

Series PH2000F

Operating manual

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From machine number	ACKPHxx257
Model	
Reference number	A137308840

Identification of the machine

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

Designation	Series PH2000F
Working width	
Weight	
Machine number	
Accessories	
Address of dealer	
Address of manufacturer	Kverneland Group Soest GmbH Coesterweg 42 D-59494 Soest Germany Tel. +49 (0) 2921/974-0

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Target group

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

Safety

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

For the employer

Provide instruction in these safety instructions for personnel working with the machine on a regular basis and provide information on statutory regulations. Untrained or unauthorised persons 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

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

The EC Conformity Declaration	Integral part of this operating manual → Chapter »The EC Conformity Declaration«, page132
Spare parts list	Integral part of the delivery with this machine
Operating manual of the PTO shaft manufacturer	Integral part of the delivery with this machine

Symbols

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

- A bullet point stands next to enumerations

▸ A triangle is located before activities which you should undertake

→ 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 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 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 the control unit

For your safety

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

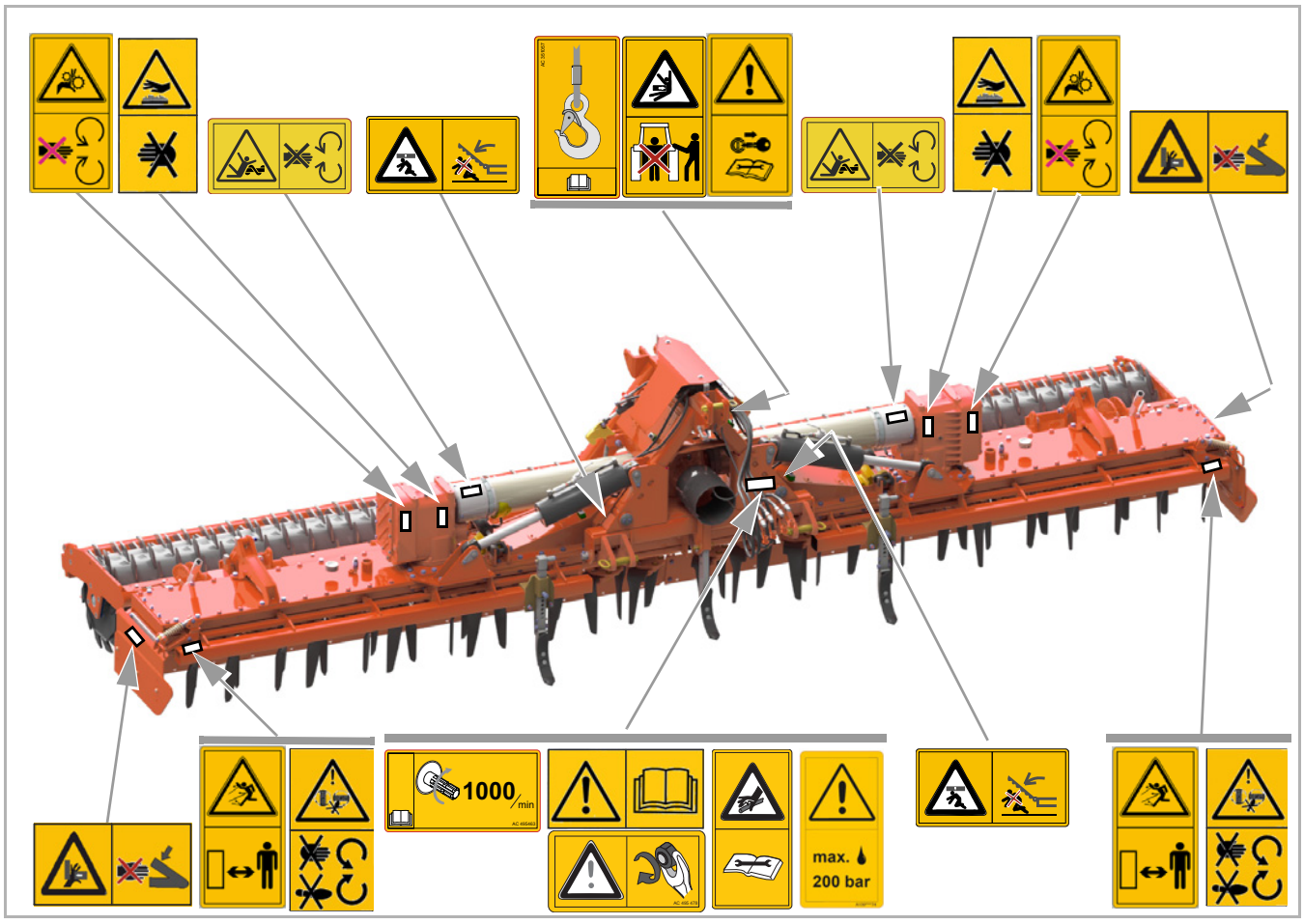
- In the interest of your own safety
- In the interest of the safety of others
- To ensure the safety of the machine

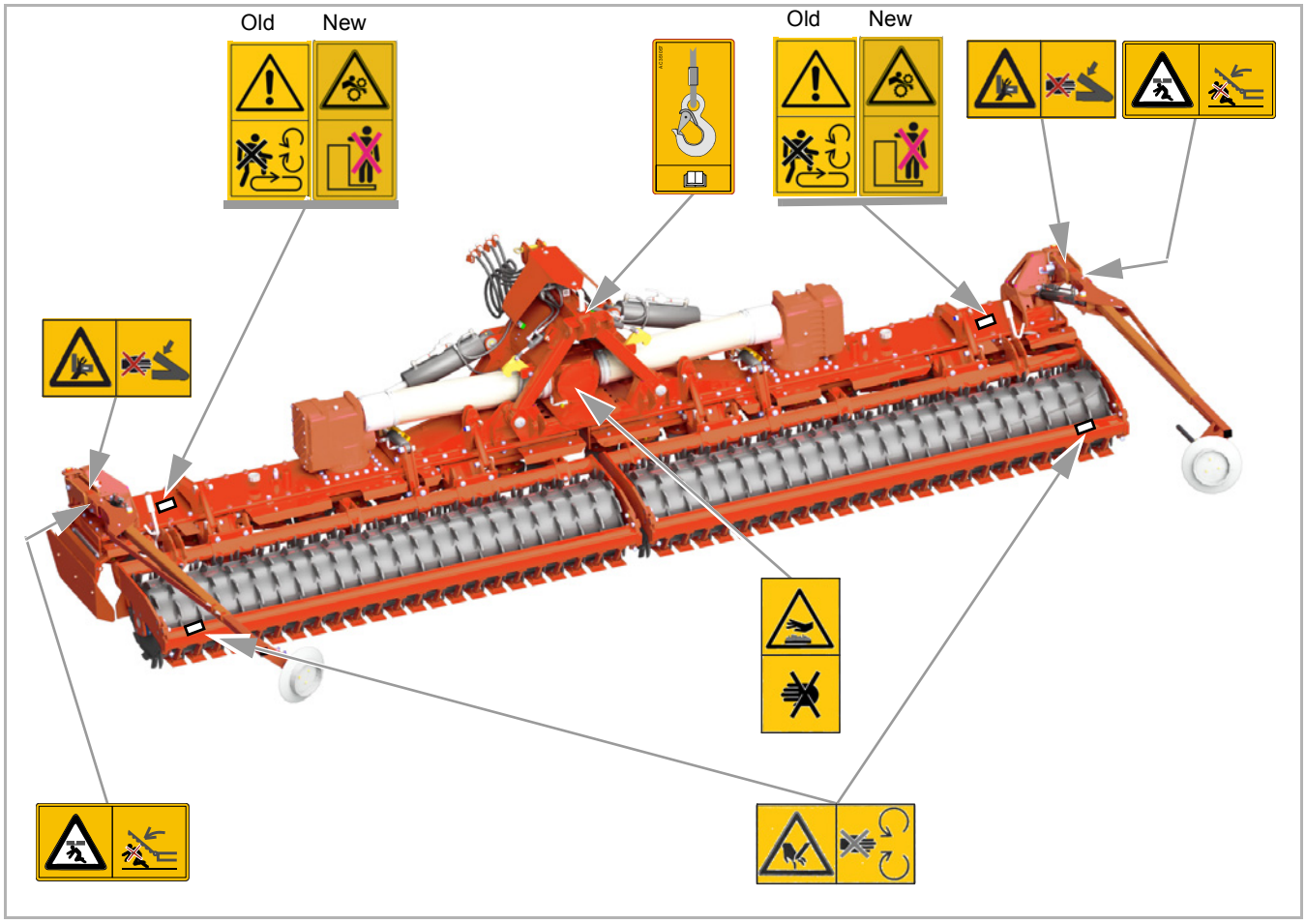
Numerous risks can result from handling agricultural machines in the wrong way. Therefore, always work with particular care and never under time pressure.

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

Warning signs

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




Old
New
Old
New



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.



Old New

It is strictly forbidden to climb on the implement or to ride on it
Risk of cutting and entrapment due to moving parts and risk of falling. This can result in severe or fatal accidents. Maintain a safe distance.



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.



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



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.



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.



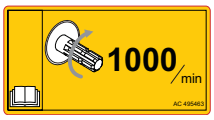
Re-tighten screws
After the first hours of operation, all bolts must be checked and tightened if necessary. Screw connections might have come loose due to vibrations.



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



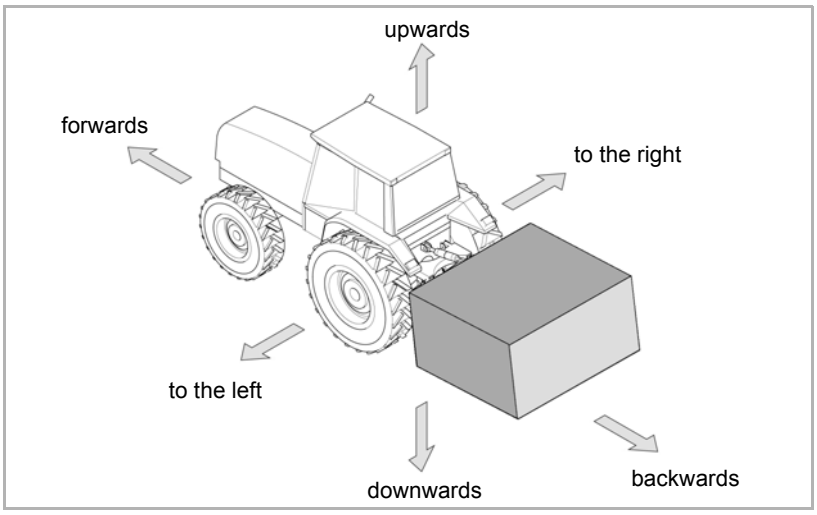
Do not reach into the drive shaft when it is turning.
The protective devices must not be removed or by-passed. Check all protective devices before starting the machine. Unprotected machine components can cause serious or fatal injury.



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

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

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

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

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

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

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

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

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

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

Coupling

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

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

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

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

Check and fasten the PTO shaft guard in position
The rotating PTO shaft is protected by the PTO shaft guard. Ensure that the guard is not damaged. Fasten the PTO shaft guard in position by connecting the chains on the implement and the tractor. Unguarded PTO shafts can cause life-threatening injuries.

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

Hydraulics

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

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.

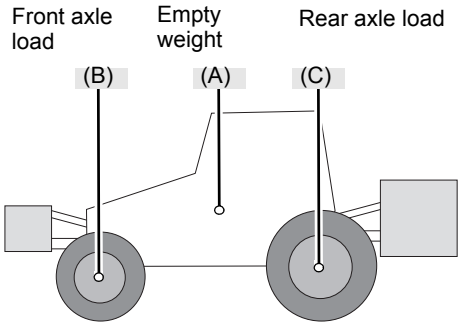
Centre of gravity

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

The following can be easily calculated:

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

For this calculation, the following data is required:



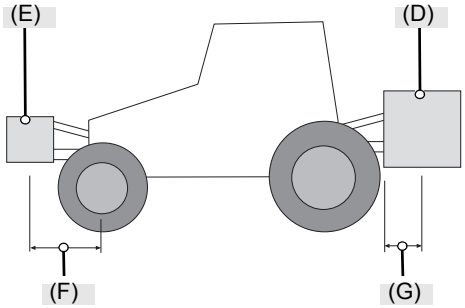
Total weight when front-mounted

Total weight when rear-mounted

Data from the tractor's operating manual:

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

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

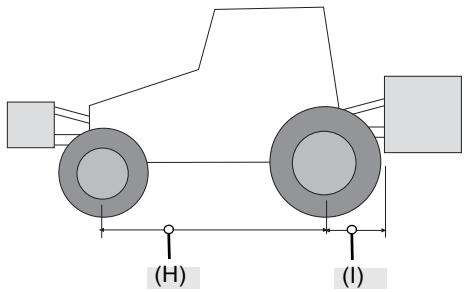


Distance:
Front attachment centre of gravity to front axle midpoint

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

Data from this operating manual:

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



Wheel base

Distance:
Rear axle midpoint to lower link ball midpoint

Data which you can determine by measuring:

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

Calculation

The measured values can now be inserted into the formulae.

Ballast with front weights

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

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

Ballast with rear weights

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

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

Front axle load

Calculation of the actual front axle load

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

Total weight

Calculation of the actual total weight

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

Rear axle load

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

Tyre load-bearing capacity

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

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

Summary

Check if the following conditions are met:

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

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



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

Road transport

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

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

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.

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

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

Turn off the power supply
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, please observe the following:

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

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

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

Range of application

The Series PH2000F power harrow can be used to prepare soil by fragmenting the soil and preparing it for seeding.

As the ranges of application are very broad, the driver must pay particular attention to the power harrow's performance limits. At the first indication of an overload, the power harrow must be decommissioned immediately.

Proper use

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.
Examples of improper use:

- Transporting persons or objects
- Without a packer roller fitted. The only packer rollers which may be fitted are those supplied by the power harrow manufacturer for the model in question.
- Transferring power to other objects
- 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.

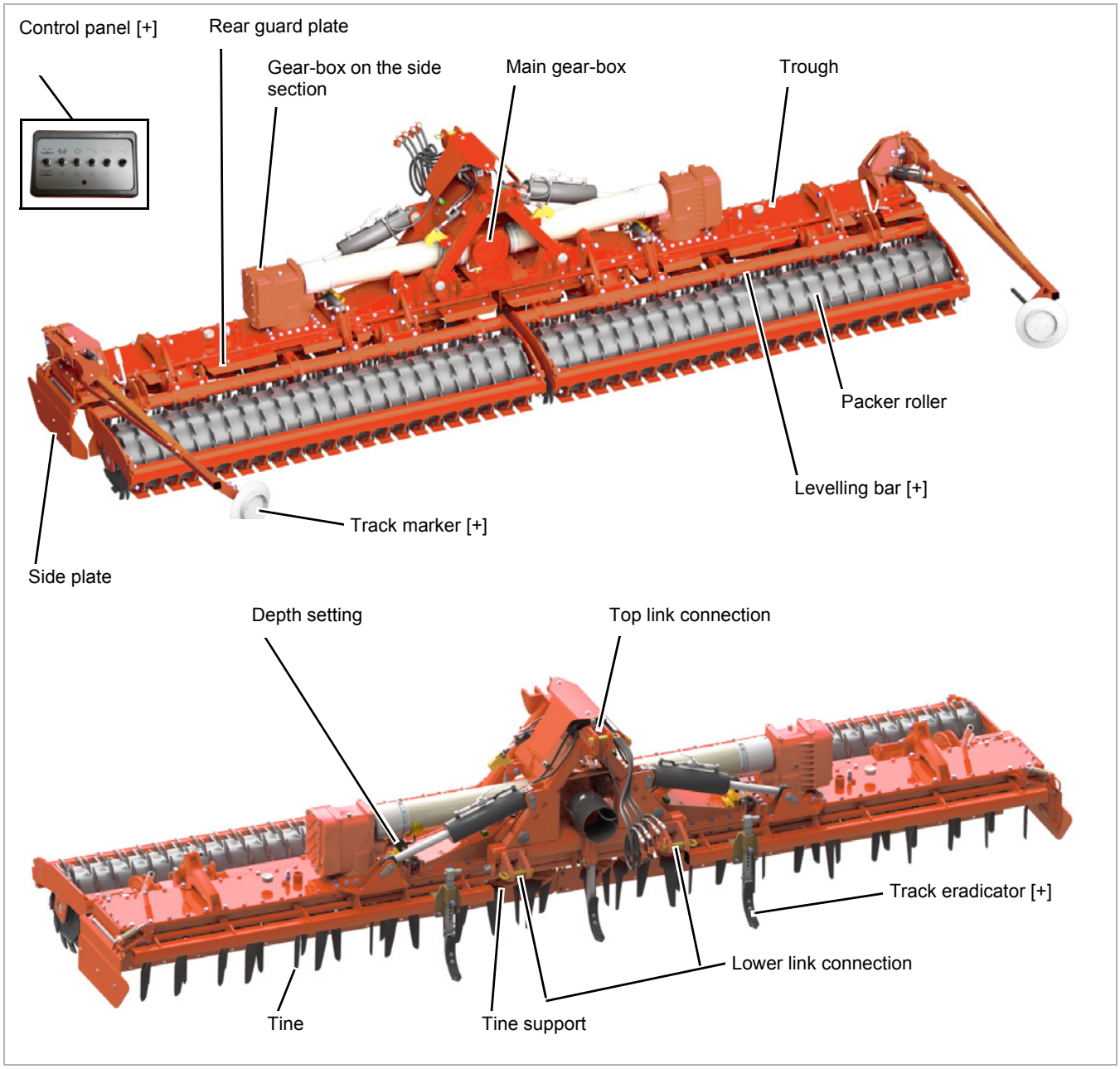
Constant depth control
The power harrow's packer roller is used to achieve constant depth control, independently of the ground profile.

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.

Designation of components



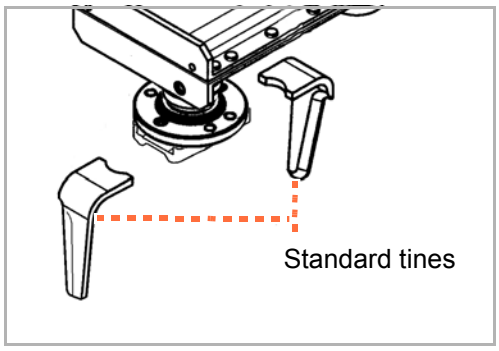
Technical data

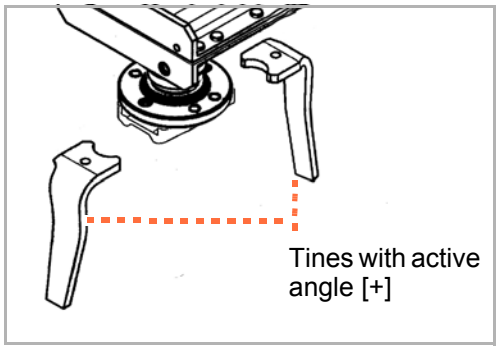
General

	Series PH2000F			
	4.00 m	**4.50 m**	**5.00 m**	**6.00 m**
Height [m]				
In work position	1,50			
In transport position	2,15	2,35	2,60	3,15
Width [m]				
Machine in transport position	2,90			
Machine in work position	4,00	4,50	5,00	6,00
Depth [m]				
Machine with mounted toothed packer roller dia. 575	1,73			
Total weight [kg]				
Machine with levelling bar, toothed packer roller dia. 575 and PTO shaft approx.	2590	2990	3290	3690
Distance [m] from centre of the lower link to the centre of gravity of the machine				
Machine with levelling bar, toothed packer roller dia. 500 and PTO shaft	1,10			
Three-point linkage				
Top link connection	CAT 3			
Lower link connection				
Tool carrier rotor speed [rpm]				
Standard ratio of transmission and at PTO speed 1000 rpm	336			
Optional ratio of transmission and at PTO speed 1000 rpm	290 - 362 - 450			
Performance [kW]				
Minimum required drive capacity	120			
Maximum permissible drive capacity	220			
Overload protection on PTO shaft [Nm]				
Automatic coupling	2500			

	Series PH2000F			
	4.00 m	**4.50 m**	**5.00 m**	**6.00 m**
Tine				
Number of tine supports	16	18	20	24
Number of standard tines	32	36	40	48
Number of standard tines with carbide coating				
Number of tines with active angle	32	36	40	48
Number of tines with active angle and carbide coating				
Tine dimensions [mm]	15 x 315			
Ball bearing distance [mm]	72,5			
Main gear-box				
Transmission oil [l]	4,0			
Specification	Synthetic oil ISO VG 320 DIN 51502 PGLP			
Gear-box on the side sections				
Transmission oil [l]	2 x 12.0			
Specification	Synthetic oil ISO VG 320 DIN 51502 PGLP			
Trough				
Grease [kg]	2 x 14.0	2 x 15.75	2 x 17.5	2 x 21
Specification	Lithium grease SAE 140 EP NLGI00 G00K DIN 51826			
Linkage of seeding machines				
With Hydrolift / lifting force [kg]	Yes / 2500			
Hydraulics				
Maximum permitted operating pressure [bar]	200			
Noise level				
At a PTO speed of 1000 rpm [db A]	Approx. 85			

Tine shapes





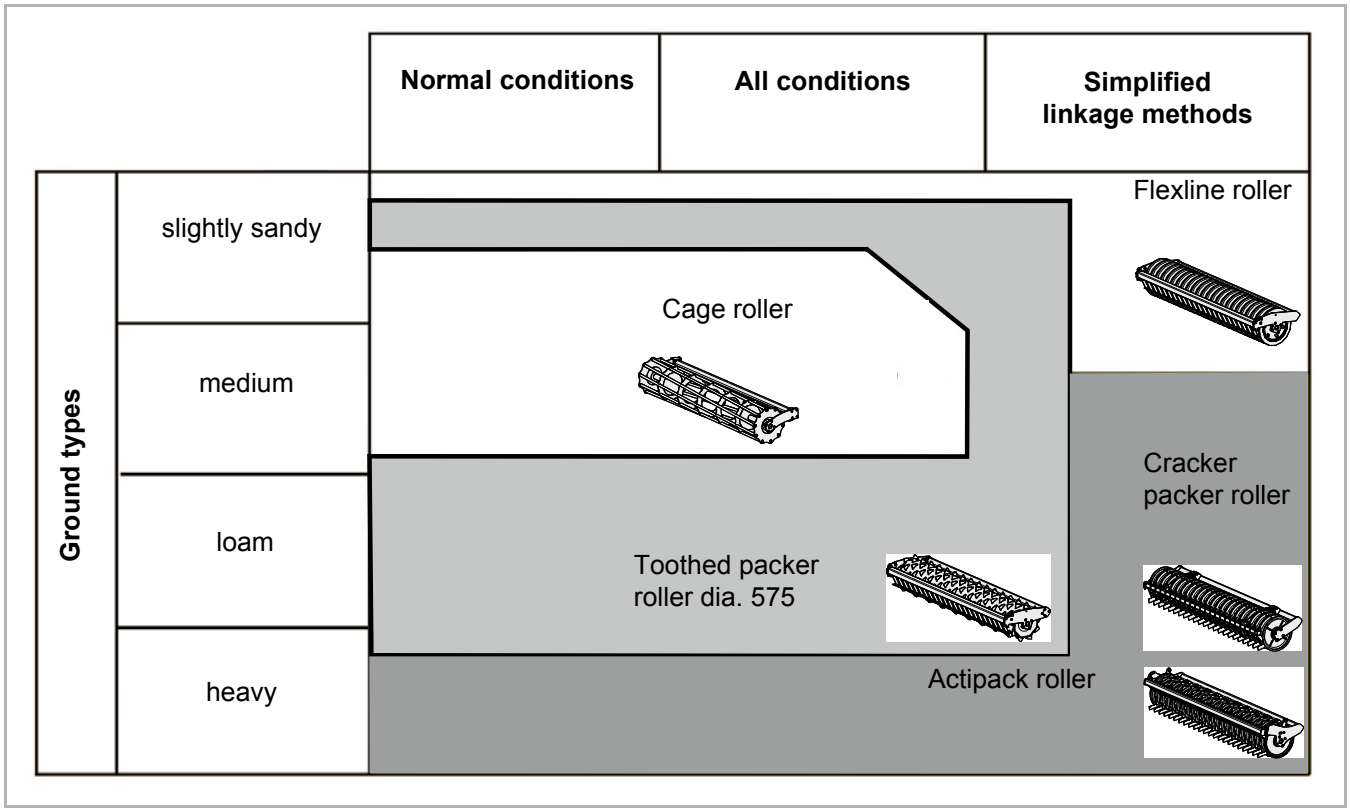
The power harrow can be equipped with different tines, which are suitable for different soil conditions, in order to fragment the farmland soil.

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
Tines with active angle [+]	In particular for not yet cultivated surfaces
Tines with active angle [+] and with carbide coating [+]	In particular for not yet cultivated surfaces and soils with higher friction

Packer rollers

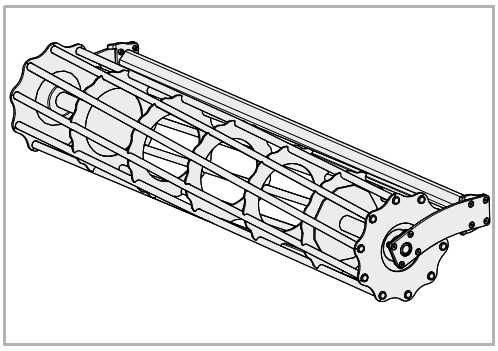
The packer rollers guide the power harrow in the working depth and compact the soil.
With some models, further fragmentation of the already cultivated soil is possible.

The table below lists the typical ranges of application of the different packer rollers:



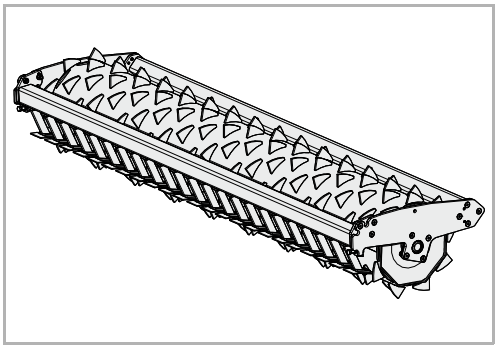
A wide range of packer rollers are available for the ground type to be cultivated:

Cage roller



Cage rollers enable re-compaction of light and medium mixed soils. Cage rollers are ideal for cultivating dry, non-sticky ground.

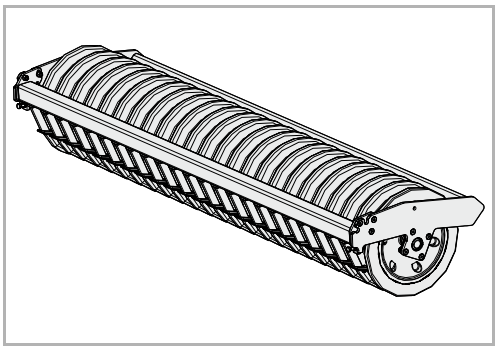
Toothed packer roller dia. 575



The shape of toothed packer rollers enables even re-compaction of the soil over the entire surface.This means they are universally usable, both for medium soils and for heavy, damp or sticky soils. The scrapers can be adjusted individually and centrally.

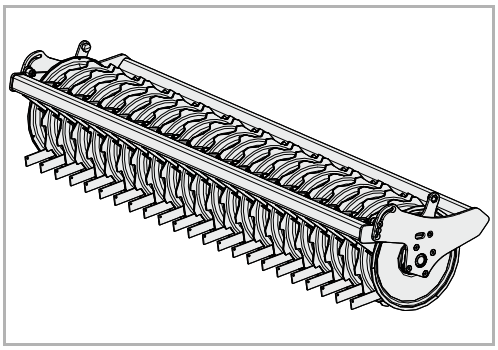
As an option, scrapers with a tungsten-carbide coating are also available.

Flexline roller



Flexline rollers enable re-compaction of sandy, light and medium soils. Flexline rollers can also be used in damp soils.

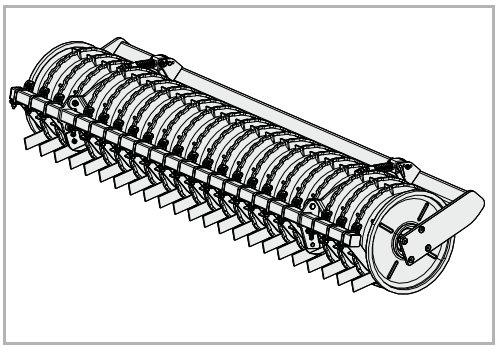
Actipack roller



Actipack rollers enable fragmentation and re-compaction of the soil. Actipack rollers are particularly suitable for medium and loamy, damp and sticky soils.

The degree of soil comminution can be adjusted at the top of the Actipack roller.

Cracker packer roller



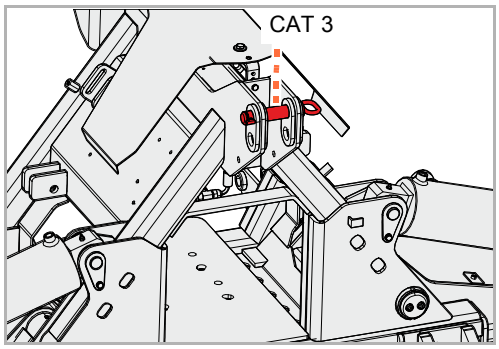
Cracker packer rollers enable comminution and re-compaction of the soil. The Cracker packer roller leaves furrows in the ground surface, which can be used as preparation for seeding.
The Cracker packer rollers are particularly suitable for heavy, damp or sticky soils.

Three-point linkage

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

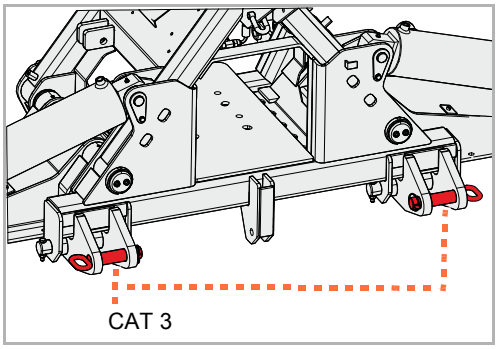
Top link connection

The top link connection is implemented in CAT 3.



Lower link connection

The lower link connection is implemented in 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:

- Hydrolift
- Coulter bar 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 in the »Preparations in the field« (Preparations in the field) chapter from page 77.

Scope of delivery

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

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

- Observance of a sequence of worksteps
- Compliance with tolerances and torques

Assembly carried out incorrectly 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.

Connecting



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

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

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

Prerequisites
The machine may have been parked in 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«, page71



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 they are not secured, the machine could come loose. This could result in damage to the machine or tractor, or personal injury.

The machine was parked in a 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 to be used

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 :

- Observing the sequence of worksteps
- Observing tolerances and torques
- Safely handling 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

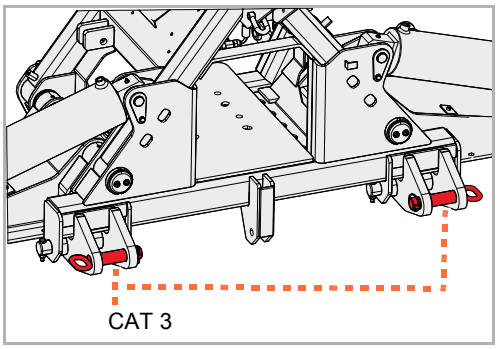
The power harrow is connected to the tractor via a three-point linkage.

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

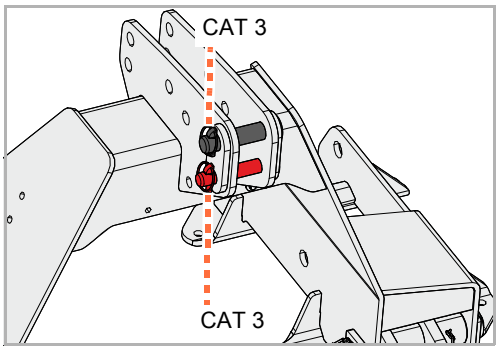
The lower link connection is implemented in CAT 3.

Lower link connection	CAT 3
Pin diameter [mm]	36,6
Distance between the lower link connections [mm]	965



- 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 lift the lower link and ensure the hooks are securely engaged

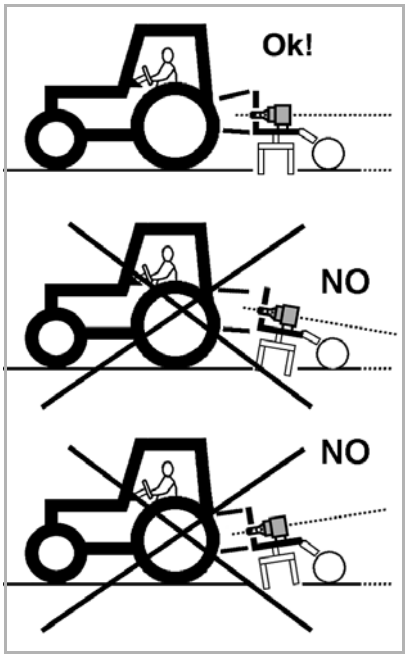
Top link connection



The top link connection is implemented in CAT 3.

Top link connection	CAT 3
Pin diameter [mm]	31,75

- Attach the top link. Use a split pin to secure the pin
- Set the lower links so that they have little play to the left or right
- Adjust 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 would damage it.
Failure to observe these instructions may result in serious or fatal injuries.

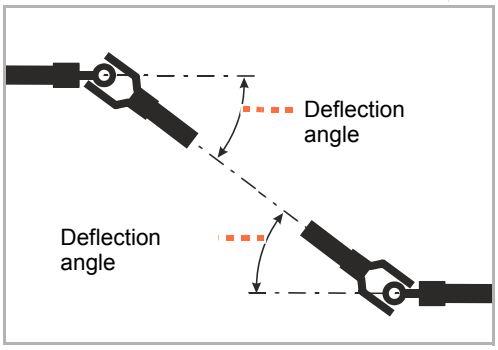
Increased risk of injury
Connecting the PTO shaft creates an increased risk of injury. Therefore:

- 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 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
- Fix 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 lighting of the machine
- The hydraulic control system

- Check all connections to ensure they are working properly



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, for:

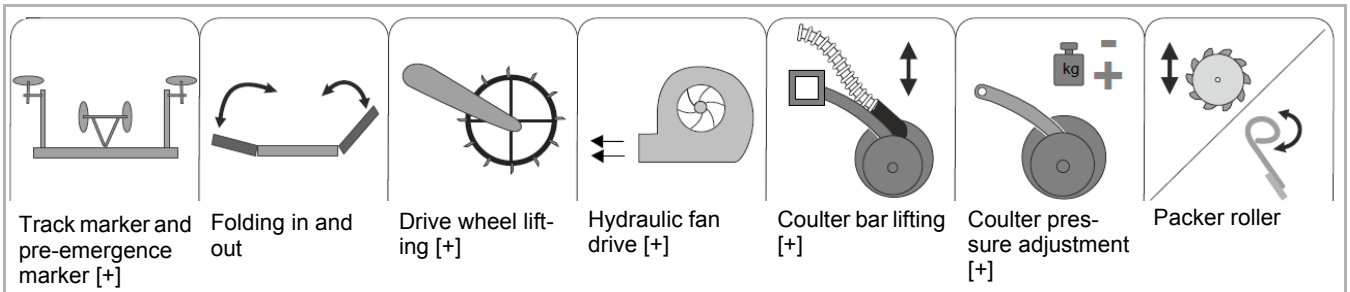
- Folding the power harrow
- Adjusting the packer roller
- Activating the track markers
- Adjusting the coulter pressure
- Lifting the coulter bar
- Hydraulic cylinders of the Hydrolift

▸ If the hydraulic hoses to the tractor are equipped with ball valves, open all of these
▸ Check all connections to ensure they are working properly

Familiarising yourself with the hydraulic system

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

The hydraulic hoses are colour-coded so that you can assign the functions to the individual hydraulic hoses more easily.



Track marker and pre-emergence marker [+] | Folding in and out | Drive wheel lifting [+] | Hydraulic fan drive [+] | Coulter bar lifting [+] | Coulter pressure adjustment [+] | Packer roller

Connection to the tractor

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

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

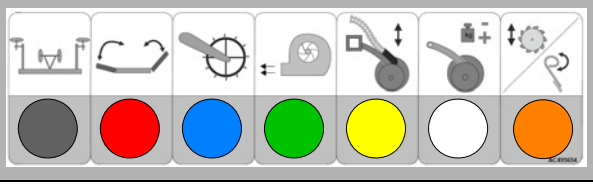
The power harrow is equipped with one of three variants for the hydraulic connection to the tractor:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Standard hydraulic system

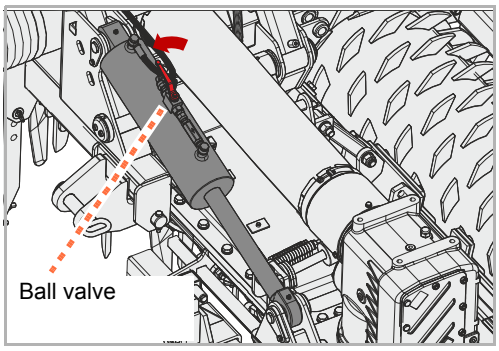
On the standard hydraulic system, each hydraulic function is directly connected to a control unit on the tractor.
The hydraulic lines are colour-coded.
Assign the various power harrow hydraulic functions to the tractor's control units in such a way that the machine can be operated easily.

- Connect the hydraulic hoses as specified in the following table

Function 	Control valves		Colour coding
	Single-acting	Double-acting	
Track marker [+]		x	**Grey**
Folding in and out		x	**Red**
Hydraulic coulter bar lifting [+]		x	**Yellow**
Hydrolift [+]	x		**Yellow**
Hydraulic coulter pressure adjustment [+]		x	**White**
Packer roller		x	**Orange**

Activating the floating position

The side sections of the power harrow can be moved independently of one another when in the floating position and can therefore adapt better to the soil structure.

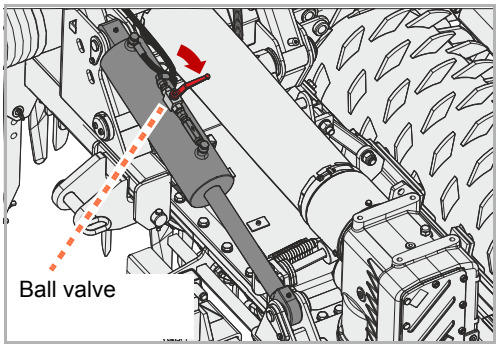


- Move the ball valve to the open position and activate the floating position
- Adjust the setting identically on the other side of the machine

This function must be selected so that the power harrow can be folded in and out and is in the floating position.

Deactivating the floating position

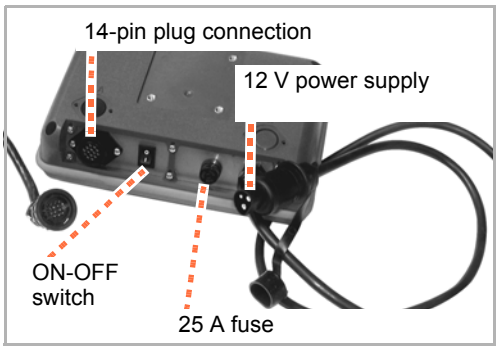
If the floating position is deactivated, the side sections of the power harrow are fixed in relation to one another.



- Move the ball valve to the closed position and deactivate the floating position
- Adjust the setting identically on the other side of the machine

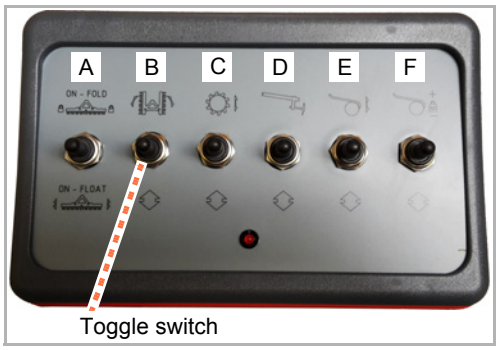
Hydraulic system with control panel [+]

On a hydraulic system with control panel, all hydraulic functions are supplied by a control unit on the tractor. The various functions are supplied with hydraulic oil by a series-connected electrohydraulic control block.
The functions can be selected on the control panel.

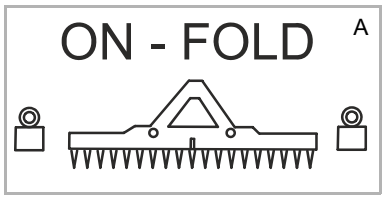


- Set the ON-OFF key to OFF
- Connect the control panel electrical connection to the tractor
- Insert the 14-pin plug connection
- Connect the hydraulic hoses as specified in the following table

Function	Control valves		Colour coding
	Single-acting	Double-acting	
Feed line		x	**Red**
Return line			**Blue**

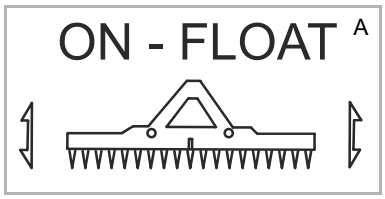


In order to actuate the hydraulic functions, use the toggle switch to preselect these and then actuate the tractor's control valve.



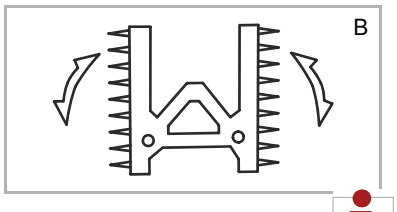
- Activate the >Fold power harrow< function using toggle switch >A< and lock the toggle switch

This function must be selected so that the power harrow can be folded.
If this function remains activated during working, both side sections are fixed in relation to one another.



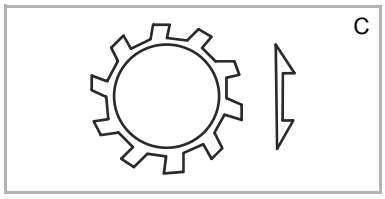
- Activate the >Power harrow floating position< function with toggle switch >A< and lock the toggle switch

If this function remains activated during working, both side sections can move independently of one another.

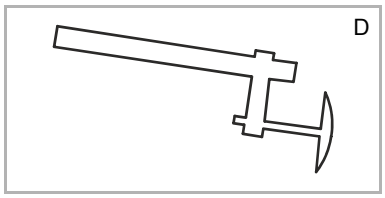


- Activate the >Fold power harrow< function using toggle switch >B<
- Move the tractor control valve in the correct direction for folding the power harrow in or out

Before folding out, actuate the folding in function once again; the safety latches will be freed and will safely unlock during folding out.

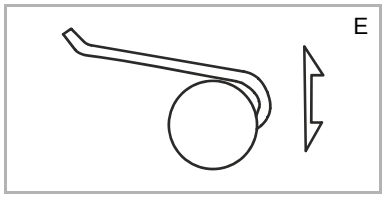


- Activate the >Set packer roller< function using toggle switch >C<
- Move the tractor control valve in the correct direction for setting the working depth of the power harrow



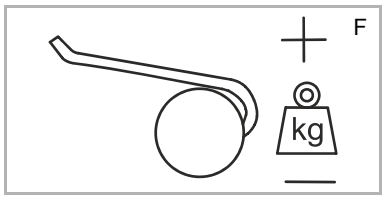
- Activate the >Track marker< function using toggle switch >D<
- Move the tractor control valve in the correct direction for folding the track markers in or out

A control valve on the power harrow automatically controls the two track markers alternately.



- Activate the >Coulter bar lifting system< function using toggle switch >E<
- Move the tractor control valve in the correct direction for lifting or lowering the coulter bar

For additional instructions on this, see the operating manual for the seeding machine.



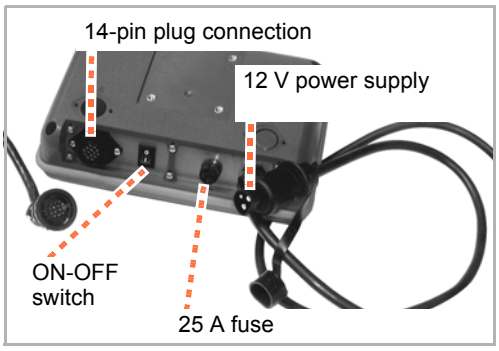
- Activate the >Coulter pressure< function using toggle switch >F<
- Move the tractor control valve in the correct direction for setting the coulter pressure

For additional instructions on this, see the operating manual for the seeding machine.

By adjusting the oil flow on the tractor control valve, you can control the movement speeds of the individual functions.
Set this such that none of the functions are carried out too quickly.

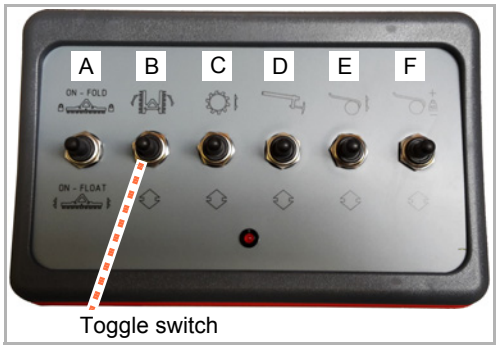
Hydraulic system with control panel and load-sensing valve [+]

On a hydraulic system with control panel and load-sensing valve, all hydraulic functions are supplied with hydraulic oil by a control unit on the tractor in line with demand. The various functions are supplied with hydraulic oil by a series-connected electrohydraulic control block. The functions can be selected on the control panel.

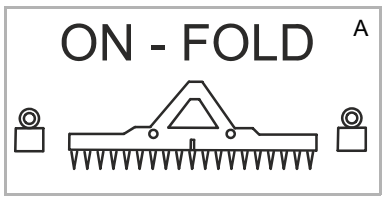


- Set the ON-OFF key to OFF
- Connect the control panel electrical connection to the tractor
- Connect the hydraulic hoses as specified in the following table

Function	Direct connection to the tractor	Colour coding
Feed line	**P**	**Red**
Return line	**T**	**Blue**
Load-sensing connection	**LS**	**Yellow**

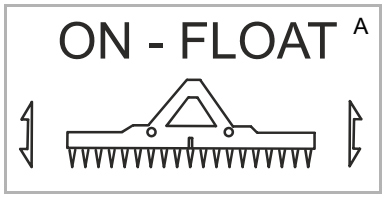


In order to actuate the hydraulic functions, activate the tractor's control valve and then actuate the relevant toggle switch.



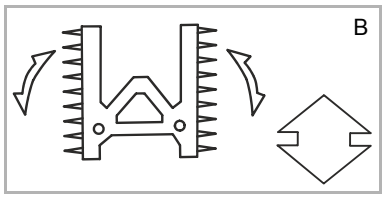
- Activate the >Fold power harrow< function using toggle switch >A< and lock the toggle switch

This function must be selected so that the power harrow can be folded.
If this function remains activated during working, both side sections are fixed in relation to one another.



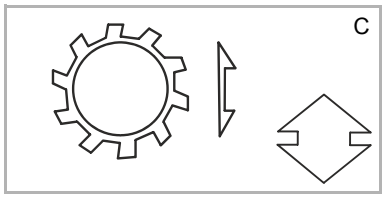
- Activate the >Power harrow floating position< function with toggle switch >A< and lock the toggle switch

If this function remains activated during working, both side sections can move independently of one another.

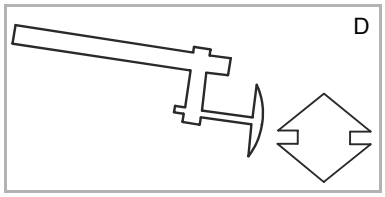


- Activate the >Fold power harrow< function using toggle switch >B< in order to fold the power harrow in or out
- Return the toggle switch to the neutral position

Before folding out, actuate the folding in function once again; the safety latches will be freed and will safely unlock during folding out.

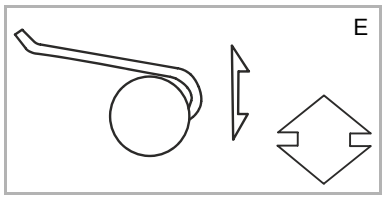


- Activate the >Set packer roller< function using toggle switch >C< in order to set the working depth of the power harrow
- Return the toggle switch to the neutral position



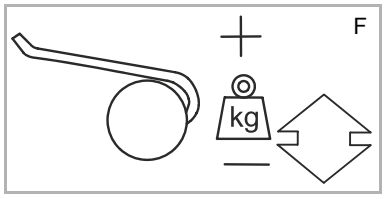
- Activate the >Track marker< function using toggle switch >D< in order to fold the track markers in or out
- Return the toggle switch to the neutral position

A control valve on the power harrow automatically controls the two track markers alternately.



- Activate the >Coulter bar lifting system< function using toggle switch >E< in order to lift or lower the coulter bar
- Return the toggle switch to the neutral position

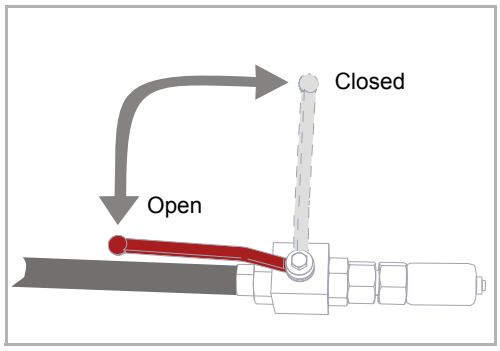
For additional instructions on this, see the operating manual for the seeding machine.



- Activate the >Coulter pressure< function using toggle switch >F< in order to set the coulter pressure
- Return the toggle switch to the neutral position

For additional instructions on this, see the operating manual for the seeding machine.

By adjusting the oil flow on the tractor control valve, you can control the movement speeds of the individual functions.
Set this such that none of the functions are carried out too quickly.



- If the hydraulic hoses to the tractor are equipped with ball valves, open all of these

Working with the hydraulics

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

In addition, check:

- Is the electronic control system correctly connected?

Folding in or out

Folding in or out only when the PTO is deactivated and not braked
The machine may only be folded in or out when the tractor PTO is deactivated and not braked. The PTO must be able to turn away from the implement.
Otherwise the machine may be seriously damaged during folding in or folding out.

Folding in or out only when the power harrow is lifted
The machine may be folded in or out only when the power harrow is lifted 30 to 40 cm above the ground.
Otherwise the machine may be seriously damaged during folding in or folding out.

The machine can be folded out to work position or folded in to transport position by way of the corresponding control unit on the tractor.

Folding the track markers [+]

The track markers are controlled by one of three hydraulic systems:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

The two track markers are activated alternately via an electrohydraulic control block. The electrohydraulic control block is actuated by the seeding machine's electronic control system.

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

- Hydrolift
- Arrester hooks for the coulter bar

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 the 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 :

- Observing the sequence of worksteps
- Observing tolerances and torques
- Safely handling electronics

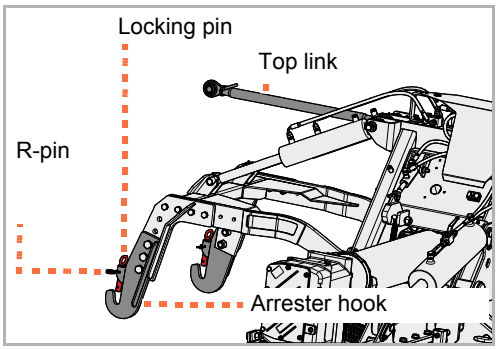
Assembly carried out by persons without specialist knowledge may result in damage to the machine or poor performance.

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

Seeding machine linkage

Hydrolift [+]

The Hydrolift can transfer lifting forces of up to 2500 kg.

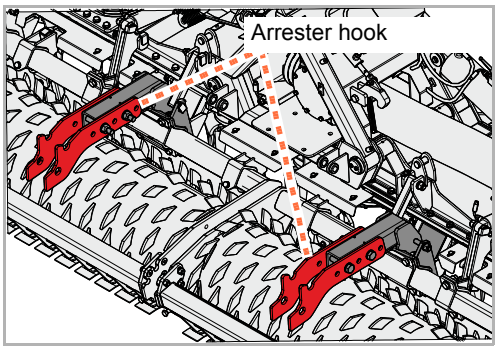


- Connect the hydraulic line of the Hydrolift to the tractor
- Lower the Hydrolift fully
- Adjust the lower link connections to the dimensions of the seeding machine
- Remove the R-pin from the locking pin
- Remove the locking pin
- Align the tractor with the power harrow centred in front of the seeding machine
- Reverse slowly. The lower link connections from the tractor must be located below the lower link connections on the seeding machine
- Lift the 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
- Adjust 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 to be lowered to its lowest position.

Coulter bar linkage [+]

Integrated linkage of seeding machines on the power harrow enables optimal positioning of the individual components of the seeding machine.



- Attach the seeding machine to the arrester hooks in accordance with the instructions in the operating manual for the seeding machine.



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 its work position
- ☑ The machine frame is parallel to the ground
- ☑ Handbrake in tractor is applied

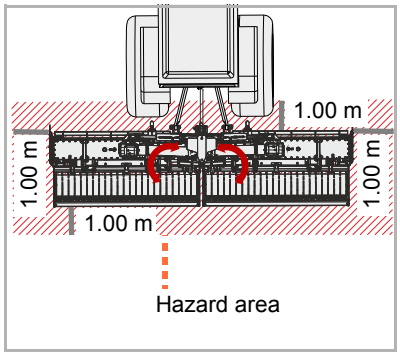
The following applies when performing all operations:

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

Folding in or out

Folding in or out only when the PTO is deactivated and not braked
The machine may only be folded in or out when the tractor PTO is deactivated and not braked. The PTO must be able to turn away from the implement.
Otherwise the machine may be seriously damaged during folding in or folding out.

Folding in or out only when the power harrow is lifted
The machine may be folded in or out only when the power harrow is lifted 30 to 40 cm above the ground.
Otherwise the machine may be seriously damaged during folding in or folding out.



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

Observe the machine when folding
Observe the machine while folding in or folding out.
If the machine behaves unusually when folding the machine in or out, interrupt the folding operation immediately and determine the cause.
This will prevent damage to the machine.

The folding-in and -out of the machine is controlled from the from the tractor via the:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Rotor speed

The table below lists the rotor speeds of the factory-fitted gear-box. These speeds generally enable optimal work results. A speed of 1000 rpm is recommended for the tractor's PTO.
The rotor speed is changed in the gear-boxes on both side sections of the power harrow.

Series PH2000F model	Input shaft	Layshaft	Rotor speed [rpm] with tractor PTO speed of 1000 rpm
4.0 m 4.5 m 5.0 m 6.0 m	Z=23	Z=33	336
	Z=24 [+]	Z=32 [+]	362
	Z=27 [+]	Z=29 [+]	450

Setting the rotor speed

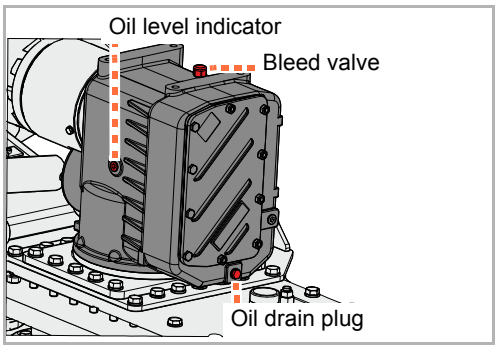


Risk of burning
Do not perform any work on a gear-box still hot from operation. Wait until the components and the oil have cooled down.
Failure to observe these instructions may result in severe injuries.

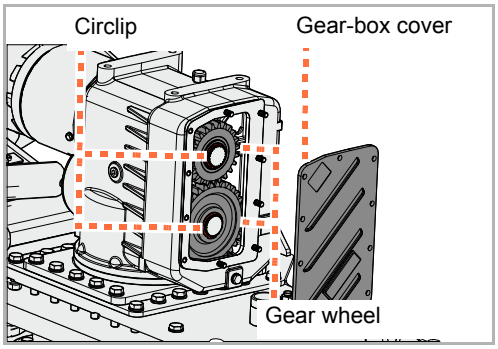
Prerequisites:

- 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 thoroughly
- Park the machine on an even, horizontal surface, so that it is standing horizontally
- Switch off the tractor and secure it against rolling away
- Position an oil collection tray under the oil drain plug
- Remove the bleed valve
- Remove the oil drain plug
- Remove the oil level indicator
- After draining the oil, insert the oil drain plug again



- Remove the bolts and open the gear-box cover. Ensure that you do not damage the seal.
- Remove the circlips and gear wheels
- Replace the gear wheels in accordance with the table above and install



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

- Insert the circlips back into the groove precisely.
- 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

→ You can find information on the oil type that has to be used in the chapter »Getting to know the machine«»Technical data«, from page 25

- Check the oil level and tightness of the seal
- Oil the removed gear wheels thoroughly and store in a dry location
- Adjust the speed setting identically on the other side of the machine

Identical speed setting in both gear-boxes
Do not use different speeds in the two gear-boxes.
Failure to observe this instruction can result in significant damage to the machine.

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 carefully in order to achieve optimal work results and low power consumption while preventing 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 described below on both sides of the machine.

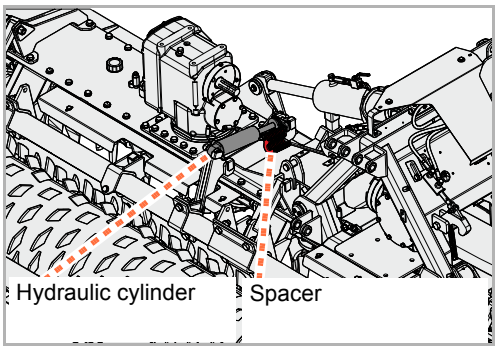
The power harrow is equipped with a hydraulic depth-setting function.

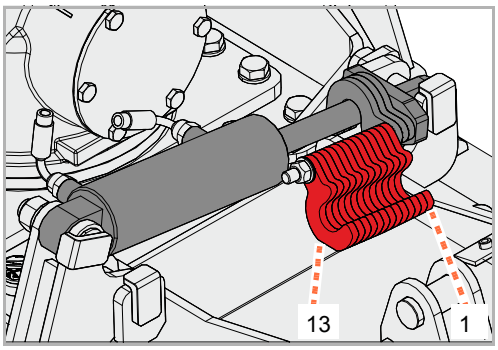
Depth setting

The working depth is set using a regulating piece. The setting can be adjusted in increments of 1.5 cm each.

Prerequisite:

- The machine is lifted
- The hydraulic cylinder is extended
- The tractor's PTO is deactivated
- All driven components are stationary
- Tractor motor is switched off
- Tractor is secured against rolling away and being restarted without authorisation





▸ Insert the correct number of spacers for the desired power harrow working depth

1 to 4 spacers	Deep working depth
5 to 9 spacers	Average working depth
10 to 13 spacers	Shallow working depth

▸ Adjust the setting identically on the other side of the machine

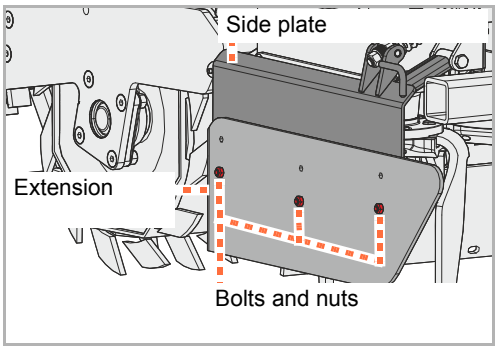
Side plates

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.

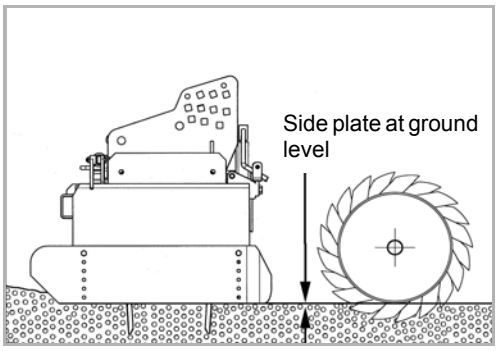
Prerequisite:

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

Adjust the extensions as follows:



- Remove the nuts and bolts of the extensions



- Bring the extensions to a height above ground that corresponds to the desired working depth
- Re-insert the bolts and tighten the nuts securely
- Adjust the setting identically on the other side of the machine

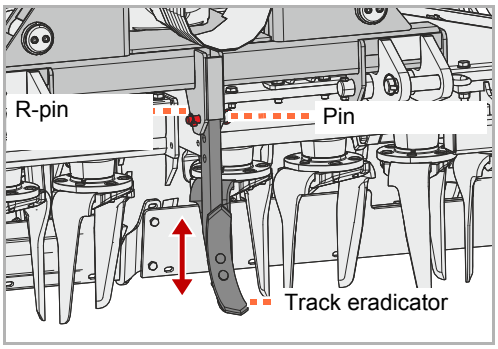
Track eradicator in the centre

The track eradicator in the centre of the machine loosens the soil that cannot be reached by the tines of the power harrow. The track eradicator is attached to the transverse carrier on the main frame. The working depth of the track eradicator must match the working depth of the tines.

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

Prerequisite:

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



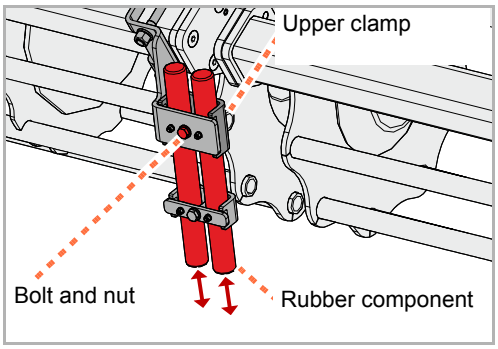
- Remove the R-pin
- Lift the track eradicator slightly
- Remove the pin
- Set the track eradicator to the desired working depth
- Insert the pins and secure them with safety splints

Levelling element in the centre

The levelling element in the centre of the machine levels the ground between the two packer rollers.
It should be adjusted so that the level is the same as that achieved after the packer rollers move over the ground. The lower clamp is set depending on the soil type.

Prerequisite:

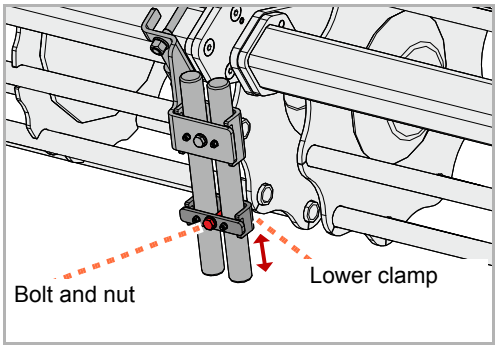
- The machine is lifted and in the transport position
- The tractor's PTO is deactivated
- All driven components are stationary
- Tractor motor is switched off
- Tractor is secured against rolling away and being restarted without authorisation



- Undo the nuts and bolts on the upper clamp so that it is possible to move the rubber components
- Set the rubber components to the desired position
- Secure the bolts with nuts

The height of the lower clamp is adjusted to the rubber components in accordance with the following guide values:

Light soil	In the upper area
Heavy soil	In the lower area



- Undo the nuts and bolts on the lower clamp so that it is possible to move it onto the rubber components
- Set the lower clamp to the desired position
- Secure the bolts with nuts

Levelling bar [+]

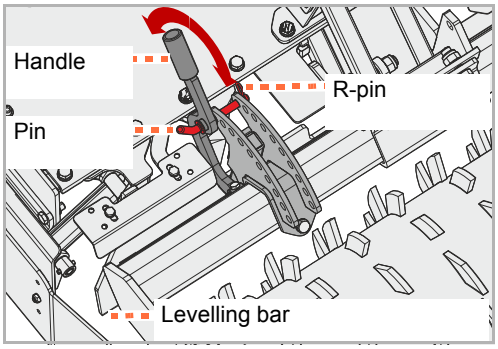
The levelling bar levels the ground behind the rotors.
The set height of the levelling bar also influences how long the soil remains in the power harrow and thus the intensity of the processing.

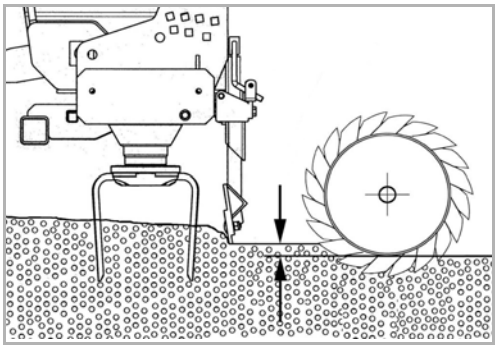
Prerequisite:

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

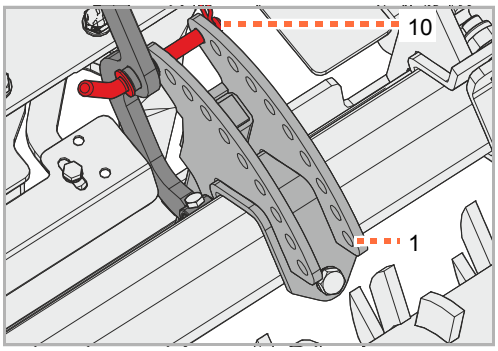
Make the adjustment as follows:

- Remove the R-pin
- Use the lever to slightly lift the levelling bar and remove the pins





It is adjusted so that it is above the working level of the roller.



- Select the hole that corresponds to the desired height of the levelling bar

Hole 1 to 3	High
Hole 4 to 7	Average
Hole 8 to 10	Low

- Adjust the setting identically on the other side of the machine
- Insert the pins into the desired position and secure them with R-pins
- Adjust the setting identically on the other side of the machine

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 properly and may be damaged.

Track eradicator [+]

The track eradicators are used to 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.

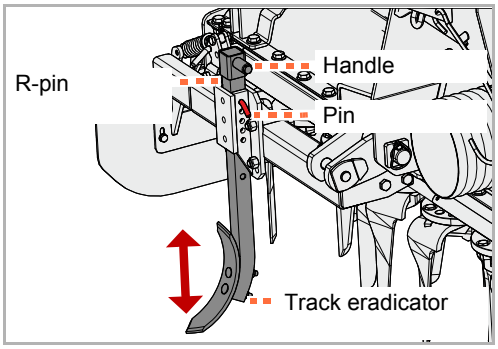
Adjust the track eradicators to the centre line of the tractor tyres. If there are two track eradicators per side, choose the line of the outside edges of the tractor tyres.

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

Prerequisite:

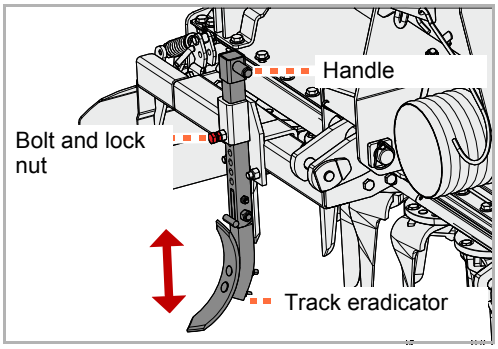
- The machine is lifted
- The tractor's PTO is deactivated
- All driven components are stationary
- Tractor motor is switched off
- Tractor is secured against rolling away and being restarted without authorisation

Track eradicators without overload protection [+]



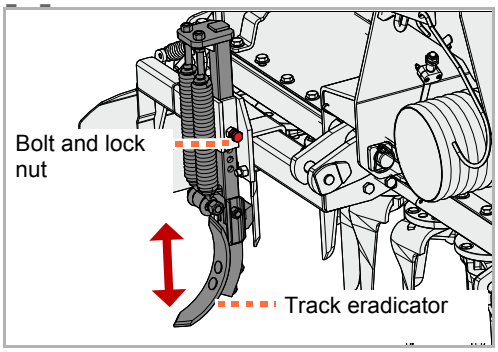
- Remove the R-pin
- Lift the track eradicator slightly at the handle
- Remove the pin
- Set the track eradicator to the desired working depth
- Secure the pin with the R-pin
- Adjust the setting identically on the other side of the machine

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 desired working depth
- Tighten the bolt and secure with the lock nut
- Adjust the setting identically on the other side of the machine

Track eradicators with automatic overload protection



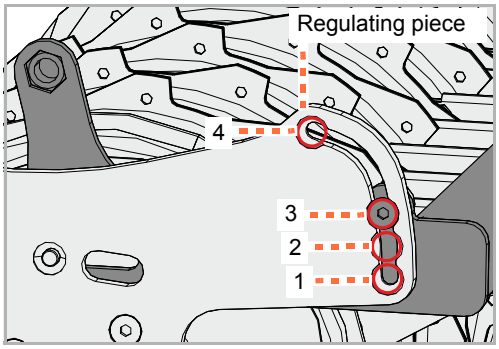
- Release the lock nut
- Lift the track eradicator slightly
- Unscrew the bolt until the track eradicator can be adjusted
- Set the track eradicator to the desired working depth
- Tighten the bolt and secure with the lock nut
- Adjust the setting identically on the other side of the machine

Actipack roller [+]

Actipack rollers are equipped with knives that enable intensive cultivation of the soil.
Between the rollers, there are scrapers, which remove soil deposits from the 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 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

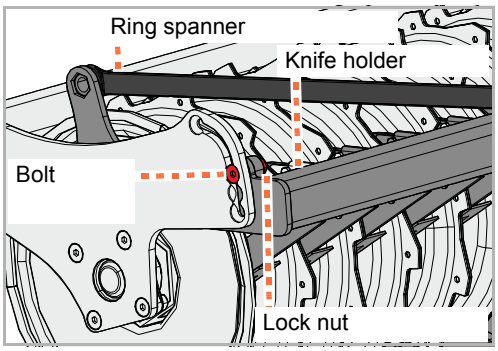
The more intensively the knives are used, the greater the level of wear and the probability that a wall will form in front of the roller. Then reduce the driving speed, if necessary.

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

Setting of the working depth

Prerequisite:

- The machine is lifted by around 20 cm
- The tractor's PTO is deactivated
- All driven components are stationary
- Tractor motor is switched off
- Tractor is secured against rolling away and being restarted without authorisation



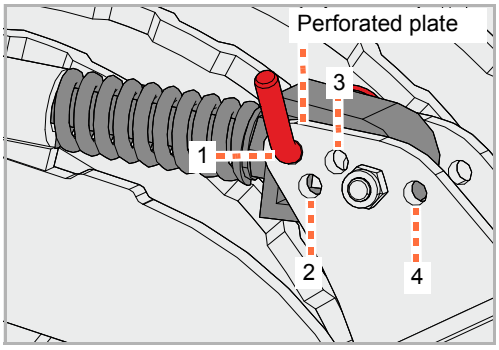
- Remove the lock nut used to lock the adjustment screw on both roller sides
- Unscrew the bolt on one of the two sides by approx. 1 cm, so that it can then slide through the connecting link
- On the opposite side on the inside, attach the spanner to the leverage point
- Hold the ring spanner with one 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 desired 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 desired position
- Hold the ring spanner firmly with one hand and with the other hand, tighten the bolt and secure with the lock nut
- Remove the ring spanner

Cracker packer roller [+]

The cracker packer rollers are equipped with knives that enable intensive cultivation of the soil.
Between the rollers, there are scrapers, which remove soil deposits from the rollers.

Both the knives and the scrapers are mounted on a corresponding frame.

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

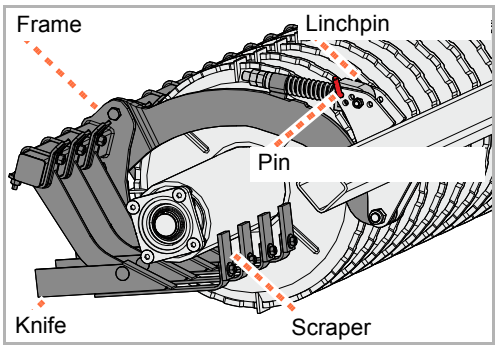
The more intensively the knives are used, the greater the level of wear and the probability that a wall will form in front of the roller. Then reduce the driving speed, if necessary.

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

Setting of the working depth

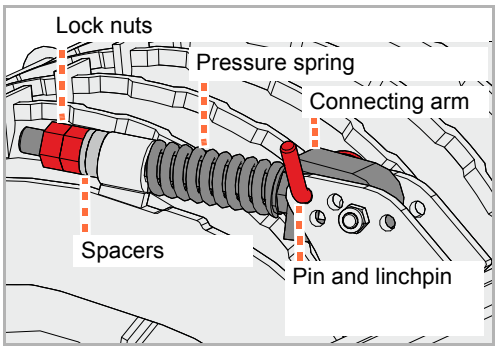
Prerequisite:

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



- Remove the linchpin
- Remove the pin
- Reinsert the pin according to the desired working depth of the knife, lift the frame if necessary
- Secure the pin with a linchpin
- Adjust the setting identically on the other side of the machine

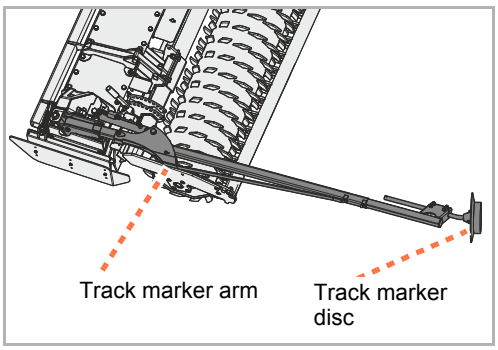
Setting the pretension of the pressure spring



- 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
- Mount the desired spacer on the connecting arm
- Install the connecting arm with pressure spring and spacer
- Fit the remaining spacer
- Secure the connecting arm with lock nuts
- Fit the bolt and nut
- Reinsert the pin according to the desired working depth of the knife, lift the frame if necessary
- Secure the pin with a linchpin
- Adjust the setting identically on the other side of the machine

Track marker [+]

As an option, the power harrow can be equipped with track markers so that a seeding machine can be used at the same time.

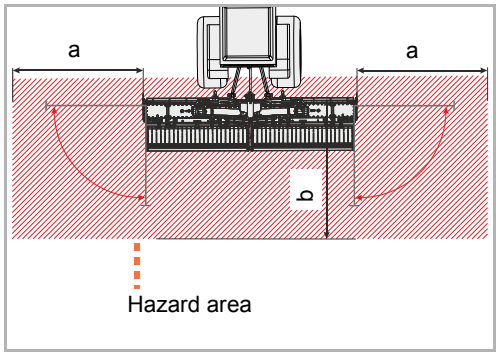


During the forward pass, the track markers mark a path in the seed bed for the return pass. To enable this, set the track markers as follows:

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

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

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



Working width [m]	Hazard area [m]	
	a	b
4,00	3,50	4,00
4,50	3,75	4,25
5,00	4,00	4,50
6,00	4,50	5,00

The folding-in and -out of the machine is controlled from the from the tractor via the:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Setting to tractor centre

You will need the following information:

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

▸ Move the machine to its work position

▸ Lower the track markers

Calculation

Length of the track markers for tractor centre =

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

Example



Example

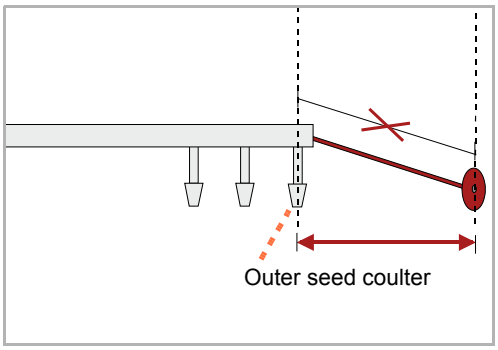
Row spacing of the seeding machine	12.5 cm
Working width of the seeding machine	600.0 cm

In this example, the calculated length of the track markers is 306.25 cm.

Settings

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

On the machine, the track marker is at a considerable distance from the coulter. To determine the correct length of the track marker, it is advisable to position, for example, a batten in the extension of the coulter and use it to determine the measuring point at the height of the track marker.



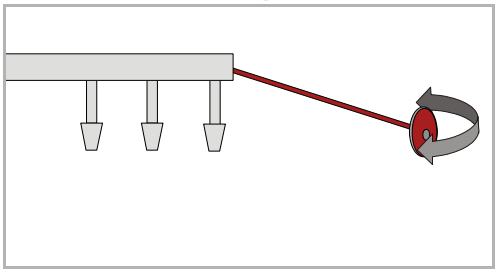
Right track marker arm:

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

Lefttrack marker arm:

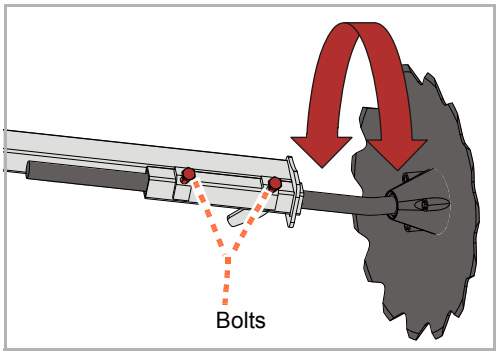
- Begin the measurement in the centre of the outer left coulter

Inclination angle



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

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



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

- Release the bolts
- Set the inclination angle as desired
- Re-tighten bolts

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

Safety

Before transporting the machine on public roads, read the following safety information. 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 machine.
- The permissible transport width and weight, axle loads, tyre load-bearing capacity and total weights are observed
- The steering capability of the tractor must not be affected. When the machine is in its transport position, there must be sufficient weight on the steering axle.
- The seed hopper must be empty for transport on public roads
- Close the seed 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.
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.
Accidental actuation of the 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.

Note the transport height
Note the permissible transport height and, if necessary, do not lift the machine too high in the transport position. 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.

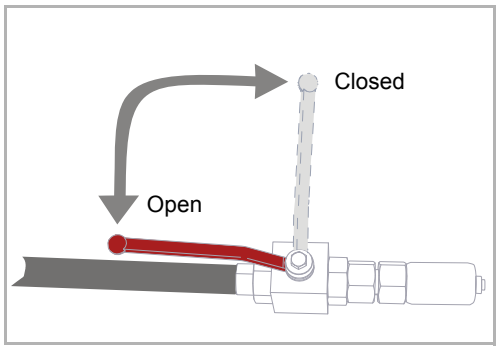
Trip ropes must hang loose
Trip ropes for quick-release couplings must hang loose and must not, when in their lowered position, release the couplings of their own accord.
Unintended tripping can cause serious accidents.

Transport position

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

Ball valve

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

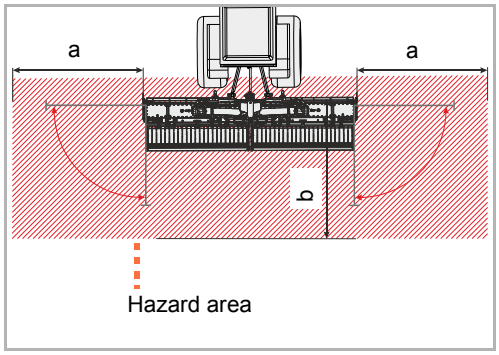


- Open the ball valve
- Move the machine with the control unit on the tractor into transport position

Folding in the track markers [+]

If installed, fold in the track markers prior to road transport.

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

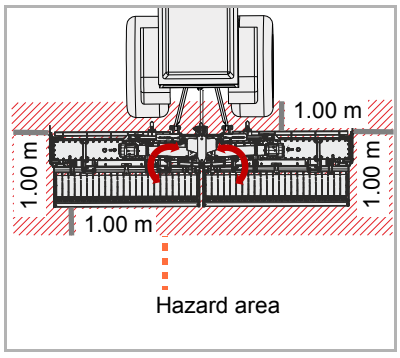


Working width [m]	Hazard area [m]	
	a	b
4,00	3,50	4,00
4,50	3,75	4,25
5,00	4,00	4,50
6,00	4,50	5,00

The folding-in and -out of the machine is controlled from the from the tractor via the:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Folding in the power harrow

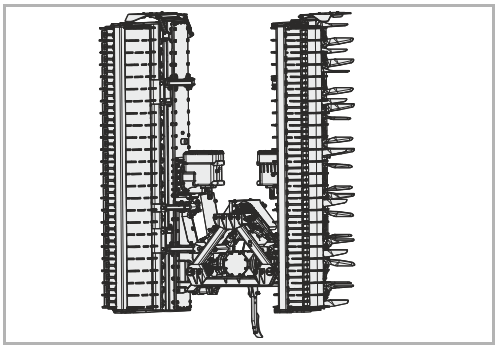


No persons in the hazard area
No persons, in particular children, but also no animals or objects should remain in the hazard area when folding in or folding out.
Persons who remain in the hazard area when the machine is folded in or out may be seriously or fatally injured.

Observe the machine when folding
Observe the machine while folding in or folding out.
If the machine behaves unusually when folding the machine in or out, interrupt the folding operation immediately and determine the cause.
This will prevent damage to the machine.

Folding in is accomplished in two stages:

- Lift the power harrow
- Fold in the side sections



The folding-in of the machine is controlled from the tractor:

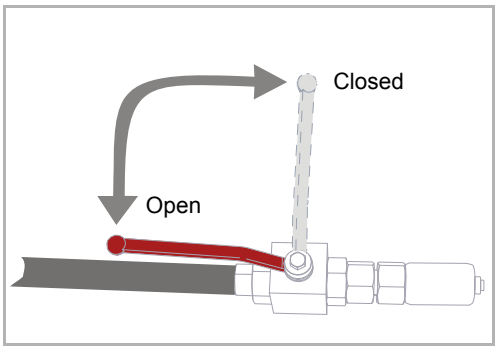
- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Hydrolift [+]

For road transport, the Hydrolift is to be lowered to its lowest position.

Ball valve

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



- Move the machine with the control unit on the tractor into transport position
- Close the ball valve

Road transport



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

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

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

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

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

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

- ☑ The machine is folded in completely
- ☑ The Hydrolift is in transport position
- ☑ Track markers are secured
- ☑ The lighting equipment is installed and operational

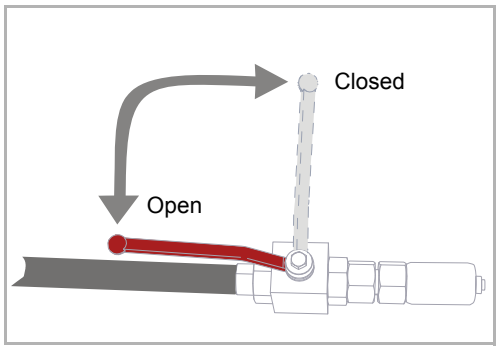
Work position

The following applies when performing all operations:

- Secure the machine
- Lower the machine to its work position
- Make settings as desired

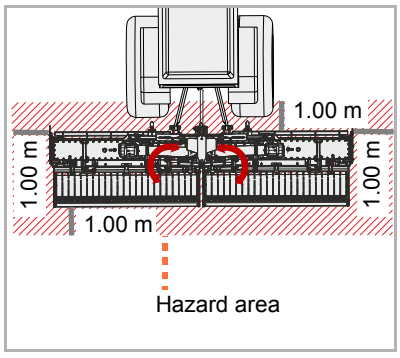
Ball valve

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



- Open the ball valve
- Using the control unit on the tractor, move the machine into work position

Folding out the power harrow



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

Observe the machine when folding
Observe the machine while folding in or folding out.
If the machine behaves unusually when folding the machine in or out, interrupt the folding operation immediately and determine the cause.
This will prevent damage to the machine.

Folding out is accomplished in two stages:

- Fold out the side sections
- Lower the power harrow

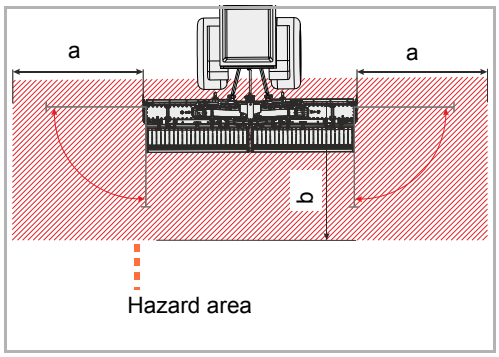
The folding-out of the machine is controlled from the tractor:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Folding out the track markers [+]

If installed, fold out the track markers.

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



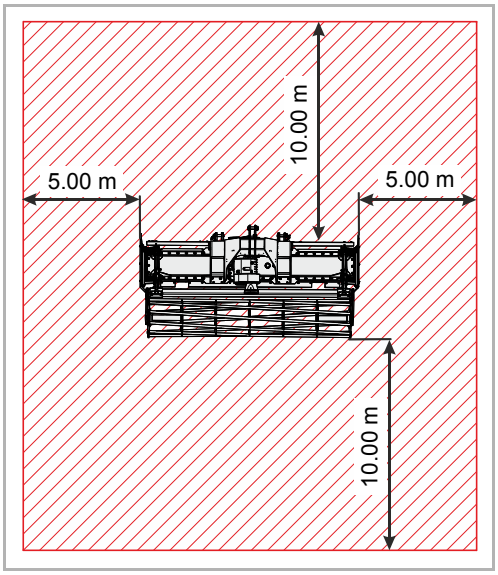
Working width [m]	Hazard area [m]	
	a	b
4,00	3,50	4,00
4,50	3,75	4,25
5,00	4,00	4,50
6,00	4,50	5,00

The folding-in and -out of the machine is controlled from the from the tractor via the:

- Standard hydraulic system
- Hydraulic system with control panel
- Hydraulic system with control panel and load-sensing valve

Danger zone

Check the danger zone
Check the danger zone before driving off, folding out, and operating the machine. Ensure sufficient visibility. Do not begin work until the danger zone is cleared of any persons – particularly children – but also animals or objects.
Failure to observe these instructions may result in severe or fatal injuries

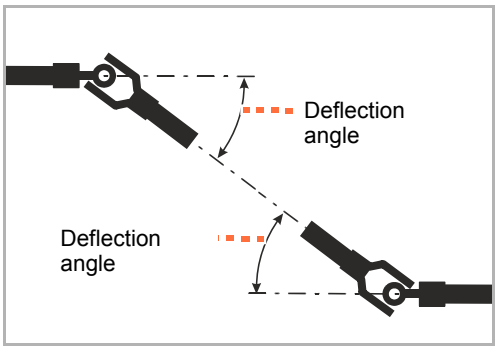


During operation, the danger zone covers 10 m in front of and behind the machine and 5 m to the sides.
Check the machine's danger zone before starting, during initial operation and during operation.
Adapt the distances in relation to the machine's space requirement and its add-on devices.
Only start the machine once the danger zone 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 there are no objects in the working area (wood, metal, plastic, glass, etc.), which could be ejected from the machine or could 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 and/or slopes or even pits or 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
The machine must only be in work position when facing 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.
Otherwise, this will produce a substandard work result and lead to premature wear of the tools.

Checks

Before starting work

Carry out the inspection using the check list:

- ☑ Is sufficient gear-box grease available?
- ☑ 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 danger zone been checked?

Switching on the power harrow

On the field, switch on the power harrow as follows:

- Lift the machine until all tools are lifted evenly 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.
The machine may be damaged and produce substandard work.



The driving speed is based on the following criteria:

- Soil type
- Soil condition
- Desired level of comminution to be achieved for the soil

As a general rule, the greater the driving speed, the lower the quality of the work.

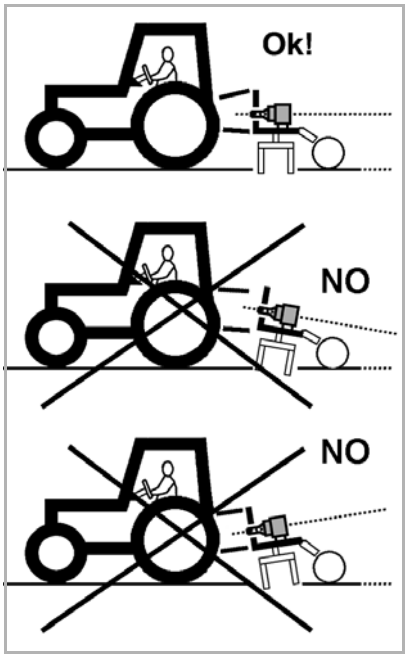
Test drive

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

Check the danger zone
Check the danger zone before driving off, folding out, and operating the machine. Ensure sufficient visibility. Do not begin work until the danger zone is cleared of any persons – particularly children – but also animals or objects.
Failure to observe these instructions may result in severe or fatal injuries

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

Performing the test drive

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

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 danger zone
Check the danger zone before driving off, folding out, and operating the machine. Ensure sufficient visibility. Do not begin work until the danger zone is cleared of any persons – particularly children – but also animals or objects.
Failure to observe these instructions may result in serious or fatal injuries.

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.

Work position and cultivation

- Fold out the machine
- Begin soil preparation

Working speed

During soil preparation, monitor the working speed. The possible working speed within the range of 1 – 15 km/h depends on the desired comminution of the soil.

Switching on the power harrow

On the field, switch on the power harrow as follows:

- Lift the machine until all tools are lifted evenly 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.
The machine may be damaged and produce substandard work.



The driving speed is based on the following criteria:

- Soil type
- Soil condition
- Desired level of comminution to be achieved for the soil

As a general rule, the greater the driving speed, the lower the quality of the work.

Operating faults

The tools are designed to prevent clogging or blocking. It is therefore extremely rare for a fault to occur.

Clogging

In case of clogging, the engine speed continuously falls 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 as normal



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.
In this case, the tractor's PTO must be deactivated immediately.



Do not continue working with a blockage
Work must not be continued until 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 grasp foreign bodies directly with your hand to remove them.
Failure to observe these instructions may result in severe or fatal injuries.

In the event of a blockage

- Switch off the tractor's PTO immediately
- Stop the tractor
- Lift the machine
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor
- Secure the tractor against rolling away
- Remove foreign bodies with a suitable tool
- Continue work as usual

Vibrations and unusual noises

If unusual noises or vibrations occur during work, stop the machine immediately and eliminate the causes.
Observe the safety instructions on the previous pages or, if relevant, contact an authorised dealer.

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 stub shaft
- After the turn, lower the machine to the work position again approximately 1 m ahead of where you want to begin work
- 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.

The Hydrolift can be used in the following cases

- When manoeuvring the machine on the headland
- When preparing the field using only the power harrow

- Throttle the tractor engine speed just before reaching the field edge
- Lift the Hydrolift via the tractor's control valve
- Lift the power harrow while travelling
- Switch off the tractor's PTO stub shaft
- After the turn, lower the power harrow to the work position again approximately 1 m ahead of where you want to begin work
- Lower the Hydrolift via the tractor's control valve
- Switch on the tractor's PTO

End of work

After completing the work, switch off the power harrow as follows:

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

Inspection tasks during soil preparation

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

☑ Does the PTO speed remain constant 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

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. Therefore:

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

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



Only park the power harrow in the work position when on the ground
Only park the power harrow in the folded-out work position when on the ground.
Failure to observe this instruction causes damage to the machine.

Power harrow

- Fold the power harrow into the work position
- Lower the power harrow until it stands securely on the ground
- 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

Power harrow and seeding machine



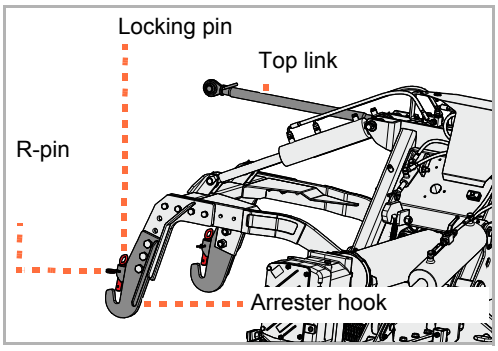
Danger of tilting when using power harrow with seeding machine
For power harrows with seeding machine, lower the Hydrolift with the seeding machine to the ground before uncoupling the device combination from the tractor. If the seeding machine remains in the raised position, the device combination could 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

Some preparation is required if the seeding machine is to be uncoupled from the power harrow. The use of struts may be required, depending on the seeding machine.
→ Operating manual of the seeding machine

Hydrolift



- Lower the Hydrolift fully
- 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 at the desired location

Other linkage devices for seeding machines

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

Storing the machine

After cleaning, the machine should be stored in transport position in a dry location and on a level and stable surface.
→ Section »Securing the machine«, page 92

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, please always observe the following:



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

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

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

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



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

General information

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



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

Fundamentals

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

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

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 a 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	9,9	14	17
M8	24	34	41
M10	48	68	81
M12	85	120	145
M16	210	290	350
M20	425	610	710
M24	730	1050	1220
M12x1.5	75	89	125
M14x1.5	125	150	205
M16x1.5	190	220	310
M18x1.5	270	320	450
M20x1.5	380	450	630
M22x1.5	510	600	850
M24x1.5	670	800	1120
M27x1.5	990	1170	1640

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.

You can secure the machine while it is folded in or folded out.

- Lower the machine over the tractor's lower link balls
- 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

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	•				•	•								96
Visual inspection	•	•												
Pin connection to the tractor						•		•		•	•			110
Hydraulics														
Hydraulic hoses every 6 years											•			124
Hydraulic hoses in general							•	•		•	•			124
Power harrow														
Gear-box (oil)										•				107
First change after 30 operating hours					•	•	•				•			107
Trough (grease)							•		•	•				109
PTO shaft --> Manufacturer's maintenance regulations		•						•	•		•			
Folding joints and Hydraulic cylinder		•						•	•		•			
Fastening elements on the tine supports		•					•			•	•			112
Tine		•					•	•		•	•		•	112

	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
Packer roller														
Storage of the roller			•				•	•	•		•			100
Storage of the rocker arm			•				•	•	•		•			110
Scraper			•				•	•		•	•	•		114
Accessories														
Track eradicator			•				•	•		•	•			121
Levelling bar			•				•		•				•	110
Mechanical linkage device			•				•	•	•		•			110
Hydrolift			•				•	•	•		•			110

Lubricating the bearings

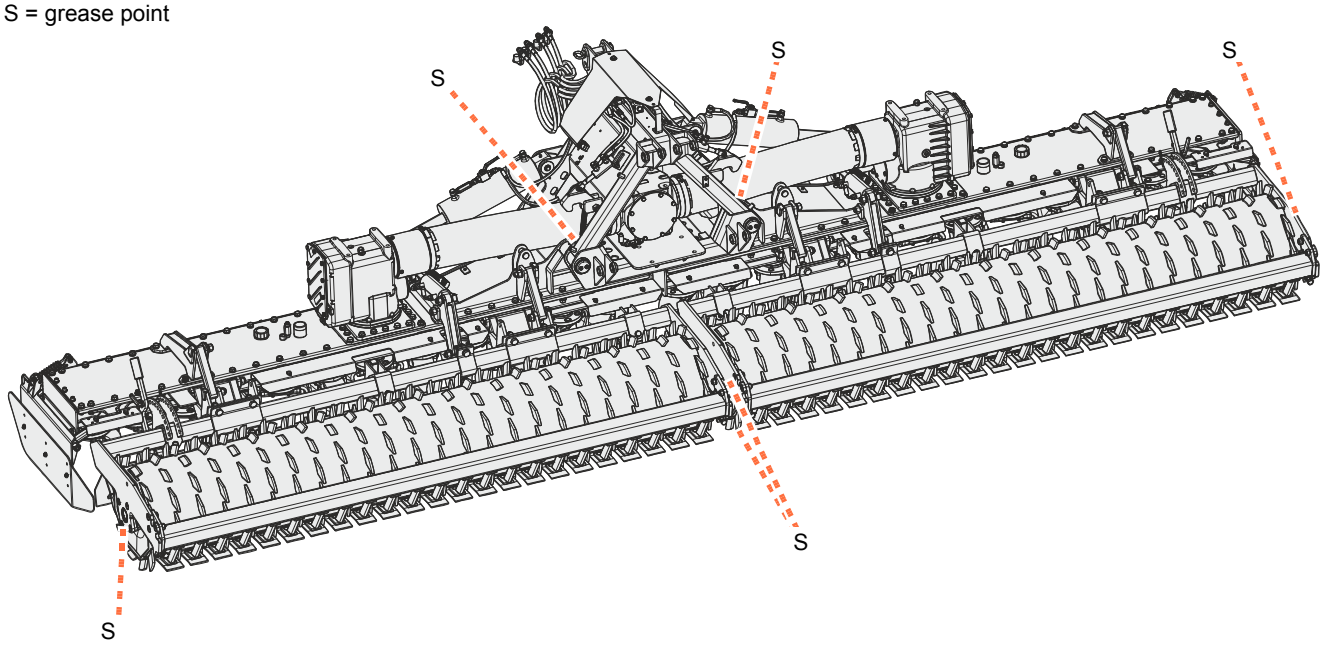
The bearings must be lubricated regularly. Only use 1 or 2 strokes from the grease gun:

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

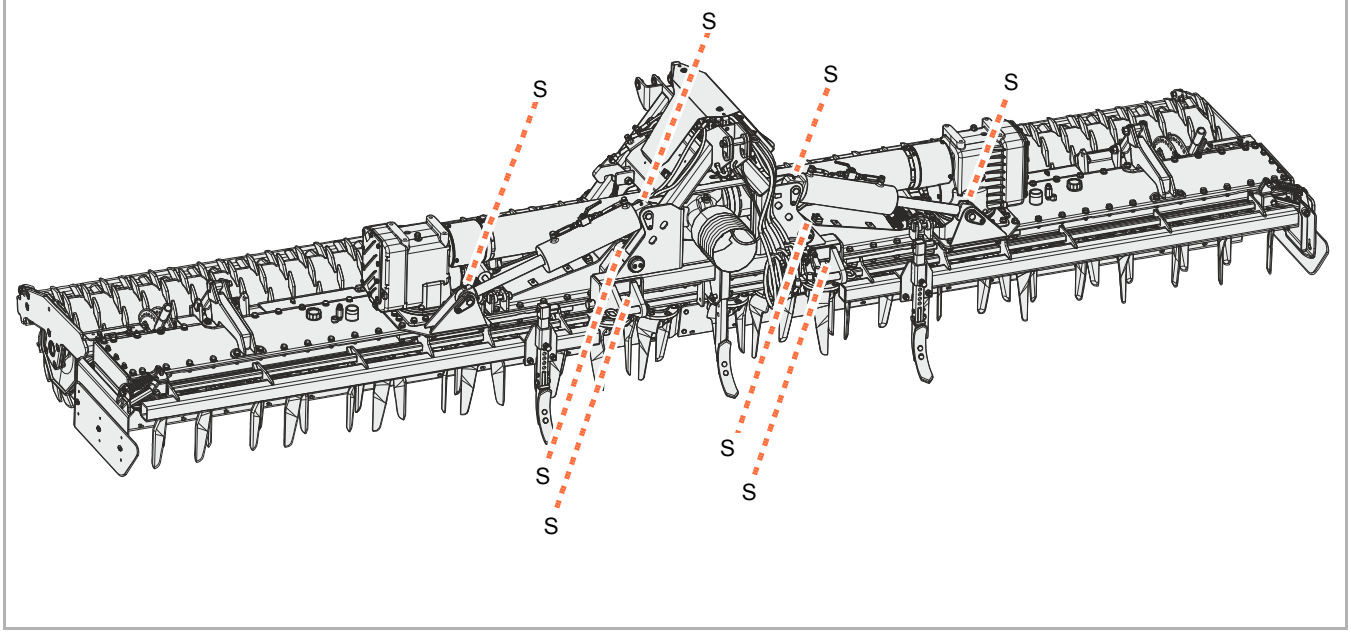
Do not lubricate maintenance-free bearings.

Overview of lubrication points

S = grease point

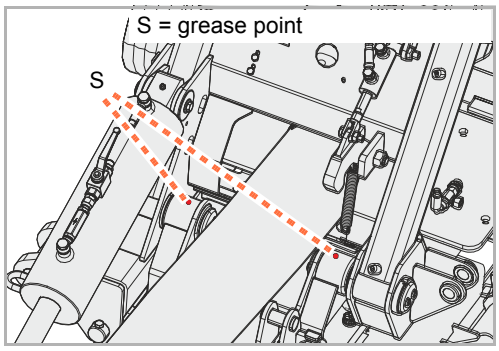


S = grease point



Folding

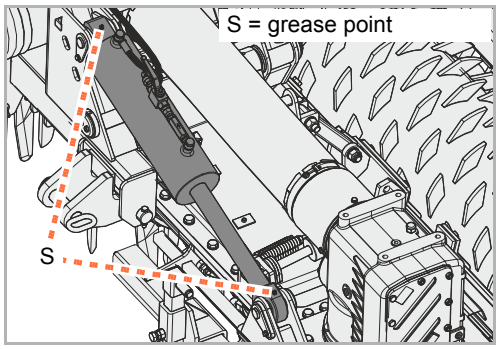
Every 50 hours of operation



There are two lubrication points on each side of the machine at the folding pivot points.

- Lubricate the lubrication points

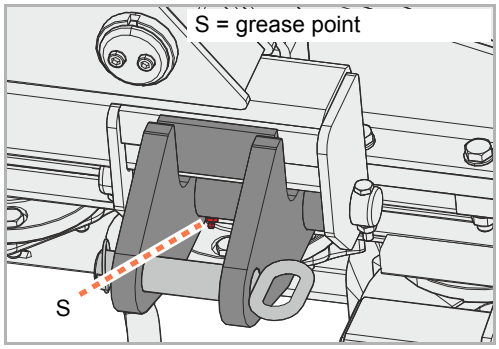
There are two lubrication points on each side of the machine at the folding hydraulic cylinders.



- Lubricate the lubrication points

Lower link connection

Every 50 hours of operation

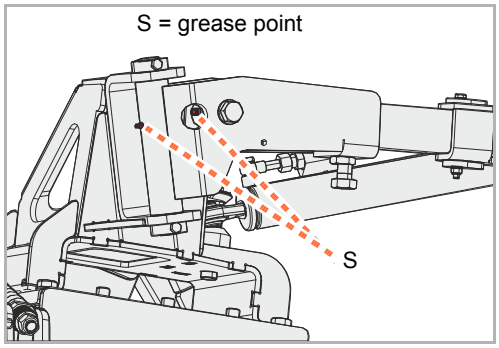


There is one lubrication point on each side of the machine at the lower link connections.

- Lubricate the lubrication points

Track marker [+]

Every 50 hours of operation

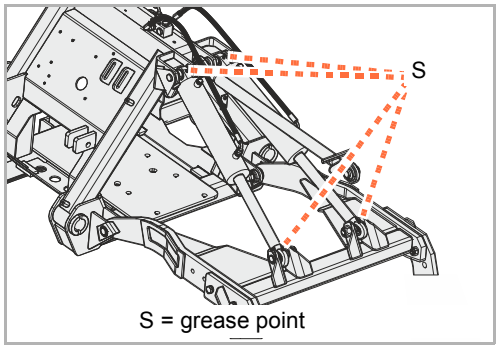


There are two lubrication points on each side of the machine at the track markers.

- Lubricate the lubrication points

Hydrolift [+]

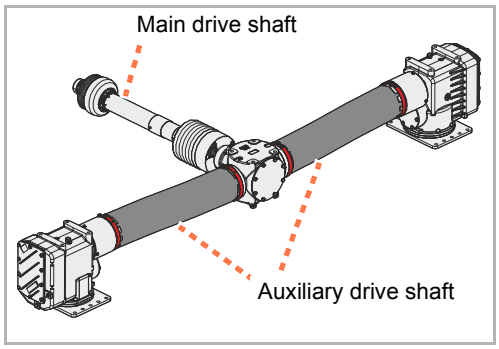
Every 50 hours of operation



There are four lubrication points on the Hydrolift.

- Lubricate the lubrication point

PTO shafts



The power harrow has three PTO shafts:

- A main drive shaft from the tractor to the main gear-box
- Two auxiliary drive shafts between the main gear-box and the gear-boxes on the side sections

Different types of maintenance work must be performed at various intervals for the PTO shafts. You must perform the following tasks on the PTO shafts:

- Greasing
- Lubrication

Main drive shaft

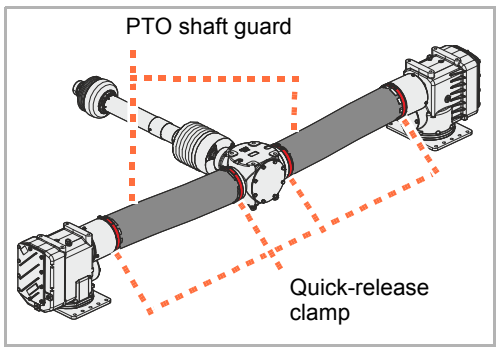
Daily

The maintenance work for the main drive shaft is described in the PTO shaft manufacturer's manual.

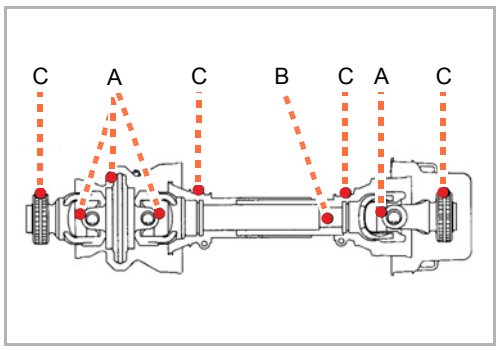
Auxiliary drive shaft

Daily

The maintenance work for the auxiliary drive shaft is described in the PTO shaft manufacturer's manual.



- Release the quick-release clamps
- Slide the PTO shaft guard to the side



- Lubricate or grease the various positions according to the information from the PTO shaft manufacturer or in the table below.

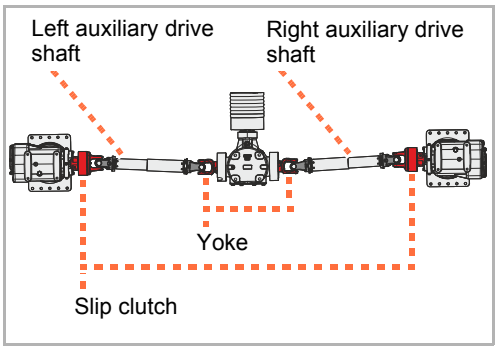
Position	Maintenance interval [h]	Greasing	Lubrication
A	8	X	
B	16		X
C	50	X	

- Close the PTO shaft guard again and secure with quick-release clamps
- Perform the same operation on both sides of the machine

Installing the auxiliary drive shafts in the prescribed positions
If the auxiliary drive shafts have been removed, they must be reinstalled in the prescribed positions.
Failure to observe results in increased wear or even in damage to the machine.

Installing the auxiliary drive shafts in the prescribed positions
If the auxiliary drive shafts have been removed, they must be reinstalled in their previous positions; the left auxiliary drive shaft on the left-hand side of the machine, and the right auxiliary drive shaft on the right-hand side of the machine.
Failure to observe results in increased wear or even in damage to the machine.

If the auxiliary drive shafts are removed for maintenance work, observe the following:



- Remove the auxiliary drive shafts and position them so that the assignment to the side of the machine remains identifiable.
- Carry out the work
- Reposition the auxiliary drive shafts on the corresponding side of the machine
- Attach the yokes to the main gear-box in the same position on both sides
- Attach the slip clutches to the gear-boxes on the side sections

Gear-box

Gear-box oil specifications

Only use the oils specified in the table.

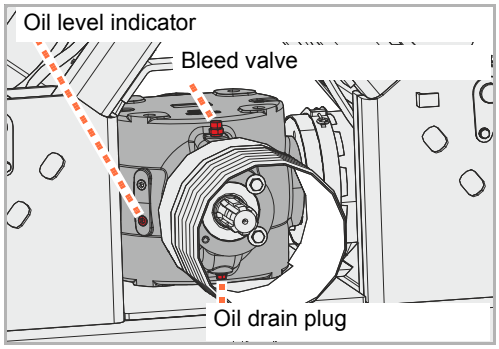
Gear-box	Oil type	Quantity
Main gear-box	Synthetic oil ISO VG 320 DIN 51502 PGLP	4,0 l
Gear-box on the side sections		2 x 12.0 l

Fill level

Main gear-box

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.

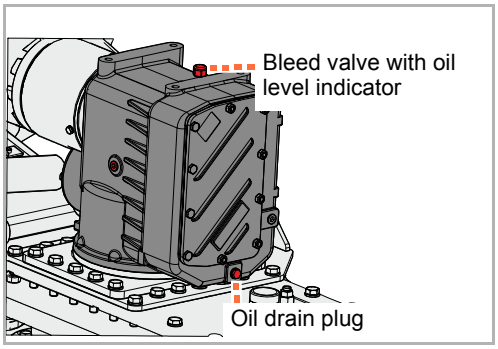


- Fold out the machine in its work position
- Park the machine on an even, horizontal surface, so that it is standing horizontally
- Switch off the tractor and secure it against rolling away
- Remove the oil level indicator
- Check the gear-box fill level. It must be at the lower edge of the opening
- If necessary, top up the transmission oil using a funnel
- Insert the oil level indicator
- Check the tightness of the oil level indicator after each maintenance

Gear-box on the side sections

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.



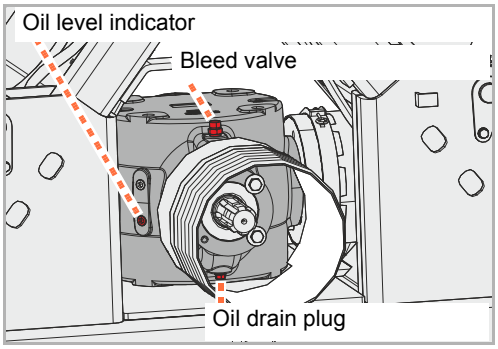
- Fold out the machine in its work position
- Park the machine on an even, horizontal surface, so that it is standing horizontally
- Switch off the tractor and secure it against rolling away
- Remove the oil level indicator
- Check the gear-box fill level. It must be at the top marking on the oil level indicator
- If necessary, top up the transmission oil using a funnel
- Insert the oil level indicator
- Check the tightness of the oil level indicator after each maintenance
- Perform the same operation on both sides of the machine

Oil change

Main gear-box

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 severe injuries.

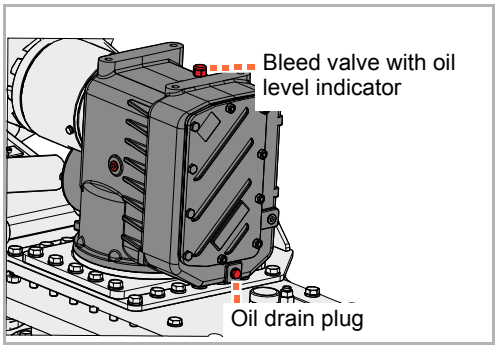


- Fold out the machine in its work position
- Park the machine on an even, horizontal surface, so that it is standing horizontally
- Switch off the tractor and secure it against rolling away
- Position an oil collection tray under the oil drain plug
- Remove the oil drain plug
- Remove the oil level indicator
- After draining the waste oil, insert the oil drain plug again
- Replenish with oil
- Check the gear-box fill level. It must be at the lower edge of the opening
- Insert the oil level indicator
- Check the tightness of the oil level indicator after each maintenance
- Dispose of waste oil properly

Gear-box on the side sections

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 severe injuries.



- Fold out the machine in its work position
- Park the machine on an even, horizontal surface, so that it is standing horizontally
- 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
- Replenish with 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
- Perform the same operation on both sides of the machine
- Dispose of waste oil properly

Trough

Gear-box grease specifications

Only use the greases specified in the table.

Model	Grease type	Quantity
4.00 m	Lithium grease SAE 140 EP NLGI00 G00K DIN 51826	2 x 14.0 kg
4.50 m		2 x 15.75 kg
5.00 m		2 x 17.5 kg
6.00 m		2 x 21.0 kg

Fill level

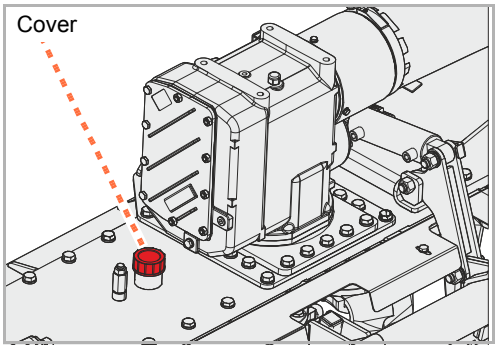
Once per season

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 severe injuries.

To check the trough's grease fill level, proceed as follows.

Prerequisite:

- Machine is folded out to the work position
- Operate the machine until the grease has warmed up and has distributed itself evenly throughout the trough.



- Park the machine on an even, horizontal surface, so that it is standing horizontally
- Switch off the tractor and secure it against rolling away
- Remove the cover on the filling port
- Check the 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

Operate the machine for a short time and then check again.

Other lubrication points

Generally:

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

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

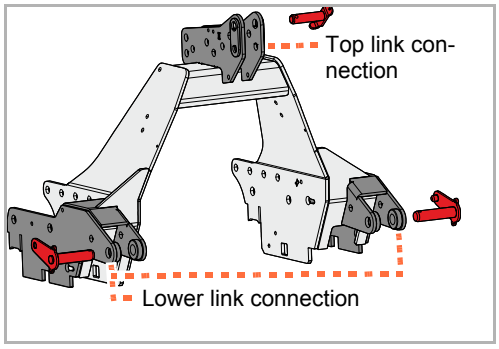
Pin connection to the tractor

Once per season

You must check all the pins and the holes for them in the pin connection to the tractor.

- The measurements must be within the specified range
- Worn parts must be replaced

	CAT 2N / CAT 2	CAT 3N / CAT 3	CAT 4N / CAT 4
Top link connection			
Pin diameter [mm]	25,37 - 25,50	31,55 - 31,75	44,20 - 45,00
Bore diameter [mm]	25,70 - 25,90	32,00 - 32,25	45,20 - 45,50
Lower link connection			
Pin diameter [mm]	27,80 - 28,00	36,4 - 36,60	49,70 - 50,80
Bore diameter [mm]	28,70 - 29,00	37,4 - 37,75	51,00 - 51,50



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

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 using suitable equipment to support the power harrow against dropping.
Failure to observe these instructions may result in serious or fatal injuries.

Replacing the tines

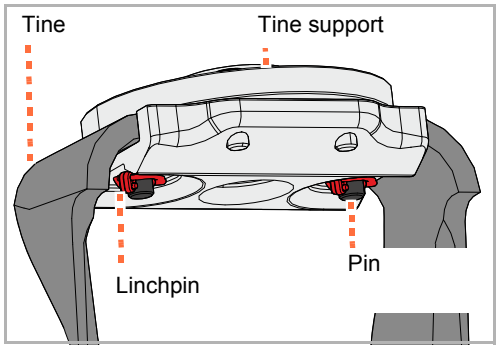
If required

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.
The uneven load on one of the tine supports could cause 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 results in increased wear to the tines or even in damage to the machine.



- Lift the machine
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Remove the linchpin
- Remove the pin
- Remove worn tines
- Insert new tines
- Insert the pin and secure with linchpin

Packer rollers



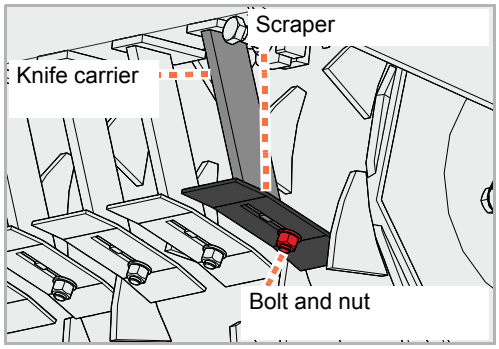
Support the machine
Do not perform any work under the power harrow without using suitable equipment to support the power harrow against dropping.
Failure to observe these instructions may result in serious or fatal injuries.

Toothed packer roller

During work, the scrapers continuously remove the soil that collects on the rollers and thus prevent deposits.
The scrapers wear down over time.

Setting the scrapers

After 50 hours of operation



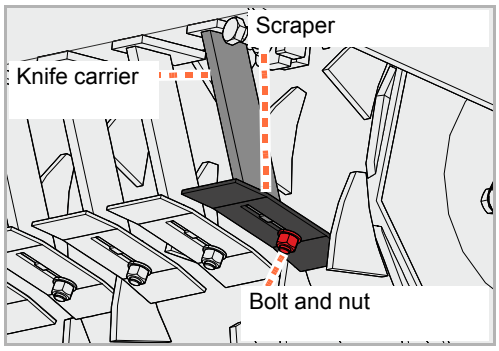
- Release the nuts on each individual scraper and push the scrapers up against the roller
- Re tighten the nut
- Adjust the scraper bar using the adjustment screw so that the scrapers are at a distance of 1 to 2 mm from the roller
- Tighten the nuts on both sides of the packer roller
- Tighten the lock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

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

Replacing the scrapers

In case of wear

The scrapers on the toothed packer roller are symmetrical. Therefore, the scrapers on the knife carrier can be rotated if one of the sides becomes worn.



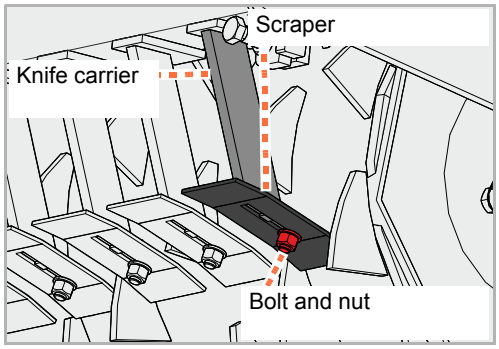
- Remove the nuts on each individual scraper and remove the scrapers
- Insert new scrapers and push against the roller
- Fit nuts and tighten firmly
- Adjust the scraper carrier using the adjustment screw so that the scrapers are at a distance of 1 to 2 mm from the roller
- Tighten the nuts on both sides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

Flexline roller

During work, the scrapers continuously remove the soil that collects on the rollers and thus prevent deposits.
The scrapers wear down over time.

Setting the scrapers

After 50 hours of operation



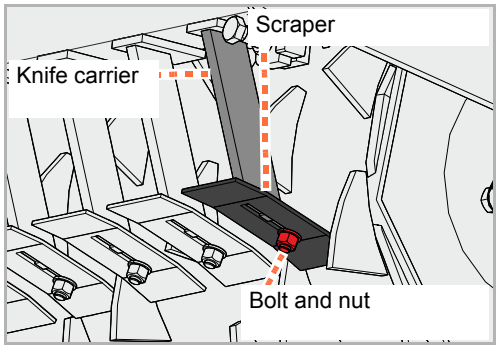
- Release the nuts on each individual scraper and push the scrapers up against the roller
- Re tighten the nut
- Adjust the scraper bar using the adjustment screw so that the scrapers are at a distance of 3 to 5 mm from the roller
- Tighten the nuts on both sides of the packer roller
- Tighten the lock 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 roller by hand. None of the scrapers should touch the roller

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

Replacing the scrapers

In case of wear

The scrapers on the toothed packer roller are symmetrical. Therefore, the scrapers on the knife carrier can be rotated if one of the sides becomes worn.



- Remove the nuts on each individual scraper and remove the scrapers
- Insert new scrapers and push against the roller
- Fit nuts and tighten firmly
- Adjust the scraper holder using the adjustment screw so that the scrapers are at a distance of 3 to 5 mm from the 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 roller by hand. None of the scrapers should touch the roller

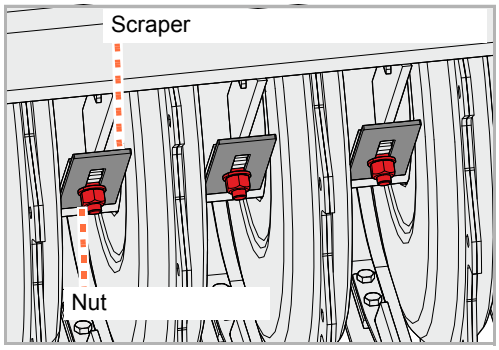
Actipack roller

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

The recommended distance is 10 mm.

Setting the scrapers

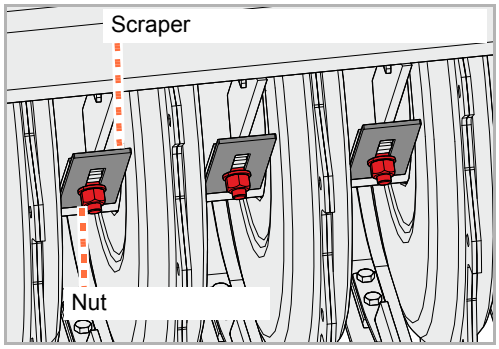
After 50 hours of operation



- Lift the machine
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Only release the nuts
- Setting the scraper
- Tighten the nut

Replacing the scrapers

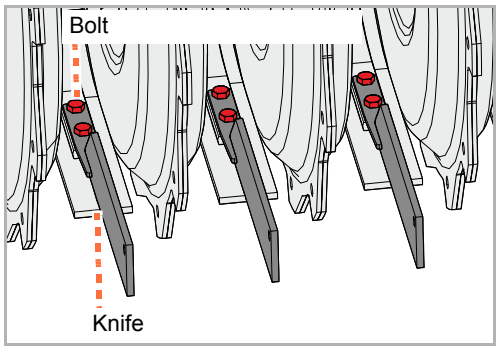
In case of wear



- Lift the machine
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Remove the nuts
- Remove the scrapers
- Install and adjust new scrapers
- Tighten the nut

Replacing the knife

In case of wear



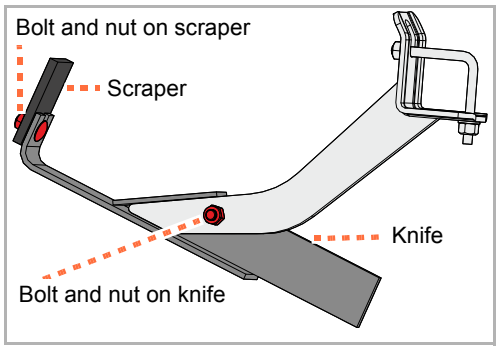
- Lift the machine
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Remove the bolts
- Remove the knife
- Install a new knife
- Tighten bolt

Cracker packer roller

During work, the scrapers continuously remove the soil that collects on the rollers and thus prevent deposits. The knives continuously comminute the soil
The scrapers and knives wear down over time.

Replacing the knife

In case of wear

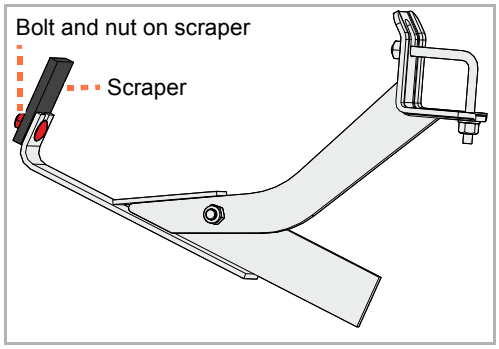


Make the same setting on both sides of the machine

- Lift the machine
- Use suitable equipment to secure the machine against accidental 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
- If required, align the scraper

Replacing the scrapers

In case of wear



Make the same setting on both sides of the machine

- Lift the machine
- Use suitable equipment to secure the machine against accidental 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

Track eradicator

Support the machine
Do not perform any work under the power harrow without using suitable equipment to support the power harrow against dropping.
Failure to observe these instructions may result in severe or fatal injuries.

Turn or replace the coulter tip

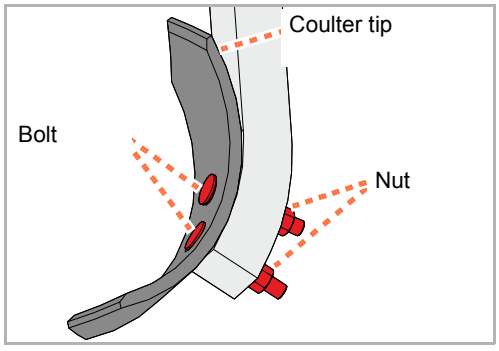
In case of wear

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

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.

Make the same setting on both sides of the machine

- Lift the machine
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Remove the nuts
- Remove the bolts
- Turn or replace the coulter tip
- Fit the bolt and secure with a nut

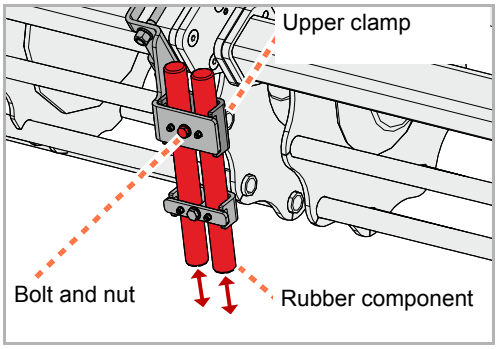


Levelling element in the centre

The levelling element in the centre of the machine levels the ground between the two packer rollers.
It should be adjusted so that the level is the same as that achieved after the packer rollers move over the ground.

Adjusting the rubber components

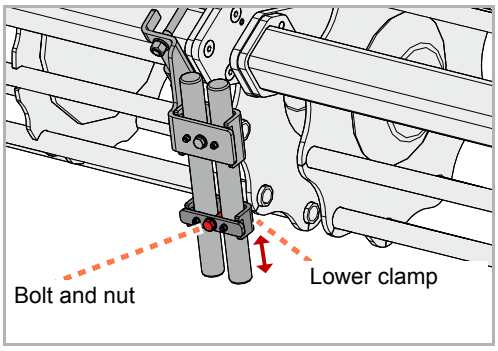
In case of wear



- Lift the machine into its transport position
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Undo the nuts and bolts on the upper clamp so that it is possible to move the rubber components
- Set the rubber components to the desired position
- Secure the bolts with nuts

The height of the lower clamp is adjusted to the rubber components in accordance with the following guide values:

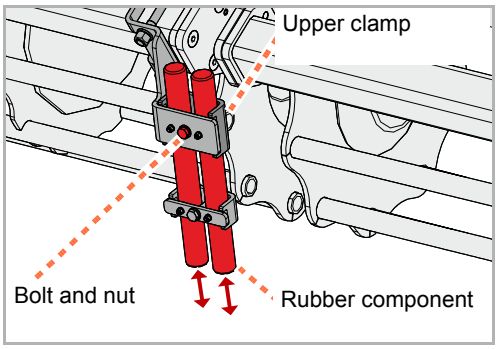
Light soil	In the upper area
Heavy soil	In the lower area



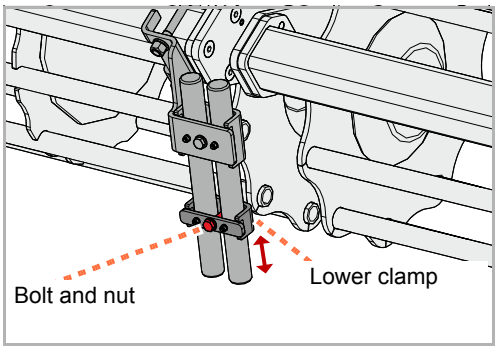
- Undo the nuts and bolts on the lower clamp so that it is possible to move it onto the rubber components
- Set the lower clamp to the desired position
- Secure the bolts with nuts

Replacing the rubber components

In case of wear



- Lift the machine into its transport position
- Use suitable equipment to secure the machine against accidental lowering or dropping
- Switch off the tractor and secure it against rolling away
- Undo the nuts and bolts on the upper clamp so that it is possible to remove the rubber components
- Replace the rubber components
- Set the rubber components to the desired position
- Secure the bolts with nuts



- Undo the nuts and bolts on the lower clamp on the worn rubber components so that it is possible to remove the bottom clamp
- Attach the lower clamp to new rubber components

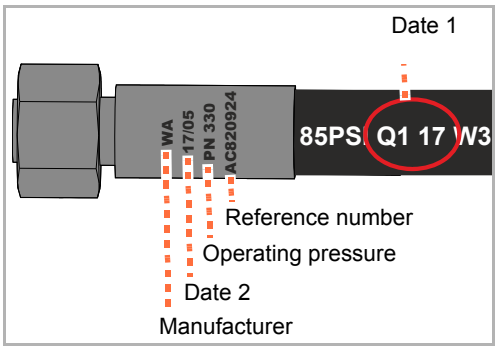
The height of the lower clamp is adjusted to the rubber components in accordance with the following guide values:

Light soil	In the upper area
Heavy soil	In the lower area

- Set the lower clamp to the desired position
- Secure the bolts with nuts

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 hydraulic hoses

Every 6 years or if required

All pressure must be released from the hoses. Only use hydraulic hoses with the same specification. The hydraulic hoses within the frame must only be replaced in a specialist workshop.

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

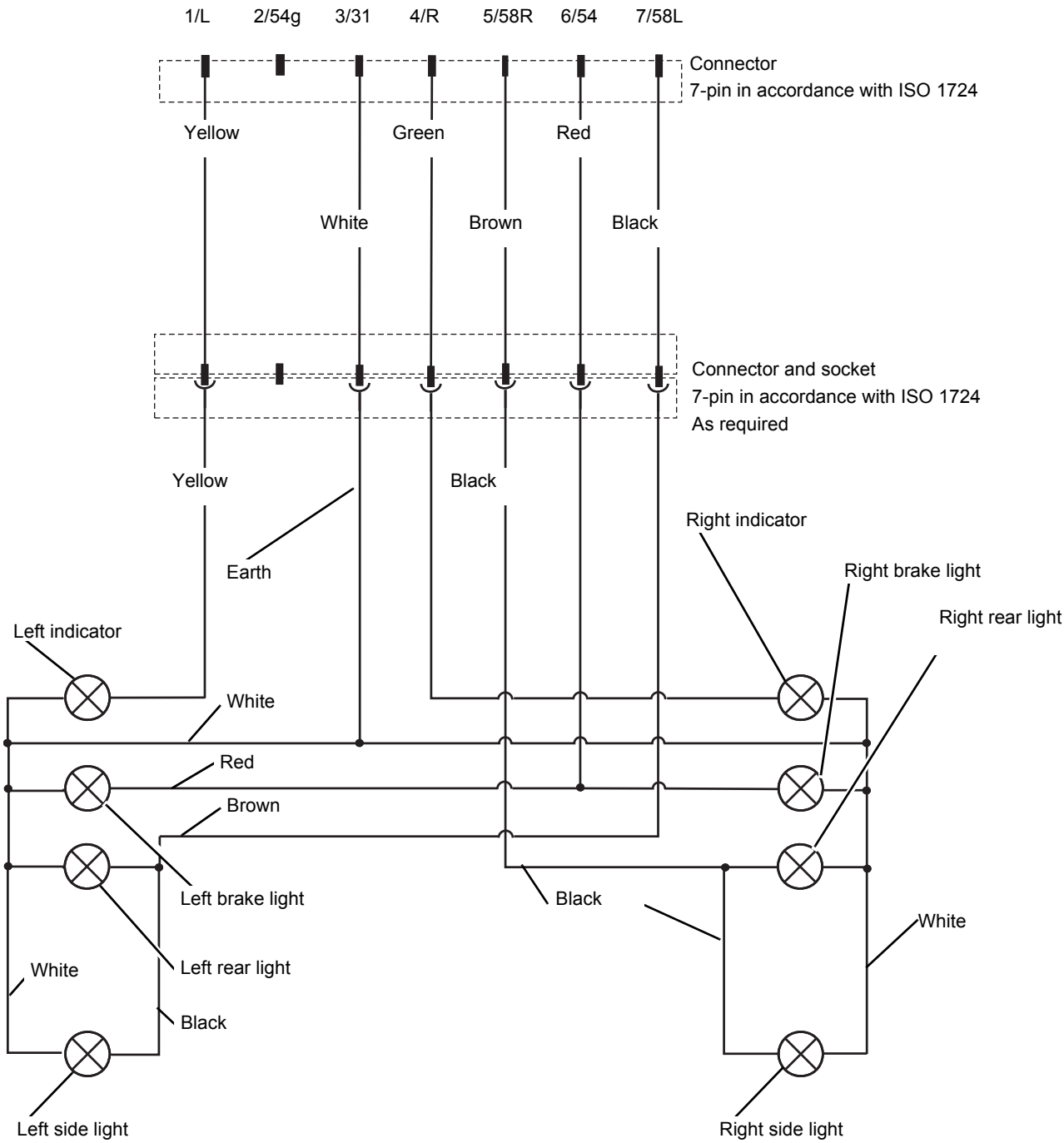
- Are the hydraulic hoses properly connected?
- Is the control unit at the tractor defective?
  If so, contact your dealer.
- Is the hydraulic pump of the tractor defective?
  If so, contact your dealer.

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
	Universal joint bearing 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
Breakage or bending of the auxiliary drive shaft	Overload	Avoid overload and switching on the machine under load Functional test of the overload clutch
	Incorrect assembly after maintenance	Auxiliary drive shafts installed in the correct position
	Lack of maintenance	Grease the sliding parts
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 range

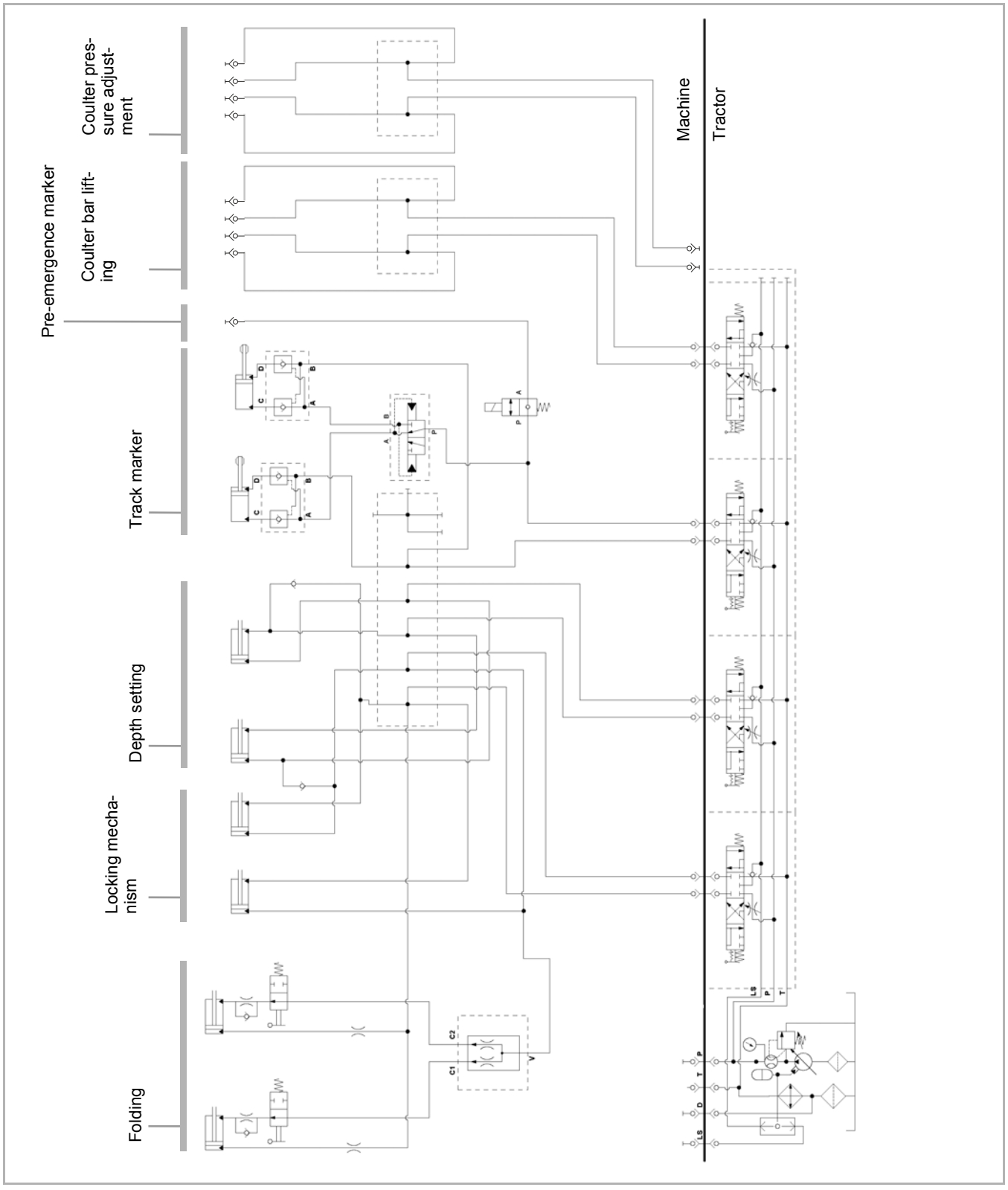
Fault	Cause	Remedy
Leakage of grease at the tine supports	Damage to seals by foreign bodies	Replace the damaged seals
Dam formation at device sides	Damage to side plates during use	Align or replace the damaged parts
Dam formation in the centre of the device	Levelling element not set correctly	Adjust the levelling element
	Levelling element worn	Adjust or replace the levelling element
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	Setting the scraper
	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	Correctly set the working depth
	Dam formation	Correctly set the working depth
Packer roller blocked	Inadequate lubrication of the bearing	Lubricate bearings
	Bearings are worn	Replace the bearings
	The packer roller or bearings have deformed	Replace the roller or bearings

Circuit diagram of lighting equipment

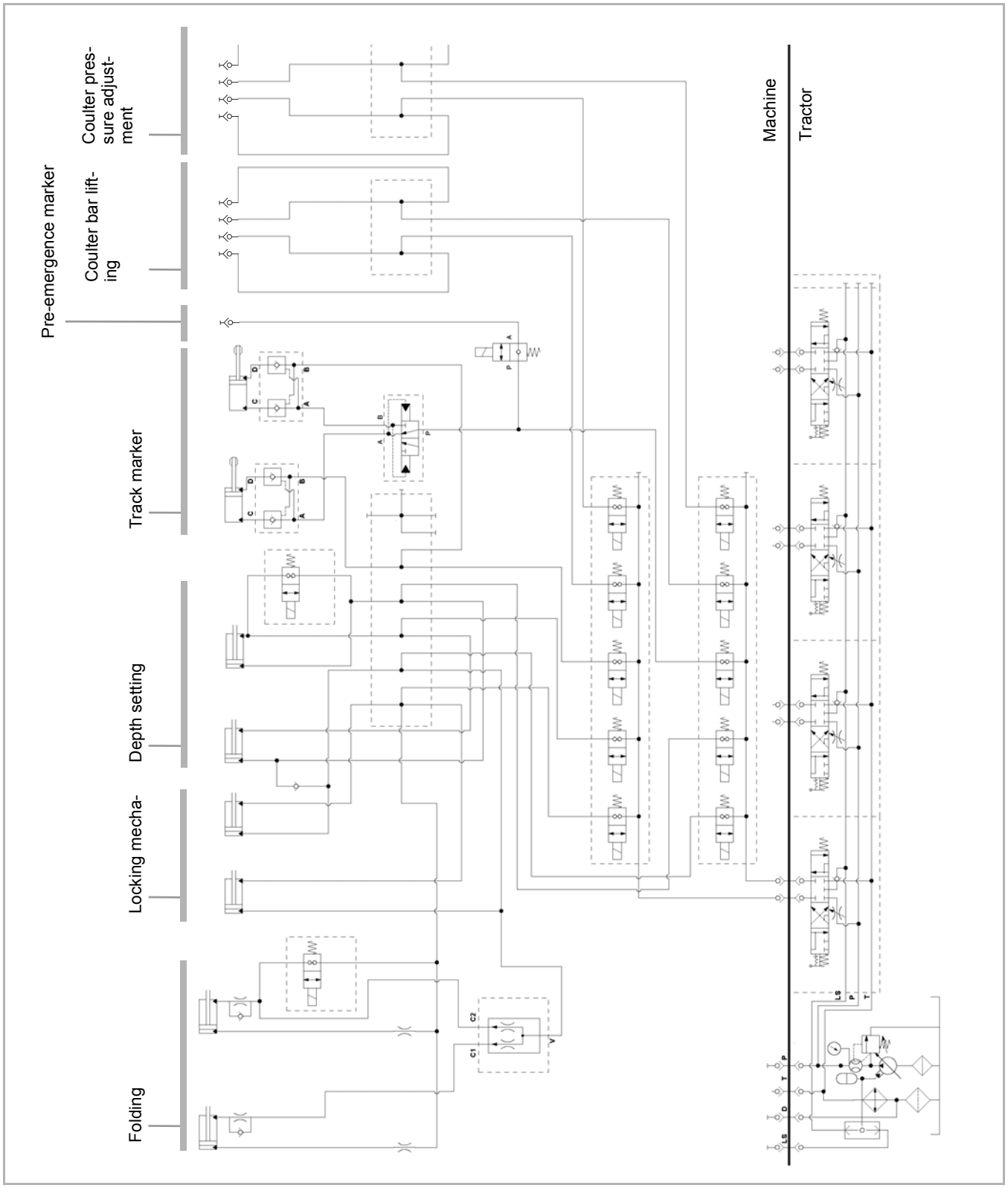


Hydraulics circuit diagram

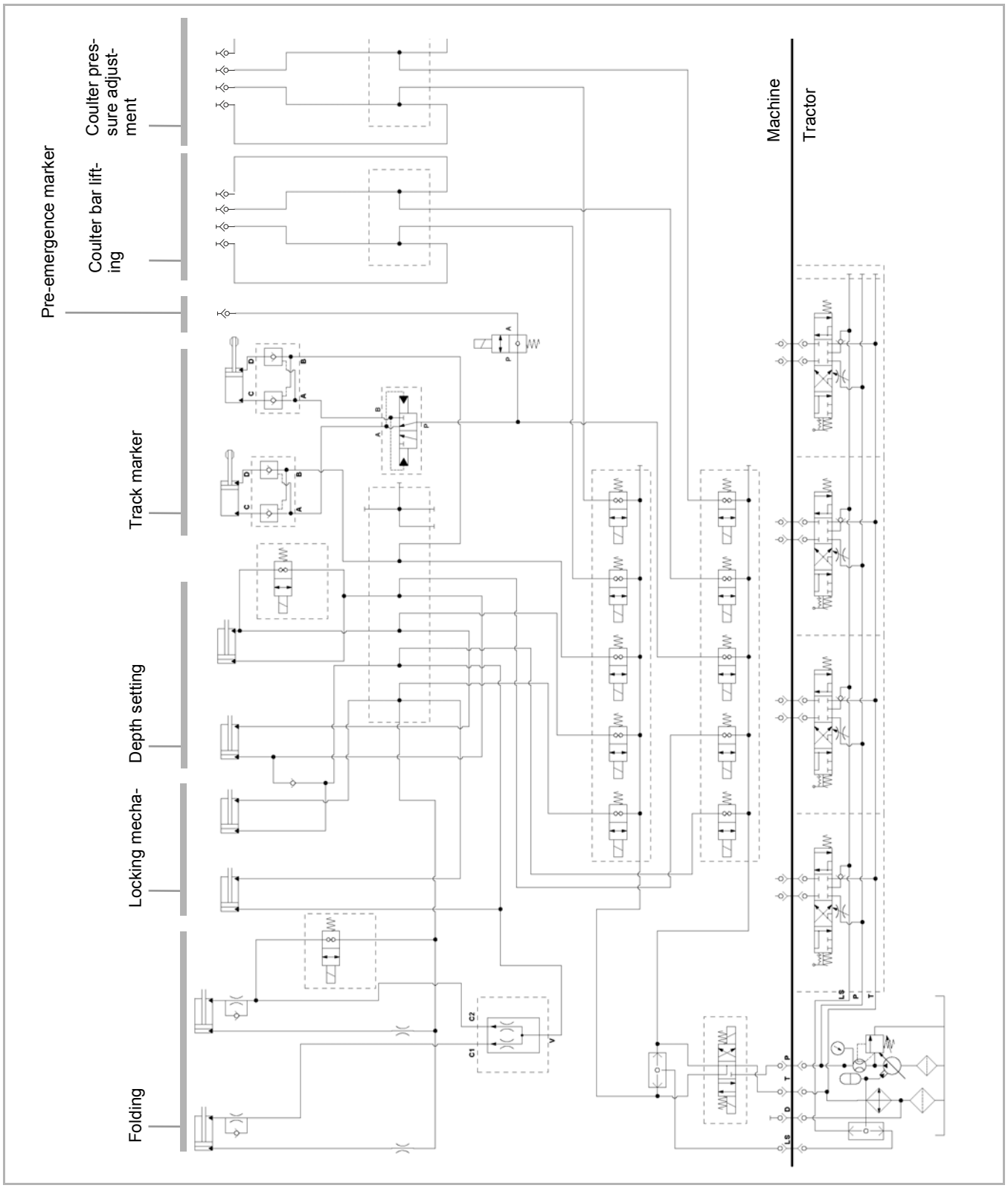
Standard hydraulic system



Hydraulic system with control panel [+]



Hydraulic system with control panel and load-sensing valve [+]



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

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

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

Tyres
Tyres can be sent to tyre recycling facilities.

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

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

The EC Conformity Declaration

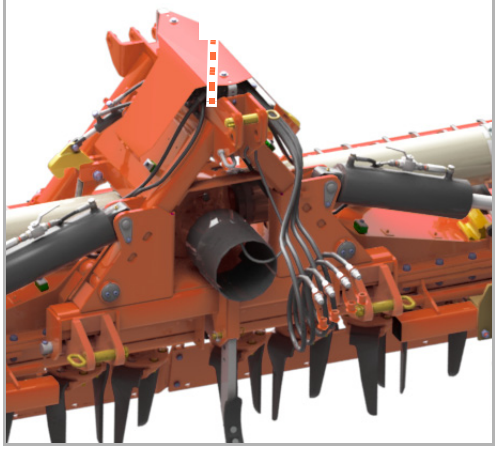
Conforms to EC directive 2006/42/EC

We

Kverneland Group Soest GmbH
Coesterweg 42
D-59494 Soest
Germany

declare with sole responsibility that the product

Type plate and CE symbol



Series PH2000F
in all equipment variants
and its accessories

Type:

Valid from machine number
ACKPHxx257

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

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

- ISO 12100:2010
- ISO 4254-1:2013
- ISO 4254-5:2010

Kverneland Group Soest GmbH
Soest, 11.11.2016

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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