically driven granule distributors:
If no granules are to be applied during the test drive, you can switch off the mechanical drive.

- Remove the corresponding drive shaft from the granule distributor drive
- Switch the granule distributor drive back on after carrying out the test drive

On machines with electrically driven granule distributors:

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

- Switch off the granule distributor drive via the electronic control system

  → “PSD software” operating manual
- Switch the granule distributor drive back on after carrying out the test drive

Performing the test drive

- First perform a test drive in the work position at working speed (5 - 10 km/h)

→ “PSD-e-drive-II-Software” operating manual

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

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

After the test drive

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

- Sowing distance

→ Chapter »Preparing for operation«, page 72

- Scraper

→ Chapter »Preparing for operation«, page 78

- Seed deposit depth

→ Chapter »Preparing for operation«, page 60

- Fertiliser deposit depth

→ Chapter »Preparing for operation«, page 86



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 during folding in and out, under no circumstances perform machine folding operations in proximity to live overhead power lines! Danger of electrocution!
Should the machine come into contact with a live overhead power line:

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

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

Sowing

→ “PSD-e-drive-II-Software” operating manual

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

Work position and cultivation

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

Turning

The machine must be lifted at the headland.

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

Shortly before field border:

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

After turning

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

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

Checks

During sowing, use the checklist to examine the following:

General

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

☑ Has the negative pressure not been adjusted correctly?
→ Chapter »Preparing for operation«, section »Manometer« page 76
☑ Sowing depth OK?
☑ Placing accuracy OK?
☑ Are all coulters unobstructed?
☑ Is seed consumption in all hoppers uniform?
☑ Is the fertiliser being applied?
☑ Is the consumption of fertiliser uniform?
☑ Are the furrows covered as well as possible?

Mechanical hectaremeter[+]

Cultivated surface

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

Reset the hectaremeter before every use to zero.

Calculate the cultivating field area using the following formula:

$$\frac{\text{Reading of the hectaremeter x table value}}{10.000} = \text{ha}$$

Example:
Seeding machine with 8 rows, 45 cm row spacing
Reading of the hectaremeter = 4000

$$\frac{4000 \times 7.67}{10.000} = 3068 \text{ ha}$$

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

Number of sowing units	Row spacing [cm]													
	30	35	38	40	42	45	48	50	51	60	63	70	75	80
4	2,56	2,98	3,20	3,41	3,58	3,84	4,09	4,26	4,33	5,12	5,33	5,97	6,40	6,82
5	3,20	3,73	4,00	4,26	4,48	4,80	5,12	5,33	5,41	6,40	6,66	7,46	7,99	8,53
6	3,84	4,48	4,80	5,12	5,37	5,76	6,14	6,40	6,50	7,67	7,99	8,95	9,50	10,23
7	4,48	5,22	5,60	5,97	6,27	6,72	7,16	7,46	7,58	8,95	9,33	10,45	11,19	11,94
8	5,12	5,97	6,40	6,82	7,16	7,67	8,19	8,53	8,66	10,23	10,66	11,94	12,79	13,64
9	5,76	6,72	7,19	7,67	8,06	8,63	9,21	9,59	9,75	11,51	11,99	13,43	14,39	15,35
10	6,40	7,46	7,99	8,53	8,95	9,59	10,23	10,66	10,83	12,79	13,32	14,92	15,99	17,05
12	7,67	8,95	9,59	10,23	10,74	11,51	12,28	12,79	13,00	15,35	15,99	17,91	19,19	20,47
14	8,95	10,45	11,19	11,94	12,53	13,43	14,33	14,92	15,16	–	–	–	–	–
15	9,59	11,19	11,99	12,79	13,43	14,39	15,35	15,99	16,24	–	–	–	–	–
16	10,23	11,94	12,79	13,64	14,33	15,35	16,37	17,05	17,33	–	–	–	–	–
18	11,51	13,43	14,39	15,35	16,12	17,27	18,42	19,19	19,49	–	–	–	–	–

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

After sowing

Emptying the seed hopper
→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page 83

Emptying the fertiliser hopper
→ Chapter »Preparing for operation«, section »Emptying the fertiliser hopper«, page 98

Empty the granule distributor tank
→ Chapter »Preparing for operation«, section »Emptying the tank«, page 107

Parking the machine
→ Chapter »Parking and storage«, page 153

Move machine into transport position
→ Chapter »Driving on the road«, page 116

Cleaning

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

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

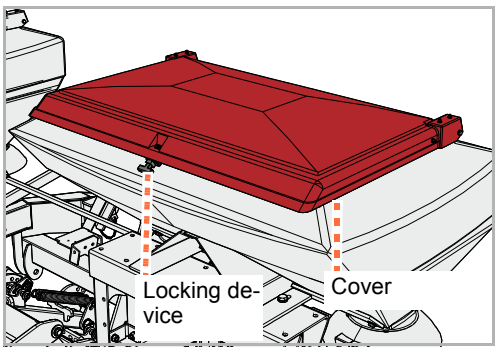
Only use low pressure to clean the bearings
Only use low pressure to clean the bearings. Housings, signal distribution boxes, electric drive motors, screw-on connections, and ball bearings are not waterproof.
The ingress of water shortens the service life of the bearings.

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

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

Prior to cleaning

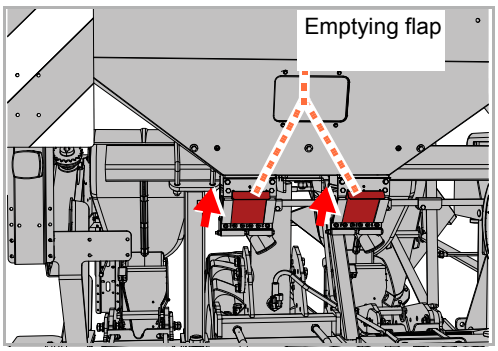
Frames rigid



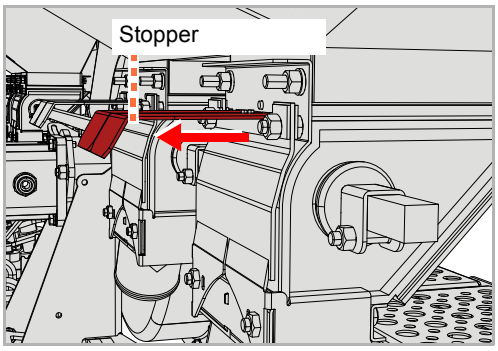
- Releasing the lock
- Open cover of fertiliser hopper

Metering device

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

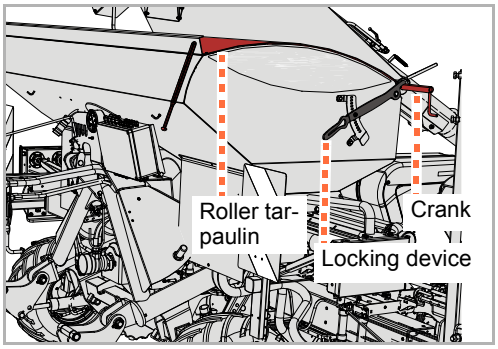


- Open the emptying flaps on all metering devices



- Open the stoppers on all metering devices

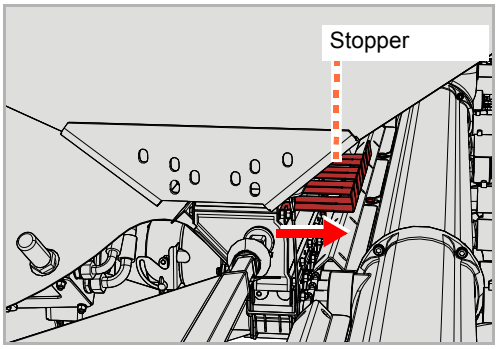
Frames rigid



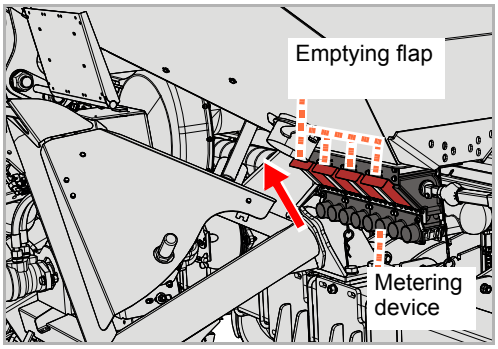
- Roll down the roller tarpaulin using the crank
- Secure the roller tarpaulin with the securing mechanism

Metering device

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



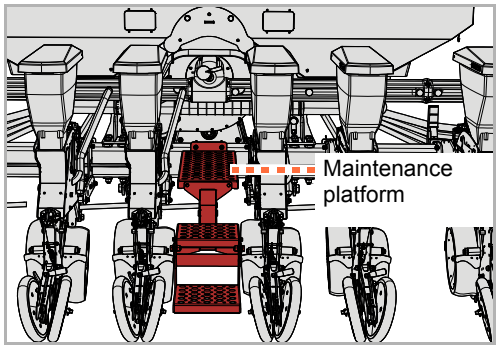
- Open the stoppers on all metering devices



- Open the emptying flap on the metering device

Maintenance platform, machine

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



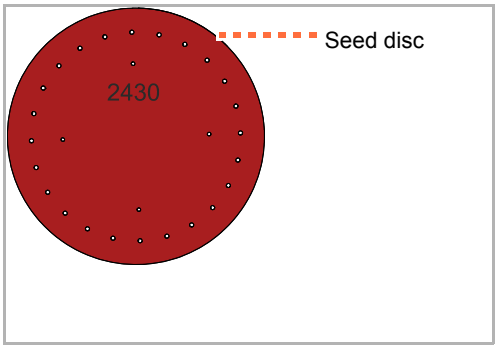
In the case of a rigid frame, a maintenance platform is located at the centre of the machine.

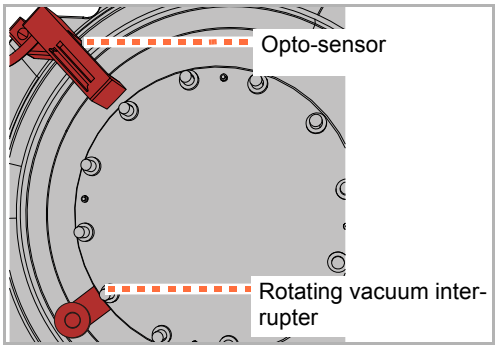
- Clean the maintenance platform and step

Sowing units

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

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





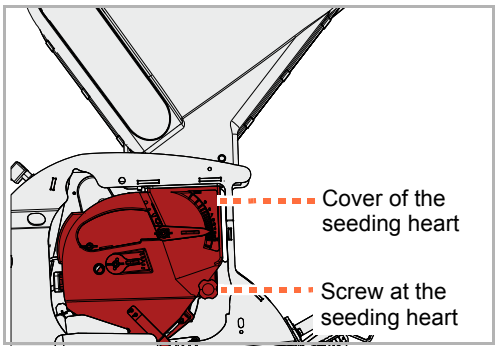
- Clean the disc of the rotating vacuum interrupter [+], the ball bearing of the vacuum interrupter and the opto-sensor with a cloth

After cleaning

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

If water has entered the seed hoppers:

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



Care

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

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

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

Parking the machine

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



Secure surface

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

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

Seed hopper

▸ Emptying the seed hopper

→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page 83

Fertiliser hopper [+]

▸ Emptying the fertiliser hopper

→ Chapter »Operation«, section »Emptying the fertiliser hopper«, page 98

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

Granule distributor [+]

▸ Empty the granule distributor tank

→ Chapter »Preparing for operation«, section »Emptying the tank«, page 107

Uncoupling

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

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

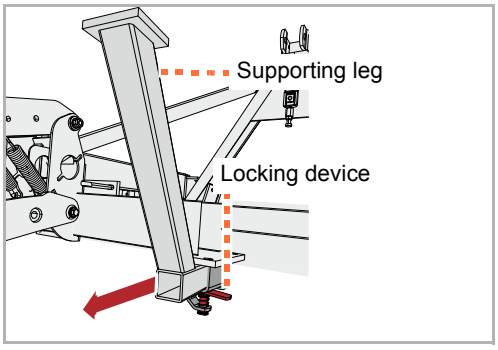
If these instructions are ignored, serious or fatal injuries may occur.

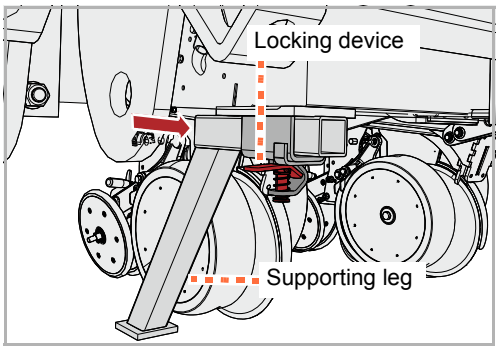
Without lengthways transport attachment

The machine can be parked:

From the work position in/into	Work position

- Lift the machine over the lower link balls of the tractor
- Press the securing mechanism downwards
- Pull out the supporting leg and remove it





- Turn the supporting leg 180° and reinsert. Take care that the securing mechanism locks in place.

With lengthways transport attachment

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

Coupling for travelling by road is described in the applicable chapter.
→ Chapter »Driving on the road«, page 116



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

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

The machine can be parked:

From the transport position in/into	Transport position



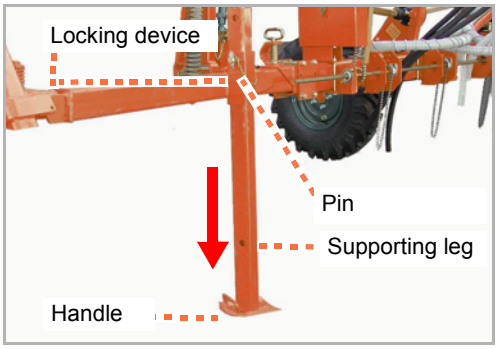
If the machine is later to be coupled in a different position than that in which it was parked, the machine must be changed accordingly.

Linkage from work position to transport position
→ Chapter »Driving on the road«, section »Transport position«, page 117

Linkage from transport position to work position
→ Chapter »Coupling the machine«, section »Coupling«, page 39

Frames rigid, 4.50 m

Supporting leg



- Lift the machine over the lower link balls of the tractor
- Remove securing mechanism at the pin
- Remove the pin
- Push the supporting leg downwards using the handle and secure with the pin
- Secure the pin
- Lower the machine

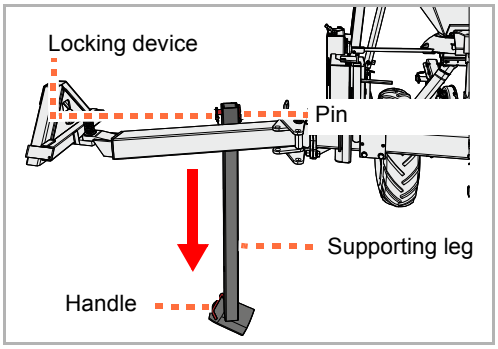
Machines with hydraulic frame ballasting:

- Relieve hydraulic frame ballasting using the control valve at the tractor. The hydraulic cylinders are to be retracted completely.

- Uncouple the machine at the coupling triangle
- Uncouple the electrical cables

Frames rigid, 6.10 m and 9.30 m

Supporting leg



- Lift the machine over the lower link balls of the tractor
- Remove securing mechanism at the pin
- Push the supporting leg downwards using the handle and secure with the pin
- Secure the pin
- Lower the machine

Machines with hydraulic frame ballasting:

- Relieve hydraulic frame ballasting using the control valve at the tractor. The hydraulic cylinders are to be retracted completely.

- Uncouple the machine at the coupling triangle
- Uncouple the electrical cables

Frames rigid, 8.30 m frame

The machine can be parked:

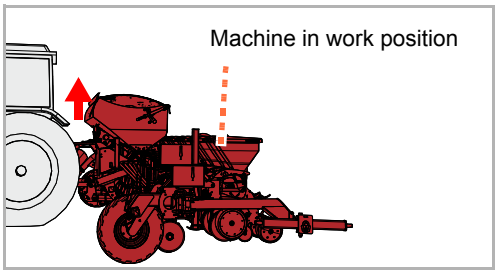
From the work position in/into	Work position
From the transport position in/into	Transport position

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

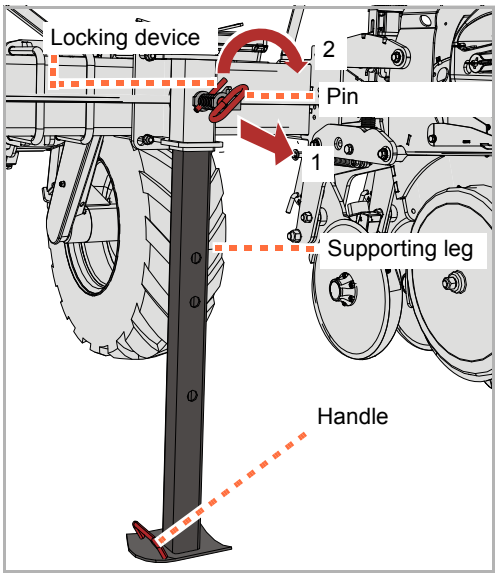
Linkage from work position to transport position
→ Chapter »Driving on the road«, section »Transport position«, page 117

Linkage from transport position to work position
→ Chapter »Coupling the machine«, section »Coupling«, page 39

Work position



- Lift the machine over the lower link balls of the tractor



- Hold supporting leg at the handle
- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Push the supporting leg downwards and secure in the lower position with the pin
- Also push the second supporting leg downwards and secure in the lower position with the pin
- Lower the machine

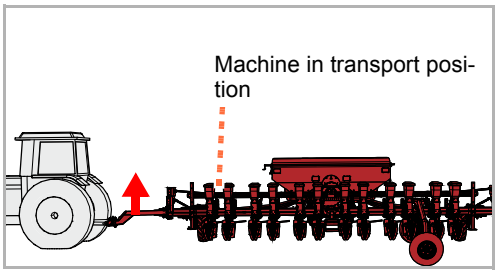
Machines with hydraulic frame ballasting:

- Relieve hydraulic frame ballasting using the control valve at the tractor. The hydraulic cylinders are to be retracted completely.

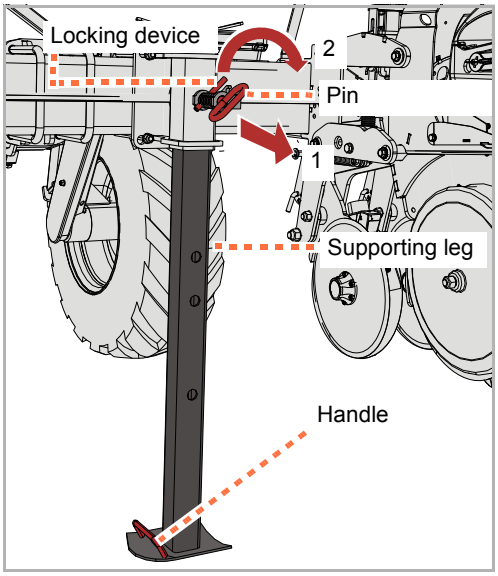
- Release top link
- Release lower link ball

Transport position

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



- Lift the machine over the lower link balls of the tractor

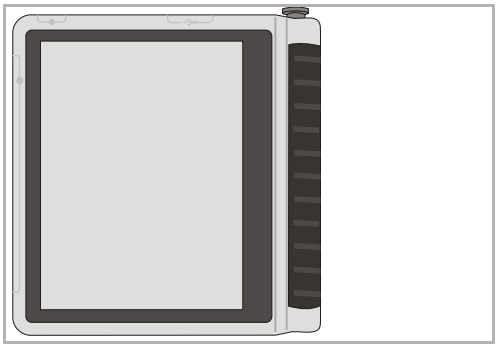


- Hold the left supporting leg near the drawbar at the handle
- Pull the pin backwards and turn it to the right until the securing mechanism is supported
- Push the supporting leg downwards and secure in the lower position with the pin
- Lower the machine
- Release lower link ball

Connections

- Disconnect hydraulic hoses from the tractor
- Protect the couplings with cover caps and stow them in the stowage compartment
- Disconnect the electrical cables and stow them in the stowage compartment
- Disconnect any other lines to the tractor
- Uncouple the machine from the tractor

Terminal [+]



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

Storing the machine

After cleaning, the machine should be stored in transport position in a dry location and on a level and stable surface.
→ Section »Parking the machine«, page 153

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

Before oiling, cover the tyres of the transport wheels. The oil can damage the tyres.
→ Chapter »Cleaning and care«, page 148

Sowing units with mechanical drive:

- Oil the drive chains using suitable oil

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

For your safety

Special safety information



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

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

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

Serious accidents can result if the device starts inadvertently.

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

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

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



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

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

Protective measures when handling oils or lubricants

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



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

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

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

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



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

General information

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



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

Fundamentals

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

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

Screw connections

Retightening bolts

All bolts must be retightened:

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

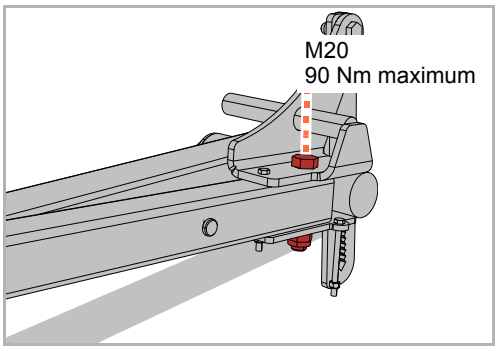
Tightening torques, general

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

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

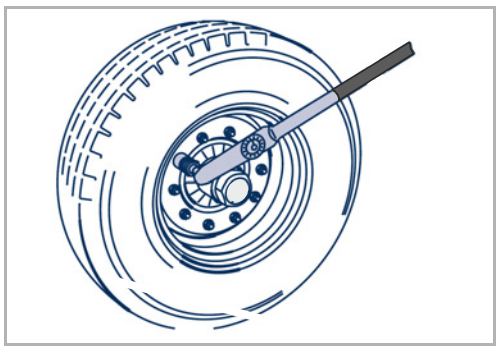
Tightening torques, special

Track marker arm



Bolt	M20
Tightening torque	90 Nm maximum

Wheel nuts



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

Maintenance intervals and setting work

	After the first hours of operation	Daily	After 75 hours of operation	Once per season	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Cleaning	Page
General											
Retighten all bolts	•				•						164
Visual inspection	•	•									
Bearing			•		•		•				170
Hose connections				•				•			
Pivot points (frame, track markers)		•						•			
Hydraulics											
Hydraulic hoses every 6 years									•		177
Hydraulic hoses in general					•	•			•		177
Hydraulic cylinders for the lower link			•		•		•	•			74
Hydraulic fan drive				•				•			
Seeding technology											
Delivery hose clamps				•				•			
Metering device		•						•		•	
Sealing lip at the metering device						•			•		83

	After the first 10 hours of operation	Daily	After 75 hours of operation	Once per season	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Cleaning	Page
Electronic control system											
All sensors		•						•			76
Other											
Wheels											
Tyres				•				•			75
Tyre pressure	•			•				•			76
Hydraulic oil from the external oil supply about every 7000 ha [+]					•				•		
Tractor lower link arms		•					•				75
Drive shafts					•		•				

	Daily	After 20 hours of operation	After 40 hours of operation	Once per season	After heavy use	If required	In case of wear	Lubrication	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Fan														
Tension jack		•						•						
Fan drive wheel							•			•				
Seeding heart	•								•				•	
Seed disc				•					•					
							•			•				
Ejector							•			•				
						•					•			
Rotating vacuum interrupter							•			•				
				•					•					
						•					•			
Vacuum interrupter							•			•				
Coulters, general							•			•				
						•			•					
Coulter flank distance					•				•					
Coverer				•					•					
						•					•			
Scraper				•					•					
						•					•			
Rubber V press wheel				•					•					
Gauge wheel				•					•					
						•					•			
Double cutting disc				•					•					
				•		•		•						
							•			•				

	Daily	After 20 hours of operation	After 40 hours of operation	Once per season	After heavy use	If required	In case of wear	Lubrication	Checking	Replacement	Settings	Tensioning	Cleaning	Page
Fertiliser application														
Metering device														
Sealing lip							•			•				
Metering wheels							•			•				
PTO shaft			•	•				•						
Filling auger, weekly								•						
Granule distributor														
Metering device				•		•							•	
Scraper							•			•				
Metering wheels							•			•				

Secure the machine

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



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

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

Working under the machine

- Mechanically secure the machine against lowering

Lubricating work

Lubricate bearings

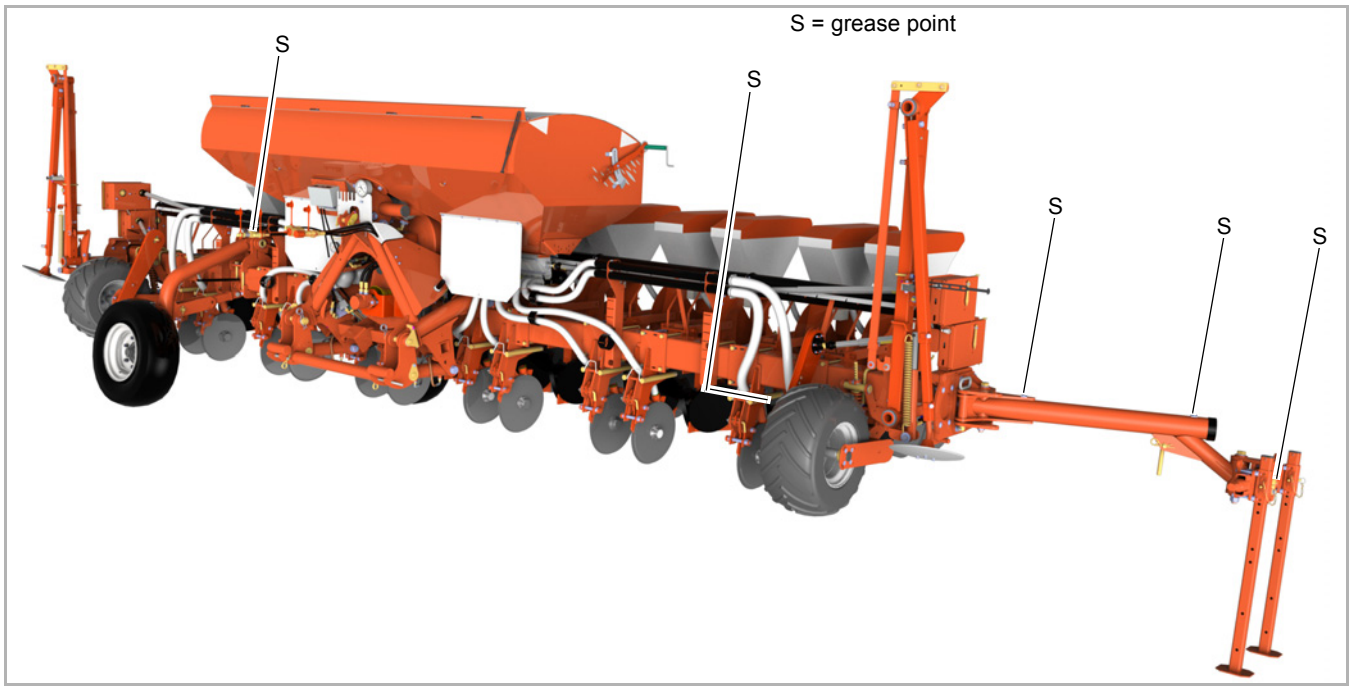
The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

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

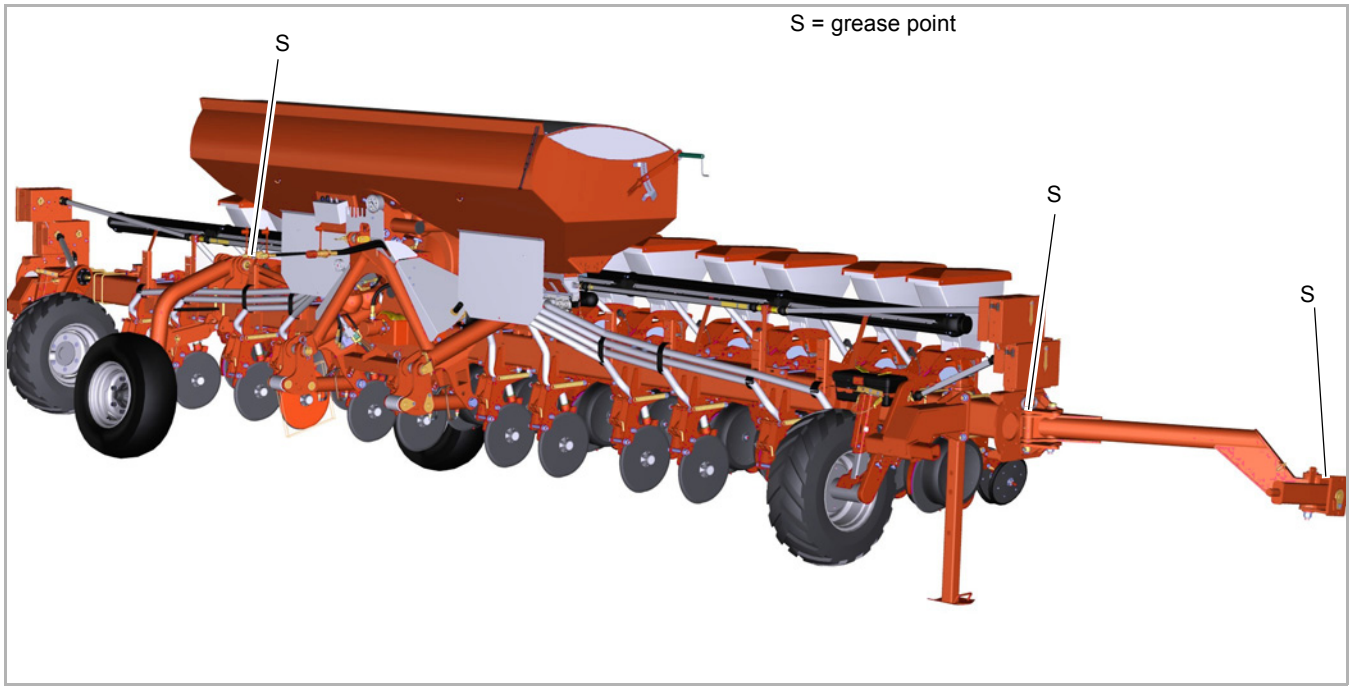
Do not lubricate maintenance-free bearings.

Overview of lubrication points

RS frame, 7.60 m

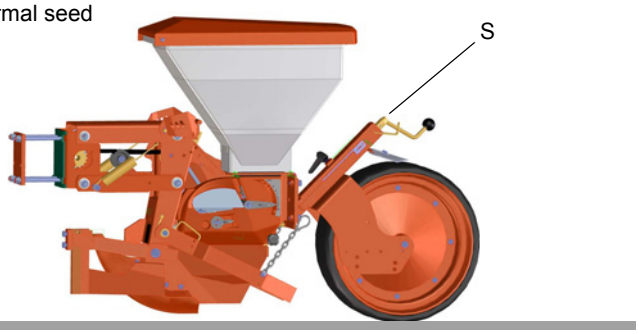


RS frame, 8.30 m



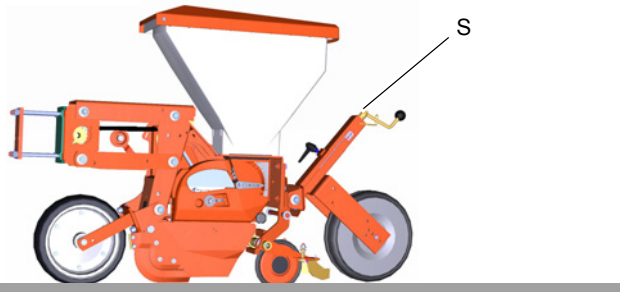
Sowing units

Normal seed

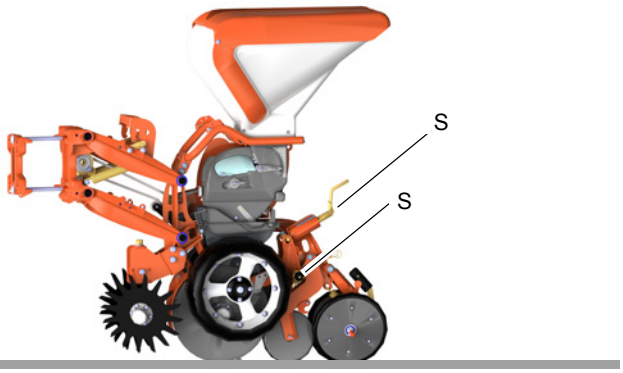


S = grease point

Tandem



HD II



Other lubrication points

Generally:

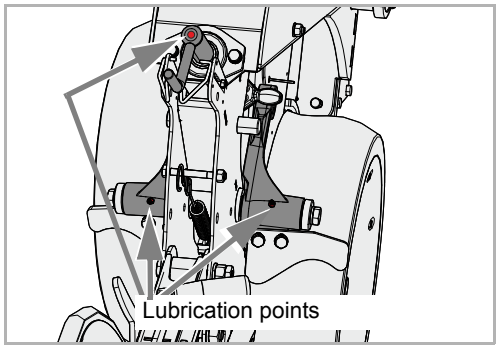
- In addition to the lubrication points shown in this operating manual, your machine may have other lubrication points
- As a rule, lubrication points are located at pivots or bearings. Therefore, check the entire machine for any such lubrication points.

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

Sowing units

Each sowing unit has three lubrication points.

After 75 hours of operation

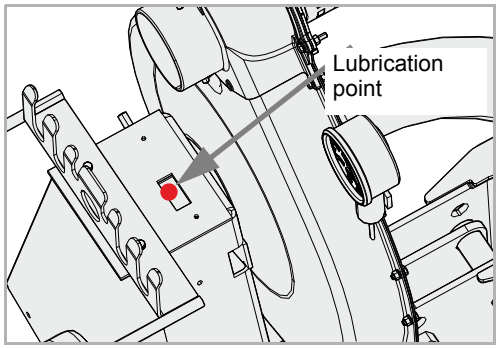


- Lubricate with one to two pumps of the grease gun

Fan

The mechanical fan drive has one lubrication point.

After 75 hours of operation



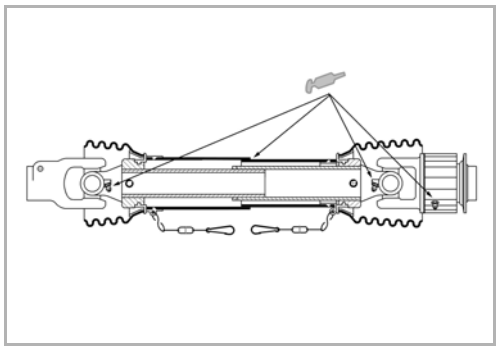
- Remove the cover
- Lubricate with one to two pumps of the grease gun
- Fit the cover

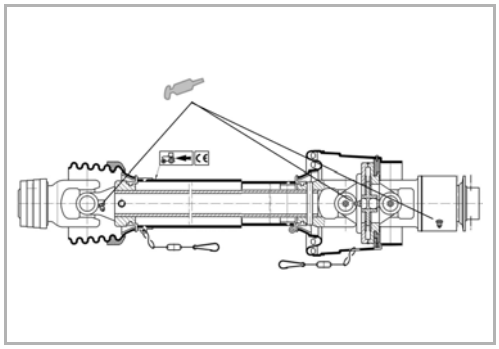
Lubricating the PTO shafts

After 75 hours of operation

The manufacturer's own operating manual is included with each PTO shaft. This includes detailed information on the relevant version of the PTO shaft.

Check the guard components
Check all guard components of the PTO shafts for wear or damage (visual inspection). Replace any defective guard components.
An unguarded PTO shaft or damaged guard components can cause very serious injuries during operation.





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

Wheels

Works:

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

Check tyres

Once per season

▸ Inspect the tyres once per season for proper condition

During maintenance work, ensure that no oil gets onto the tyres. The oil can damage the tyres.

Check tyre pressure

Once per season

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

Frames rigid		
7.00 -12.8 PR	=	Around 4.5 bar
7.00–12 AS	=	Around 2.0 bar
10.0/75-15.3	=	Around 5.0 bar
26.00x12	=	Around 1.4 bar
15x6.00-6	=	Around 2.0 bar

RS frame, 8.30 m		
10.0/75-15.3 AS	=	Around 4.0 bar
10.0/75-15.3 AW	=	Around 5.2 bar

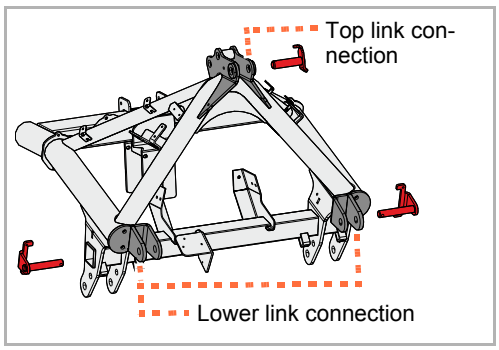
Pin connection to the tractor

Once per season

You must check all the pins and the holes for them in the pin connection to the tractor.

- The measurements must be within the specified range
- Worn parts must be replaced

	CAT 2N / CAT 2	CAT 3N / CAT 3	CAT 4N / CAT 4
Top link connection			
Pin diameter [mm]	25,37 - 25,50	31,55 - 31,75	44,20 - 45,00
Bore diameter [mm]	25,70 - 25,90	32,00 - 32,25	45,20 - 45,50
Lower link connection			
Pin diameter [mm]	27,80 - 28,00	36,4 - 36,60	49,70 - 50,80
Bore diameter [mm]	28,70 - 29,00	37,4 - 37,75	51,00 - 51,50



▸ Check all the pins and the holes for them using the information given in the table.

Sensors

This section contains information concerning setting and sensor replacement.

Setting the sensors

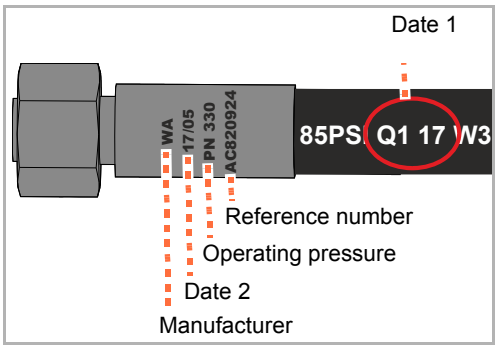
The following sensors may be connected by the electronic control system:

- Sensors on the drive shafts
- Hopper low level sensor [+]
- Travel sensor

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

Hydraulic hoses

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



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

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

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

Replacing hydraulic hoses

Every 6 years or if required

All pressure must be released from the hoses. Only use hydraulic hoses with the same specification. The hydraulic hoses within the frame must only be replaced in a specialist workshop.

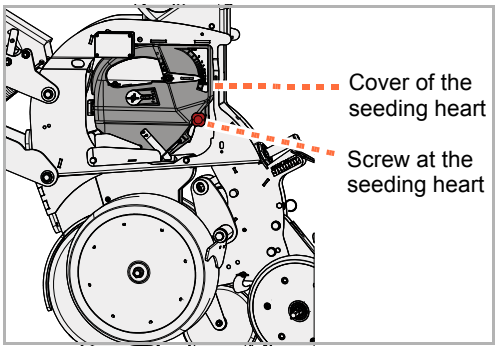
Seed discs

If the seed discs are worn or if a different seed is to be applied, the seed discs must be replaced.
→ Chapter »Refitting«, section »Seed discs«, page 178

Vacuum interrupter

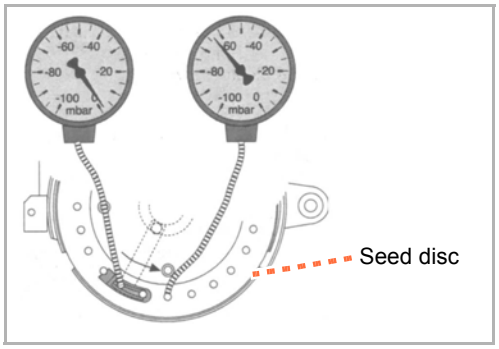
The vacuum interrupter can be incorporated as a standard version or as rotating vacuum interrupter. Its operation must be checked before and at the end of the season.

In case of wear



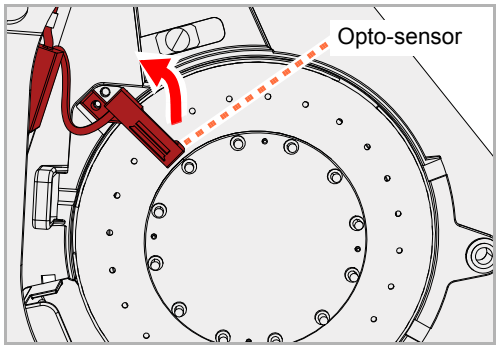
- Lift the machine
- Release the bolt, remove the cover of the seeding heart

Checking

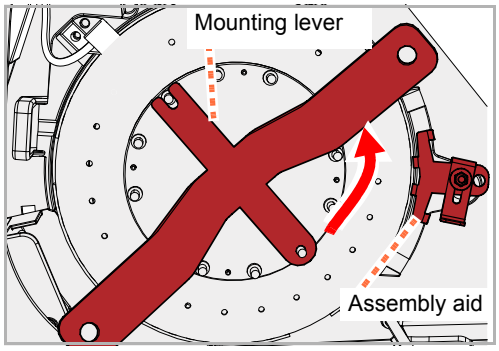


- Drive machine to working speed
- Unplug the tube of the manometer at the fan and remove the manometer from the frame
- Put the end of the tube on a hole on the seed disc
- Use the electronic control system to activate the drive motor for the sowing unit, so that the seed disc rotates. Carry on the tub with the rotating hole. If the hole is above the vacuum interrupter, the negative pressure must fall to zero. Afterwards it has to raise back to the rated value.
- Carry out the procedural steps for all sowing units

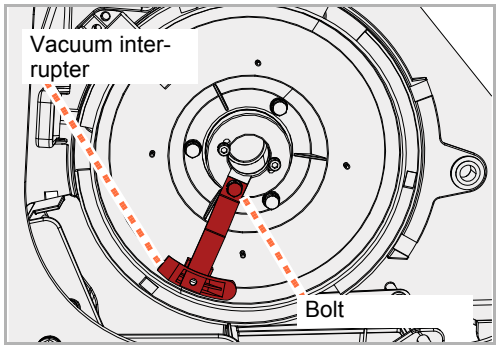
Replacement



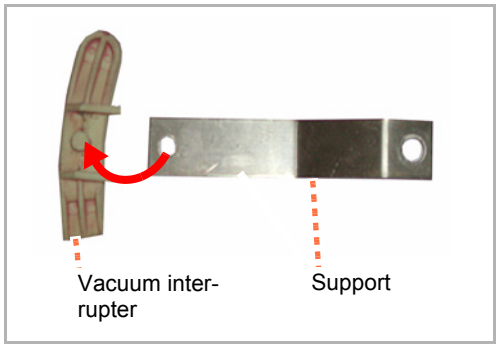
- Slightly lift the opto-sensor, turn it upwards and let it engage



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

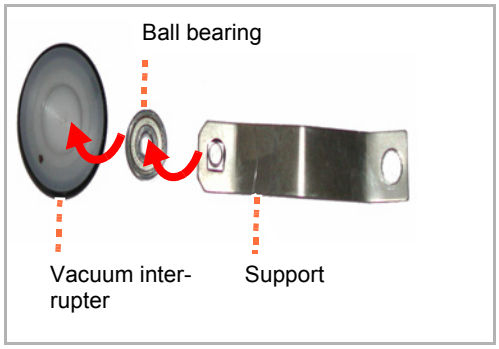


- Release the bolt and remove the support with the vacuum interrupter



Vacuum interrupter Standard

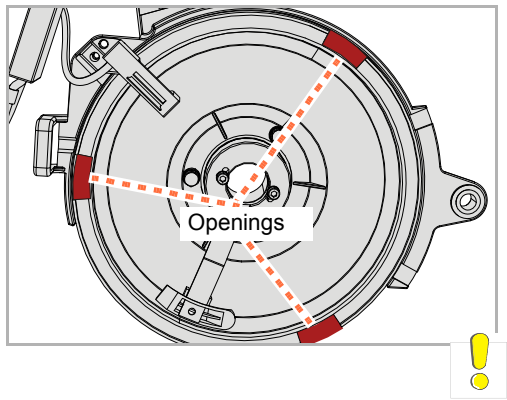
- Unplug the defective vacuum interrupter from the support
- place new vacuum interrupter upon the support and press it down tightly



Rotating vacuum interrupter

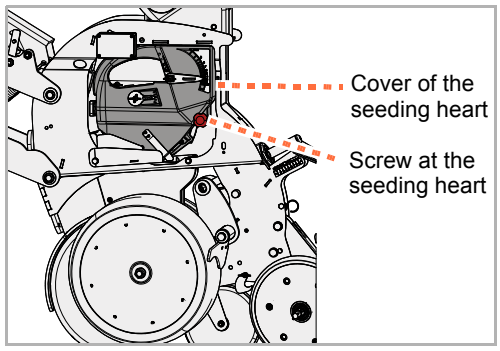
- Unplug the defective vacuum interrupter from the support
- Place the ball bearing and the new vacuum interrupter upon the support and press it down tightly

- Screw in the support with the vacuum interrupter



- Fit the seed disc. When fitting it, make sure that the lock springs of the seed disc fit into the openings in the seed drum.
- Turn the seed disc to the right using the mounting lever and tighten
- Slightly lift the opto-sensor, turn it downwards and let it engage

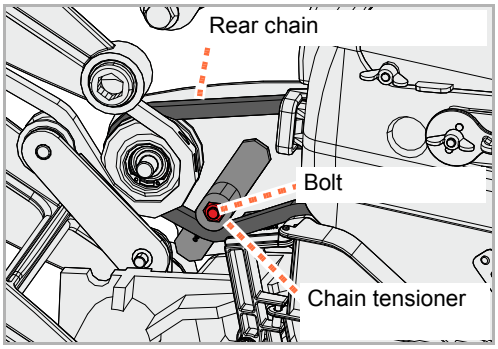
Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.



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

Chain

In case of wear



The front chain is automatically re-tensioned.
It is possible to re-tension the rear chain if it is worn.

- Release the bolt
- Re-tension the chain with a chain tensioner
- Tighten bolt

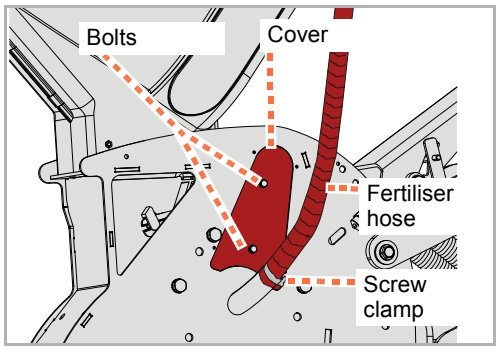
Timing belt for e-drive

Once per season

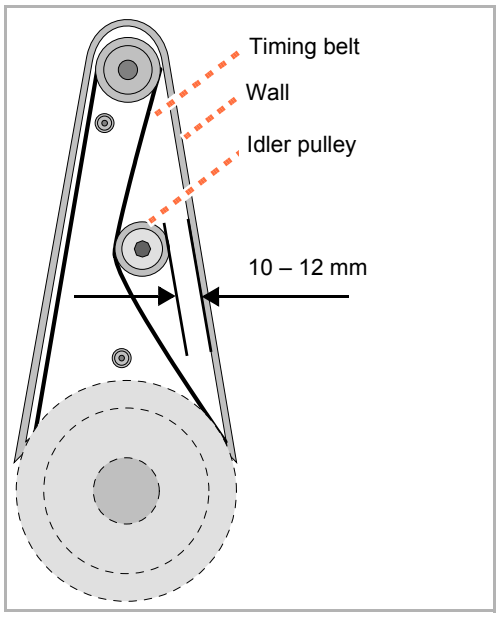
The timing belt serves to transmit the rotary motion of the electric motor onto the seed disc.

Checking

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



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



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

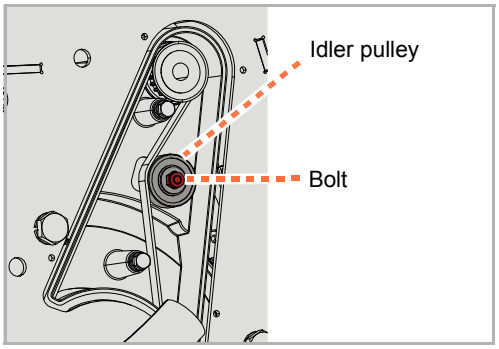
If the timing belt is sufficiently tensioned:

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

Tensioning

Retension the timing belt:

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

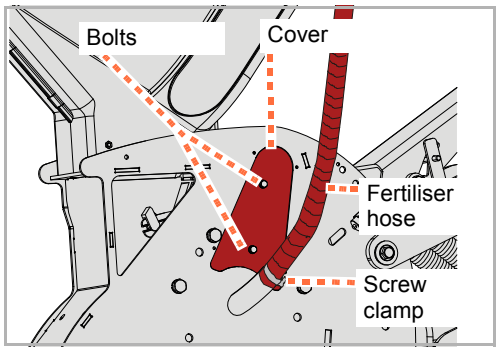


- Release bolt on the idler pulley
- Shift the idler pulley. The idler pulley should be 10 – 12 mm from the wall.
- Tighten bolt on the idler pulley
- Check the timing belt tension. If necessary, readjust the tension.
- Secure the cover and seed hose back onto the sowing unit

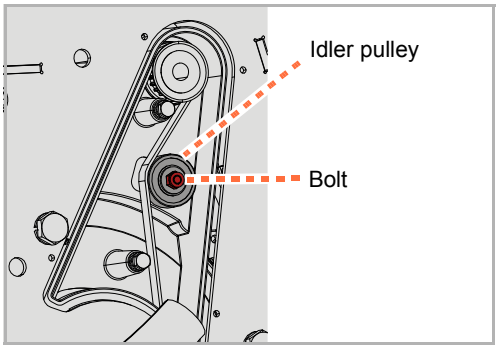
Replacement

To replace the timing belt, specific tasks have to carried out on both sides of the sowing unit. The timing belt is located behind the seeding heart. It can only be replaced if the seeding heart is completely disassembled.

Right-hand sowing unit

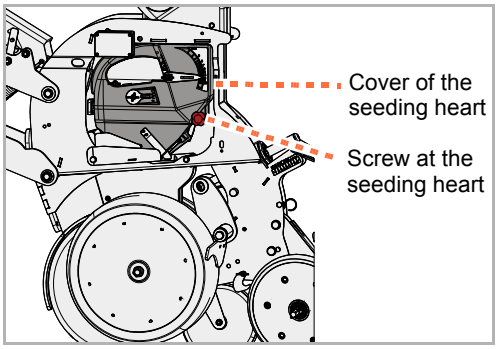


- Loosen the screw clamp on the fertiliser hose and remove the fertiliser hose
- Release bolts on the cover and take off the cover. The toothed belt is now visible.



- Release bolt on the idler pulley

Left-hand sowing unit

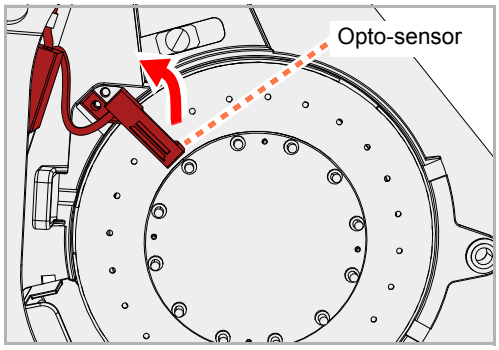


- Release the bolt, remove the cover of the seeding heart

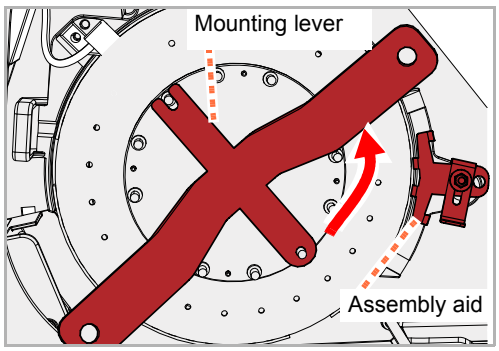
The following tools are required to disassemble the seeding heart:

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

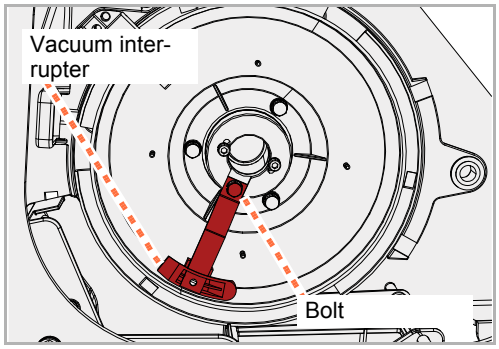
Seed disc, vacuum interrupter



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

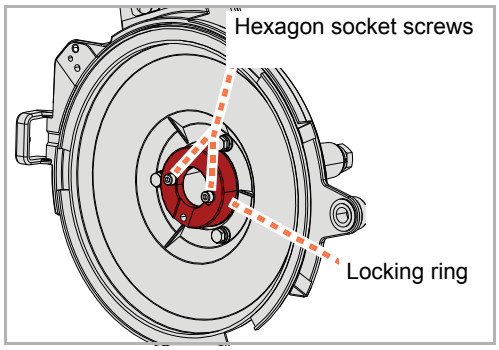


- Move the assembly aid into position. This secures the seed disc against turning.
- Turn the seed disc to the left using the mounting lever, release it and remove



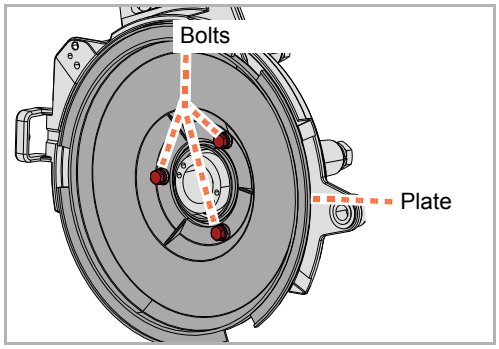
- Release the bolt and remove the support with the vacuum interrupter

Locking ring, plate



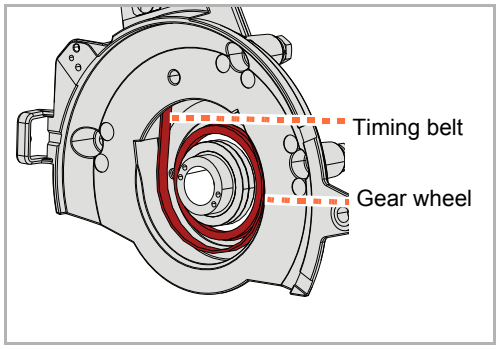
Take a note of the position of the locking ring before removing it. The locking ring must be reinserted in this position during reassembly.

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



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

Replacing the timing belt and tensioning

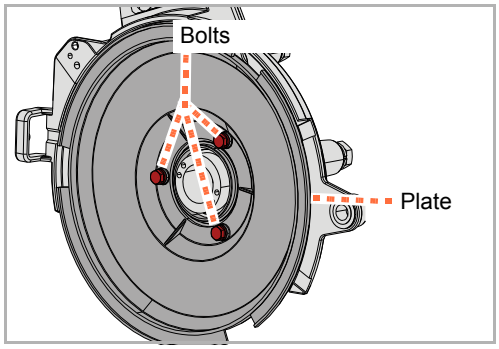


- Remove the timing belt and replace it
- Place the timing belt under the gear wheel
- Tensioning the timing belt

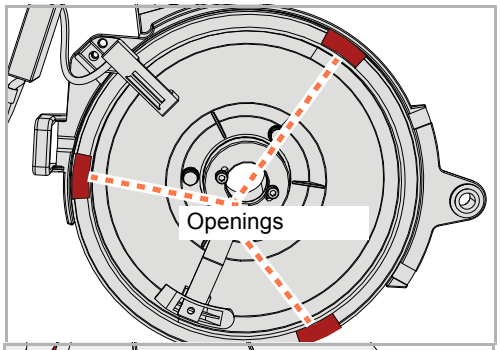
→ Section »Tensioning«, page 183

Fitting the seeding heart

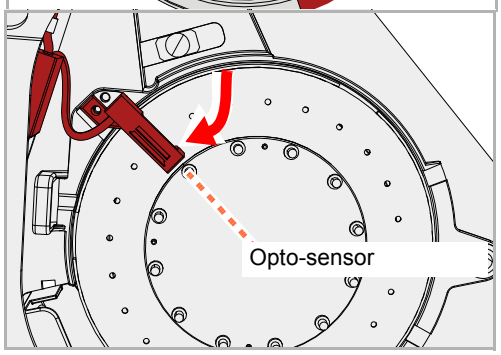
During assembly, ensure that the bolts are pre-tightened to prevent twisting of the plate.



- Fit the plate and fasten in place with the bolts

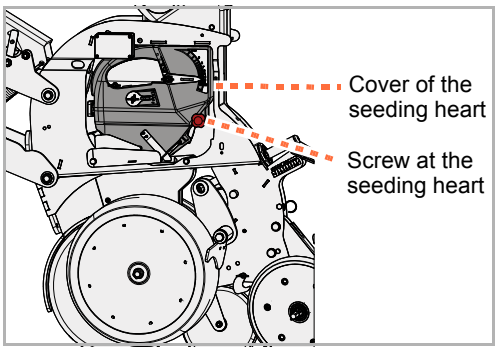


- Fit the seed disc. When fitting it, make sure that the lock springs of the seed disc fit into the openings in the seed drum.



- Turn the seed disc to the right using the mounting lever and tighten
- Slightly lift the opto-sensor, turn it downwards and let it engage

Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.



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

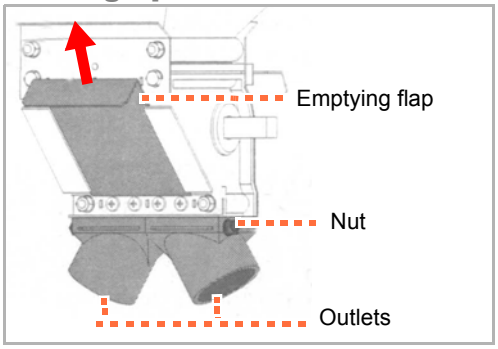
Metering device

On the metering device there are:

- Sealing lips
- Metering wheels

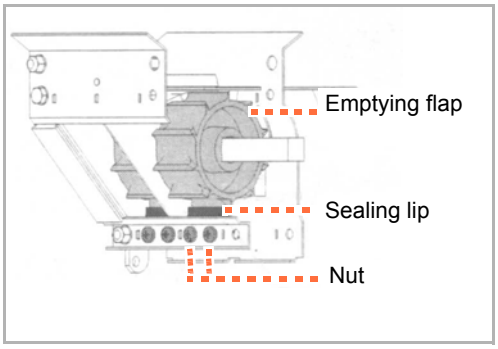
Frames rigid

Sealing lips



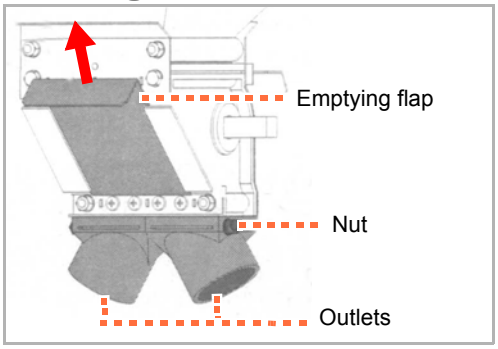
The sealing lips have to be readjusted or replaced if required.

- Pull out the emptying flap
- Release nut
- Pull out the bolt
- Pull off the outlets in the direction of the emptying flap



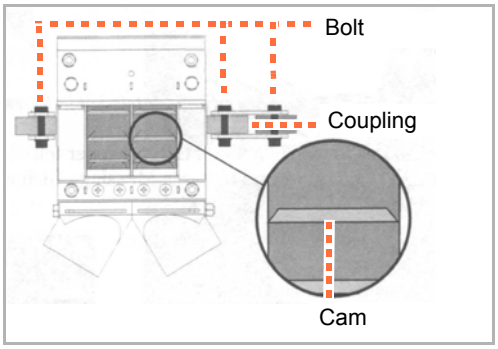
- Release the bolts
- Turn the metering wheels that the sealing lips fit into a hollow of the metering wheels
- Slide the sealing lip upwards. If the sealing lips are worn, replace the sealing lips.
- Tighten the bolts
- Re-fit the outlets
- Push in the emptying flap

Metering wheels



The metering wheels have to be replaced if worn.

- Pull out the emptying flap



- Release the bolts
- Remove the coupling
- Pull out the shaft
- Take out the worn metering wheels
- Note
- Ensure that the metering wheels are fitted in the correct position:
- The long edges at the cams have to point downwards.
- Insert new metering wheels
- Insert the shaft and fit the coupling

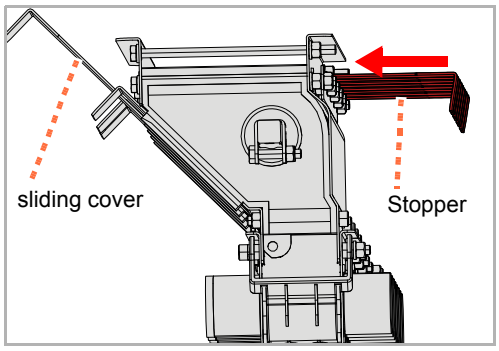
Frames rigid

Sealing lips

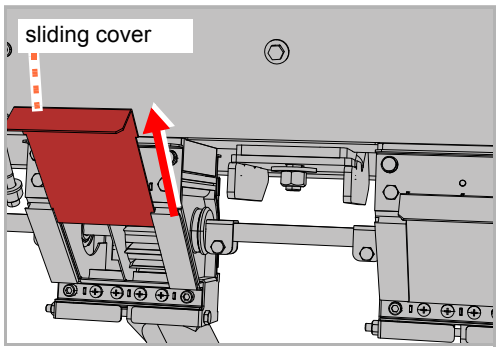
The sealing lips have to be readjusted or replaced if required.

In case of wear

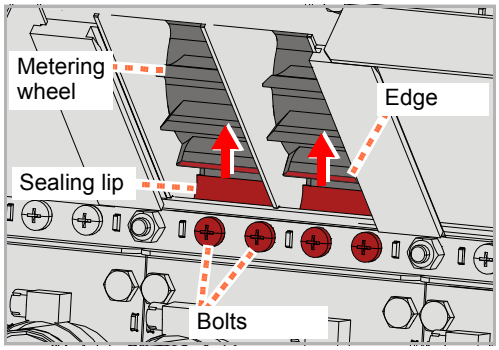
Push in the stoppers
If the fertiliser hopper is not completely empty, the stoppers on the metering device must be pushed in.
If the fertiliser hopper is not empty, the fertiliser will trickle unrestrained out of the metering device when the sliding cover is lifted up.



- Push in the stoppers



- Pull up the sliding cover



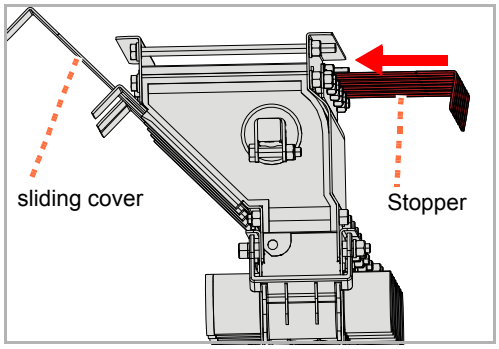
- Undo the screws with nuts
- Turn the metering wheels that the sealing lips fit into a hollow of the metering wheels
- Push the sealing lip upwards until the sealing lip is lightly in contact with the edges of the metering wheel when the metering wheel is turned. If the sealing lips are worn, replace the sealing lips.
- Tighten the bolts with nuts
- Slide in the sliding cover
- Pull out the stopper

Metering wheels

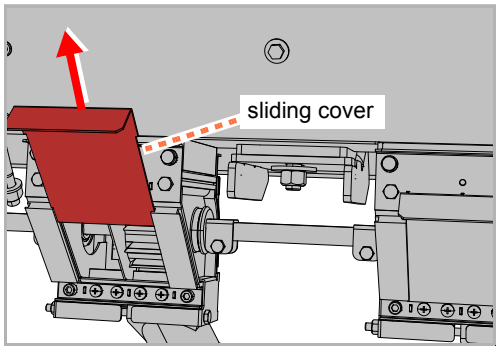
The metering wheels have to be replaced if worn.

In case of wear

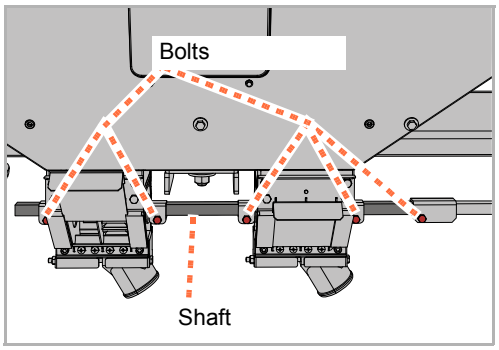
Push in the stoppers
If the fertiliser hopper is not completely empty, the stoppers on the metering device must be pushed in.
If the fertiliser hopper is not empty, the fertiliser will trickle unrestrained out of the metering device when the sliding cover is lifted up.



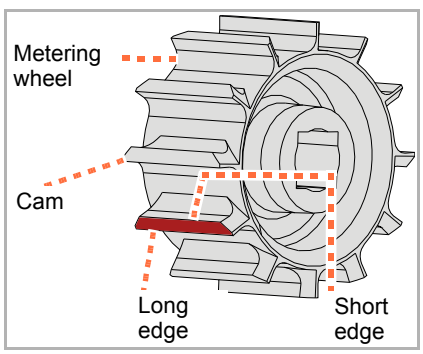
- Push in the stoppers



- Pull out the sliding cover



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



Ensure that the metering wheels are fitted in the correct position: The long edges at the cams have to point downwards.

- Insert new metering wheels
- Insert the shaft and fit the gear wheel
- Refit the sliding cover
- Pull out the sliding cover

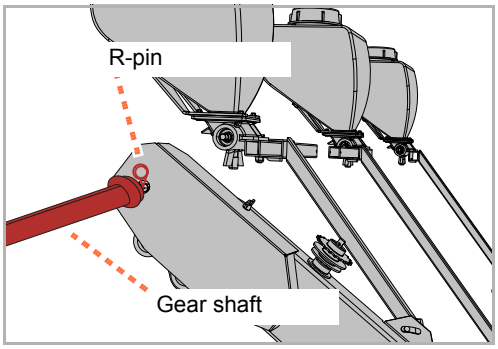
Granule distributor [+]

Mechanical drive

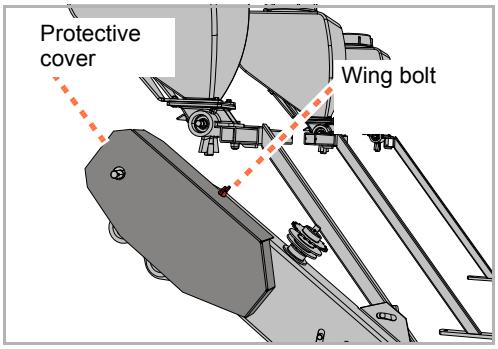
Gear wheels, chain

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

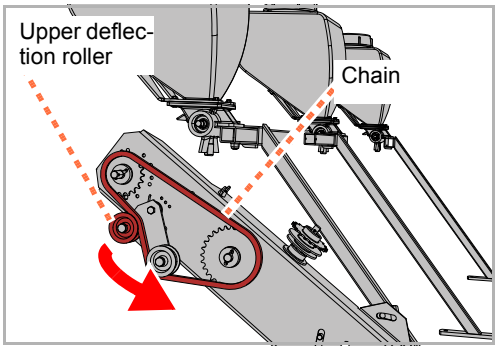
In case of wear



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



- Release wing bolt
- Remove the protective cover



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

To replace the chain:

- Fit the new chain

To replace the chain wheel:

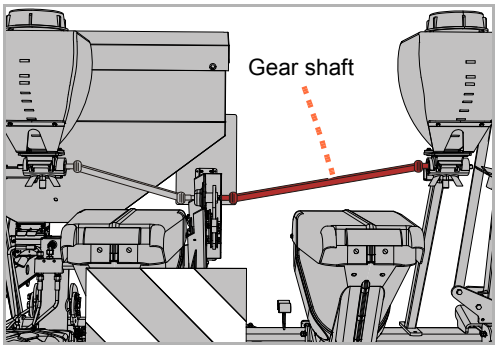
- Remove the R-pin on the chain wheel you wish to replace
- Remove chain wheel and replace
- Refit the chain

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

Gear shaft

Once per season

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

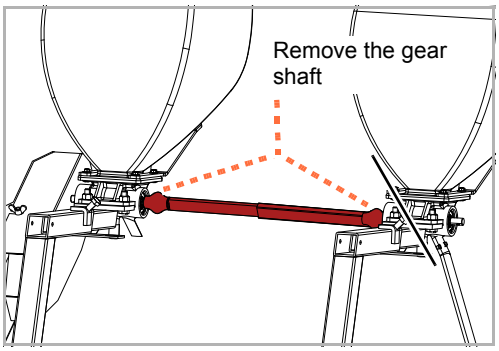


- Remove the R-pin on both sides of the gear shaft
- Remove the gear shaft and pull it apart
- Apply grease to sliding surfaces with a brush
- Reassemble both parts of the gear shaft
- Lock the gear shaft in position again

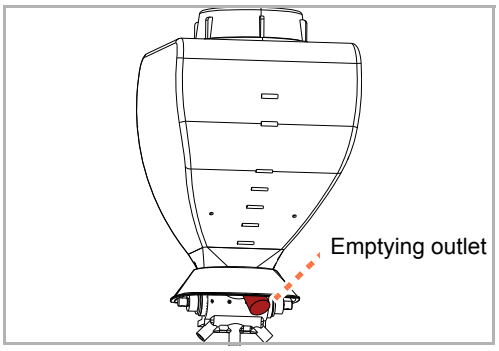
Replacing the metering wheels

If they are worn

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



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



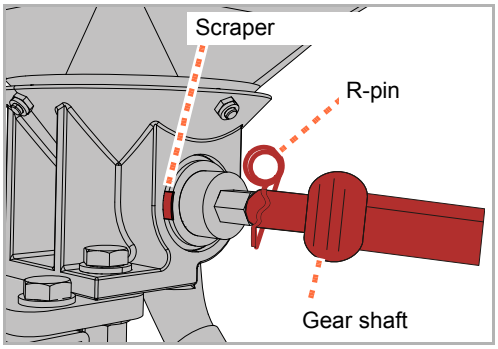
- Place a container underneath
- Unscrew the emptying outlet

Scraper

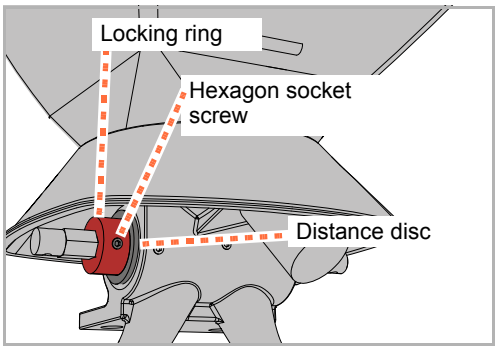
The scraper must be adjusted when it is worn.

2 sowing units

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



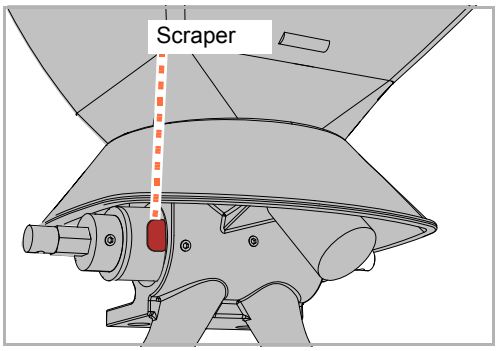
- Remove the R-pin from the gear shaft
- Remove the gear shaft



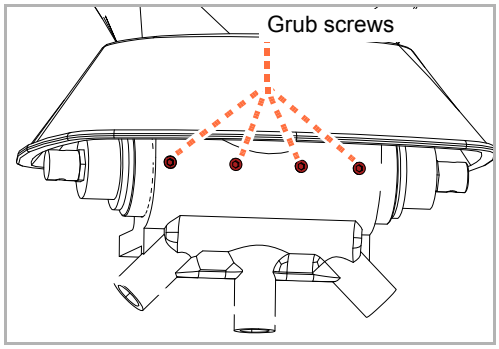
- Undo the hexagon socket screw on the locking ring
- Remove locking ring
- Remove shim
- Use a suitable tool to push in scraper slightly
- Refit the shim
- Refit the locking ring and secure it with the hexagon socket screw

3 sowing units

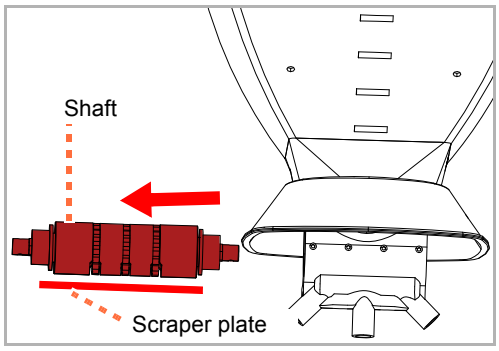
The scraper is visible from the outside.



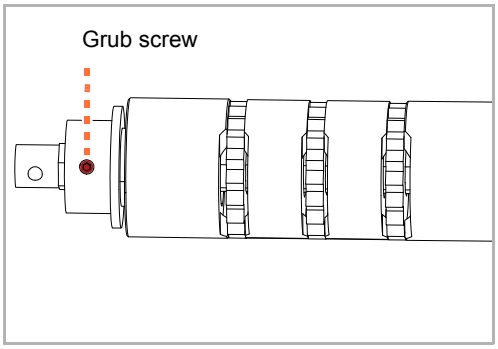
- Use a suitable tool to push in scraper slightly



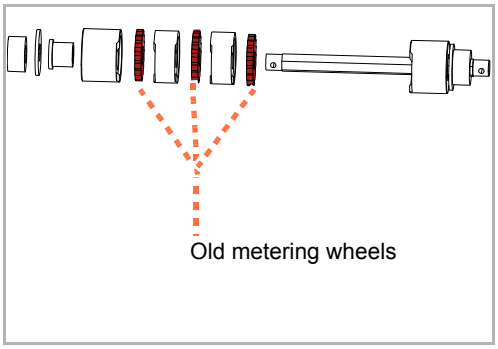
- Release the grub screws



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

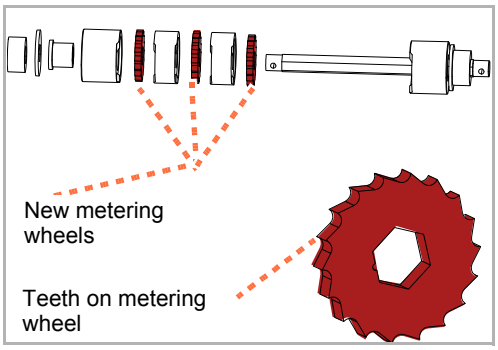


- Release the grub screw

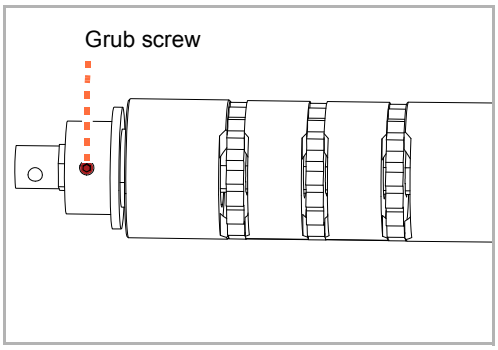


- Remove the components from the shaft and lay them on a clean support surface in the same order and the identical position as when fitted

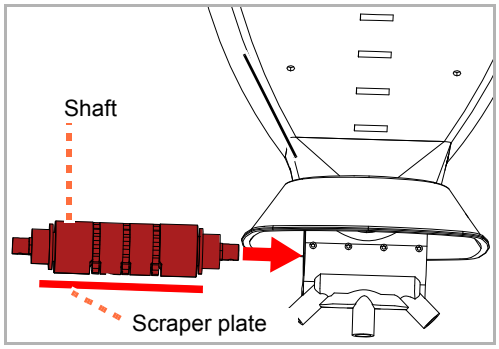
When fitting the new metering wheels, note the position of the teeth. The position of the teeth on the new metering wheels must match the position on the old metering wheels.



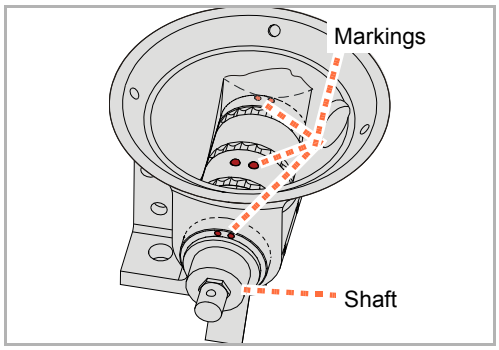
- In the same order and using new metering wheels, slide the components back onto the shaft



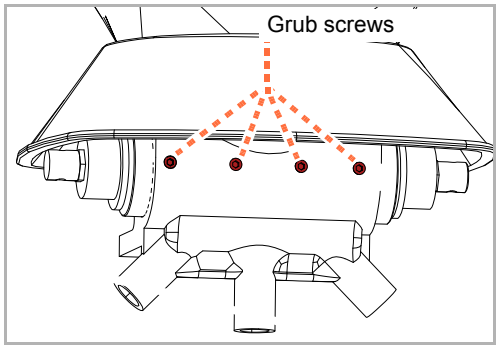
- Tightly fasten the grub screw



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



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



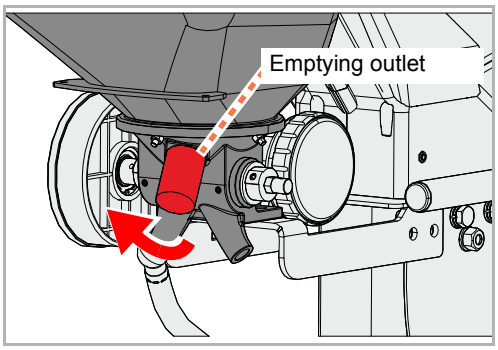
- Carefully tighten the grub screws
- When doing so, check occasionally that the shaft is still able to turn slightly

Electrical drive

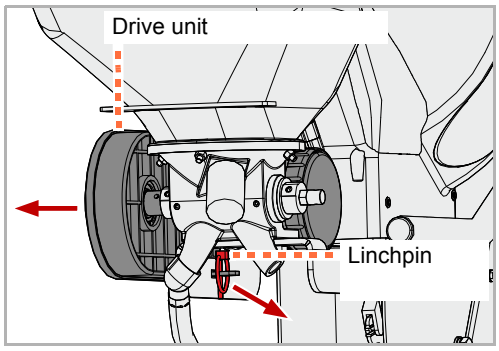
Replacing the metering wheels

In case of wear or refitting

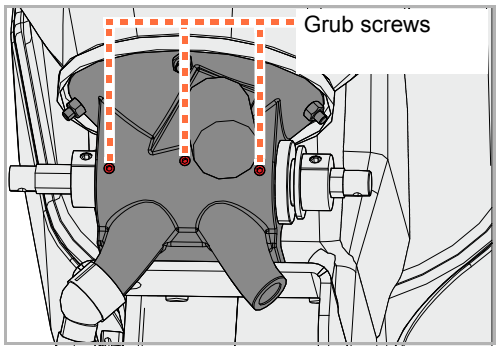
Regularly check the metering wheels for wear. The metering wheels are visible at the bottom of the granule hopper. Worn out metering wheels must be changed. Worn metering wheels can result in an incorrect application rate.



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

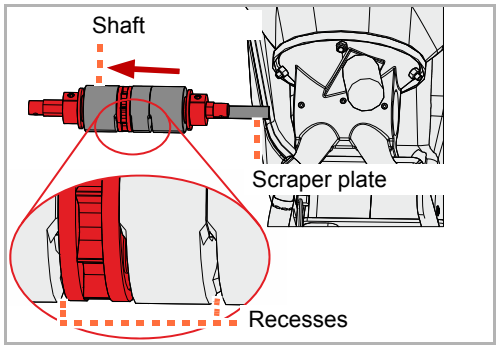


- Remove the linchpin
- Remove the drive unit and put it to one side

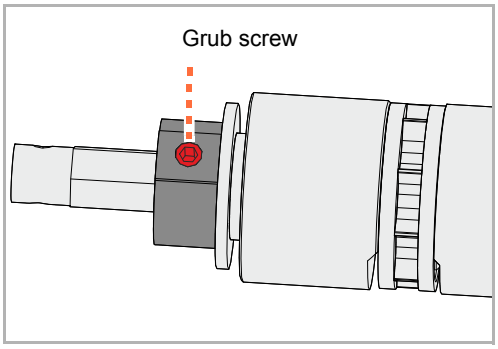


- Release the grub screws

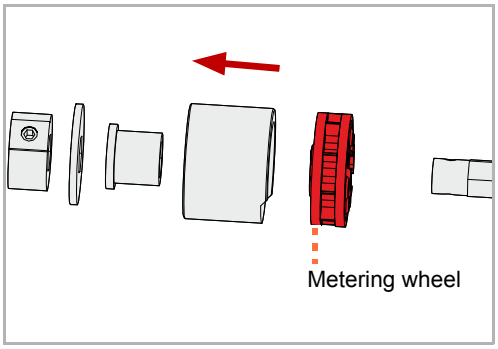
Pay attention to the position of the recesses in relation to the housing when removing the shaft. Pay attention to the position of the scraper plate



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

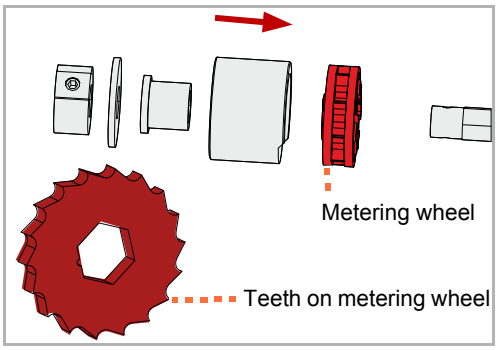


- Release the grub screw

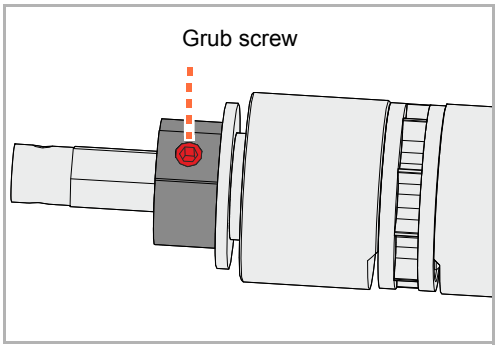


- Remove the components from the shaft and lay them on a clean support surface in the same order and the identical position as when fitted

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

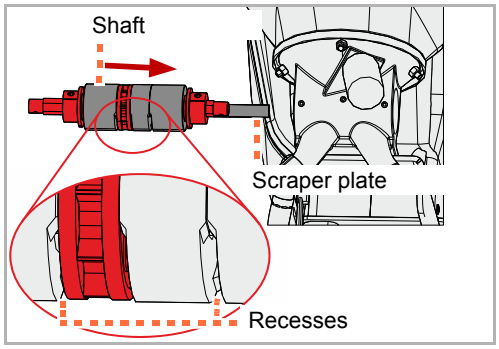


- In the same order and with the new metering wheel, slide the components back onto the shaft

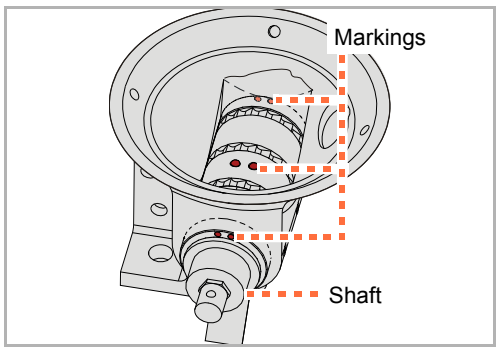


- Tightly fasten the grub screw

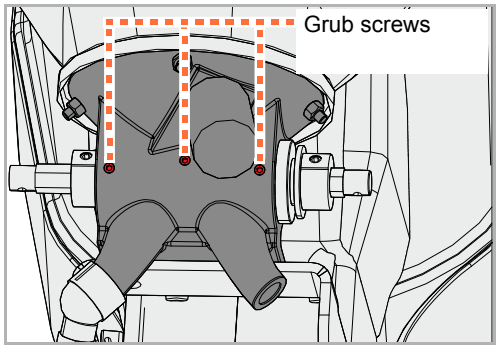
Pay attention to the position of the recesses in relation to the housing when fitting the shaft. Pay attention to the position of the scraper plate



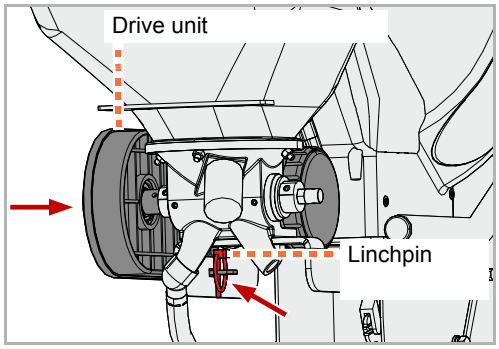
- Slide the scraper plate into the slot on the housing
- Insert the shaft. Ensure the correct position of the scraper plate whilst doing so.



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



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

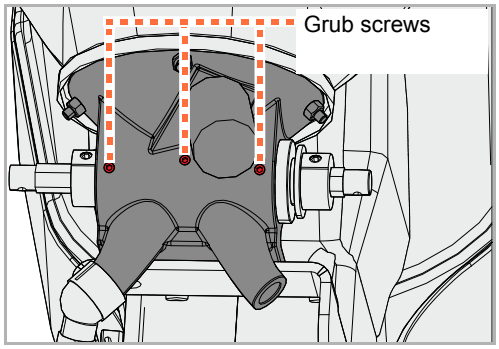


- Install the drive unit and secure it with a linchpin

Scraper

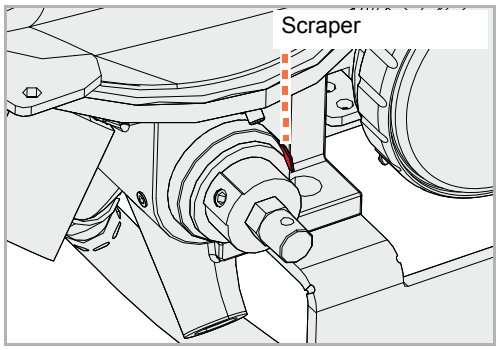
The scraper must be adjusted when it is worn.

In the event of wear



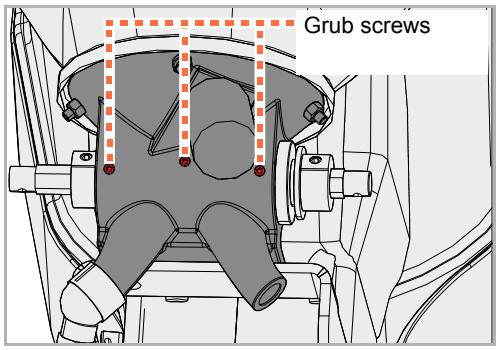
- Release the grub screws

The scraper is visible from the outside.



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

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



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

Clean Air

The clean Air is equipped with the following components:

- Air hose
- Cover
- Guide plate

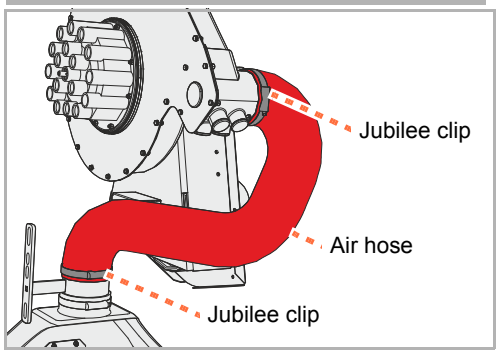
Wear breathing protection when in contact with dust which is harmful to health
For example, harmful dust could be created if dressing has been used or fertiliser has been deposited.
It is necessary to wear breathing protection with the appropriate protection class if harmful dust could be released when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

Conducting away dust which is harmful to health near the ground
Dressing dust which is harmful to health may enter the environment and may for example endanger insects such as bees.
Since dressing dust which is harmful to health is produced during work, this dust must be conducted out of the machine near the ground

Air hose

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

Once per season

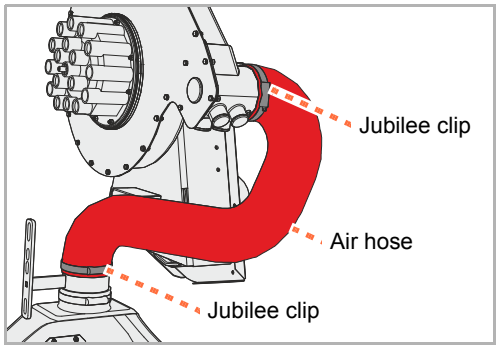


- Check the air hose for leaks
- If leaks are discovered, replace the air hose
- Check the transitions between the air hose and the adjacent components for leaks
- If leaks are discovered, re-tighten the jubilee clips

Replacement

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

In case of wear

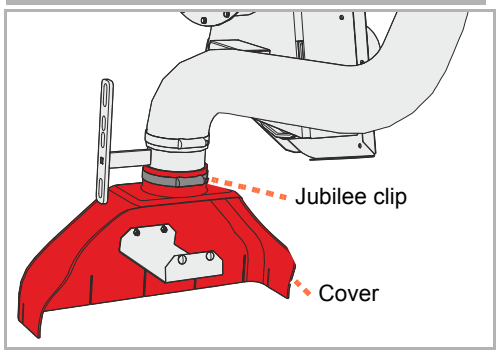


- Undo the jubilee clips
- Remove the air hose
- Cut the new air hose to the length of the old air hose
- Install a new air hose and secure with the jubilee clips

Cover

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

Once per season

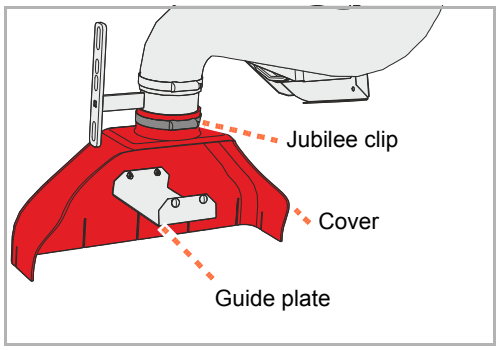


- Check the cover for damage

Replacement

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

In case of wear

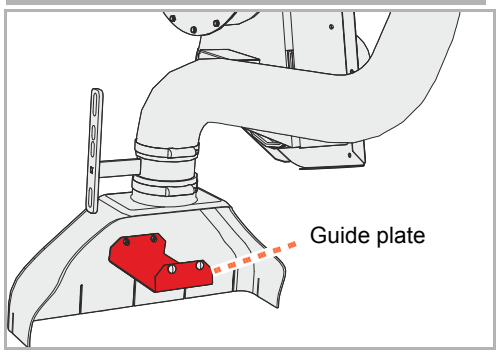


- Undo the jubilee clips
- Remove the cover
- Remove the guide plate from the cover
- Install the guide plate in a new cover
- Install a new cover and secure with the jubilee clips

Guide plate

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

Once per season

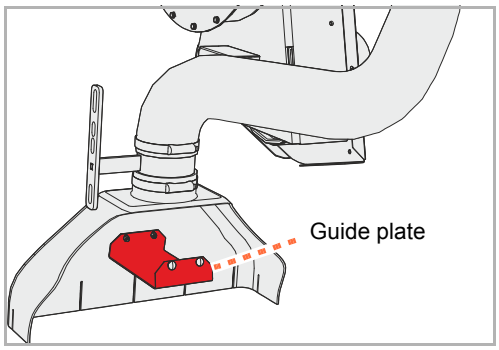


- Check the guide plate for damage

Replacement

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

In case of wear



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

Seed discs

In case of wear or refitting

Seed discs have to be refitted at:

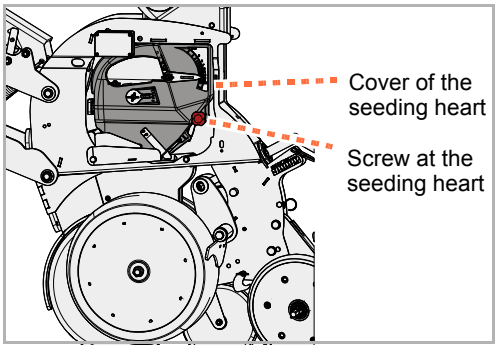
- Change of seed
- Wear of the seed disc

Before refitting, empty the seed hopper.
→ Chapter »Preparing for operation«, section »Emptying the seed hopper«, page 83

Preparation

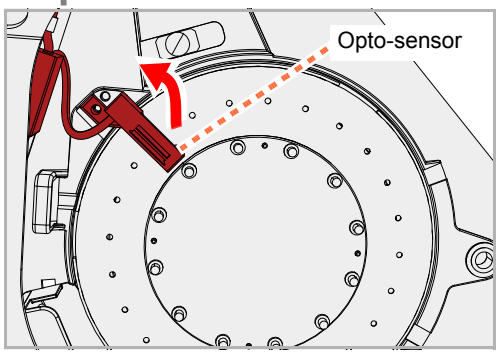
You must prepare the seeding heart for the other conversion work. This section explains all of the steps that are required. For the individual conversions, we will then refer to the numbering of the steps that are prerequisites for the relevant conversion work.

Step A1



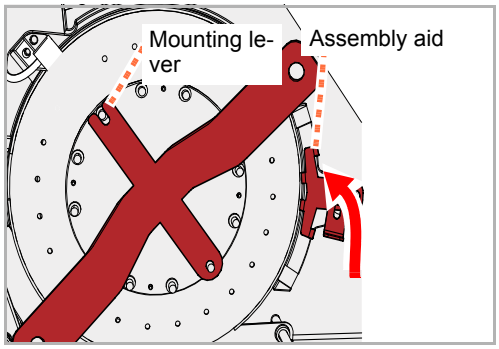
- Lift the machine
- Release the bolt, remove the cover of the seeding heart

Step A2



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

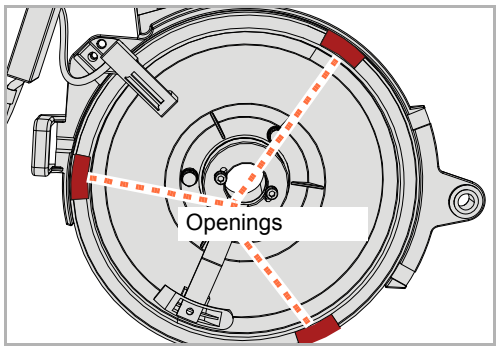
Step A3



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

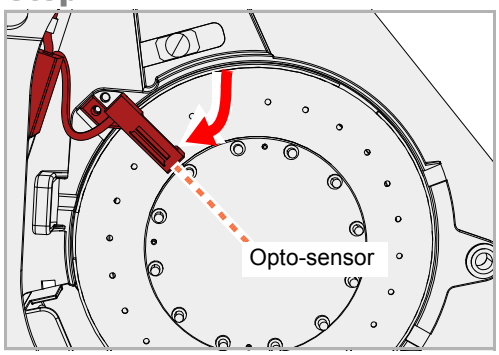
Assembly

Step Z1



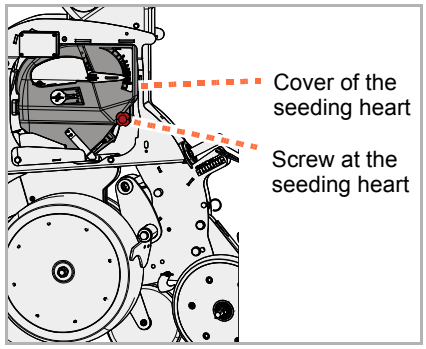
- Fit the seed disc. When fitting it, make sure that the lock springs of the seed disc fit into the openings in the seed drum.

Step Z2



- Turn the seed disc to the right using the mounting lever and tighten
- Slightly lift the opto-sensor, turn it downwards and let it engage

Step Z3



Fit the cover of the seeding heart correctly
An incorrectly fitted seeding heart cover can cause an unregulated flow of seed out of the seeding heart.
This can cause incorrect seed results.

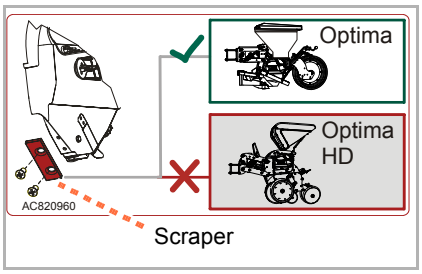
Put the cover on the seeding heart and secure it with the bolt. Ensure proper position of the cover of the seeding heart.

Turnips, sunflowers, beans

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

Conversion set for turnips, sunflowers, beans

- Seed disc
- Scraper for Normal seed sowing units



The retrofit kit contains a scraper. Do not fit this scraper on HD sowing units.

Prerequisite:

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

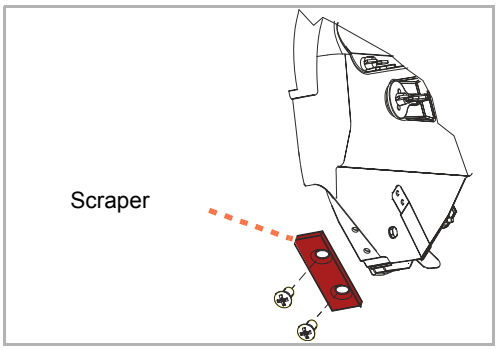
→ Chapter »Maintenance«, section »Preparation«, page 204

▸ Select the seed disc

Assembly:

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

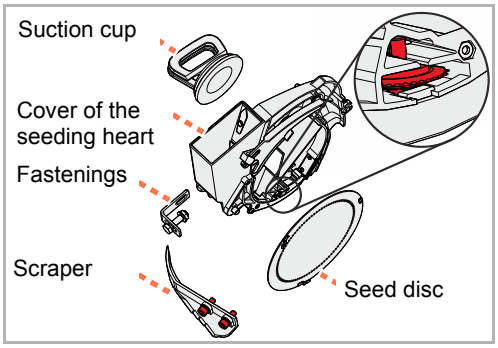
→ Chapter »Maintenance«, section »Assembly«, page 205



▸ Only install the scraper on Normal seed sowing units

Rape

for Normal seed sowing units



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

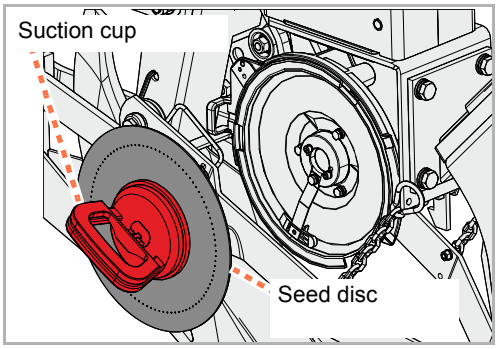
Rape conversion set for Normal seed sowing units

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

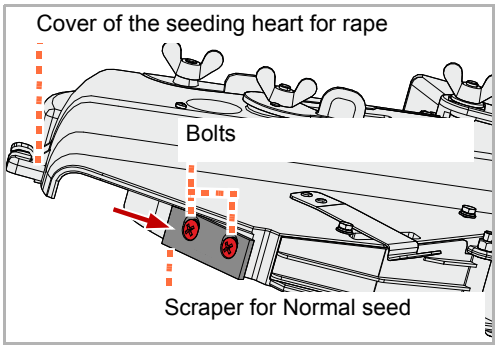
Prerequisite:

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

→ Chapter »Maintenance«, section »Preparation«, page 204



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



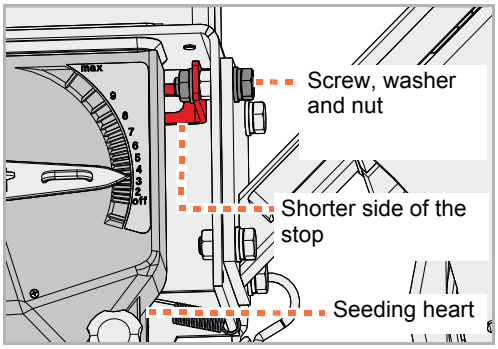
- Pre-fit the scraper for Normal seed sowing units to the cover of the seeding heart for rape but do not tighten the screws

Assembly:

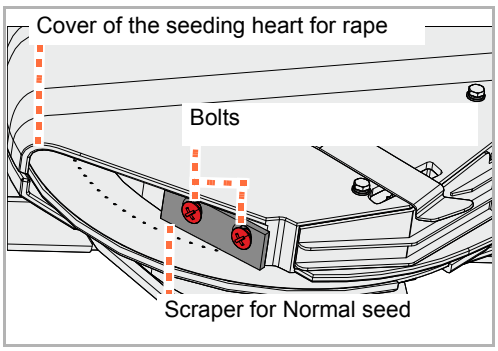
- Step Z2 of the assembly
- Step Z3 of the assembly
- Step Z4 of the assembly

→ Chapter »Maintenance«, section »Assembly«, page 205

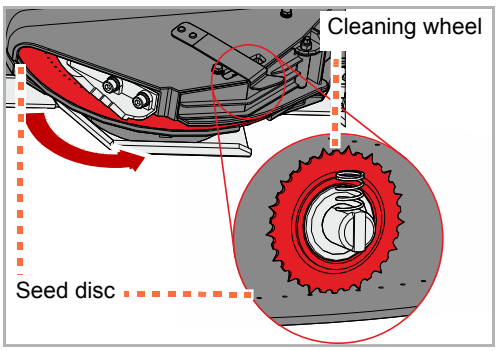
The stop must be fitted so as to prevent the seed in the lower part of the cover of the seeding heart from pressing away from the disc. The seed can be damaged in the resulting gap and lose its germination capacity.



- Align the stop with its shorter side facing the seeding heart (using the seeding heart as a support) and secure it in place with a screw, washer and nut.



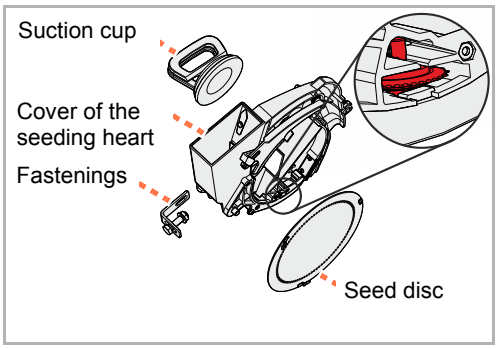
- Place the scraper for Normal seed sowing units on the seed disc and secure it in place with the screws



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

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

For HD II sowing unit



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

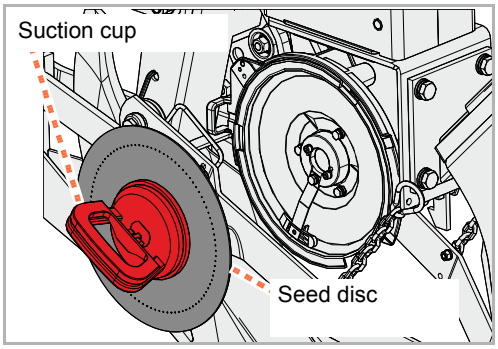
Rape conversion set for HD sowing units

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

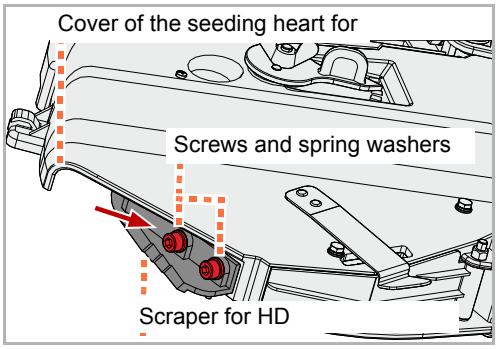
Prerequisite:

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

→ Chapter »Maintenance«, section »Preparation«, page 204



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

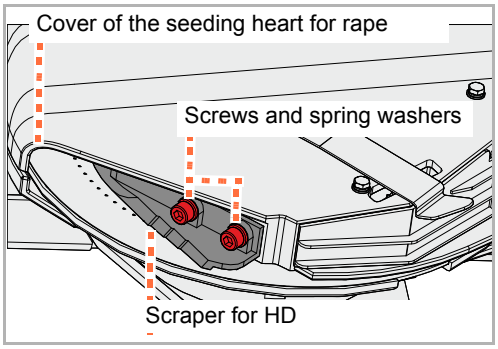


- Pre-fit the scraper for HD sowing units to the cover of the seeding heart for rape with the screws and the spring washers but do not tighten the screws

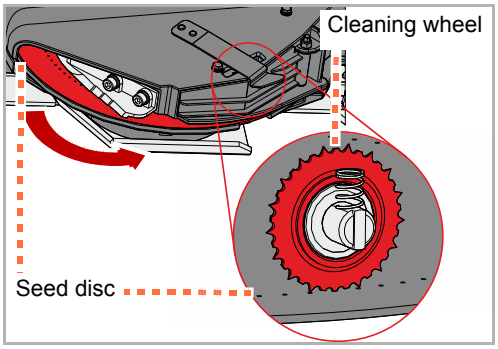
Assembly:

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

→ Chapter »Maintenance«, section »Assembly«, page 205



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



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

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

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

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

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

IsoMatch Tellus

Fault	Cause	Remedy
Terminal does not receive any pulse	Power supply interrupted	Connect the power cable if the power supply was disconnected
	Supply voltage too low	Check the voltage: The supply voltage must be 12 V
	Fuse defective	Replace fuse
The drive motor sensors are receiving no pulses	Sensors or cable defective	ESA software: In the diagnostics menu, check the motors Notify customer services if necessary
Speed is not displayed	Input pulses/100 m is missing	Enter pulse details
	Cable on the radar sensor defective	Check cable and replace if necessary
	Hardware is defective	Contact the Customer Service of the dealer
Correct number of sowing units is not shown	Insufficient number of units monitored	Check the number of sowing units and re-enter it
	Wrong number of sowing units stored	Correct the entry
Opto-sensor receiving no pulses	Opto-sensor defective	Check opto-sensor operation with the Service key on the OEC. If the fault cannot be eliminated, contact the dealer.
Indication of the seeds/hectare varies a lot	Irregular separation of the seeds	Set the sowing units correctly
	Opto-sensor is contaminated	Clean opto-sensor with a brush

Fertiliser application

Fault	Cause	Remedy
Fertiliser tubes clogging	Fertiliser tubes are sagging	Shorten the fertiliser tubes
No fertiliser applied	Fertiliser too wet	Use dry fertiliser
	Fertiliser clots too much	Use a removable sieve
Applied fertiliser quantity changes uncontrolled	Sealing lips on the metering devices are worn	Replace sealing lips
	Metering device worn	Replace metering device
	Metering wheels are stuck	Clean the metering wheels
The fertiliser spreader rotates very tight	Incorrect installation of the metering wheels	Fit metering wheels correctly

Hydraulic fan drive

Fault	Cause	Remedy
Return line pressure too high	Too small line diameter or unfavourable return path	Select lines with sufficient line diameters and large return line couplings
Hydraulic motor leakage	Worn or reversed shaft seal.	Install a new shaft seal
Speed insufficient	3-way flow control valve is incorrectly set	Check the setting of the 3-way flow control valve
	Tractor does not supply enough oil or oil pressure insufficient	Have the pressure limiting valve checked
Hydraulic motor intermission	Oil reserve on the tractor too low	Have a larger oil tank fitted
	Primary additional control valve was actuated	Select a better connection point for the pressureless return line
Valve lever trips out of the catch	Shutdown pressure too low	Check the setting
Hydraulic fluid overheating	Conveying capacity too large	Set 3-way flow control valve

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

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

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

Tyres
Tyres can be sent to tyre recycling facilities.

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

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

Fertiliser
Dispose of remaining fertiliser in accordance with the applicable regulations.

EC Declaration of Conformity

in accordance with EC Directive 2006/42/EC



Type plate and CE symbol

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest

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

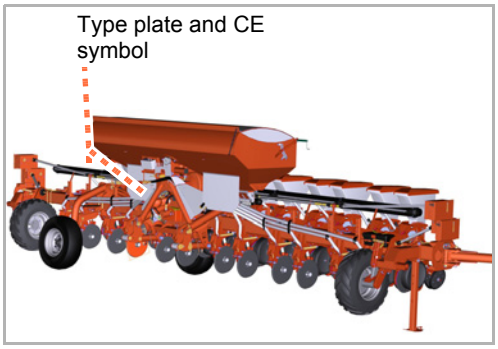
Rigid frames and accessories

Kverneland Group Soest GmbH
Soest, 30.01.2014

Friedrich Pehle
CEO and authorised person for compiling technical documentation

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Index

A

Accessory 211
Assembly 36, 37, 41, 117, 121, 123, 125, 127, 154, 155, 158

C

Calibration test
  Granule distributor 107, 112
Care 152
Centre of gravity 16
Changing the seed type 84
Characteristics 24
Cleaning 153
Component designations
  HD sowing unit 31
  Sowing unit, normal seed 29, 31
  Sowing unit, Tandem 31
  Sowing units 31, 173
Conformity Declaration 214, 215

D

Device
  Characteristic 24
  Range of application 23
Dimension G 16
Disposal of the machine 213
Driving on the road 116

E

Employer 5
Emptying
  Fertiliser hopper 153
  Granule distributor 153
  Seed hopper 153
Emptying the fertiliser hopper 98
Emptying the granule distributor 153
Emptying the seed hopper 153

F

Faults 211
Fertiliser coulters
  Settings 86
Fertiliser hopper
  Emptying 153
Filling in the fertiliser 87

G

Granule distributor 116
  Calibration test 107, 112
  Changing gear wheels 190, 196
  Combining gear wheels 101, 108
  Emptying the tank 107, 112
  Filling the tank 105, 110
  Lubricating the gear shaft 191
  Replacing the metering wheels 191
  Setting the application rate 104, 109
  Setting the scraper 192

H

Hydraulic fan drive
  Operation 54
  Technical data 49

I

Instruction 5
Intermediate press wheel
  Settings 63

L

Lubrication points 171

M

Machine
  Storing 159
  Uncoupling 159
Maintenance
  Checking the vacuum interrupter 178
  General information 162
  Maintenance intervals 166
  Metering device 187
  Timing belt 182

O

Original spare parts 21

P

Preparing for operation
  Setting sowing units 60
Proper use 23

R

Range of application 23
Replacement
  Granule distributor metering wheels 191
Road transport, see Driving on the road
Row fertiliser spreader
  Big Bag 90

S

Safety 7
  Agricultural training 14
  Altered driving and braking performance 18
  Axle loads 16
  Care and maintenance intervals 21
  Care and maintenance work 21
  Centre of gravity 16
  Checking screw connections 22
  Cleaning 21
  Coupling 15
  Minimum ballast 16
  Original spare parts 21
  Putting the machine into operation 19
  Riding on the machine 18
  Total weight 16
  Tyre load-bearing capacity 16
  Uncoupling 20
  Warning signs 7
  Welding work 22
Scales 113
  Changing the batteries 115
  Settings 114
  Technical data 113
Scope of delivery 36
Scraper 63
Seed discs
  Deliverable seed discs 71
Setting sowing units 60
Setting the rubber V press wheels 67
Settings
  Fertiliser coulters 86
  Intermediate press wheel 63
  Rubber V press wheels 67
  Scraper 63
  Scraper granule distributor 192
  Sowing distance 72
  Sowing units 60
Sowing
  Checks 145
Sowing distance
  Calculating 72
  Settings 72
Sowing unit
  Lifting device 61
  Working depth 60
Spare parts, see Original spare parts
Stickers, see warning signs
Symbols 6

T

Target group 5
Timing belt
  Maintenance 182
  Replacement 183
  Tensioning 183
Track marker
  Folding out 55
  Setting 58

W

Warning 7
Warning signs 7
  Meaning 12
Wheels
  Checking air pressure 175
Working depth 60