

PH1001

Operating manual

Original operator's manual

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Language	EN
From machine number	ACKPHxx881
Model	
Reference number	A156126840

Identification of the machine

Operating manual valid from machine number	

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

Designation	PH1001
Working width	
Weight	
Machine number	
Accessories	
Supplier's address	
Manufacturer's address	Kverneland Group Soest GmbH Coesterweg 42 D-59494 Soest Germany Tel. +49 (0) 2921/974-0

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Target group

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

Safety

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

For the employer

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

The following are included in this training:

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

Regular instruction sessions

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

Instruction

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

Other applicable documents

The EC Conformity Declaration	Integral part of this operating manual → Chapter »Original EC Declaration of Conformity«, page119
Spare parts list	Available via https://www.kvgportal.com/publicquest/
Operating manual of the PTO shaft manufacturer	Integral part of the delivery with this machine

Symbols

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

- A bullet point stands next to enumerations

▸ A triangle 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 also use pictograms which will help you in finding text passages:



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

- Moderate to serious injury
- Fatal injury

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



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

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



This symbol indicates information, tips and notes on operation.



This symbol indicates tips for assembling or setting up work.



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

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

Before folding out only

▸ Release the locking mechanism for transport.

▸ Actuate control unit.

For your safety

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

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

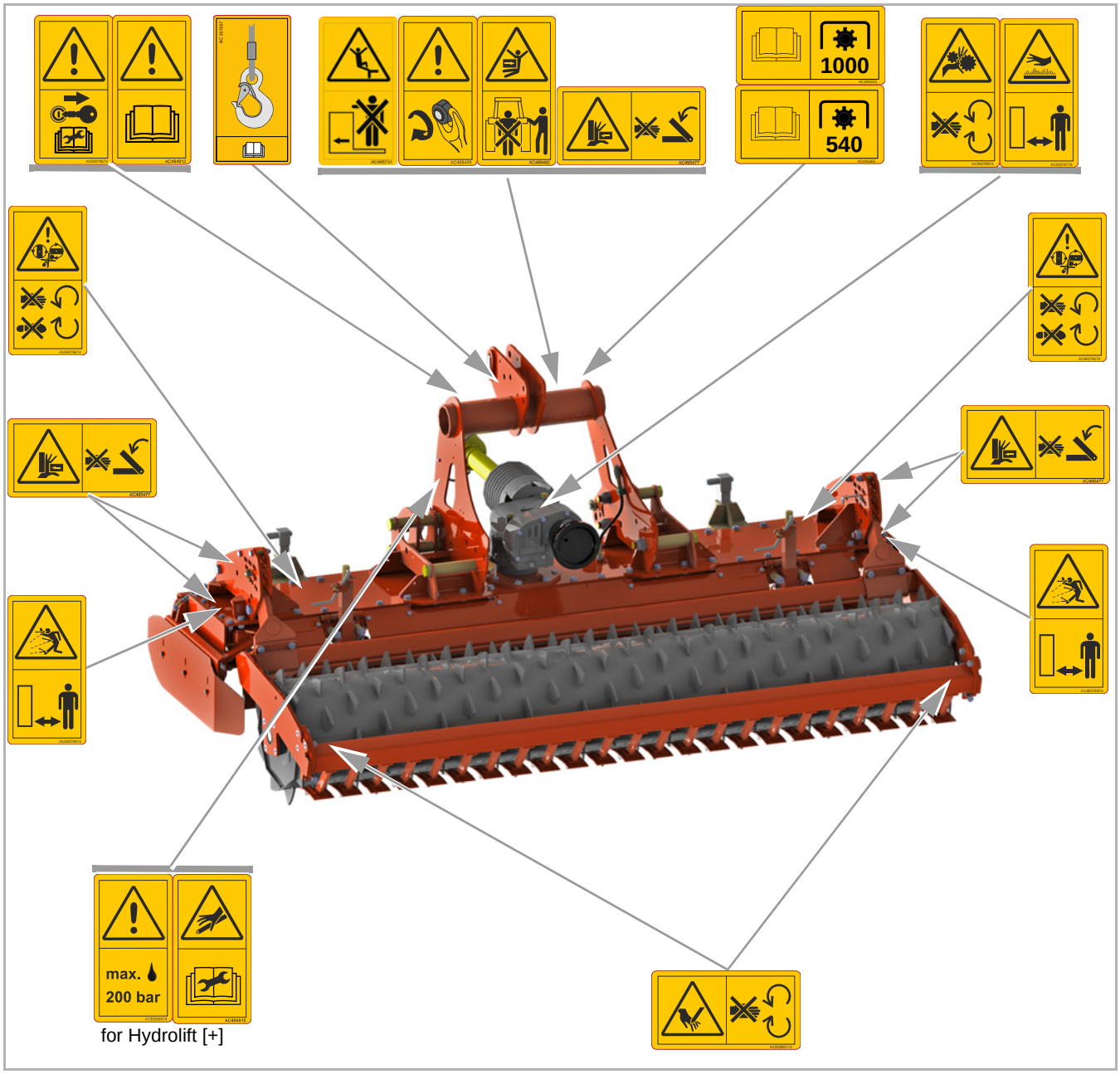
Numerous risks can result from handling agricultural machines in the wrong way. Therefore, always work with particular care and never under time pressure.

For the employer

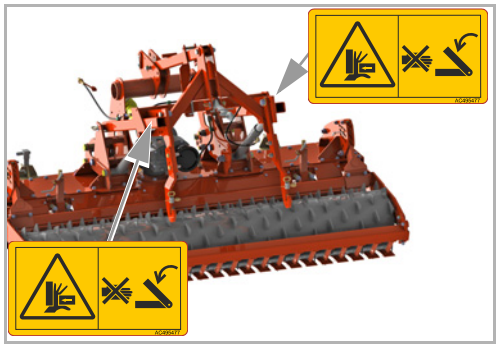
Regularly provide the following information to all persons who work with the machine: The safety instructions and the statutory regulations.

Warning signs

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



for Hydrolift [+]



Meaning



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



Stand clear of moving parts
Risk due to rotating parts.
Keep hands and feet a safe distance away.



Attention, hot surface
After long periods of operation, the surfaces can heat up.



Risk from ejected objects
During operation, the implement can pick up objects, e.g. stones, and then eject them again. Maintain a safe distance.



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.



Maximum operating pressure for the hydraulic system
Observe the maximum operating pressure for the hydraulic system of 200 bar.



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



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



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



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.



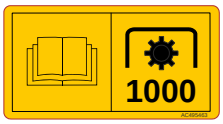
Re-tighten screws
After the first hours of operation, all bolts must be checked and tightened if necessary. Screw connections might have come loose due to vibrations.



Risk of cutting
Do not reach into the hazard area with your hands
Risk due to rotating parts.



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



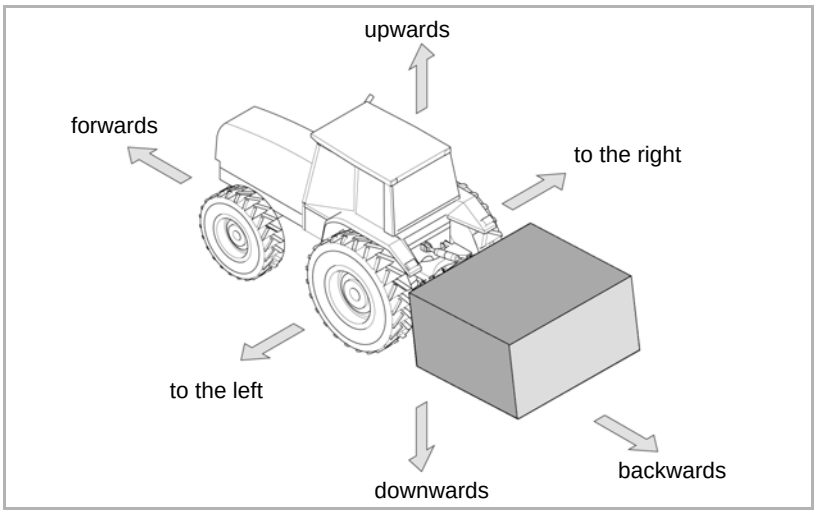
Check the PTO speed
Depending on the type of machine, the PTO speed is 1000 rpm.



Depending on the type of machine, the PTO speed is 540 rpm.

Definitions

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



Who is authorised to operate the machine?

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

General safety information

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

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

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

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

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

Operating a faulty machine can cause accidents or damage.

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

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

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

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

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

Do not place limbs below components that can be lowered
Some components are lowered when you work on the machine. Do not place limbs below these components.
Components that are lowered may lead to serious injuries.

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

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

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

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

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

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

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

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

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

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

Coupling

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

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

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

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

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

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

Hydraulics

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

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

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

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

Electrics

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

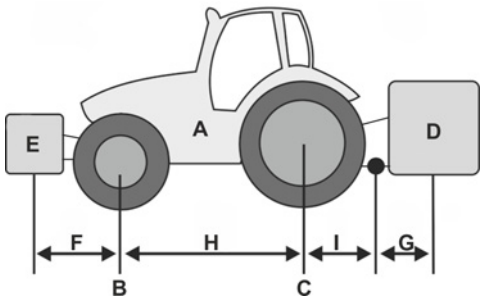
Calculation of axle loads

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

You calculate:

- Total weight
- Axle loads
- Minimum ballast

For this calculation, the following data is required:



From the tractor's operating manual

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

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

From the tyre manufacturer's documentation

- Tyre load-bearing capacity

From the operating manual

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

Measurements

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

Calculation

You can calculate the values using the formulas.

Ballast with front weights

Ballast with front weights on rear-mounted machines:

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

Ballast with rear weights

Ballast with rear weights on front-mounted machines:

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

Front axle load

Actual front axle load (J) in kg

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

Total weight

Actual total weight (K) in kg

$$K = E + A + D$$

Rear axle load

Calculating the actual rear axle load (L) in kg

$$L = K - J$$

Summary

The following conditions must be met:

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

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



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

Road transport

Ensure that the condition of the machine conforms to traffic regulations

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

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

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

Close the ball valves

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

Check tyre pressures

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

Check the hitch pins

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

Check trip ropes for the quick release coupling

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

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

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

Putting the machine into operation

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

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

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

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

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

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

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

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

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

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

Uncoupling

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

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

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

Care and maintenance

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

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

When performing care and maintenance work:

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

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

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

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

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

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

Further regulations

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

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

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

- Range of application
- Definitions
- Proper use
- Characteristics
- Designation of components
- Technical data

Proper use

The machine is used to comminute the soil and prepare it for the seeding.

An attached packer roller must be used. The only packer rollers which may be fitted are those supplied by the power harrow manufacturer for the model in question.

The machine is suitable for various ranges of application. The machine must never be overloaded. At the first indication of an overload, decommission the power harrow immediately.

The machine should only be used for the designated soil preparation as described in this operating manual. Any application other than or beyond this is considered improper use. This includes transporting people or objects, power transmission to other objects, or stump pulling.

The manufacturer and dealer are not liable for damage caused by improper use. The risk is borne solely by the user.

Characteristics

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

Tine
Depending on the field conditions, standard tines or tines with an active angle can be selected.

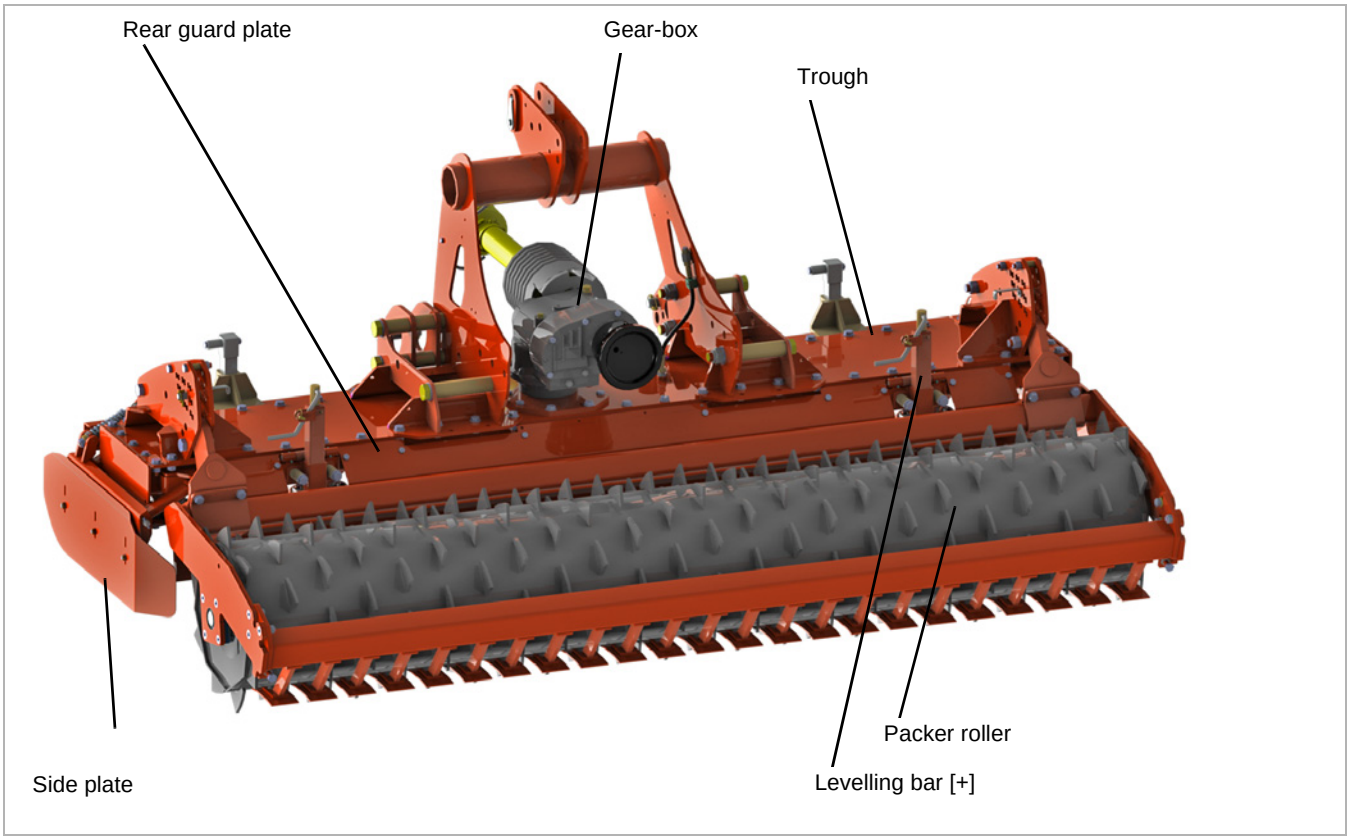
Constant depth control
The power harrow's packer roller is used to achieve constant depth control, independently of the ground profile.

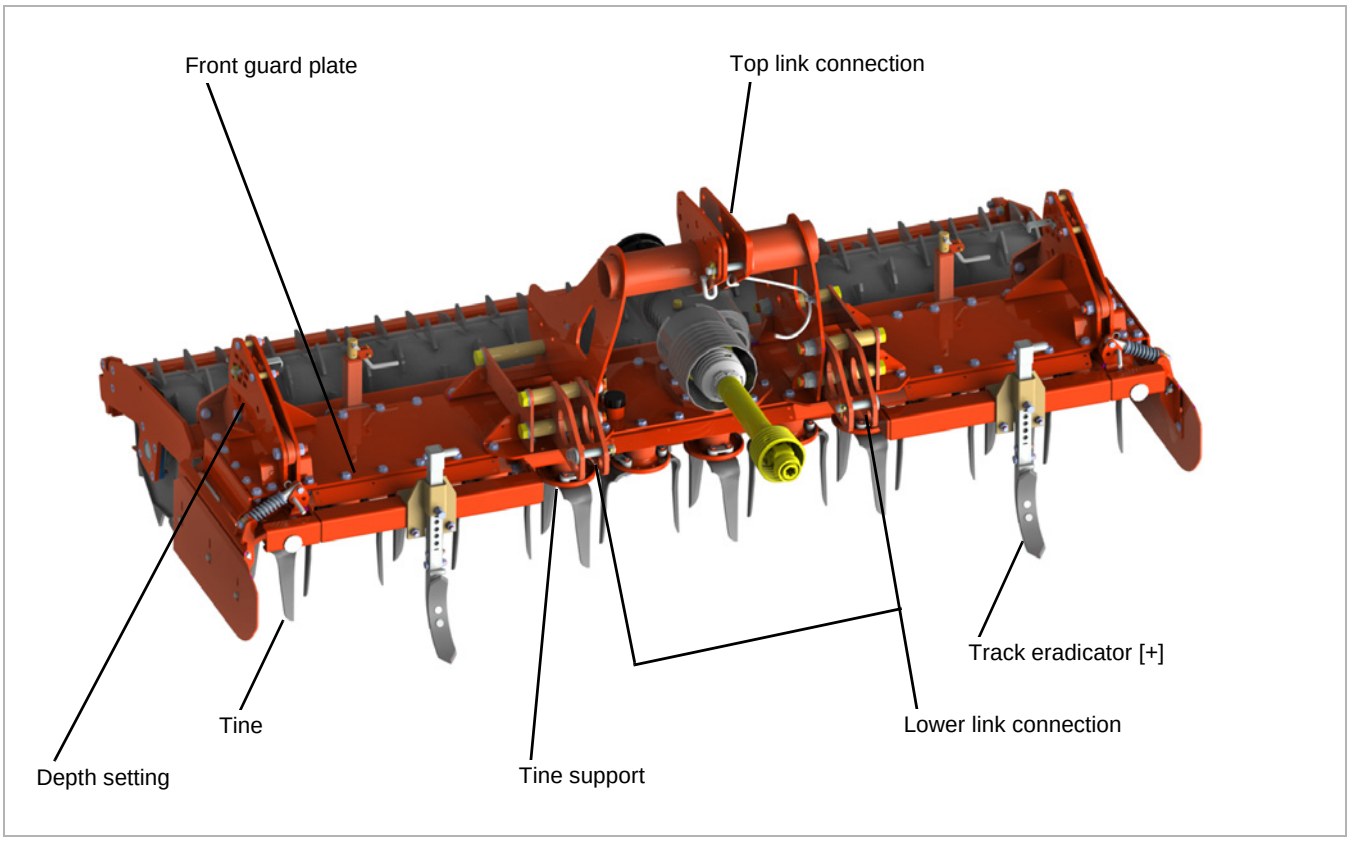
High rate of work
The simple design of the machine makes high rates of work possible at driving speeds of up to 12 km/h.

Obstruction-free work
Equipping the power harrow with specially shaped tines helps prevent clogging on fields with crop residues.

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

Assemblies


Rear guard plate
Gear-box
Trough
Side plate
Packer roller
Levelling bar [+]


Front guard plate
Top link connection
Track eradicator [+]
Tine
Lower link connection
Depth setting
Tine support

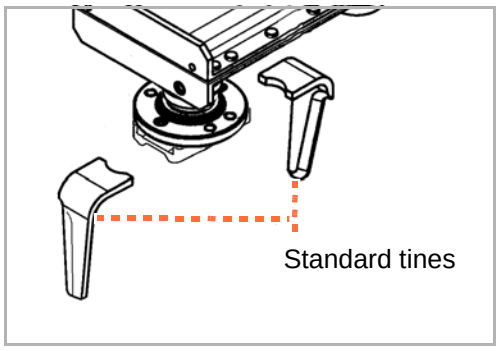
Technical data

General

	2.50 m	3.00 m
Height [m]		
In work position	1.11 - 1.38	
Width [m]		
Machine in transport position	2.50	3.00
Machine in work position	2.65	3.15
Depth [m]		
Machine with mounted toothed packer roller	1.67	
Total weight [kg]		
Machine with levelling bar, toothed packer roller and PTO shaft	1350	1550
Distance [m] from centre of the lower link to the centre of gravity of the machine		
Machine with levelling bar, toothed packer roller and PTO shaft	0.7	
Three-point linkage		
Top link connection	CAT 2, CAT 3	
Lower link connection	CAT 2, CAT 3N, CAT 3	
Tool carrier rotor speed [rpm]		
Standard ratio of transmission and at PTO speed 540 rpm	311	
Optional ratio of transmission and at PTO speed 540 rpm	358	
Optional ratio of transmission and at PTO speed 1000 rpm	351	
Performance [kW]		
Minimum required drive capacity	60	
Maximum permissible drive capacity	105	
Overload protection on PTO shaft [Nm]		
Automatic coupling at PTO speed of 540 rpm	2000	
Automatic coupling at PTO speed of 1000 rpm	1800	

	2.50 m	3.00 m
Tine		
Number of tine supports	10	12
Number of standard tines	20	24
Number of standard tines with carbide coating		
Tine dimensions [mm]	12 x 280	
Ball bearing distance [mm]	70.0	
Gear-box		
Transmission oil [l]	5.0	
Specification	Mineral oil SAE 140 - EP ISO VG 460 DIN 51517	
Trough		
Grease [kg]	17.5	21.0
Specification	Lithium grease SAE 140 EP NLGI00 G00K DIN 51826	
Linkage of seeding machines		
With mechanical linkage device / lifting force [kg]	Yes / 1400	
With Hydrolift / lifting force [kg]	Yes / 1600	
With coupling triangle	Yes	
Hydraulics		
Maximum permitted operating pressure [bar]	200	
Noise level		
At a PTO speed of 1000 rpm [db A]	Approx. 85	

Tine shapes



The power harrow can be equipped with different tines, which are suitable for different soil conditions.

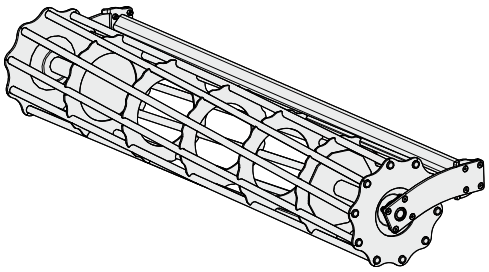
Tine shape	Range of application
Standard tines	preferably on already cultivated surfaces
Standard tines with carbide coating [+]	Preferably on already cultivated surfaces and soils with higher friction

Packer rollers

The packer roller guides the power harrow to a constant working depth and ensures that the soil is re-compacted. Some packer roller models are also used to further comminute the soil that has already been cultivated.
The table below shows how suitable the different types of packer roller are for different soils.
The following symbols stand for the following assessments:

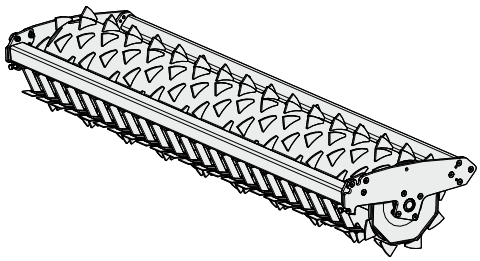
Symbol	Assessment
-	Not suitable
+	Suitable
++	Very suitable

Cage roller

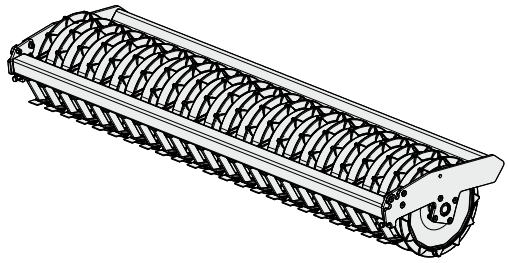


	Ground types			
	Slightly sandy	**Medium**	**Loam**	**Heavy**
Soil preparation with the plough	++	+	+	-
Reduced soil preparation	++	+	-	-
Notes	The cage roller is ideal for cultivating dry, non-sticky soils.			

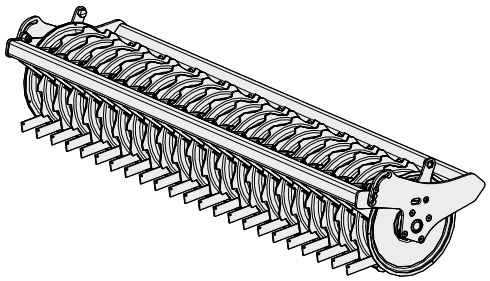
Toothed packer roller

	Ground types			
	Slightly sandy	**Medium**	**Loam**	**Heavy**
Soil preparation with the plough	+	++	++	+
Reduced soil preparation	+	++	++	-
Notes	The scrapers can be adjusted individually and centrally. As an option, scrapers with a tungsten-carbide coating are also available.			

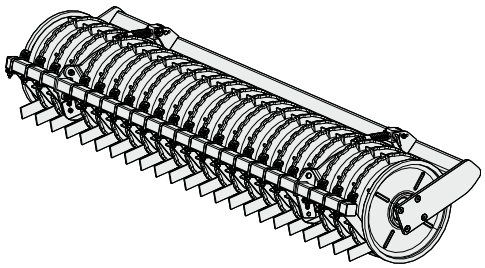
Actiline roller

	Ground types			
	Slightly sandy	**Medium**	**Loam**	**Heavy**
Soil preparation with the plough	+	+	+	++
Reduced soil preparation	+	+	+	++
Notes	The Actiline roller is suitable for heavy, damp and slightly sandy soils.			

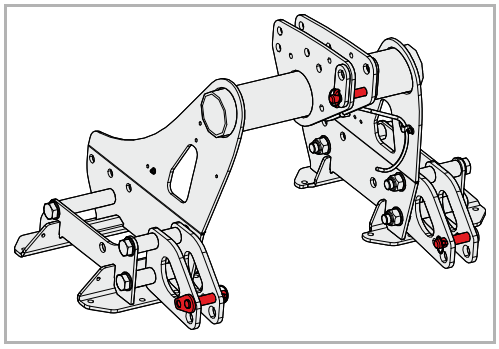
Actipack roller

	Ground types			
	Slightly sandy	**Medium**	**Loam**	**Heavy**
Soil preparation with the plough	-	-	+	++
Reduced soil preparation	-	+	+	++
Notes	The Actipack roller is suitable for medium and loamy, damp and sticky soils The degree of soil comminution is adjusted at the top of the Actipack roller.			

Cracker packer roller

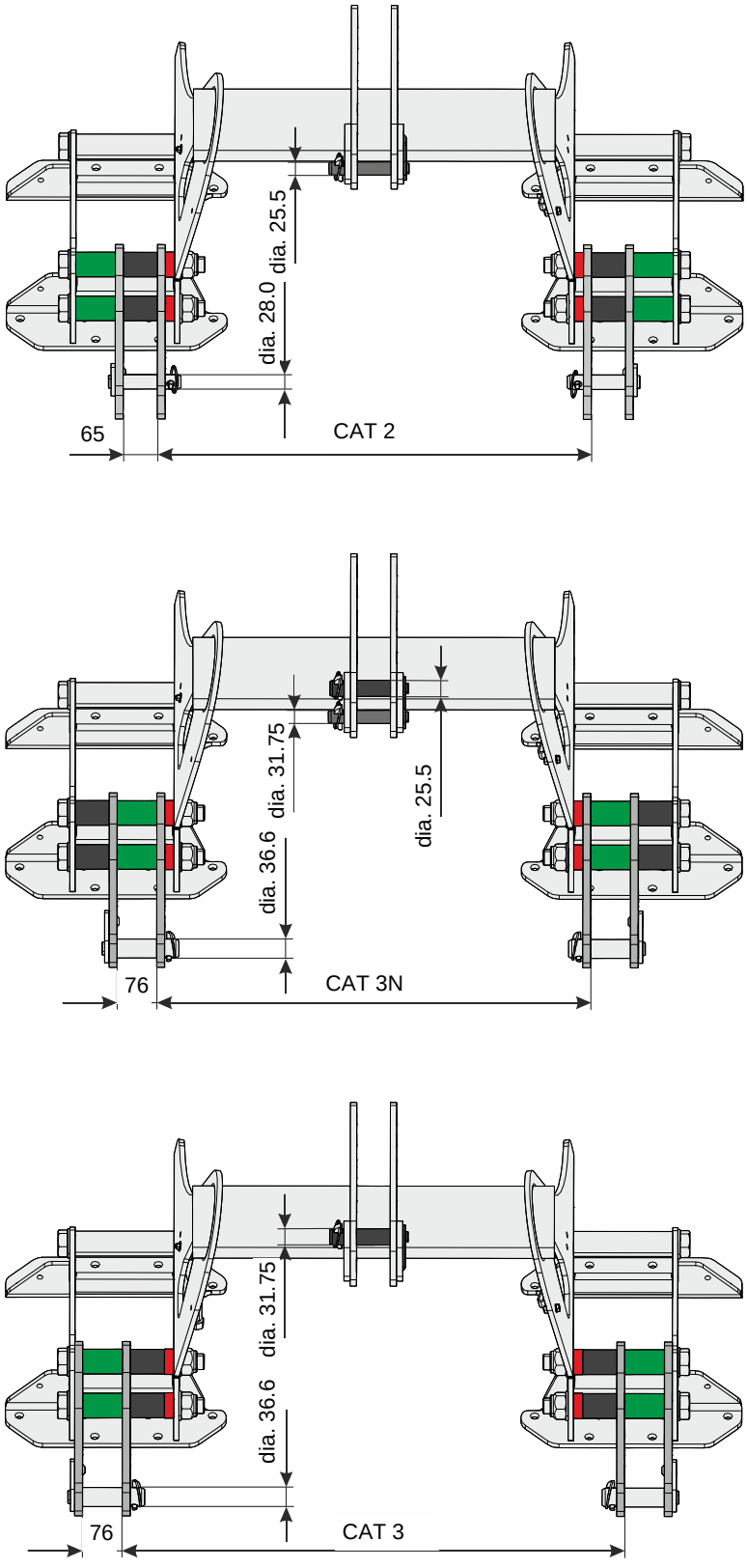
	Ground types			
	Slightly sandy	**Medium**	**Loam**	**Heavy**
Soil preparation with the plough	-	-	+	++
Reduced soil preparation	-	+	+	++
Notes	The Cracker packer roller leaves furrows in the ground surface, which can be used as preparation for seeding. The Cracker packer rollers are suitable for heavy, damp or sticky soils.			

Three-point linkage



The power harrow is connected to the tractor via a three-point linkage.

The top link connection and the lower link connection are fitted ex works.
It is not possible to convert this to a different category.
→ Chapter »Refitting«, page109


dia. 25.5
dia. 28.0
65
CAT 2
dia. 31.75
dia. 25.5
dia. 36.6
76
CAT 3N
dia. 31.75
dia. 36.6
76
CAT 3

Seeding machine linkage

Various special connections to the mechanical and hydraulic lifts are available to attach a seeding machine to the power harrow:

- Mechanical linkage device
- Hydrolift
- Coupling triangle for seeding machines
- Integrated linkage

Track eradicator

The track eradicators loosen the soil that has been compacted by the tractor tyres. The track eradicators are attached to two carriers, which are bolted onto the frame of the power harrow.

→ You can find information on the settings and properties of the track eradicators in the “Preparations in the field” chapter, page 55.

Scope of delivery

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

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

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

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

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

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

Coupling



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

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

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

Prerequisites:
The machine may have been in the work position or could still be in as-delivered condition. 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«, page61



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

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

The machine is in the work position:

- The machine, with attached packer roller in work position, is standing on a firm surface.
- The PTO shaft is fitted on the machine side and its length is adjusted to the linkage situation of the tractor.

If the prerequisites have not been met:

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

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

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

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

Do not operate the machine when front-mounted
The machine must only be connected to the rear of the tractor.
If front-mounted to the tractor, the machine may be damaged.

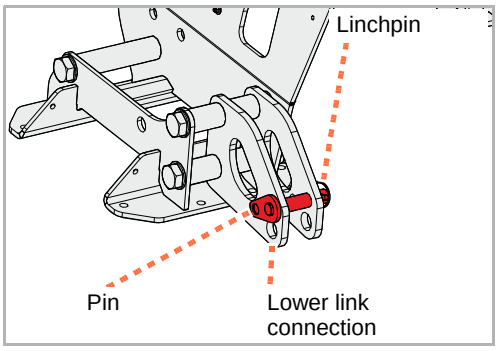
Three-point linkage

The power harrow is connected to the tractor via a three-point linkage.

To ensure that the connections for your tractor fit, you will generally need to fit balls to the pins in the lower link connections and the top link connection.

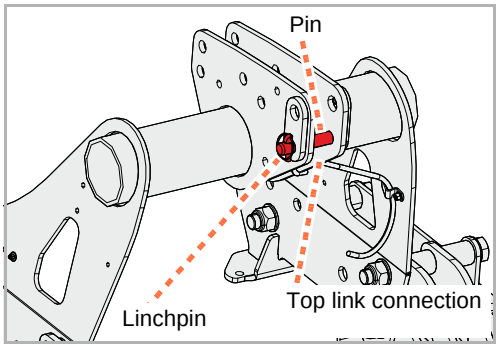
Lower link connection

The lower link connection is fitted ex works in CAT 2, CAT 3N or CAT 3.



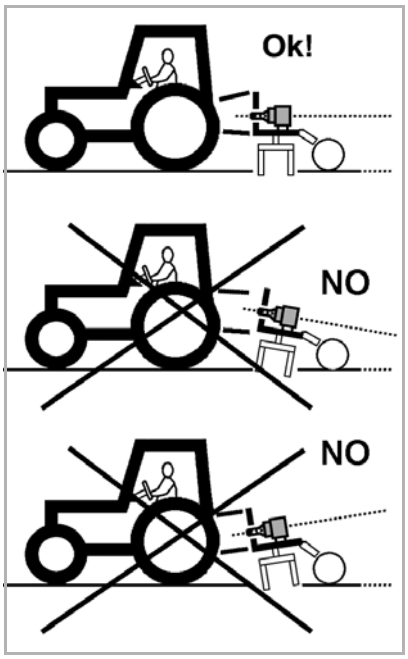
- Attach balls for the lower link onto the pin for the lower link connections, and secure these using a linchpin.
- Align the tractor centrally in front of the machine.
- Reverse slowly. The lower link balls from the tractor must be located below the lower link connections on the machine.
- Slightly raise the lower link and ensure the arrester hooks are securely locked in place.

Top link connection



The top link connection is implemented in CAT 2 and CAT 3.

- Attach a ball for the top link to the pin for the top link connection.
- Secure the pins with a split pin.
- Attach the top link and ensure the arrester hooks are securely locked in place.
- Set the lower links so that they have little play to the left or right.
- Set the length of the top link so that the drive shaft of the machine is horizontal.



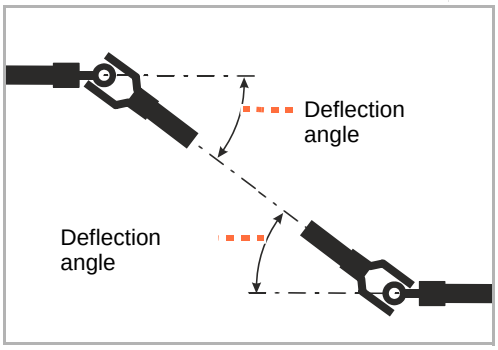
Align the drive shaft horizontally
Failure to align the machine's drive shaft horizontally would cause the PTO shaft to move out of its prescribed operating position and damage it.
Failure to observe these instructions may result in serious or fatal injuries.

Increased risk of injury
Connecting the PTO shaft creates an increased risk of injury.
- Install only the PTO shaft supplied or one of an identical type.
- When attaching it ensure that the PTO shaft locks engage securely.
- When operating the machine, make sure that the PTO speed is correct.

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

Depending on the tractor involved, the PTO shaft will need to be shortened correctly before installation. This task may only be performed by properly qualified individuals.
→ Operating manual of the PTO shaft manufacturer

Observe the maximum permissible deflection angle of the PTO shaft
If the machine is in the work position, the deflection angle of the PTO shaft must not exceed 20°.
The maximum permissible deflection angle for the PTO shaft is 25°.
Lifting the machine beyond this deflection angle *can cause significant damage to the machine.*



- Couple the PTO shaft to the tractor and secure.
- Secure the anti-twist protection for the PTO shaft guard tube to the tractor.
- Lift the machine.

Connecting

After coupling, make the following connections:
- Electrics
- Hydraulics

Electrics

If present, attach the following electrical cables to the tractor:
- The machine's lighting equipment.

- Check whether all of the connections are working properly.

Hydraulics

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

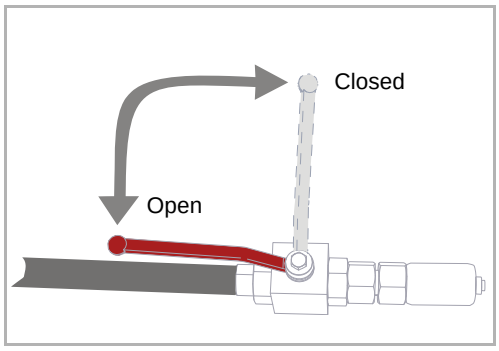
Check the hydraulic hoses and hydraulic couplings
Before making connections, check all hydraulic hoses for damage. Check all hydraulic couplings for firm seating after connecting them.
Defective hydraulic hoses or incorrectly seated hydraulic couplings can trigger unpredictable machine movements and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

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

- The lines for the Hydrolift's hydraulic cylinder



- If the hydraulic hoses to the tractor are equipped with ball valves, open all of these.
- Check whether all of the connections are working properly.

Seeding machine linkage

Various special connections to the mechanical and hydraulic lifts are available to attach a seeding machine to the power harrow:

- Mechanical linkage device
- Hydrolift
- Coupling triangle for seeding machines
- Integrated linkage

Prerequisites

- The power harrow is attached to the tractor.
- One of the above-mentioned linkage devices is fitted on the power harrow.
- The seeding machine is in work position on a secure surface behind the power harrow.

If the prerequisites have not been met:



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

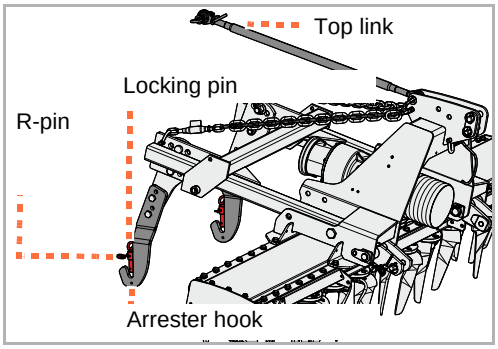
- The observance of a sequence of workshops
- Compliance with tolerances and torques
- Safe handling of the electronics

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

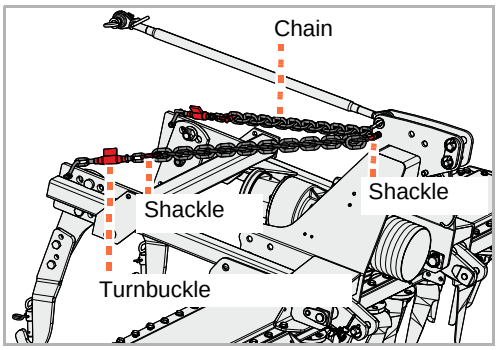
▸ Prepare the machine in such a way that the prerequisites are met.

Mechanical linkage device [+]

The mechanical linkage device can transfer lifting forces of up to 1400 kg.



- Set the lower link connections to the dimensions of the seeding machine.
- Remove the R-pin from the locking pin.
- Remove the locking pin.
- Align the tractor with the power harrow centred in front of the seeding machine.
- Reverse slowly. The lower link connections from the tractor must be located below the lower link connections on the seeding machine.
- Lift the power harrow and ensure the arrester hooks are securely locked in place.
- Insert the locking pin and secure with an R-pin.
- Fasten the top link to the seeding machine and secure.
- Lower the entire machine combination to work position.
- Set the length of the top link so that the seeding machine is in its prescribed alignment with the ground.
- Adjust the length of the chain by repositioning it in the shackles or by setting the turnbuckle.
- Apply the same setting on the other side of the machine.

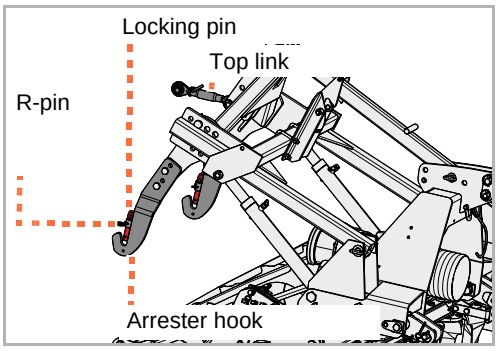


The chains must hang loose if the seeding machine is in work position, so that it can run on its wheels unhindered and can also be guided correctly in ground depressions. However, the chains must not be tensioned too loosely, as they restrict the ground clearance when lifting the power harrow and seeding machine.

Hydrolift [+]

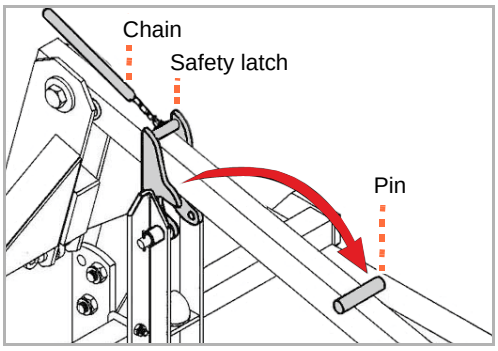
Depending on the model, the Hydrolift can transfer lifting forces of up to 1600 kg.

Using the Hydrolift with PTO-driven seeding machines
In the event of excessive lift with the Hydrolift, the PTO shaft would move out of its prescribed operating position and would be damaged
Failure to observe these instructions may result in serious or fatal injuries.



- Connect the hydraulic line of the Hydrolift to the tractor.
- Lower the Hydrolift completely.
- Set the lower link connections to the dimensions of the seeding machine.
- Remove the R-pin from the locking pin.
- Remove the locking pin.
- Align the tractor with the power harrow centred in front of the seeding machine.
- Drive backwards slowly. The lower link connections from the tractor must be located below the lower link connections on the seeding machine.
- Lift the Hydrolift and ensure the arrester hooks are securely locked in place.
- Insert the locking pin and secure with an R-pin.
- Fasten the top link to the seeding machine and secure.
- Lower the entire machine combination to work position.
- Set the length of the top link so that the seeding machine is in its prescribed alignment with the ground.

For road transport, the Hydrolift is equipped with a locking mechanism in the topmost position.



- Lift the Hydrolift until the safety latch locks onto the pin.

The Hydrolift must be unlocked when in work position.

- Release the safety latch by pulling on the chain.
- Lower the Hydrolift.

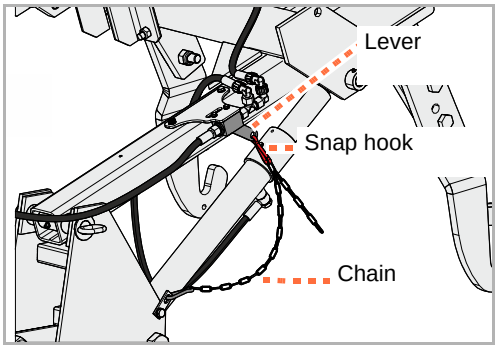
Raise the Hydrolift in order to release the tension from the safety latch so that it can be unlocked.

Lift limiter [+]

The lift limiter can be used to lift the seeding machine to a preselected height using the Hydrolift, in order to prevent collisions between components of the seeding machine and the power harrow. This is advisable, for example, when turning on the headland or for PTO-driven seeding machines.

Using the lift limiter with PTO-driven seeding machines
In the event of excessive lift with the Hydrolift, the PTO shaft moves out of its prescribed operating position and is damaged.
Failure to observe these instructions may result in serious or fatal injuries.

The height of the lift is determined by the length of the chain. The shorter the chain, the less the seeding machine can be lifted.



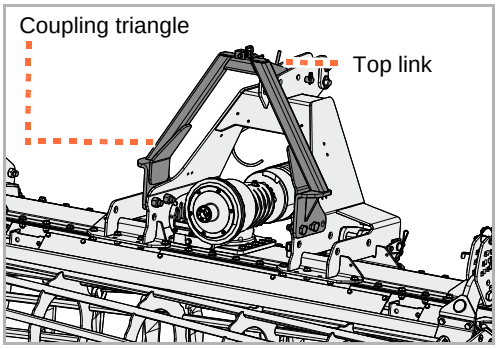
- Set the lifting height by hanging the corresponding chain link in the snap hook.

To deactivate the lift limiter for the transport position:

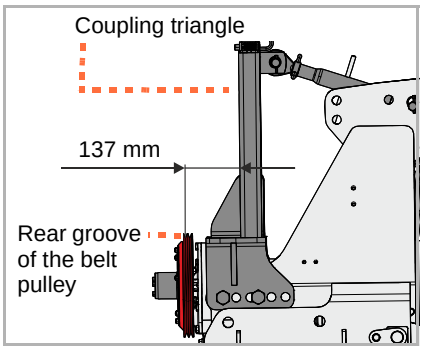
- Remove the PTO shaft from the PTO-driven seeding machine, as required.
- Decouple the chain at the snap hook.
- Raise the Hydrolift fully, until the locking mechanism is activated.

Coupling triangle for seeding machines [+]

The coupling triangle for seeding machines is a quick-release coupling.



- Attach the seeding machine to the power harrow in accordance with the instructions in the operating manual for the seeding machine.



The distance between the centre of the rear groove in the belt pulley and the rear wall of the coupling triangle must be 137 mm.



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.

Prepare for soil preparation according to your machine configuration:

- Rotor speed
- Working depth
- Side plates
- Levelling bar
- Track eradicator

Prerequisites for the preparation work:

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

☑ The machine is in the work position.

☑ The machine frame is parallel to the ground.

☑ Handbrake in tractor is applied.

- ▸ Secure the machine.
- ▸ Lower the machine to its work position.
- ▸ Make the settings.
- ▸ Move the machine back into the transport position.

Rotor speed

The table below lists the rotor speeds of the factory-fitted gear-box. These speeds generally ensure optimal work results. A rotational speed of 540 rpm or 1000 rpm is recommended for the tractor's PTO, depending on the design of the gear box in the power harrow.

PTO speed 540 rpm

Working width	Input shaft	Layshaft	Rotor speed [rpm]
2.50 m **3.00 m**	Z=31	Z=26	311
	Z=33 [+]	Z=24 [+]	358

PTO speed 1000 rpm

Working width	Input shaft	Layshaft	Rotor speed [rpm]
2.50 m **3.00 m**	Z=24 [+]	Z=33 [+]	351

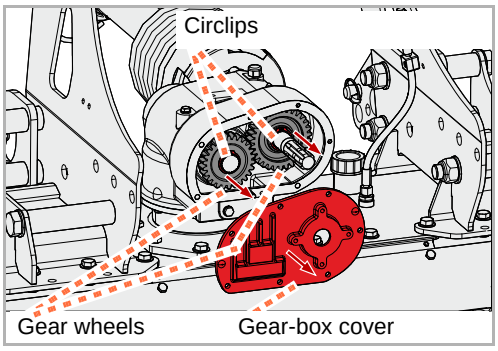
Setting the rotor speed



Risk of burning
Do not perform any work on a gear-box still hot from operation. Wait until the components and the oil have cooled down.
Failure to observe these instructions may result in severe injuries.

Prerequisites:

- The tractor's PTO is deactivated.
- All driven components are stationary.
- The machine has been lowered to the work position.
- Tractor motor is switched off.
- Tractor is secured against rolling away and being restarted without authorisation.
- PTO shaft is separated from the tractor.
- The transmission oil is not drained.



- Clean the trough, gear-box and surrounding area.
- Remove the bolts and open the gear-box cover. Do not damage the seal.
- Remove the circlips and gear wheels.
- Replace and install gear wheels.

→ Chapter »Preparing for operation«, section »Rotor speed«, page 47

If the gear wheels do not interlock with each other straight away, turn the input shaft accordingly.

- Insert the circlips back into the groove.
- If relevant, replace damaged seal.
- Close the gear-box cover and check for correct seating of the seal.
- Tighten the bolts evenly.
- Replenish with the prescribed oil.

→ For information on the oil type to be used, see the »Getting to know the machine« chapter, section »Technical data«, page 26

- Check the oil level and tightness of the seal.
- Oil the removed gear wheels thoroughly and store in a dry location.

After replacing the gear wheels in the gear-box, pay particular attention to hot machine components and hot oil during operation. Check the oil level in the gear-box in these cases.

Working depth

The working depth of the power harrow is set by limiting the movement of the packer roller in relation to the power harrow.

The position of the side plates and levelling bar must be adapted to the selected working depth of the power harrow.

Configure the settings precisely in order to achieve optimal work results and low power consumption. They therefore prevent unnecessary wear and damage.



After initial coarse tuning, carry out fine adjustment on the field. The penetration depth of the packer roller in the ground depends on the soil condition and therefore influences the working depth.



Always perform the adjustment work for all of the depth settings on both sides of the machine.

The power harrow is equipped with one of the listed depth settings:

- Standard connection
- EURO connection [+]

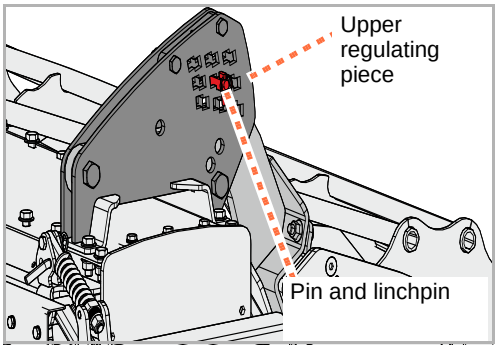
Standard connection

Depth setting

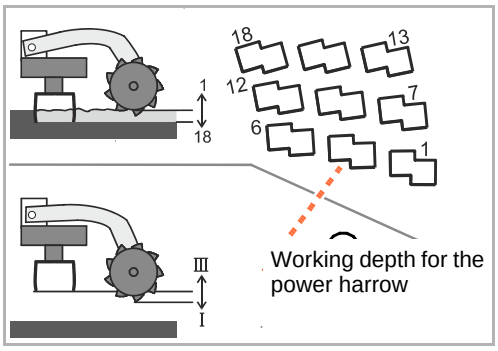
Adjust the working depth using a regulating piece. The setting is adjusted in increments of 2 cm each.

Prerequisite:

- The machine is lifted.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.



- Remove the linchpin.
- Remove the pin.



- Reinsert the pin according to the required working depth for the power harrow.

Scale values 1 to 6	Shallow working depth
Scale values 7 to 12	Average working depth
Scale values 13 to 18	Deep working depth

- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.

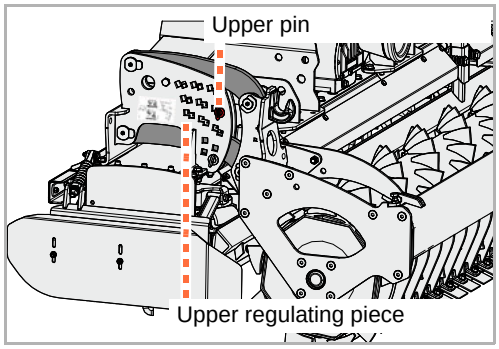
EURO connection

Depth setting

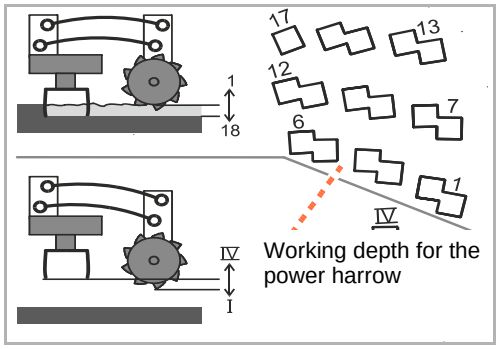
Adjust the working depth using a regulating piece. The setting is adjusted in increments of 1.5 cm each.

Prerequisite:

- The machine is lifted.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.



- Remove the linchpin.
- Remove the upper pin.



- Reinsert the pin according to the required working depth for the power harrow.

Scale values 1 to 6	Shallow working depth
Scale values 7 to 12	Average working depth
Scale values 13 to 17	Deep working depth

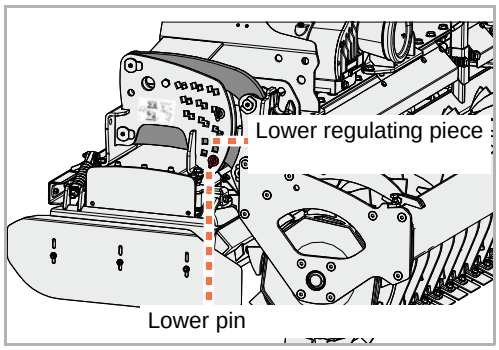
- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.

Lifting height of the packer roller

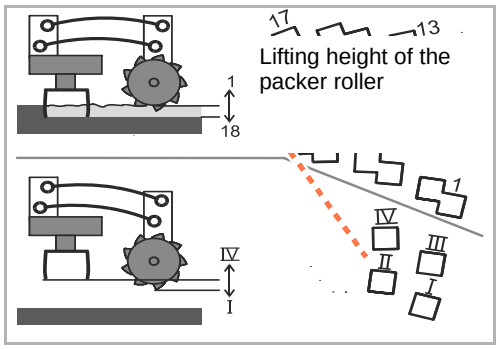
Adjust the lifting height using a regulating piece. The setting is adjusted in increments of 3.0 cm each.

Prerequisite:

- The machine must be set down on the ground.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.



- Remove the linchpin.
- Remove the lower pin.



- Reinsert the pin according to the required lifting height for the packer roller.

Scale value I	Lowest lifting height
Scale values II and III	Average lifting height
Scale value IV	Greatest lifting height

- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.

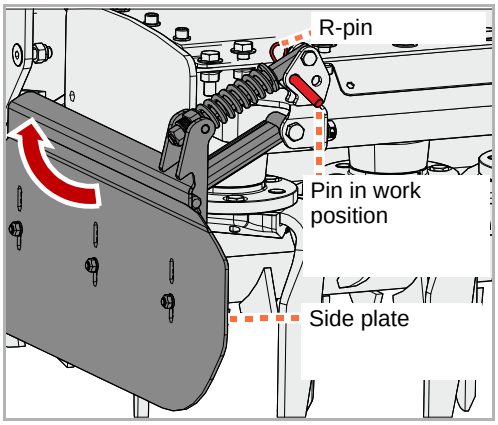
The lifting height of the packer roller may possibly be increased further, if the power harrow's tines are in the ground and a further hole in the regulating piece is freed up.

Side plates

The side plates limit the working width of the power harrow on both sides. They must be adjusted so that a wall of earth is not created at the sides of the power harrow. The position of the extensions depends on the working depth of the power harrow.

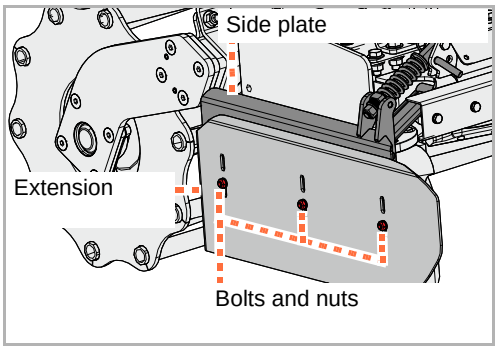
Prerequisite:

- The machine is lifted.
- The side plates on the power harrow are in the work position.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.

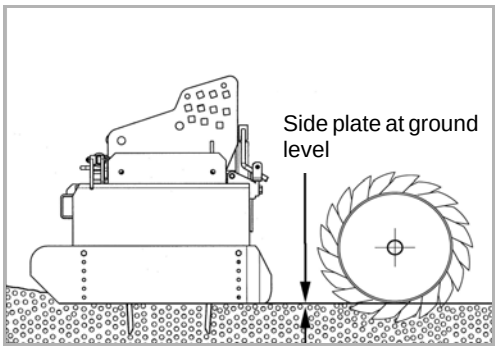


- Remove the R-pin.
- Lift the side plate and remove the pin.
- Move the pin into the work position.
- Allow the side plate to swing downwards.
- Secure the pin with the R-pin.

Adjust the extensions:



- Remove the nuts and bolts of the extensions.



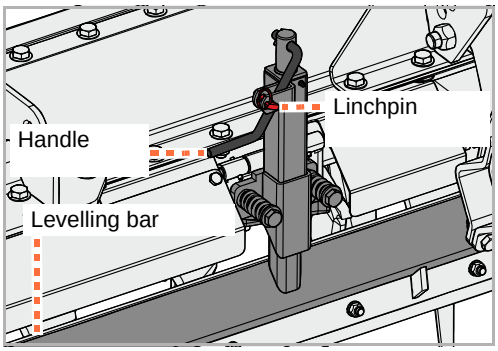
- Bring the extensions to a height above ground that corresponds to the required working depth.
- Re-insert the bolts and tighten the nuts securely.
- Apply the same setting on the other side of the machine.

Levelling bar

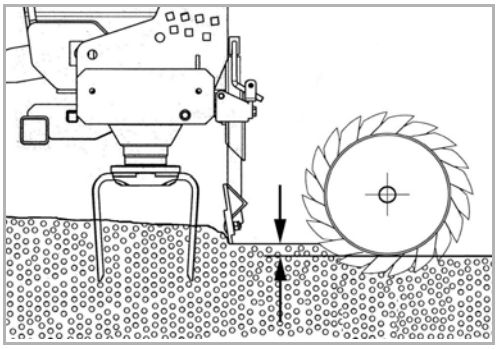
The levelling bar levels the ground behind the rotors.
The set height of the levelling bar also influences how long the soil remains in the power harrow and thus the intensity of the processing.

Prerequisite:

- The machine is in work position.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.



- Remove the linchpin.
- Remove the handle from the storage bag.
- Set the height of the levelling bar.



Adjust the levelling bar in such a way that it is above the working level of the packer roller.

- Place the handle in the storage bag and secure with a linchpin.
- Apply the same setting on the other side of the machine.

If a dam is formed in the soil at the side plates, set the levelling bar higher or reduce the working speed. When cultivating soil that tends to pile up, stick and become compacted (wet ground), move the levelling bar to the highest possible position or remove it.

Setting the levelling bar correctly
Set the levelling bar correctly.
If it is set too deep, the levelling bar will not work reliably and may be damaged.

Track eradicator

The track eradicators loosen the soil that has been compacted by the tractor wheels. The track eradicators are attached to two equaliser bars, which are bolted onto the frame of the power harrow. You can adjust the working depth of the track eradicators. The track eradicators should penetrate around 5 cm in to the ground of the compacted track.

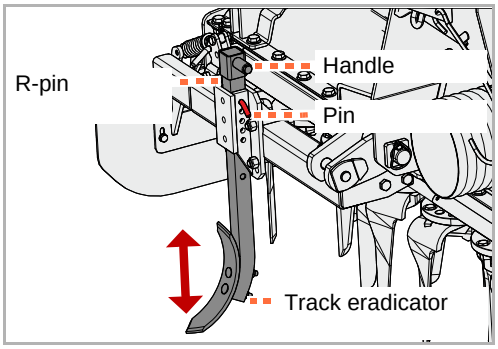
Adjust the track eradicators to the centre line of the tractor tyres. If there are two track eradicators per side, choose the line of the outside edges of the tractor tyres.

Setting the track eradicators correctly
Set the track eradicators correctly.
If set too deep, the track eradicators will not work reliably and may be damaged.

Prerequisite:

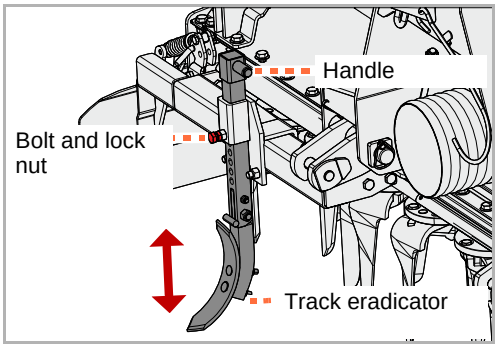
- The machine is lifted.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.

Track eradicators without overload protection



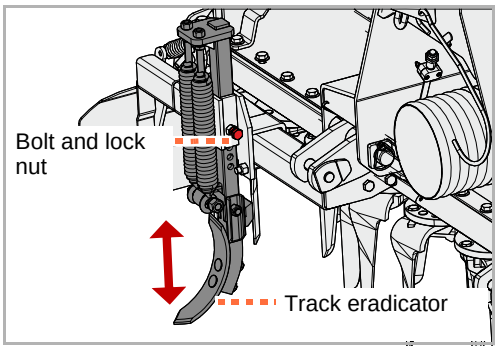
- Remove the R-pin.
- Lift the track eradicator slightly at the handle.
- Remove the pin.
- Set the track eradicator to the required working depth.
- Secure the pin with the R-pin.
- Apply the same setting on the other side of the machine.

Track eradicators with shear bolt



- Release the lock nut.
- Lift the track eradicator slightly at the handle.
- Unscrew the bolt until the track eradicator can be adjusted.
- Set the track eradicator to the required working depth.
- Tighten the bolt and secure with the lock nut.
- Apply the same setting on the other side of the machine.

Track eradicators with automatic overload protection



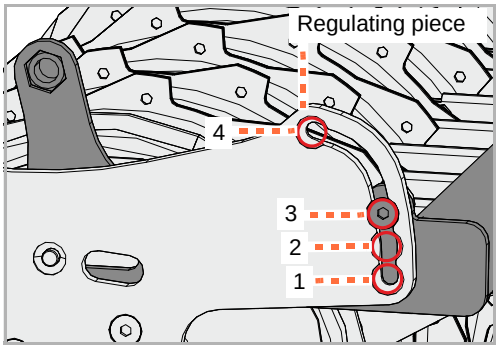
- Release the lock nut.
- Slightly raise the track eradicator.
- Unscrew the bolt until the track eradicator can be adjusted.
- Set the track eradicator to the required working depth.
- Tighten the bolt and secure with the lock nut.
- Apply the same setting on the other side of the machine.

Actipack roller [+]

Actipack rollers are equipped with knives for intensive cultivation of the soil. Between the roller elements, there are scrapers, which remove soil deposits from the packer rollers.

Both the knives and the scrapers are mounted on a corresponding frame. The frame can be adjusted centrally.

The cultivation intensity of the soil can be changed by adjusting the frame in relation to the packer roller. Three work positions are possible as well as deactivation of the knives via a regulating piece.



Position	Intensity	Use
1	Heavy	Fine fragmentation, heavy to medium-heavy soils
2	Medium	Medium-fine fragmentation, heavy to medium-heavy soils
3	Light	Relatively coarse fragmentation, medium-heavy soils
4	Tines deactivated	Coarse fragmentation, light soil

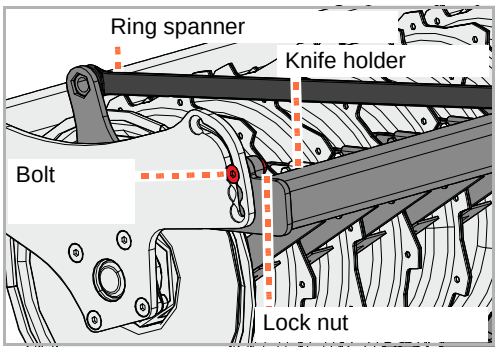
The more intensively the knives are used, the greater the level of wear and the probability that a wall will form in front of the packer roller. Reduce the driving speed.

In position 4, it is advisable to check the distance between the scrapers and the packer roller. The scrapers must never touch the roller.

Setting of the working depth

Prerequisite:

- The machine is lifted.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.



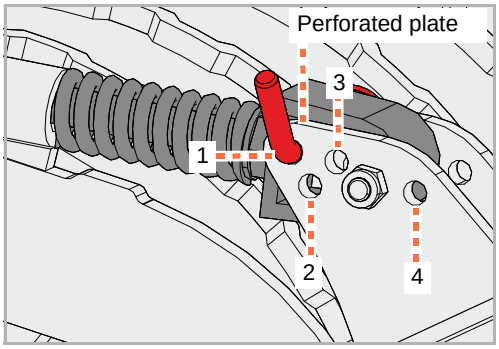
- Remove the lock nuts used to lock the adjustment screws on both roller sides.
- Unscrew the bolt on one of the two sides by approx. 1 cm, so that it can slide through the connecting link.
- On the opposite side on the inside, attach the spanner to the leverage point.
- Hold the ring spanner with one hand and, with the other hand, unscrew the second bolt on the outside by approx. 1 cm, so that it can slide through the connecting link.
- Using the ring spanner as a lever, adjust the knife holder until the bolt is in the required position.
- Tighten the bolt and secure with the lock nut.
- Using the ring spanner as a lever, adjust the knife holder on the other side until the bolt is in the required position.
- Hold the ring spanner firmly with one hand and use the other hand to tighten the bolt. Secure with the lock nut.
- Remove the ring spanner.

Cracker packer roller [+]

Cracker packer rollers are equipped with knives for intensive cultivation of the soil. Between the roller elements, there are scrapers, which remove soil deposits from the packer rollers.

Both the knives and the scrapers are mounted on a corresponding frame. The frame can be adjusted centrally.

The cultivation intensity of the soil can be changed by adjusting the frame in relation to the roller. Three work positions are possible as well as deactivation of the knives via a perforated plate. In addition, the pretension of the pressure spring can be further increased.



Position	Intensity	Use
1	Heavy	Fine fragmentation, heavy to medium-heavy soils
2	Medium	Medium-fine fragmentation, heavy to medium-heavy soils
3	Light	Relatively coarse fragmentation, medium-heavy soils
4	Tines deactivated	Coarse fragmentation, light soil

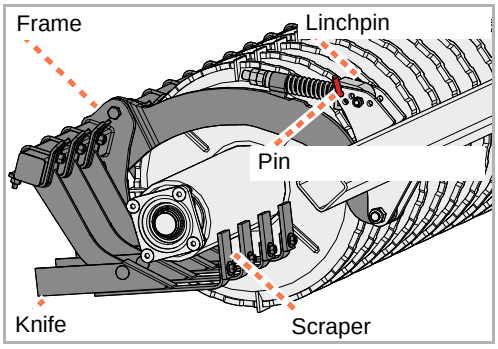
The more intensively the knives are used, the greater the level of wear and the probability that a wall will form in front of the packer roller. Reduce the driving speed.

In position 4, it is advisable to check the distance between the scrapers and the packer roller. The scrapers must never touch the roller.

Setting of the working depth

Prerequisite:

- The machine is lifted.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.

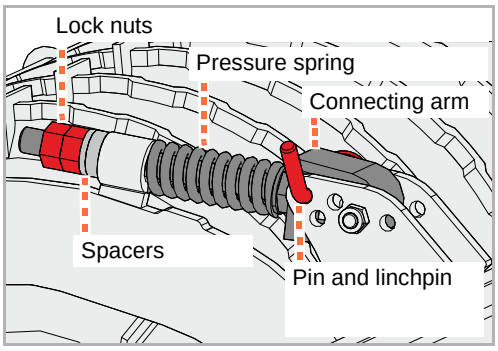


- Remove the linchpin.
- Remove the pin.
- Reinsert the pin according to the required working depth of the knife; lift the frame if necessary.
- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.

Setting the pretension of the pressure spring

Prerequisite:

- The machine is lifted.
- The tractor PTO is deactivated.
- All driven components are stationary.
- The tractor motor is switched off.
- The tractor is secured against rolling away and being restarted without authorisation.



- Remove the linchpin.
- Remove the pin.
- Remove the bolt and nut.
- Undo and remove the lock nuts.
- Remove the spacers.
- Remove the connecting arm with pressure spring.
- Fit the required spacer on the connecting arm.
- Install the connecting arm with pressure spring and spacer.
- Fit an additional distance piece.
- Secure the connecting arm with lock nuts.
- Fit the bolt and nut.
- Reinsert the pin according to the required working depth of the knife; lift the frame if necessary.
- Secure the pin using the linchpin.
- Apply the same setting on the other side of the machine.

Safety

Before transporting the machine on public roads, read the following safety instructions. Observing the safety instructions prevents accidents.

General

Ensure that the condition of the machine conforms to traffic regulations

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

- Lighting, warning and protective devices must be fitted
- With the machine folded, all brake, reversing, and turn indicator lights as well as the number plate must be clearly visible. If a clear view is not possible, the lighting equipment and the number plate must be fitted to the attached seeding technology.
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- Transport with a full hopper is not permitted. You may only carry the previously calculated load.
- The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
- Close the hopper with the cover.

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

Before road transport



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

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

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

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

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



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

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

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

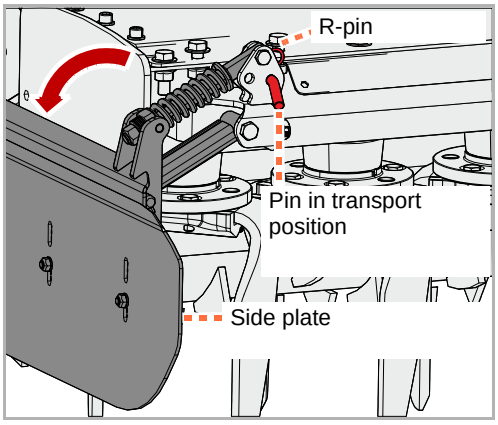
Trip ropes must hang loose
Trip ropes for quick-release couplings must hang loose and must not, when in their lowered position, release the couplings of their own accord.
Unintended tripping can cause serious accidents.

Transport position

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

Side plate

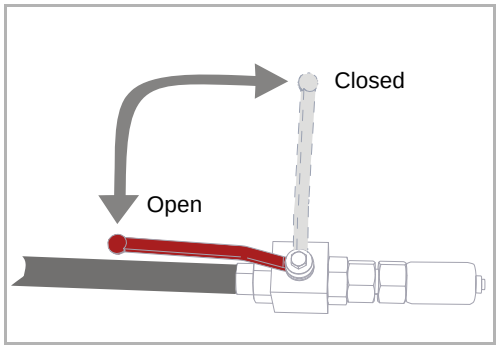
To move the power harrow's side plates into the transport position:



- Remove the R-pin.
- Lift the side plate and remove the pin.
- Move the pin into the transport position.
- Allow the side plate to swing downwards.
- Secure the pin with the R-pin.

Ball valve

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

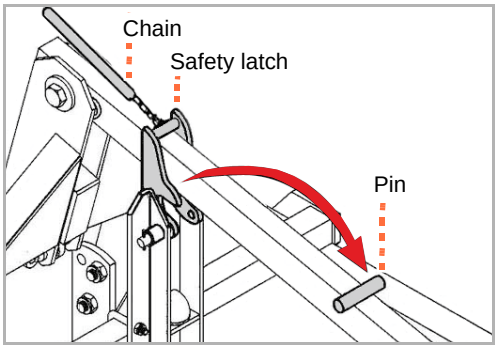


- Open the ball valve.
- Using the control unit on the tractor, fold the machine into its transport position.
- Close the ball valve.

Hydrolift [+]

The Hydrolift must be locked in the top position for road transport.

Using the Hydrolift with PTO-driven seeding machines
In the event of excessive lift with the Hydrolift, the PTO shaft would move out of its prescribed operating position and would be damaged
Failure to observe these instructions may result in serious or fatal injuries.



- Lift the Hydrolift until the safety latch locks onto the pin.

Ropes or chains must hang freely
The ropes or chains for actuation of the safety latch must hang freely in transport position.
Failure to observe these instructions may result in serious or fatal injuries.

Lift limiter [+]

To deactivate the lift limiter for the transport position:

- Remove the PTO shaft from the PTO-driven seeding machine, as required.
- Decouple the chain at the snap hook.
- Raise the Hydrolift fully, until the locking mechanism is activated.

Road transport



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

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

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

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

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

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

Before travelling on the road, check the following:

☑ The machine is folded in completely.

☑ The side plates are in transport position.

☑ The lift limiter is deactivated.

☑ The Hydrolift is in transport position.

☑ Track markers are secured.

☑ The lighting equipment is installed and operational.

☑ The emptying flap on the metering device is closed.

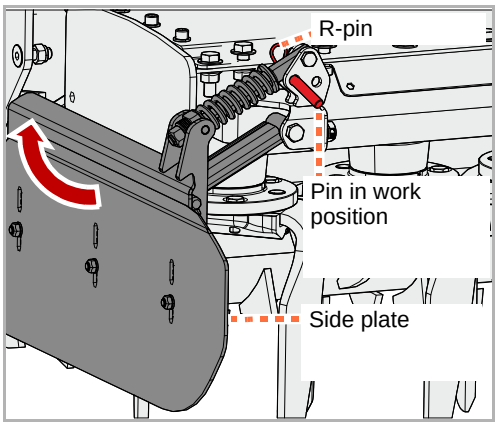
Preparatory work

‚**Prerequisites:**

- The machine is secured.
- The machine has been lowered to the work position.

Side plates

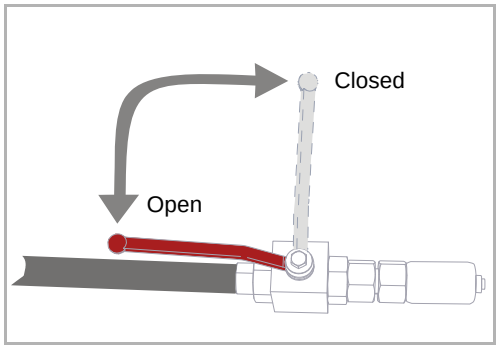
To move the power harrow's side plates into the work position:



- Remove the R-pin.
- Lift the side plate and remove the pin.
- Move the pin into the work position.
- Allow the side plate to swing downwards.
- Secure the pin with the R-pin.

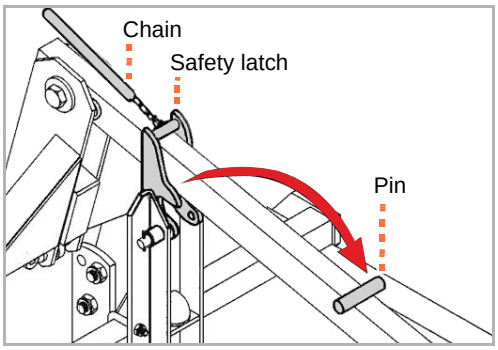
Ball valve

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



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

Hydrolift [+]



The Hydrolift must be unlocked when in work position.

- Release the safety latch by pulling on the chain.
- Lower the Hydrolift.

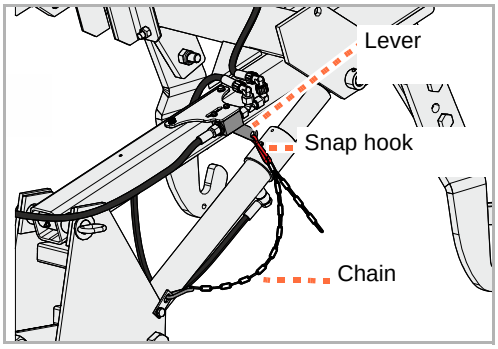
To unlock the Hydrolift, raise the Hydrolift in order to release the tension from the safety latch.

Lift limiter [+]

Using the lift limiter with PTO-driven seeding machines
In the event of excessive lift with the Hydrolift, the PTO shaft moves out of its prescribed operating position and is damaged.
Failure to observe these instructions may result in serious or fatal injuries.

Prerequisite:

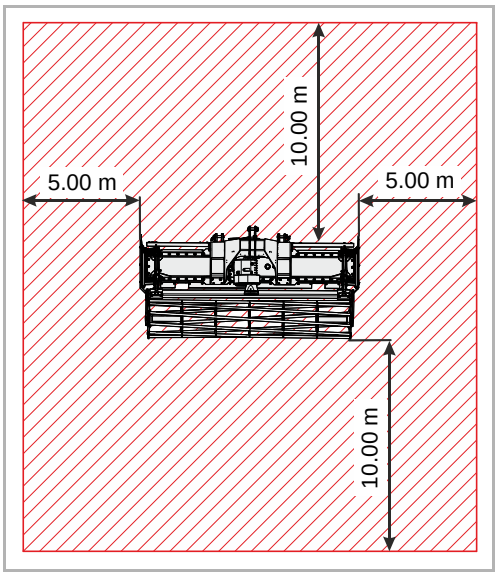
- The Hydrolift has been fully lowered.



- Set the required height by hooking the corresponding chain link into the snap hook.
- Install the PTO shaft of the PTO-driven seeding machine, as required.

Hazard area

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

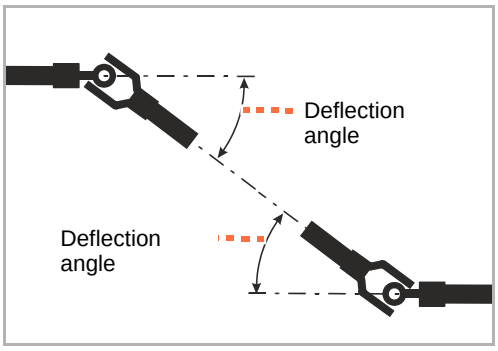


During operation, the hazard area zone covers 10 m in front of and behind the machine and 5 m to the sides.
Check the machine's hazard area before starting, during initial operation and during operation.
Adapt the distances in relation to the machine's space requirement and its add-on devices.
Only start the machine once the hazard area is cleared of any persons – especially children – but also animals or objects.
In unfavourable conditions, objects could be ejected through the machine at high speed.

Check the working area for objects
Ensure that the working area is clear of any objects that may be ejected from the machine or may damage the machine.
Failure to observe these instructions may result in serious or fatal 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.

Driving and working on terrain
During work, watch out for uneven ground, slopes or even pits and embankments.
Adapt the driving speed to the ground conditions.
Failure to observe these instructions may result in serious or fatal injuries.



Only work in the direction of travel
When in the work position, a machine must only move in the direction of travel. The machine must be lifted when reversing.
If the machine remains in work position when reversing, this can cause significant damage to the machine.

Observe the maximum permissible deflection angle of the PTO shaft
If the machine is in the work position, the deflection angle of the PTO shaft must not exceed 20°.
The maximum permissible deflection angle for the PTO shaft is 25°.
Lifting the machine beyond this deflection angle *can cause significant damage to the machine.*

Deactivate the PTO before lifting the machine
Before lifting the machine, always switch off the tractor's PTO.
The PTO shaft could otherwise be seriously damaged.

Set the lower link balls of the tractor to floating position
Set the lower link balls of the tractor to floating position. The lower link balls of the tractor must not be operated during position adjustment.
Failure to observe this instruction leads to poor work results and early wear of the tools.

Checks

Carry out the inspection using the check list:

Before starting work

- ☑ Gear-box grease is sufficient
- ☑ Has the gear-box oil level been checked?
- ☑ Have all lubrication points been lubricated in accordance with the maintenance regulations?
- ☑ Have all the connection lines been checked?
- ☑ Have the side plates been swivelled into work position?
- ☑ Is the Hydrolift unlocked?
- ☑ Has the lift limiter been activated?
- ☑ Has the working depth been set?
- ☑ Has the hazard area been checked?

Switching on the power harrow

- Lift the machine until all tools are lifted off the ground.
- Switch on the tractor PTO and slowly increase the tractor motor speed.
- Lower the machine to work position and slowly increase the tractor motor speed further.
- Drive forwards and begin working.
- Continue increasing the tractor motor speed until you reach the prescribed PTO speed.



Avoid high driving speeds
Never work at high driving speeds.
Failure to observe this instruction leads to poor work results and causes damage to the machine.



Adjust the driving speed based on the following criteria:

- Soil type
- Soil condition
- Degree of soil comminution

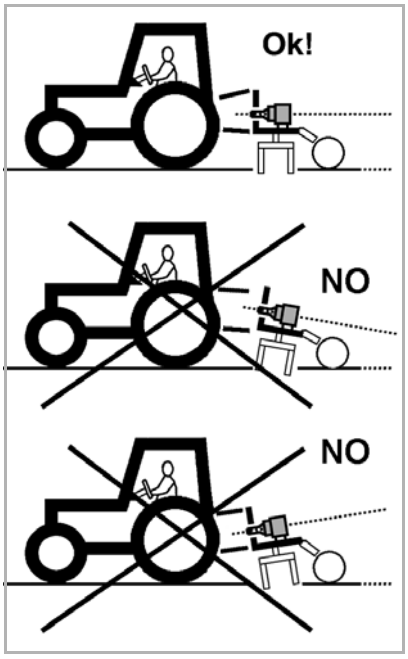
Test drive

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

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

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

Machine in work position



Align the drive shaft horizontally
Failure to align the machine's drive shaft horizontally would cause the PTO shaft to move out of its prescribed operating position and cause damage during operation.
Failure to observe these instructions may result in serious or fatal injuries.

Performing the test drive

- First perform a test drive in work position at working speed (10–12 km/h).
- Readjust the working depth and the soil preparation tools.

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.

After the test drive, check:

- Degree of soil comminution
- Working depth for the power harrow
- Adjustment of the side plates
- Working depth of the track eradicator
- Adjustment of the levelling bar
- Settings on the Hydrolift



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 (particularly children), animals or objects.
Any use of the machine without first checking the surrounding area can cause accidents.

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

- Do not attempt to exit the tractor cabin.
- Do not touch any metal parts on the tractor.
- Do not create any 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.

Starting the work

Prerequisites:

- The machine has been lowered to the work position.
- Machine is folded out.

Working speed

During soil preparation, monitor the working speed. The possible working speed within the range of 5–15 km/h depends on the required comminution of the soil.

Switching on the power harrow

- Lift the machine until all tools are lifted off the ground.
- Switch on the tractor PTO and slowly increase the tractor motor speed.
- Lower the machine to work position and slowly increase the tractor motor speed further.
- Drive forwards and begin working.
- Continue increasing the tractor motor speed until you reach the prescribed PTO speed.



Avoid high driving speeds
Never work at high driving speeds.
Failure to observe this instruction leads to poor work results and causes damage to the machine.



Adjust the driving speed based on the following criteria:

- Soil type
- Soil condition
- Degree of soil comminution

Turning

The machine is lifted before the turning procedure.

Deactivate the PTO before lifting the machine
Before lifting the machine, always switch off the tractor's PTO.
The PTO shaft could otherwise be seriously damaged.

- Throttle the tractor engine speed just before reaching the field edge and raise the machine while still driving.
- Switch off the tractor's PTO.
- After turning, lower the machine to the work position again approximately 1 m ahead of the working zone.
- Switch on the tractor's PTO.

Hydrolift [+]

Using the Hydrolift, the lifting height of the attached seeding machine can be increased in order to create more free space above the ground and bring the centre of gravity of the seeding machine closer to the tractor.

Using the Hydrolift:

- Manoeuvring the machine on the headland
- Preparing the field using only the power harrow
- Driving on the road

Turning with Hydrolift

- Throttle the tractor engine speed just before reaching the field edge.
- Raise the Hydrolift via the tractor's control valve.
- Raise the power harrow while travelling.
- Switch off the tractor's PTO.
- After the turn, lower the power harrow again approximately 1 m to the work position before starting work.
- Lower the Hydrolift via the tractor's control valve.
- Switch on the tractor's PTO.

Inspection tasks during soil preparation

During soil preparation, use the checklist to examine the following:

☑ Constant PTO stub shaft speed during soil preparation

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

☑ Degree of soil comminution
☑ Working depth for the power harrow
☑ Adjustment of the side plates
☑ Working depth of the track eradicator
☑ Adjustment of the levelling bar
☑ Settings on the Hydrolift
☑ Gear box temperature
☑ Trough temperature
☑ Hazard area

End of work

- Reduce the speed of the tractor motor.
- Lift the machine until all tools are lifted off the ground.
- Switch off the tractor's PTO.

Operating faults

The tools are designed to prevent clogging or blocking.

Clogging

In the event of clogging, the engine speed decreases continuously and the quality of the work result is reduced

At the first signs of clogging

- Reduce the driving speed.
- Lift the machine slightly.
- Lower the machine and resume work.



If the clogging has occurred due to compacted soil deposits, clean the machine thoroughly with a pressure washer.

Blocking

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

- Switch off the tractor's PTO immediately.



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

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

- Switch off the tractor's PTO immediately.
- Stop the tractor.
- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor.
- Secure the tractor against rolling away.
- Remove foreign bodies with a suitable tool.
- Continue with the work.

Vibrations and unusual noises



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

If unusual noises or vibrations occur during work:

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

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

Cleaning

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



Do not direct the water jet at the bearings
Clean the bearings in such a way that the water jet does not directly hit the bearings.
The ingress of water shortens the service life of the bearings.

Care

To ensure that the machine has a long service life, we recommend applying a protective coat of oil or special preserving agent after the end of the season and during storage.

Parking and securing the machine



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

- Make sure the machine is lowered onto a level and stable surface.
- Use supporting leg to stabilise the machine.

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

Power harrow

- Lower the power harrow until it stands securely on the ground.
- Uncouple the PTO shaft.
- Release the hydraulic connections to the tractor.
- Release the electrical connections to the tractor.
- Remove the top link.
- Release the lower link ball and lower it further.

Power harrow and seeding machine



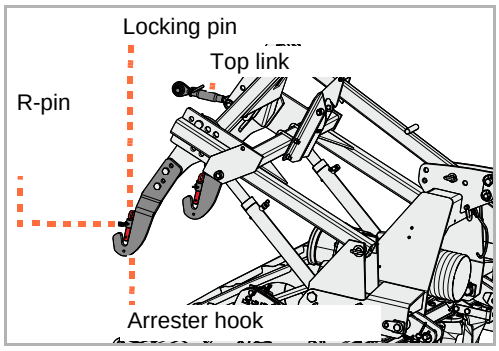
Danger of tilting when using power harrow with seeding machine
For power harrows with seeding machine, lower the Hydrolift with the seeding machine to the ground before uncoupling the device combination from the tractor. If the seeding machine remains in the raised position, the device combination could tip over.
Failure to observe these instructions may result in severe or fatal injuries.

- Fully lower the Hydrolift with fitted seeding machine.
- Lower the power harrow with seeding machine.
- Switch off the tractor and secure it against rolling away.
- Uncouple the PTO shaft.
- Release the hydraulic connections to the tractor.
- Release the electrical connections to the tractor.
- Remove the top link.
- Release the lower link ball and lower it further.

Uncoupling the seeding machine

Depending on the seeding machine, different worksteps are necessary if the seeding machine is to be uncoupled from the power harrow. The use of struts may be required.
→ Operating manual of the seeding machine

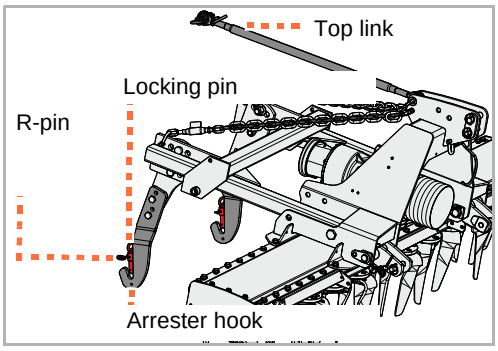
Hydrolift



For power harrows with Hydrolift:

- Lower the Hydrolift completely.

Mechanical linkage and Hydrolift



For power harrows with a mechanical linkage device or Hydrolift:

- Lower the power harrow with seeding machine until the seeding machine is standing on the ground and there is no load on the top link.
- Uncouple the PTO shaft, if available.
- Undo the hydraulic connections.
- Undo the electrical connections.
- Remove the top link.
- Remove the R-pin from the locking pin.
- Remove the locking pin.
- Lower the power harrow until the arrester hooks are free.
- Drive the tractor forwards and lift the power harrow.
- Uncouple the power harrow from the tractor.

Other linkage devices for seeding machines

For other linkage devices for seeding machines, you will find the required information in the operating manual for the seeding machine.
→ Operating manual of the seeding machine

Storing the machine

After cleaning the machine, store it in a dry location and on a flat, secure surface.
→ Section »Maintenance intervals«, page 82

For your safety

Special safety information



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

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

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

Serious accidents can result if the device starts inadvertently.

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



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

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

Protective measures for handling oils or lubricants

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



Avoid skin contact
Prevent skin contact with oil and lubricants.
Contact can result in skin damage.

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

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

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



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

General information

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



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

Fundamentals

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

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

Securing the machine

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

- Lower the tools.



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

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

Working under the machine



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

- Mechanically secure the machine against lowering.

Screw connections

Re-tightening the bolts

All bolts must be re-tightened:

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

Tightening torques, general

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

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

Maintenance intervals

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

	After the first hours of operation	Daily	After 50 hours of operation	After 100 hours of operation	After 200 hours of operation	Once per season	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Cleaning	Page
	Interval								What to do					
General														
Re-tighten all bolts	•				•	•								86
Visual inspection	•	•												
Pin connection to the tractor						•		•		•	•			96
Hydraulics														
Hydraulic hoses every 6 years											•			114
Hydraulic hoses in general							•	•		•	•			114
Power harrow														
Gear-box (oil)			•							•				94
First change after 30 operating hours					•	•	•				•			94
Trough (grease)						•	•		•	•				95
PTO shaft --> Manufacturer's maintenance regulations		•						•	•		•			
Fastening elements on the tine supports		•					•			•	•			98
Tine		•					•	•		•	•		•	98

Packer roller

	After the first hours of operation	Daily	After 50 hours of operation	After 100 hours of operation	After 200 hours of operation	Once per season	If required	In case of wear	Grease / Oil / Lubricate	Checking	Replacement	Settings	Cleaning	Page
Storing the packer roller			•				•	•	•		•			90
Storage of the rocker arm			•				•	•	•		•			96
Scraper			•				•	•		•	•	•		100
Accessories														
Track eradicator			•				•	•		•	•			107
Levelling bar			•				•		•				•	96
Mechanical linkage device			•				•	•	•		•			96
Hydrolift			•				•	•	•		•			96

Lubricating the bearings

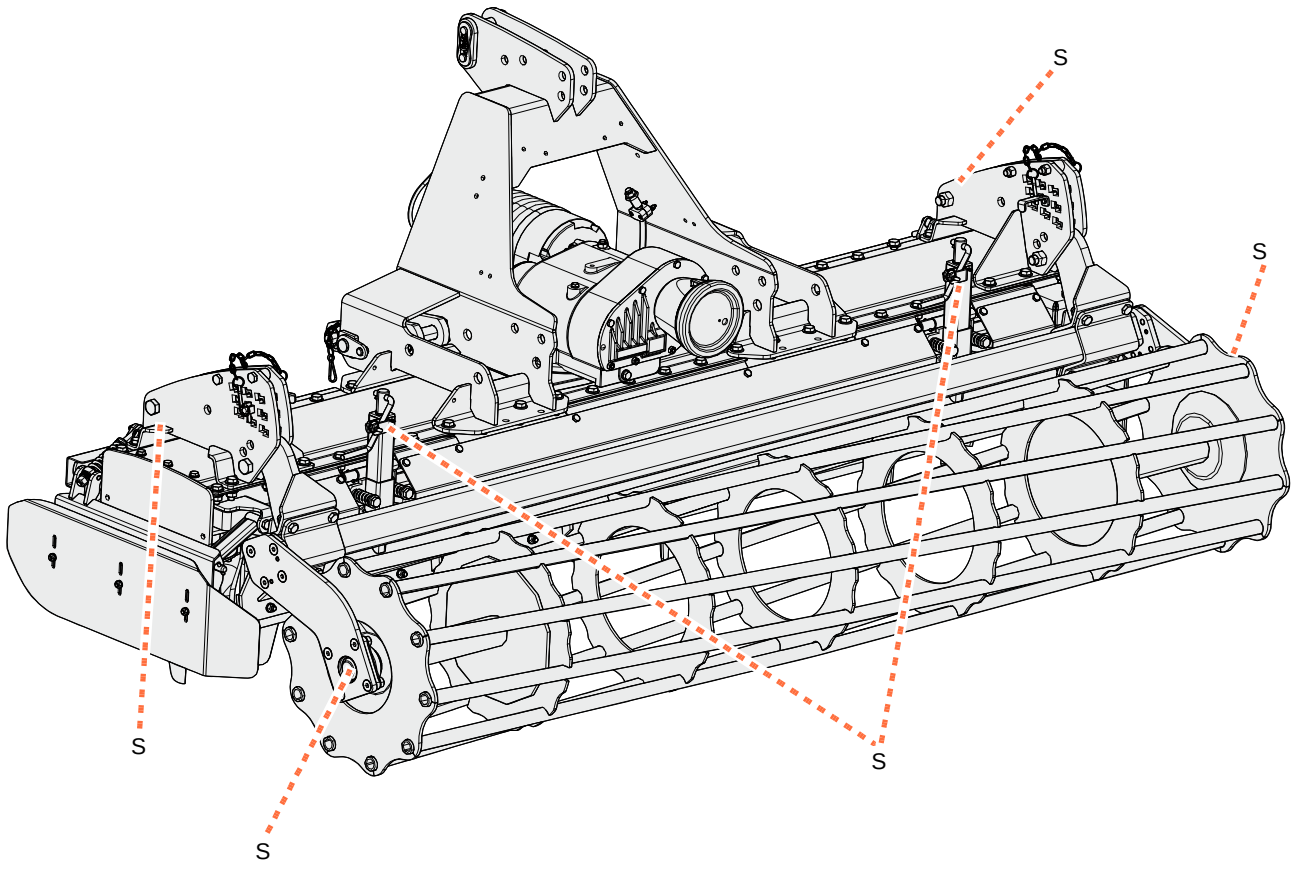
The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

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

Do not lubricate maintenance-free bearings.

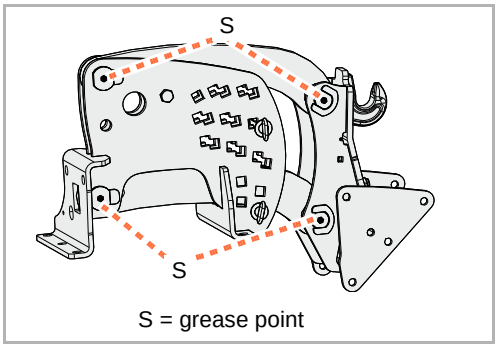
Overview of lubrication points

S = grease point



EURO connection

Every 50 hours of operation



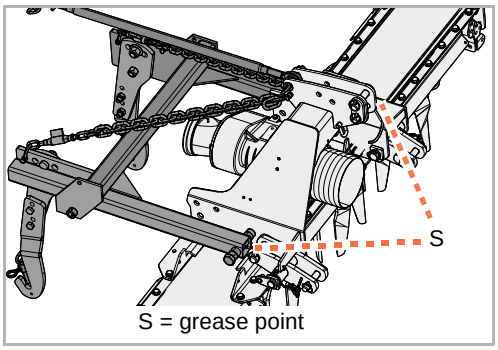
S = grease point

There are four lubrication points on each side of the machine at the parallelograms of the EURO connection.

- Lubricate the lubrication point.

Mechanical linkage device [+]

Every 50 hours of operation



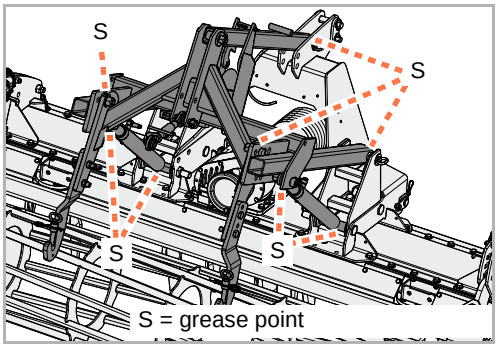
S = grease point

There are two lubrication points on the mechanical linkage device.

- Lubricate the lubrication point.

Hydrolift [+]

Every 50 hours of operation



S = grease point

There are nine lubrication points on the Hydrolift.

- Lubricate the lubrication point.

PTO shaft

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

- Greasing
- Lubrication

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

Gear-box

Gear-box oil specifications

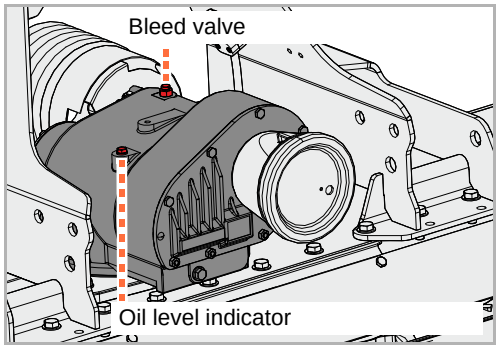
Only use the oils specified in the table.

Model	Oil type	Quantity
2.50 m **3.00 m**	Mineral oil SAE 140 - EP ISO VG 460 DIN 51517	5.0 l

Fill level

Daily

Risk of burning
Do not perform any work on a gear-box still hot from operation. Wait until the components and the oil have cooled down.
Failure to observe these instructions may result in severe injuries.

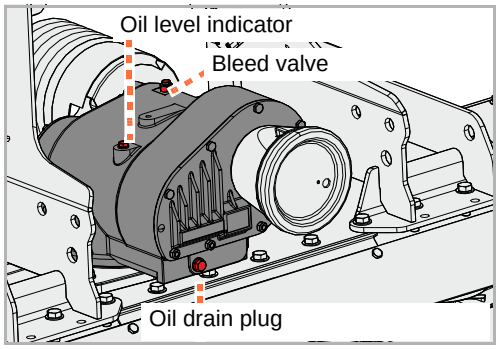


- Ensure the machine is level.
- Switch off the tractor and secure it against rolling away.
- Remove the oil level indicator.
- Check the gear-box fill level. It must be at the top marking on the oil level indicator.
- If necessary, replenish the transmission oil using a funnel.
- Insert the oil level indicator.
- Check the tightness of the oil level indicator after each maintenance.

Oil change

After 200 operating hours or once per season

Risk of burning
Do not perform any work on a gear-box still hot from operation. Wait until the components and the oil have cooled down.
Failure to observe these instructions may result in serious injury



- Ensure the machine is level.
- Switch off the tractor and secure it against rolling away.
- Position an oil collection tray under the oil drain plug.
- Remove the oil drain plug.
- Remove the oil level indicator.
- After draining the waste oil, insert the oil drain plug again.
- Pour in oil.
- Check the gear-box fill level. It must be at the top marking on the oil level indicator.
- Insert the oil level indicator.
- Check the tightness of the oil level indicator after each maintenance.
- Dispose of the waste oil in accordance with regulations.

Trough

Gear-box grease specifications

Only use the greases specified in the table.

Model	Grease type	Quantity
2.50 m	Lithium grease SAE 140 EP NLGI00 G00K DIN 51826	17.5 kg
3.00 m		21.0 kg

Fill level

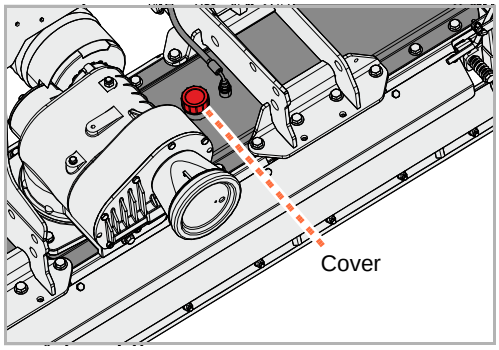
Daily

Risk of burning
Do not perform any work on a gear-box still hot from operation. Wait until the components and the oil have cooled down.
Failure to observe these instructions may result in serious injury

Check the fill level of the grease in the trough:

Prerequisite:

- Operate the machine until the grease has warmed up and has distributed itself evenly throughout the trough.



- Ensure the machine is level.
- Switch off the tractor and secure it against rolling away.
- Remove the cover on the filling port.
- Fill level of the grease in the trough, the gear wheels must be half covered with grease.
- Replenish gear-box grease as required.
- Fit the cover onto the filling port.
- Check tightness of the cover on the filling port after each maintenance.

Start up the machine for a short time. Check the fill level again.

Other lubrication points

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

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

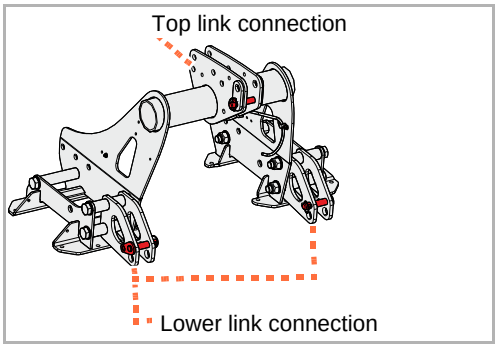
Pin connection to the tractor

Daily

Check all the pins and the holes for them in the pin connection to the tractor.

- The values must be within the specified range.
- Worn parts must be replaced.

	CAT 2	CAT 3N/CAT 3
Top link connection		
Pin diameter [mm]	25.37 - 25.50	31.55 - 31.75
Bore diameter [mm]	25.70 - 25.90	32.00 - 32.25
Lower link connection		
Pin diameter [mm]	27.80 - 28.00	36.40 - 36.60
Bore diameter [mm]	28.70 - 29.00	37.40 - 37.75



▸ Check all the pins and the holes for them using the information given in the table.

Tine

The tines can be used until they are worn down to half their original length.
Tines with a residual length of 150 mm can only be used for work with very low working depths, as they are shortened by half.

Support the machine
Do not perform any work under the power harrow without supporting the power harrow against lowering.
Failure to observe these instructions may result in serious or fatal injuries.

Replacing the tines

If required

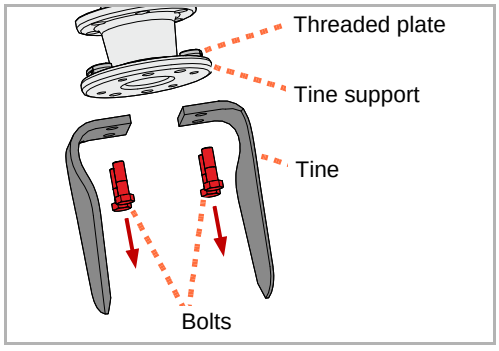
The power harrow tines must be replaced if

- they are damaged.
- they are worn.

Only replace tines in pairs
If only some tines are to be replaced, always replace both tines on the same tine support.
Unevenly worn tines on a tine support may lead to serious damage to the machine.

Note the direction of movement of the tines
Install the left and right tines according to their prescribed direction of movement.
Failure to observe this instruction results in increased wear to the tines and damage to the machine.

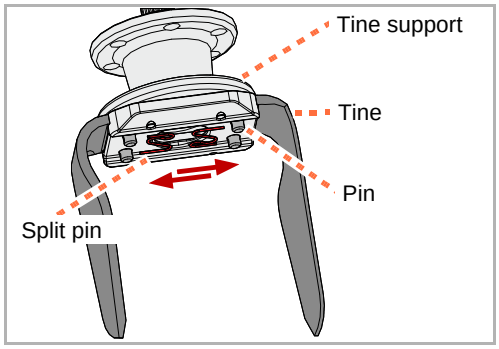
Tine with screw connection

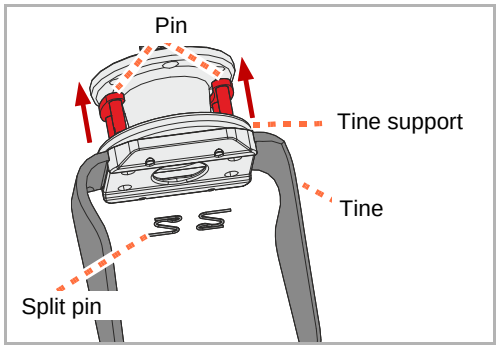


- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Loosen the bolts and remove them.
- Remove worn tines from the tine support.
- Insert new tines and fasten in place with the bolts.

Tine with Quick Fit

- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Remove the split pin.





- Remove the pin.
- Remove worn tines from the tine support.
- Insert new tines.
- Insert the pin and secure with split pin.

Packer rollers

Support the machine
Do not perform any work under the power harrow without supporting the power harrow against lowering.
Failure to observe these instructions may result in serious or fatal injuries.

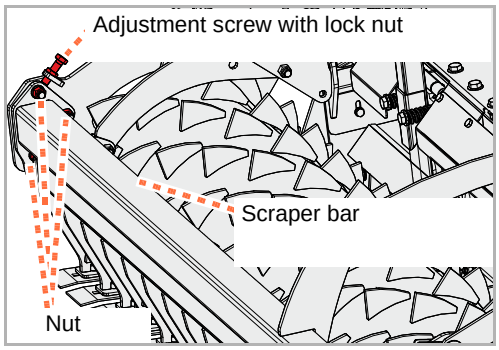
During work, the scrapers continuously remove the soil that collects on the packer rollers and thus prevent deposits.
The scrapers wear down over time and must be readjusted or replaced.

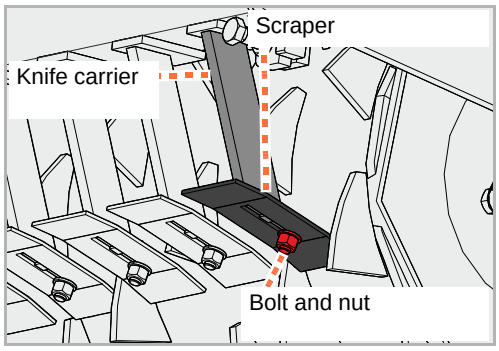
Toothed packer roller

Setting the scrapers

After 50 hours of operation

- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Undo the nuts on the scraper bar.
- Release the lock nut on the adjustment screw of the scraper bar.
- Adjust the adjustment screw on the scraper bar so that the scrapers are as close as possible to the packer roller.





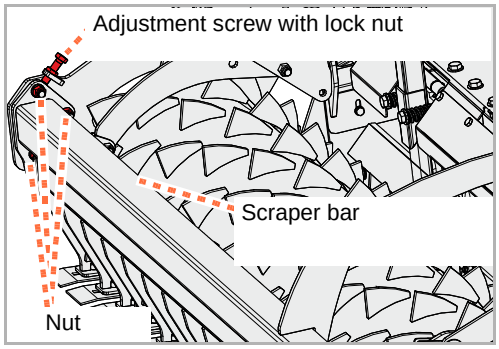
- Release the nuts on each individual scraper and push the scrapers up against the packer roller.
- Retighten the nut.
- Adjust the scraper bar using the adjustment screw so that the scrapers are at a distance of 1 to 2 mm from the packer roller
- Tighten the nuts on both sides of the packer roller.
- Tighten the lock nut on the adjustment screw of the scraper bar.
- Turn the packer roller by hand. None of the scrapers should touch the packer roller.
- Apply the same setting on both sides of the machine.

The scrapers can be worn down as far as the knife carrier.

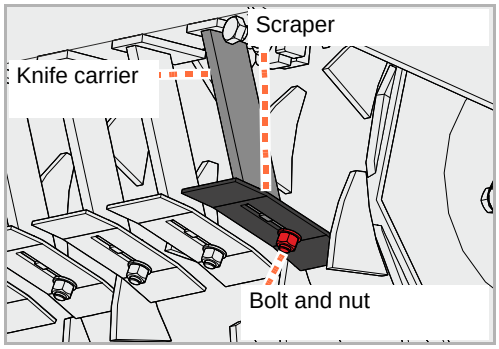
Replacing the scrapers

In case of wear

The scrapers on the packer roller are symmetrical. The scrapers can therefore be rotated if one of the sides becomes worn.



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Undo the nuts.
- Release the lock nut on the adjustment screw of the scraper bar.
- Adjust the adjustment screw of the scraper bar so that the scraper bar is located in the centre position of its adjustment range.

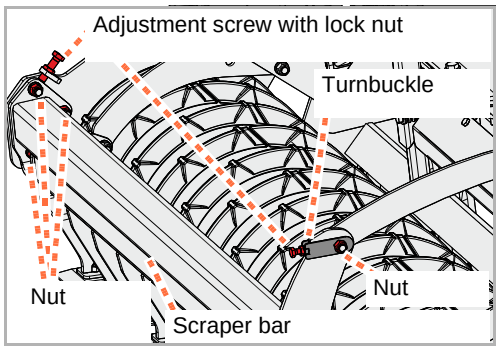


- Remove the nuts on each individual scraper and remove the scrapers.
- Insert new scrapers and push against the packer roller.
- Fit nuts and tighten firmly.
- Set the scraper carrier using the adjustment screws so that the scrapers are at a distance of 1 to 2 mm from the packer roller.
- Tighten the nuts on both sides of the packer roller.
- Tighten the lock nut on the adjustment screw.
- Turn the packer roller by hand. None of the scrapers should touch the packer roller.
- Apply the same setting on both sides of the machine.

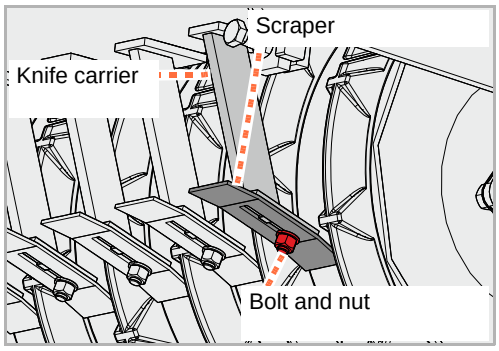
Actiline roller

Setting the scrapers

After 50 hours of operation



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Release the nuts on the scraper bar and turnbuckle.
- Release the lock nut on the adjustment screw of the scraper bar and turnbuckle.
- Unscrew the adjustment screw on the turnbuckle.
- Adjust the adjustment screw on the scraper bar so that the scrapers are as close as possible to the packer roller.



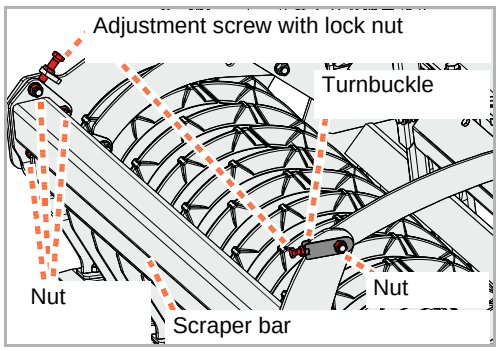
- Release the nuts on each individual scraper and push the scrapers up against the packer roller.
- Retighten the nut.
- Set the scraper bar using the adjustment screw so that the scrapers are at a distance of 1 to 2 mm from the packer roller.
- Tighten the nuts on both sides of the packer roller.
- Tighten the lock nut on the adjustment screw of the scraper bar.
- Screw in the adjustment screw on the turnbuckle until it comes into contact with the support surface and then screw in by a further two revolutions.
- Secure the adjustment screw on the turnbuckle with a lock nut.
- Tighten the nut on the turnbuckle.
- Turn the packer roller by hand. None of the scrapers should touch the packer roller.
- Apply the same setting on both sides of the machine.

The scrapers can be worn down as far as the knife carrier.

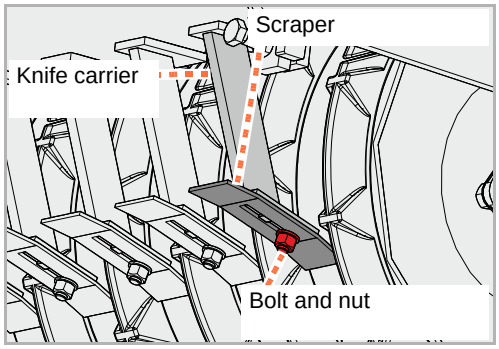
Replacing the scrapers

In case of wear

The scrapers on the packer roller are symmetrical. The scrapers can therefore be rotated if one of the sides becomes worn.



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Undo the nuts.
- Release the lock nut on the adjustment screw of the scraper bar and turnbuckle.
- Unscrew the adjustment screw on the turnbuckle.
- Adjust the adjustment screw of the scraper bar so that the scraper bar is located in the centre position of the adjustment range.



- Remove the nuts on each individual scraper and remove the scrapers.
- Insert new scrapers and push against the packer roller.
- Fit nuts and tighten firmly.
- Set the scraper carrier using the adjustment screws so that the scrapers are at a distance of 1 to 2 mm from the packer roller.
- Tighten the nuts on both sides of the packer roller.
- Tighten the lock nut on the adjustment screw.
- Screw in the adjustment screw on the turnbuckle until it comes into contact with the support surface and then screw in by a further two revolutions.
- Secure the adjustment screw on the turnbuckle with a lock nut.
- Turn the packer roller by hand. None of the scrapers should touch the packer roller.
- Apply the same setting on both sides of the machine.

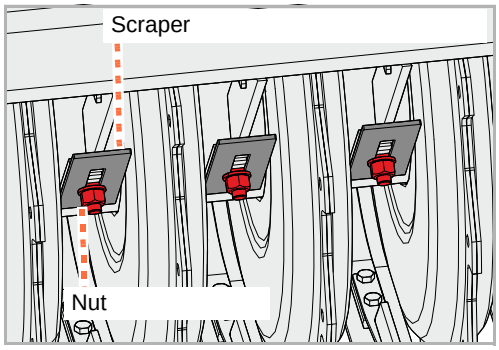
Actipack roller

The scrapers must not touch the packer roller. An insufficient distance increases the wear of the scrapers. However, if the distance is too large, cleaning of the packer roller will be prevented, resulting in soil deposits.

The correct distance is 10 mm.

Setting the scrapers

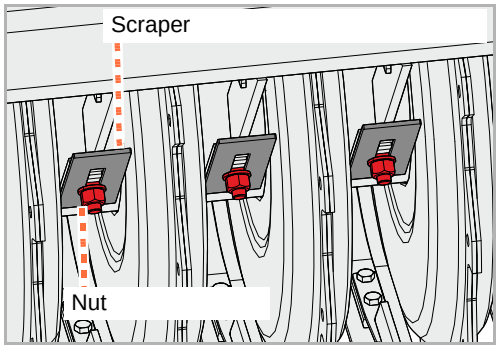
After 50 hours of operation



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Only release the nuts.
- Set the scrapers.
- Tighten the nut.

Replacing the scrapers

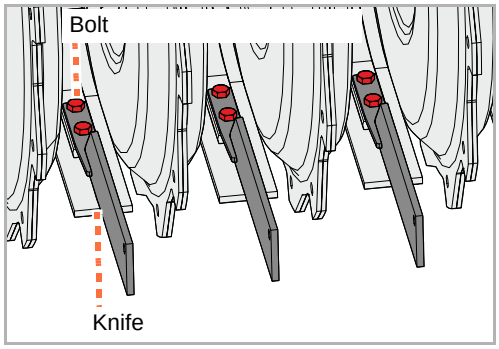
In case of wear



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Remove the nuts.
- Remove the scrapers.
- Install and set new scrapers.
- Tighten the nut.

Replacing the knife

In case of wear

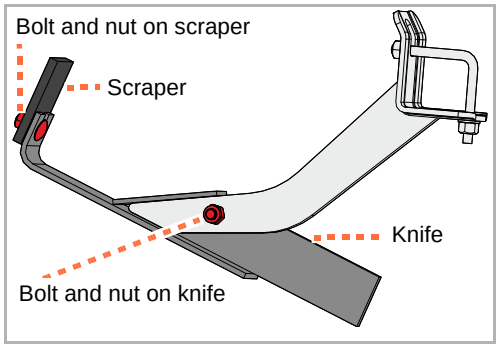


- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Remove the bolt.
- Remove the knife.
- Install a new knife.
- Tighten bolt.

Cracker packer roller

Replacing the knife

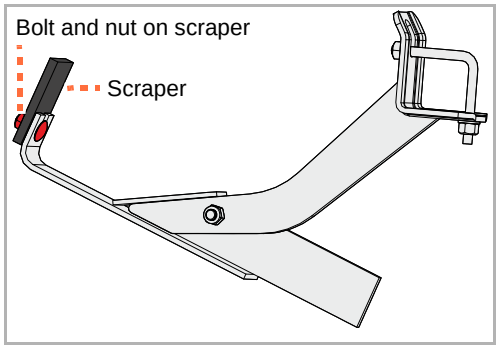
In case of wear



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Remove the bolt and nuts on the knife.
- Remove the knife with scraper.
- Remove the bolt and nuts on the scraper.
- Remove the scrapers.
- Dispose of the old knife.
- Fit the scraper onto new knife with a bolt and nut.
- Fit the new knife onto the holder with a bolt and nut.
- Align the scrapers.
- Apply the same setting on both sides of the machine.

Replacing the scrapers

In case of wear



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Remove the bolt and nuts on the scraper.
- Remove the scrapers.
- Dispose of the old scraper.
- Fit the scraper onto the knife with the bolt and nut.
- If required, align the scraper.
- Apply the same setting on both sides of the machine.

Track eradicator

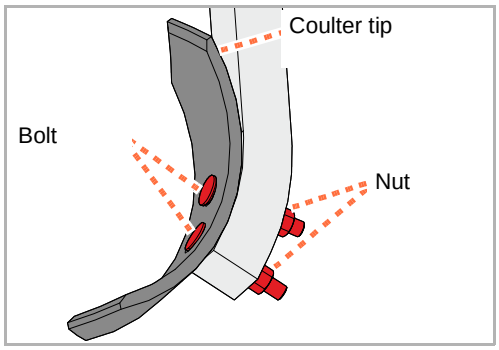
Support the machine
Do not perform any work under the power harrow without supporting the power harrow against lowering.
Failure to observe these instructions may result in serious or fatal injuries.

Turn or replace the coulter tip

During work, the track eradicators are continuously pulled through the soil, with the result that they wear down over time.

In case of wear

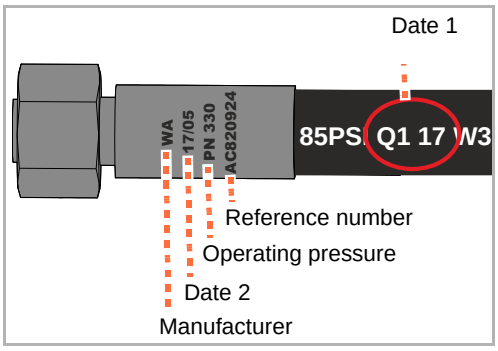
The coulter tips of the track eradicators are symmetrical. Therefore, the coulter tips on the carrier can be rotated if one of the sides becomes worn.



- Lift the machine.
- Secure the machine against lowering or dropping.
- Switch off the tractor and secure it against rolling away.
- Remove the nuts.
- Remove the bolt.
- Turn or replace the coulter tip.
- Fit the bolt and secure with a nut.
- Apply the same setting on both sides of the machine.

Hydraulic hoses

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



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

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

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

Replacing the hydraulic hoses

Every 6 years or if required

The hoses must have been depressurised. Only use hydraulic hoses with the same specification. The hydraulic hoses within the frame must only be replaced in a specialist workshop.

For your safety

Special safety information



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

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

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

Serious accidents can result if the device starts inadvertently.

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

Securing the machine

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



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

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

Working under the machine



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

- Mechanically secure the machine against lowering.

Three-point linkage

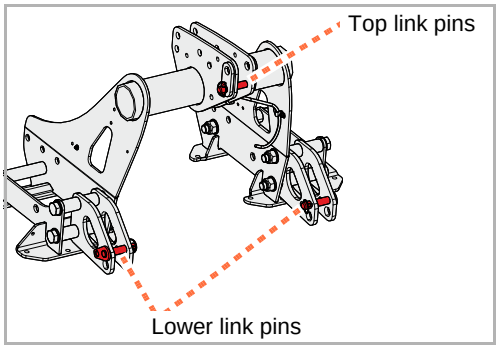
The power harrow is connected to the tractor via a three-point linkage.

Changing the category

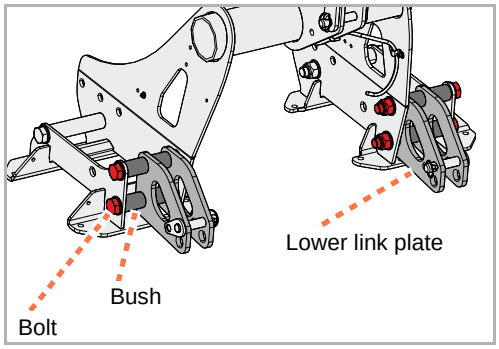
The top link connection and the lower link connection are fitted ex works.
It is not possible to convert this to a different category.

Prerequisites:

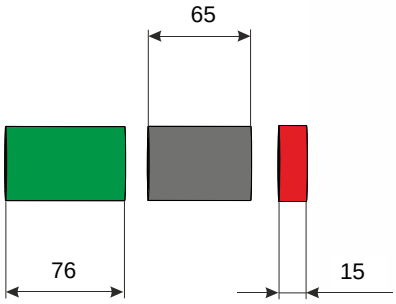
- The machine is parked on a level and solid surface.
- Use existing supporting legs.
- The machine is uncoupled from the tractor.

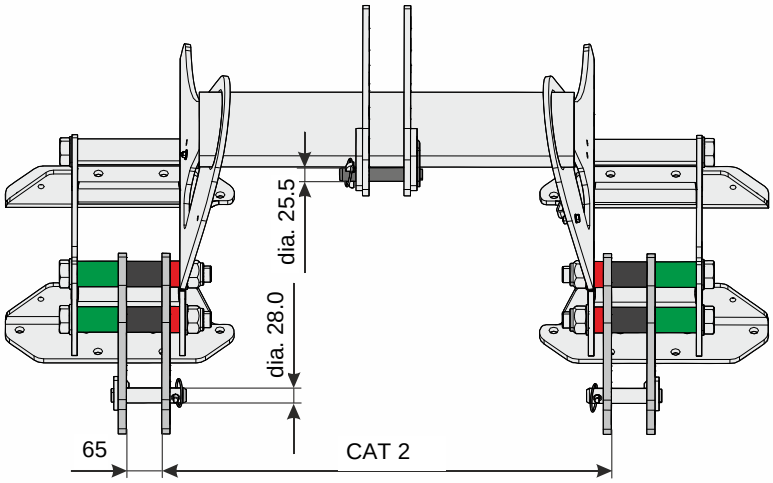


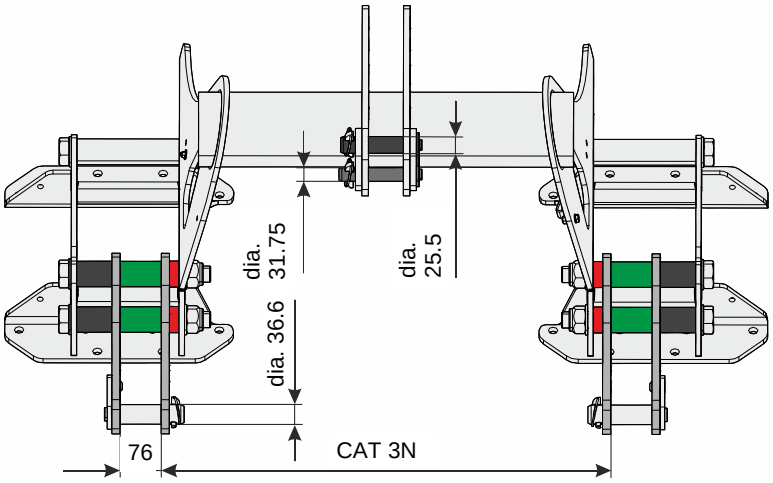
- Remove the linchpin on the lower link pin.
- Remove the lower link pins.

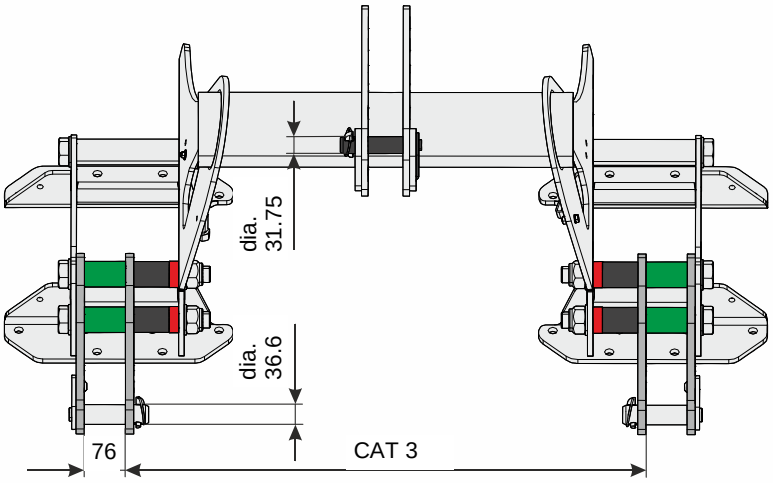


- Undo and remove the nuts.
- Remove the bolts, bushes and lower link plates.

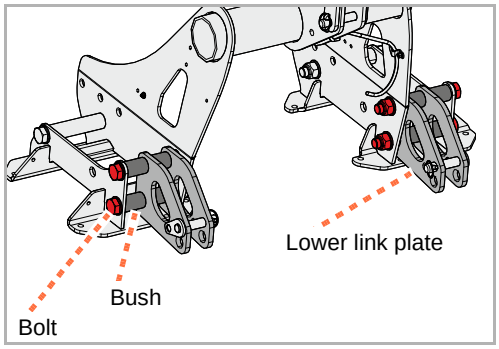








- Insert the bolts, bushes and lower link plates in accordance with the selected category.



- Tighten the nuts to a tightening torque of 1400 Nm.
- Insert the lower link pin from the selected category.
- Secure the lower link pin using the linchpin.
- Replace the top link pin in accordance with the selected category.
- Secure the top link pin using the linchpin.

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.

Fault	Cause	Remedy
Noises during operation of the PTO shaft	Inadequate lubrication	Lubricate in accordance with the PTO shaft manufacturer's regulation.
	The bearings on the universal joint are worn	Replace the bearing.
	Incorrect length of PTO shaft	Correct the length Replace incorrectly sawn-off parts.
PTO shaft wear	Inadequate lubrication	Lubricate in accordance with the PTO shaft manufacturer's regulation.
	Incorrect deflection angle	Reduce the deflection angle.
	Overload	Avoid overload and switching on the machine under load.
Breakage or bending of the PTO shaft	Overload	Avoid overload and switching on the machine under load. Functional test of the overload clutch.
Overheating of the gear-box	Inadequate filling of gear-box oil	Check the tightness of the seals and replace damaged seals. Replenish oil.
	Incorrect oil type	Switch the oil to the prescribed oil type.
	Excessive oil filling	Correct the oil level to the prescribed fill quantity.
	Overload	Maintain the prescribed speed and power ranges.

Fault	Cause	Remedy
Leakage of grease at the tine supports	Damage to seals by foreign bodies	Replace the damaged seals.
Dam formation at device sides	Damage to side plates during use	Align or replace the damaged parts.
Strong vibrations	Side plate damaged	Replace the side plate.
	Levelling bar damaged	Replace the levelling bar.
	Track eradicator damaged	Replace the track eradicator.
	Tine support bearings are worn	Have the bearings replaced in a specialist workshop.
	Foreign bodies have become caught in the tine supports	Remove foreign bodies.
	Packer roller scrapers are worn	Set the scrapers.
	PTO drive speed is not correct	Set the correct drive speed at the PTO.
The work result is inadequate	The working speed is too high	Reduce the driving speed.
	The working depth of the accessories is too deep or too shallow	Set the correct working depth.
	Dam formation	Set the correct working depth.
Packer roller blocked	Inadequate lubrication of the bearing	Lubricate the bearings.
	Bearings are worn	Replace the bearings.
	The packer roller or bearings have deformed	Replace the packer roller or bearings.

Loading onto a transport vehicle



Risk of death due to falling load
If the load is not sufficiently secured, there is a risk that the machine or parts of the machine may become loose and fall off the transport vehicle while travelling.
Persons who are in the hazard area while transporting the machine may be seriously or fatally injured.

Machine in three-point suspension

Prerequisite:
- The foldable machine is folded out
- The telescopic machine is retracted

Load machines in a three-point suspension onto the transport vehicle with a forklift, crane or the tractor and a sturdy loading ramp.

Hitched machine

Prerequisite:
- The machine is in the transport position for road transport

Load hitched machines onto the transport vehicle via ramps and then lower them into a low position.



Observe the national regulations for permitted dimensions and weights.

Securing the machine

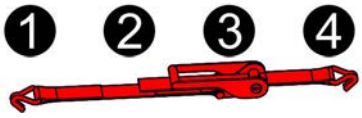
- Secure the machine and all moving machine parts with lashing straps.
- Move all fasteners on the machine into a secured position.



Prevent damage when securing the machine
- Use edge protectors or protective sleeves
- Do not lay lashing straps and tension chains over lines, hoses, cables and other delicate components
- Set the lighting signs so that few areas are exposed to the wind

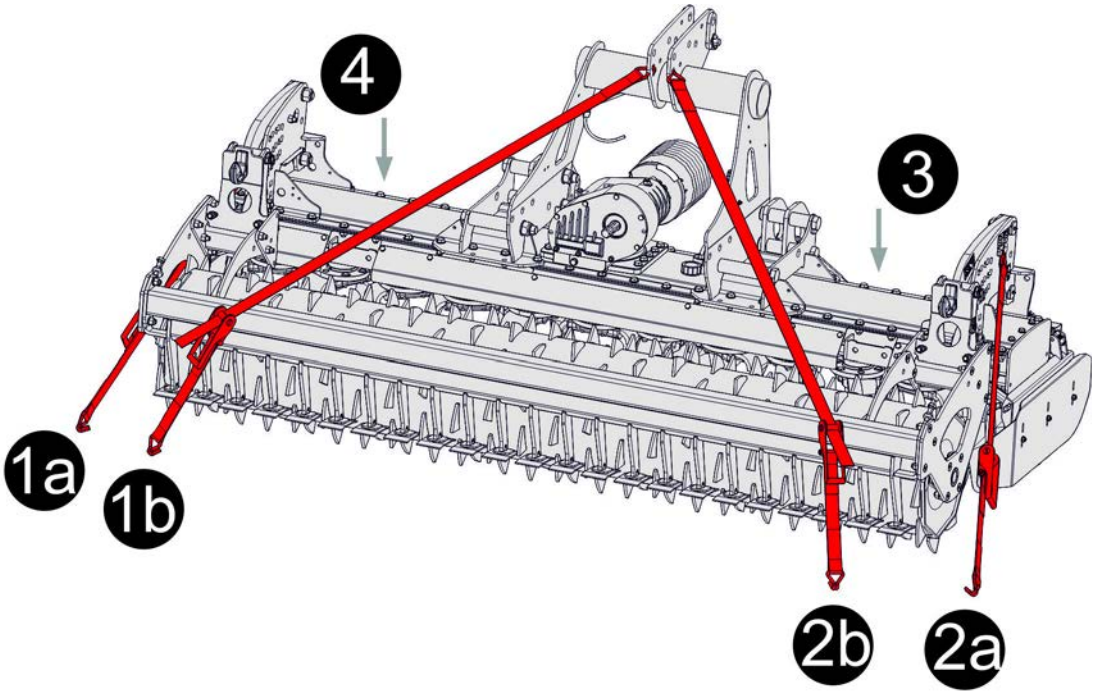
Securing the machine insufficiently causes damage to the machine.

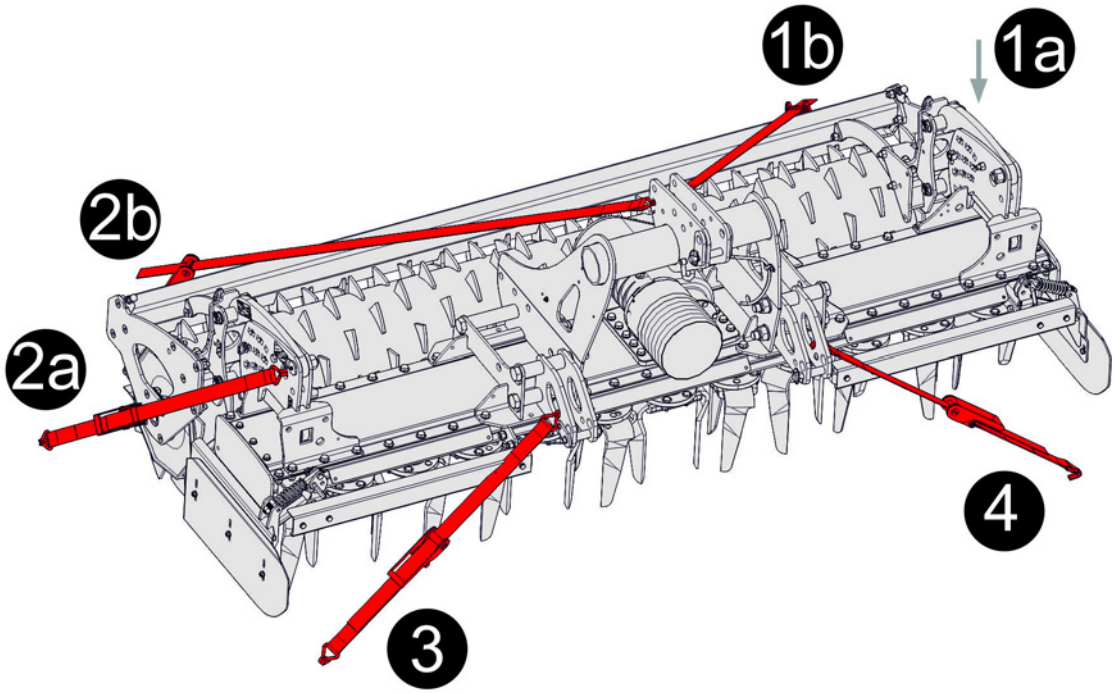
4 x LC 2500 daN



2.50 m - 4.50 m

1250 kg - 2950 kg





Disposal

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

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

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

Tyres
Tyres can be sent to tyre recycling facilities.

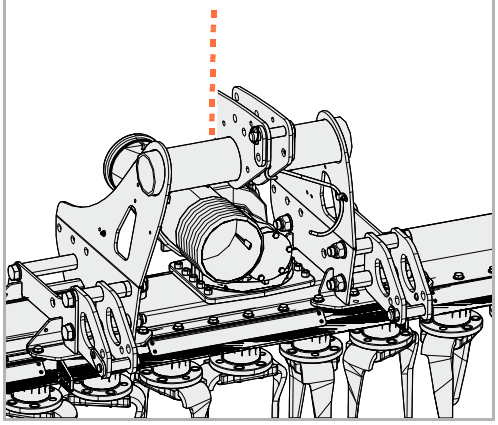
Oil
Collect fluid from the hydraulic system in a suitable container and dispose of it at an old oil collection point.

Electronics
PCBs or terminals are disposed of as electronic 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.

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declare with sole responsibility that the product

Type plate and CE symbol



PH1001
in all equipment variants
and its accessories

Model: PH1001

Valid from machine number:
ACKPHxx881

complies with the following relevant EU provisions:

- Directive 2006/42/EC
- Directive 2014/30/EU

The following harmonised standards have been used:

- EN ISO 4254-1:2015
- EN ISO 4254-5:2018

Kverneland Group Soest GmbH
Soest, 15.11.2021



Hasan Kesek
Managing director,
and authorised representative*

Copy of the type plate

* Person who is responsible for compiling the technical documentation and resides in the European Community. See address above.

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