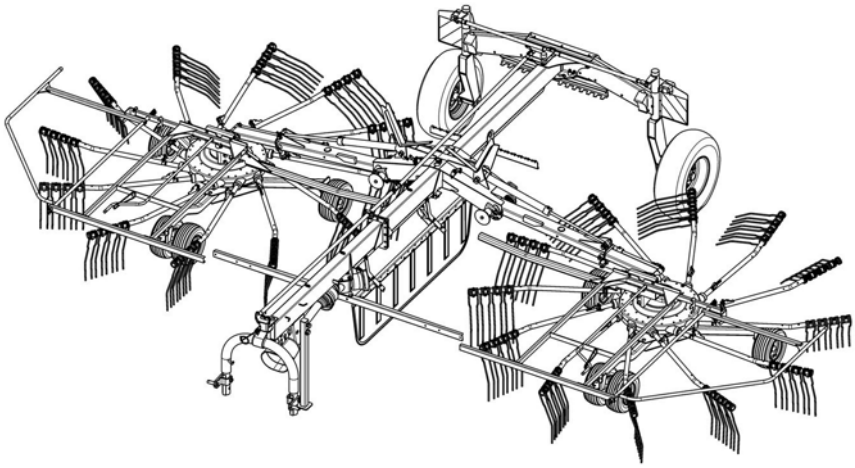


RA2584

WARNING: Cancer and Reproductive Harm - www.P65Warnings.ca.gov

Operator's manual

Original operator's manual

Edition	03.2014
Date of print	06.2020
Language	EN-US
Machine number	VF65882401 –
Model	VF6588
Document number	VF16662024.EN

Machine identification

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

Designation	RA2584
Working width	7.60 m - 8.40 m 24.95 ft - 27.55 ft
Weight	1950 kg 4300 lbs
Machine number	VF6588 _ _ _ _
Accessories	
Address of supplier	
Address of manufacturer	Kverneland Group Kerteminde AS Taarupstrandvej 25 DK-5300 Kerteminde Denmark Tel: +45 65 19 19 00

Table of contents

Target group for this operator's manual

WARNING

Simplified illustrations for better understanding
Illustrations of the machine in the operator's manual are shown without protective equipment – or with the protective equipment open – for better understanding. Be sure to observe the safety information and follow the handling instructions in the operator's manual. Otherwise, serious or fatal injury may be caused as a result.

This operator's manual is intended for trained agriculturists and persons who are otherwise qualified for agricultural activities and have received instruction in working with this machine.

Minimum age

Children under the age of 16 are not permitted to operate the machine.

For your safety

You must familiarise yourself with the contents of this operator's manual before assembly or initial operation of the machine. In this way, you will achieve optimum work results and operational safety.
The operator's manual forms an integral part of the machine and must always be kept at hand. This will ensure that you:

- avoid accidents.
- comply with warranty conditions.
- have a fully functional machine in good working order at all times.

Demonstration and training

Your dealer will provide instruction on operation and care of the machine.

Information for the employer
All personnel are to be regularly, but at least once a year, instructed on the use of the machine, in acropeance with the regulations of the national organisation for Health and Safety at Work. Untrained or unauthorised persons are not permitted to use the machine.

You are responsible for ensuring that the machine is operated and maintained safely. Make sure that you and all other persons that operate, maintain or work in close proximity with the machine are familiar with the operating and maintenance regulations, as well as the corresponding safety instructions in this operator's manual.

Symbols used

In this operator's manual , the following symbols and terms have been used:

- A bullet point accompanies each item in a list.

▸ A triangle indicates operating functions which must be performed.

→ An arrow indicates a cross-reference to other sections of this manual.

[+] A plus sign indicates additional equipment which is not included in the standard version.

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

The "Information" pictogram indicates tips and additional information.

The "Examples" pictogram indicates examples that assist understanding of the instructions.

The spanner indicates tips for assembly or adjustment work.

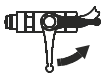
This arrow in the diagram shows the direction of travel.

The brush indicates the points that must be lubricated using the brush.

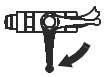
The grease gun indicates the points that must be lubricated using the grease gun.

▸ Switch on the tractor.

▸ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.



Open the ball valve.



Close the ball valve.

California Proposition 65

WARNING

Engine exhaust, some of its constituents, certain machine components and fluids, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

For your safety

Know your equipment and it's limitations. Read this entire manual before attempting start and operate the units.

This chapter contains general safety instructions. Each chapter of the operator's manual contains additional specific safety information which is not described here. Observe the safety information:

- in the interest of your own safety.
- in the interest of the safety of others.
- to ensure the safety of the machine.

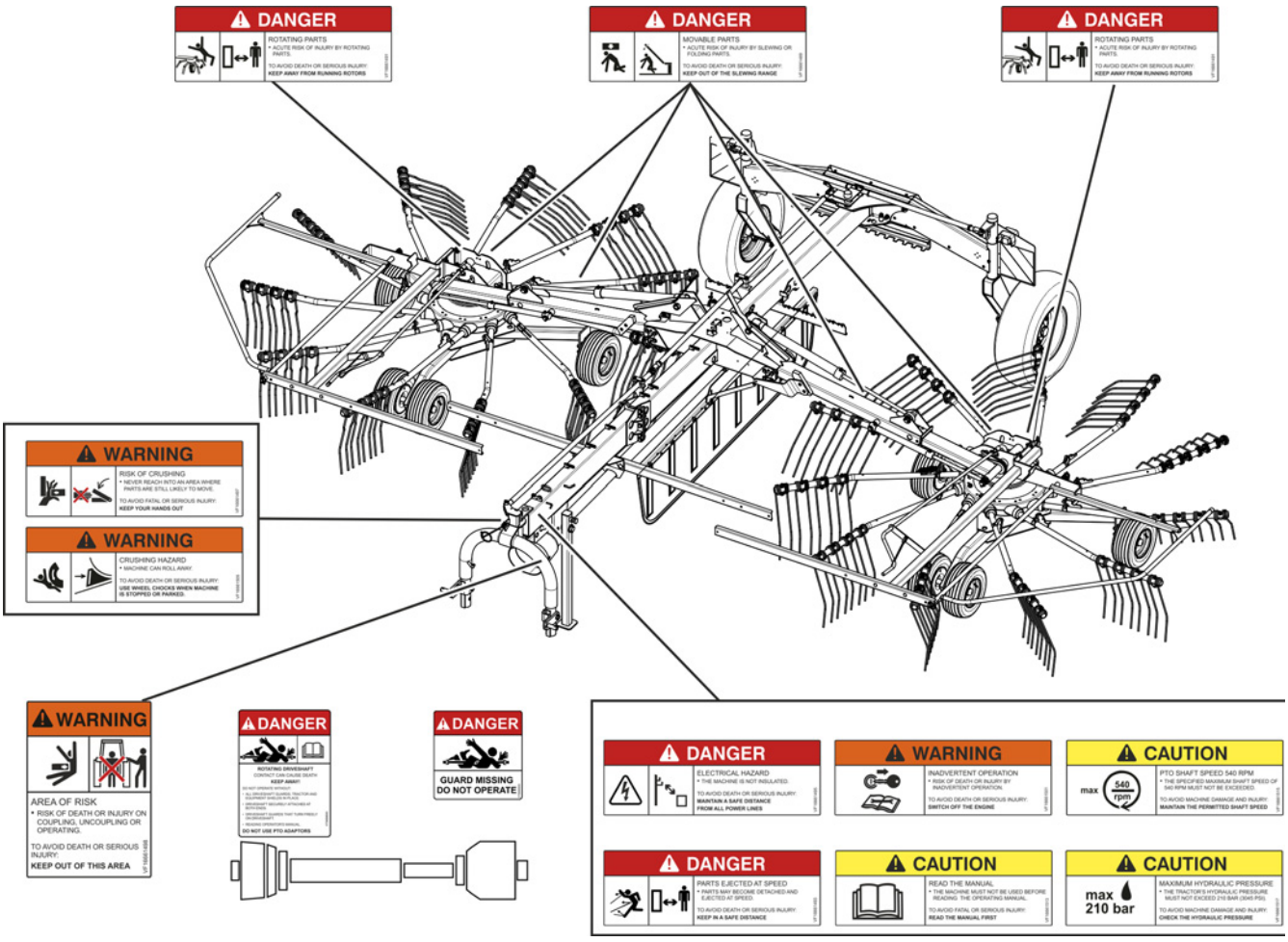
Numerous risks can result from handling agricultural machinery in the wrong way. Therefore, always work with particular care and never under time pressure.

Information for the employer
Inform all persons who work with the machine about this safety information at regular intervals and in acropeance with statutory regulations.

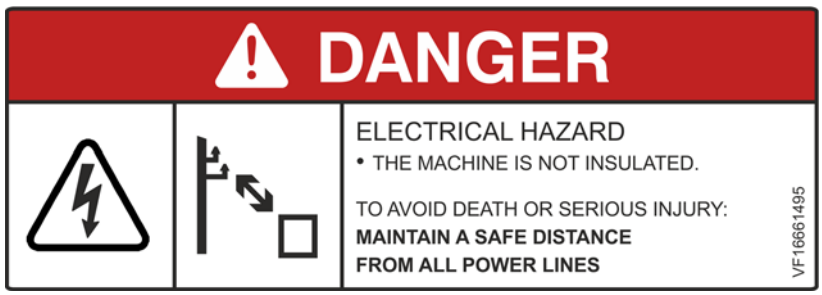
DANGER, WARNING and CAUTION labels

Safety-related labels attached to the machine indicate potential hazards. The labels must not be removed. Illegible or missing labels should be replaced. You can obtain new labels as spare parts from your dealer.

DANGER, WARNING and CAUTION labels on the machine

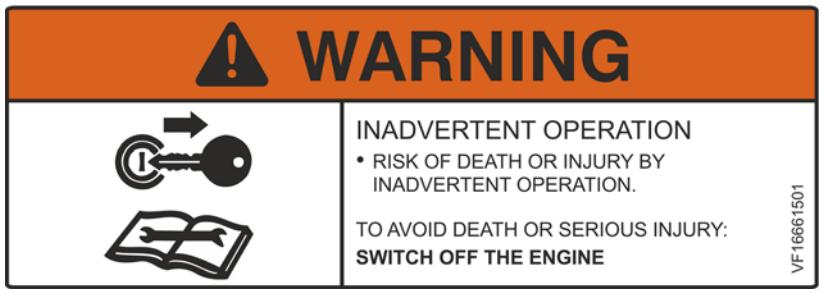


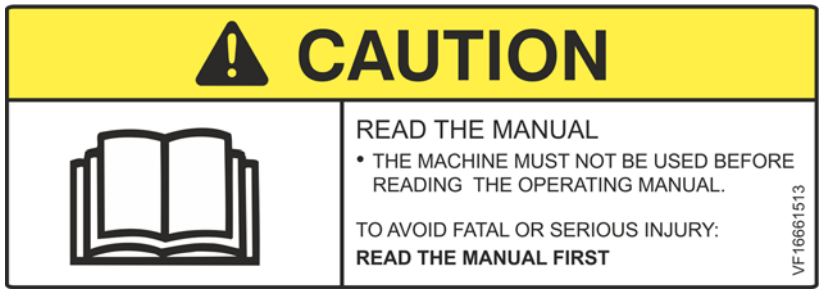
Meaning of DANGER, WARNING and CAUTION labels

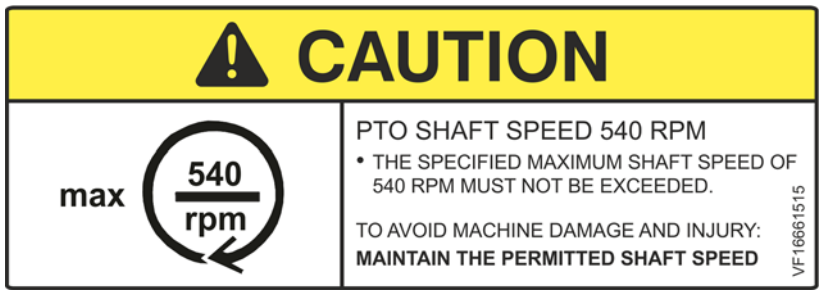


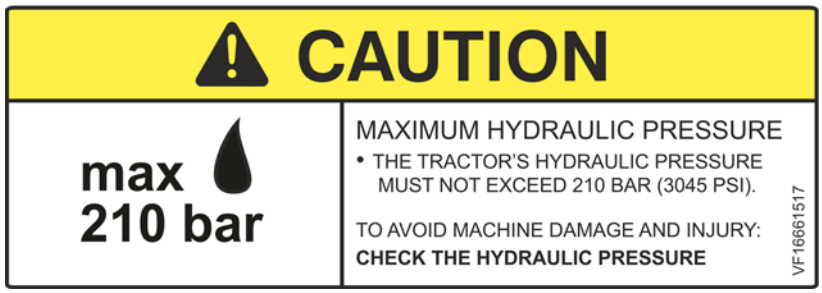
Outer tube.

Inner tube.









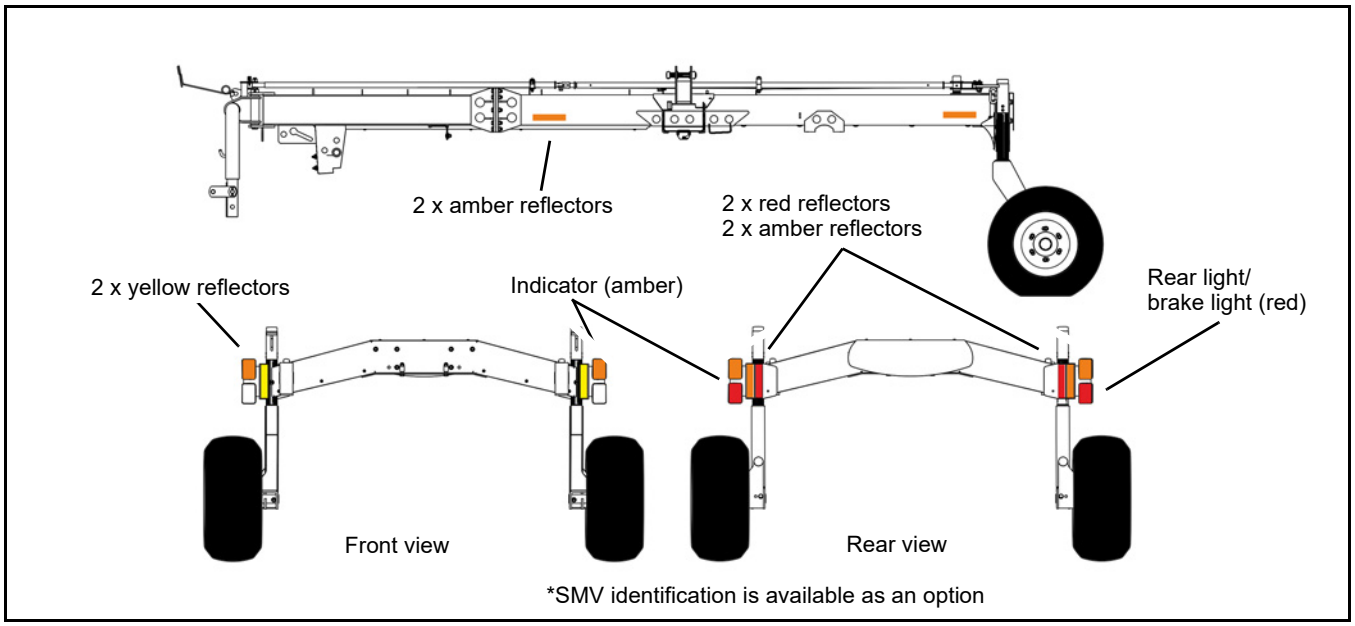
Lubrication points
Lubrication points are marked with an information label. Lubricate the machine in acropeance with the instructions in the "Maintenance" chapter.

Signalling equipment – USA

On the machine there are signalling equipment, signs and stickers that serve to ensure safety in road traffic. The signalling equipment must be in good working order at all times. The signs and stickers must not be removed. Illegible or missing labels should be replaced. You can obtain new labels as spare parts from your dealer.

If the implement, in the transport position, obscures the effective illumination of any flashing, extremity, tail or stop lamp on the tractor, the implement must be fitted with lighting appropriate to take the place of the lamp(s) obscured. See your authorized dealer for an appropriate lighting kit.

Signalling equipment



*SMV identification is available as an option

Signs

Additional markings are required for road transport in some U.S. states and some Canadian provinces:

Marking for slow-moving vehicle – SMV
This SMV emblem shall be used on all slow moving machines when operated or traveling on public roads.

- On slow moving machines with design specifications of a maximum speed of 40 km/h (25 mph) or less, the SMV emblem shall be used.
- On slow moving machines with design specifications of speed greater than 40 km/h (25 mph) but not exceeding 65 km/h (40 mph):
  - a SMV emblem shall be used and
  - a Speed Identification Symbol (SIS) shall be used.

Marking for maximum speed
(Speed identification symbol – SIS)
The scope of this standard is primarily directed to identifying agricultural equipment that have been designed in their original equipment configuration for specified ground speeds greater than 40 km/h (25 mph) but under 65 km/h (40 mph).

Who is allowed to operate the machine?

Qualified machine operators
Only qualified persons who have been informed of the dangers associated with handling the machine are permitted to operate, service or repair the machine. The necessary knowledge can be gained in the course of agricultural vocational training, professional training or intensive instruction.

General safety information

WARNING

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

Switch off the tractor and secure it
Before you dismount:

- Disengage the PTO
- Lower all implements to the ground
- Place all controls in their neutral or park position
- Set the parking brake
- Switch off the tractor.
- Remove the ignition key.
- Secure the tractor against rolling away.

An unsecured tractor can run you over or trap you. Otherwise, serious or fatal injury may be caused as a result.

Operate for the first time only after proper training
The machine may only be put into operation after proper training has been provided by an authorized dealer. 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 read and understand the manual and 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.
- Rectify the malfunction immediately yourself if qualified to do so,
- or seek the assistance of an authorized dealer.

Operating a faulty machine can cause accidents or damage.

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.

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

Switch off the tractor PTO shaft drive
Switch off the PTO shaft drive on the tractor when changing from work to transport position (and vice versa). Wait for moving parts to come to a stop. If this requirement is ignored, the consequence may be damage to the machine and even life-threatening injuries.

No reversing while the drive is running
Never drive in reverse with the PTO shaft drive switched on and in the work position if people could enter the working area of the machine. Switch off the PTO shaft drive. Rotating, unprotected parts can damage the machine and cause life-threatening injuries.

Specified workwear
Do not wear loose fitting or other inappropriate clothing. Loose fitting items of clothing may become caught in rotating parts. Wear workwear and protective clothing, request for the operating, environment and conditions. Serious or fatal injury may be caused if these guidelines are not followed.

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

Safety for children
Never assume that children will remain where you last saw them. Be alert and shut your machine down if children into the work area. Never allow children to play on or operate the machine.

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

PTO shaft
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 machine and the tractor. Unguarded PTO shafts can cause life-threatening injuries.

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. Otherwise, damage to the machine and serious or fatal injury may be caused as a result.

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

PTO shaft speed 540 rpm
The specified maximum PTO shaft speed of 540 rpm must not be exceeded. A higher PTO shaft speed will damage the machine.

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 time. resulting in accidents or damage.

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

Checking the angle of lock
On machines with attachment carriers, an angle of lock of 90° is possible. This angle must not be exceeded. Otherwise, the PTO shaft may be damaged.

Coupling

Increased risk of injury
When the machine is being coupled to the tractor, there is an increased risk of injury. Therefore:

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Never stand between the tractor and machine.
- Lock the PTO shaft securely on the PTO stub shafts of the tractor and the machine.

If this requirement is ignored, the consequence may be life-threatening injuries or damage to the machine.

Attaching electrical connections after assembly
The electrical supply to the tractor must not be connected when the lighting equipment is being fitted. Otherwise, short circuits will occur and the electronic system will be damaged.

Observe the operator’s manual of the PTO shaft manufacturer
Observe the operator’s manual of the PTO shaft manufacturer. It will provide you with instructions on how to handle the PTO shaft correctly. If these instructions are ignored, damage may be caused to the PTO shaft and machine.

Risk of tipping
When the machine is coupled to tractors with lower link quick-release couplings, the latter must be secured against unintentional opening. If the quick-release couplings open unintentionally, the tractor and machine may tip over. If this requirement is ignored, the consequence may be damage to the machine and even life-threatening injuries. Also follow the instructions in your tractor's operator’s manual.

Hydraulics

Hydraulic connection at zero pressure only
Only connect hydraulic hoses to the tractor hydraulic system if the tractor and machine hydraulic system is at zero pressure. A pressurised hydraulic system can trigger unforeseen movements on the machine and can cause serious machine damage and personal injury. Serious or fatal injury may be caused as a result.

High pressures in the hydraulic system
The hydraulic system is under high pressure. Regularly check all lines, hoses, and screwed connections for leaks and externally visible damage. Do not use hands to search for suspected leaks. Only use suitable equipment when looking for leaks. Rectify any damage immediately. Fluid escaping under pressure can penetrate skin may result in injuries and fires. Seek medical attention immediately if injuries occur.

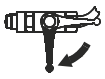
Replace hydraulic hoses every six years or earlier
Hydraulic hoses age without showing externally visible signs. Replace hydraulic hoses every six years, or earlier if aging or degradation is visible. Defective hydraulic lines can cause serious or fatal injuries.

Road transport

Ensuring road safety
The machine must conform to current national traffic regulations if you intend to drive it on public roads. Ensure the following:

- Lighting, warning and protective equipment must be fitted.
- The permissible transport widths and weights, axle loads, tire load-bearing capacities, laden weights and national speed restrictions must be observed.
- The maximum permissible road transport speed must be complied with, but not exceed 40 km/h (25 mph).
- Before driving on public roads, fully fold in all guard bars and secure the machine. All tine supports which have tips that point at right angles to the direction of travel must be removed.
- The machine should only be towed by agricultural or forestry tractors.

The empty weight of the tractor must be greater than the weight of the machine. The driver and keeper of the vehicle are liable should these conditions not be observed.



Close the ball valve
Close the ball valve before driving on the road. If the ball valve is open and there is an operating error, the machine may drop or swing out unexpectedly. This could cause traffic accidents and accidents with fatal consequences.

Check tire pressures
Check tire pressure on a regular basis. Incorrect tire pressures reduce the service life of a tire and cause unstable driving characteristics. Accidents with serious or fatal injuries may be caused as a result.

Altered driving and braking performance
Driving and braking performance are altered when the machine is coupled or hitched to the tractor. When cornering, take the overall width and balancing weight of the machine into consideration. Adjust your driving speed acropeingly. A driving style which is not adapted to conditions can cause accidents. Accidents with serious or fatal injuries may be caused as a result.

Speed adjustment
In poor road conditions and at high speeds, significant forces can be generated which subject the tractor and machine material to high or excessive stresses. Adjust your driving speed to the road conditions. A driving style which is not adapted to conditions can cause accidents. Accidents with serious or fatal injuries may be caused as a result.

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

Check release rope on quick release couplings
Release rope must hang loose and must not allow a release in their lowered position. Hitched machines may otherwise detach themselves from the lower link hitching system of their own acrope. Accidents with serious or fatal injuries may be caused as a result.

Operation

Ensure that the machine is in proper working condition
Do not operate the machine unless it is in proper working condition. Check all key components and their correct operation before use. Replace defective components. Defective components can cause material damage and personal injury.

Check the protective equipment
The protective equipment must not be removed or by-passed. Check all protective equipment before using the machine. Unprotected machine parts can cause serious or fatal injury.

Check the immediate vicinity
Check the area immediately surrounding the machine before driving off, and continually during operation. Make sure that you have an adequate view. Only begin work when the immediate vicinity is cleared of any persons or objects. Serious or fatal injury may be caused as a result.

Retighten all nuts, bolts and screws
Regularly check that nuts and bolts are correctly tightened. Retighten bolts if necessary. Nuts and bolts can work loose through machine use. The machine may be damaged or accidents caused as a result.
→ See »Tightening screws«, page 87 for proper torque values.

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

Cornering and turning manoeuvres
Centrifugal forces are in operation 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
There is an increased risk of injury when uncoupling the machine from the tractor. Therefore:

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Never stand between the tractor and machine.
- Set the machine down on firm, secure and level ground.
- Ensure that the parking stand is securely locked.
- Place the PTO shaft in the holder provided.
- Secure the machine against rolling away (use wheel chocks).
- Do not disconnect hydraulic hoses until there is no pressure in the tractor and machine hydraulic system.
- Disconnect all electrical connections.

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

Care and maintenance

Observe the care and maintenance intervals
Observe the periods specified in the operator's manual for recurrent checks and inspections. If these periods are not observed, damage to the machine and accidents may be caused as a result.

Use original parts
Many components have special properties that are essential for the stability and correct operation of the machine. Only spare parts and accessories supplied by the manufacturer have been tested and approved. Other products may adversely affect the correct operation of the machine and safety. Using non-OEM replacement parts renders the manufacturer's guarantee null and void and frees the manufacturer from all liability.

When performing care and maintenance work:

- Switch off the PTO shaft drive.
- Depressurise the hydraulic system.
- Whenever possible, uncouple the tractor.
- Place all controls in neutral or park.
- Set tractor parking brake.

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Ensure the machine is standing on firm, secure and level ground, and provide additional support, if necessary.
- Secure the machine against rolling away (use wheel chocks).

Only if these regulations are observed can safe working be ensured during care and maintenance work.

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

Caution when cleaning with a high-pressure cleaner
Exercise caution when cleaning with a high-pressure cleaner. Bearings, seals and pipe unions are not waterproof. In order to prevent damage to the machine, the bearings, seals and pipe unions must not be exposed to direct contact with the high pressure water jet.

No aggressive washing additives
Do not use any aggressive washing additives for cleaning. Uncoated metal surfaces can be damaged.

Before carrying out welding work
Disconnect all electrical connections from the tractor when carrying out welding on the hitched machine. Damage may otherwise be caused to the electrical system.

Retighten all nuts, bolts and screws
All screwed/bolted connections that are loosened during maintenance and repair operations must be retightened. Serious injury and damage to property can be caused by loose pin and screw connections.
→ See »Tightening screws«, page 87 for proper torque values.

Further regulations

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

- Accident prevention regulations in your local area.
- Generally recognised safety regulations, occupational health requirements and road traffic regulations.
- The instructions provided in this operator’s manual.
- Standards relating to operation, maintenance and repair.

Warranty

The warranty and manufacturer's liability will no longer be valid if the instructions provided in the chapter on Safety are not observed, if maintenance is inadequate or faulty, if the machine is used for purposes other than those for which it was intended and if it is over-stressed, or if impermissible modifications are made to the machine.
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Range of application

The machine is a twin rotor rake, which is suitable only for the raking together of mown, stalked material (for example, hay or straw).

Proper use

Any other use, for example, for silo distribution, any form of soil preparation, road sweeping or for the transmission of power to other machines, is not permitted. The manufacturer and dealers are not liable for damage caused by improper use. The risk is borne solely by the user.

Features

Flexible in operation
This twin rotor rake, which has a working width of approximately 8.40 metres (27.6 ft), meets all the requirements of modern crop harvesting engineering. All the important functions for field use are controlled during operation. The following functions can be set:

- Deposit of crop in single rotor operation via the hydraulic single lift.
- Individual working depth of both rotors.
- Swath width.

The rake can be pulled by tractors of 40 kW (56 hp) or more.

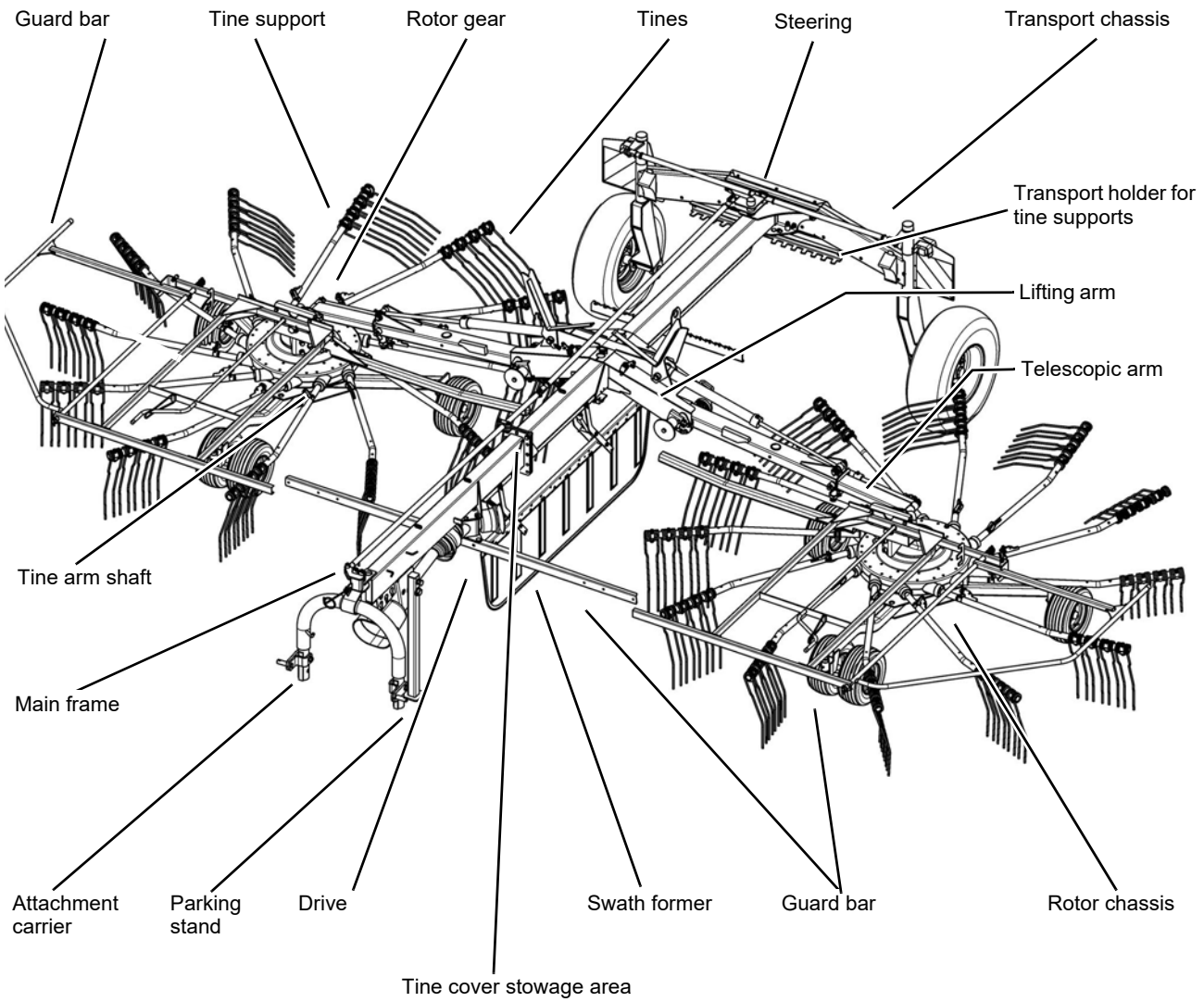
Extensive equipment
The machine is equipped with low-maintenance gearboxes and 11 arms on each rotor. The offset tines provide excellent raking quality.

The “TerraLink” support ensures outstanding adjustment to the contours of the land.

The swath former swivels into the selected transport or work position.

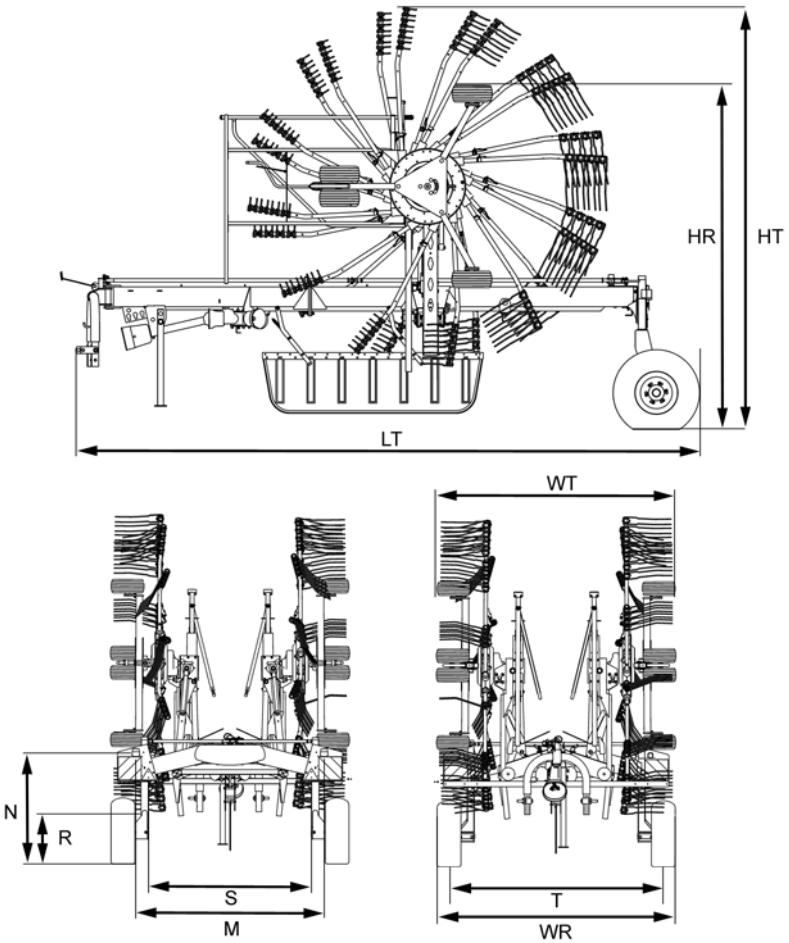
Easy changeover from work to transport position
The rake is easily changed over from the work to the transport position. Hydraulic cylinders lift the rotors into the transport position to maintain the transport width of less than 2.80 m (9.20 ft).

Designation of components

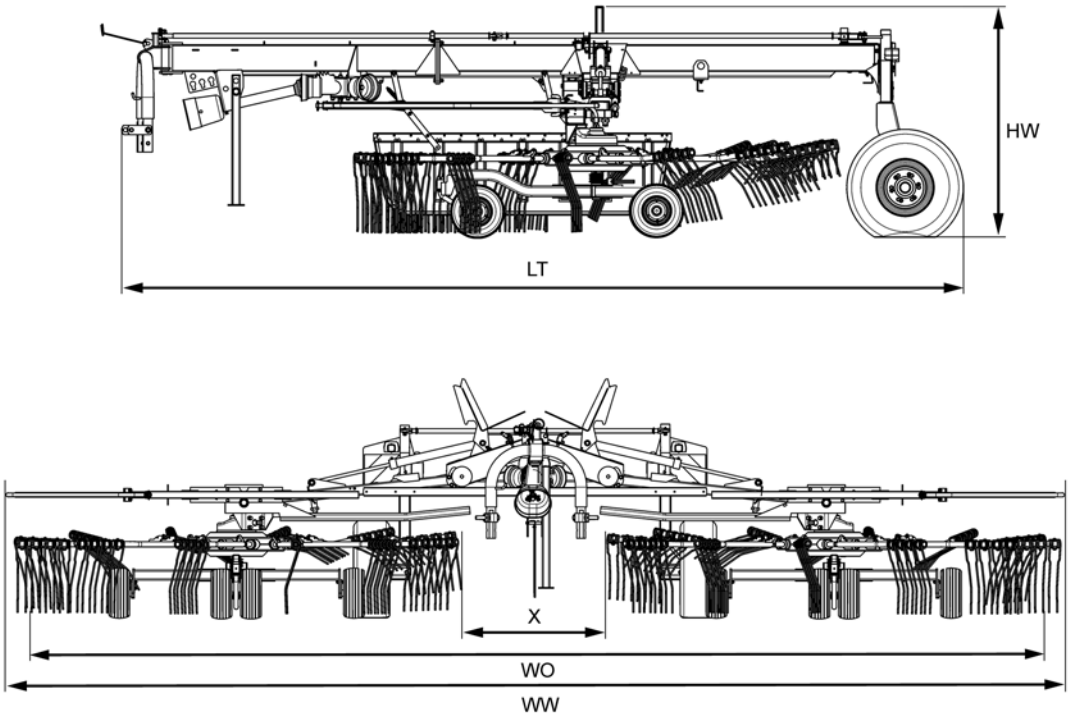


Technical specifications

Dimensions in transport position		
L_T	Length	6,24 m (20.47 ft)
H_T	Height with mounted tine supports	4,10 m* - 4,25 m (13.45 ft* - 13.95 ft)
H_R	Height without the upper tine supports for road transport	3,44* m (11.29 ft)
W_R	Width without the upper tine supports for road transport when using tires 11.5/80-15.3 and 380/55-17.	2.89 m and 2.98 m (9.48 ft and 9.78 ft)
W_T	Maximum width with mounted tine supports	2,98 m (9.78 ft)
T	Track width	2,61 m (8.56 ft)
M	Distance between lights	2,30 m (7.55 ft)
N	Height of lights	1,29 m (4.23 ft)
R	Height of bottom reflectors	0,35 m (1.15 ft)
S	Distance between bottom reflectors	2,08 m (6.82 ft)
** Machine attachment carrier (cat. 2) lowered to 20 cm from the ground.		



Dimensions in work position		
L_T	Length	6,24 m (20.47 ft)
H_W	Height in work position	1,50 m (4.92 ft)
W_W	Working width	7,60 m - 8,40 m (24.9 ft - 27.6 ft)
W_O	Raking width	8,50 m (27.90 ft)
X	Distance between the rotors	0,30 m - 1,15 m (1.00 ft - 3.77 ft)



Weights

	Work position [kg]	Transport position [kg]
Total weight	1950 kg (4300 lbs)	
Load supported on lower link	-	755 kg (1665 lbs)
Transport chassis axle load	-	1195 kg (2635 lbs) (based on supported load on lower link)

Tractor equipment required

Output / connections		
	Minimum output of the tractor	40 kW (56 hp)
	Lighting power supply	12 V, 7-pin plug socket SAE J560
	Hydraulic connections	1 x double-acting hydraulic control device 1 x single-acting hydraulic control device
	Hydraulic pressure	150 - 210 bar (2175 - 3045 psi)
	Maximum PTO shaft speed	540 rpm
	Lower link	Fixable in height and laterally

Machine equipment

Swath deposit		
	Swath former with auto-swivel	Standard
Rotors/tine supports/tines		
	Number of rotors	2
	Number of tine supports per rotor	12 swaths on the left 12 swaths on the right
	Number of tines per tine support	4
	Removable tine arms	Standard
	Rotor height adjustment	Mechanical
	Hydraulic single lift	[+]
	Tine saver	[+]
Wheels		
	Rotor chassis	16 x 6.50-8 6 PR
	Tandem axles on rotor chassis	[+]
	Transport chassis	380/55-17
Safety accessories		
	Lighting equipment	Standard
	Warning plates	Standard
PTO shaft		
	PTO shaft with freewheel	Standard

Measurement of airborne sound emissions

The airborne noise emissions from the machine are – acropeing to Machinery Directive 2006/42/EC – below the required levels.

- A-weighted sound level in the workplace:
  < 70 dB(A)
- Currently C-weighted sound level:
  < 63 Pa (130 dB based on 20 µPa)
- A-weighted sound level on the machine:
  < 80 dB(A)

Pilotbox [+]

WARNING

Protect electrical parts against moisture
The electronic control system, pilotbox [+] and electrical plug connections must be protected against damp and penetrating moisture. Dampness in electronic devices can lead to leakage current, which results in malfunction.

Using the electro-hydraulic operator control unit, the pilotbox [+], the following functions can be selected and executed using a single-acting hydraulic control device:

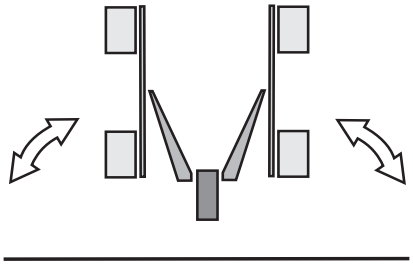
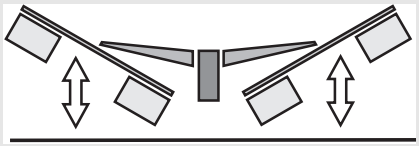
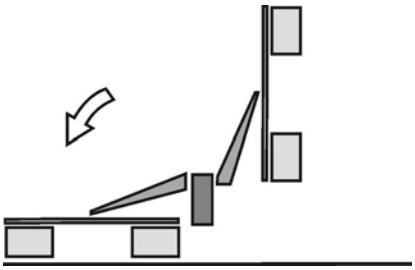
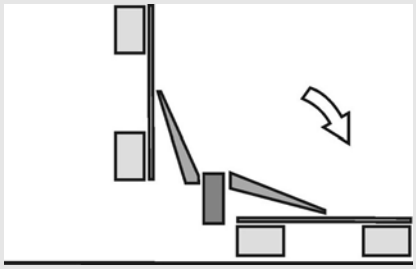
Preselection	Function
Pilotbox OFF	Raise and lower both rotors.
Pilotbox ON	Control LED lights up. The A and C functions are available.
	A: Raise and lower the left rotor.
	B: No function.
	C: Raise and lower the right rotor.

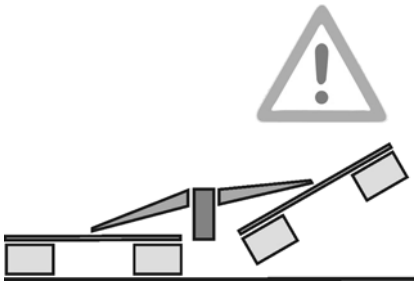
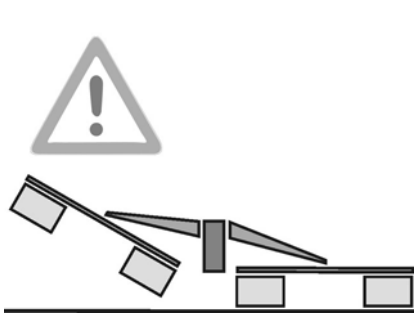
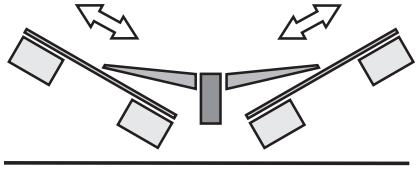
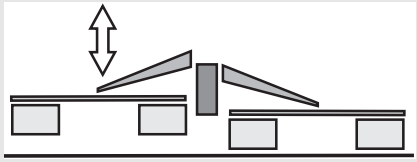
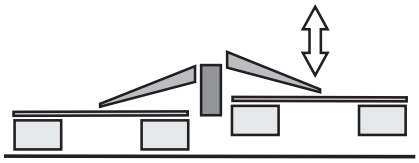
Operate the rotary rake with the pilotbox [+] as follows:

- Mount the pilotbox [+] in the tractor cab so that it is secure and easily reachable.
- Switch it on and off with the switch. The control LED lights up when the pilotbox [+] is switched on.
- With the switch, select the function (A, B or C) and then execute the function with the single-acting hydraulic control device.

Function overview

The table below provides a summary of the functions. Be sure to follow the other instructions and note the safety information in the operator's manual .

Steering	Machine position	Function
• tractor's single-acting hydraulic control device.		**Transport** • Machine in work position. • Switch off the PTO shaft drive. • Cover and/or remove outer tine arms for transportation. • Clean the machine. • Use the tractor's single-acting hydraulic control device to move the machine to the transport position. • Remove inner tine arms for transport.
• tractor's single-acting hydraulic control device.		**Work position** • Switch off the PTO shaft drive. • Use the tractor's single-acting hydraulic control device to release the lifting arm locking mechanism. • Pull the rope on the mechanical lock and keep tensioned. • Fold the rotors in fully with the tractor's single-acting hydraulic control device.
• tractor's single-acting hydraulic control device.		**Headlands** • Using the tractor's single-acting hydraulic control device, raise both rotors to the headland position, then lower them.
• tractor's single-acting hydraulic control device. • Mechanical locking mechanism rope.		**Lowering the left rotor** • Remove the right side shaft. • Raise the machine to the transport position using the single-acting hydraulic control device until the lift arms lock. • Pull the mechanical locking mechanism rope of the left rotor. • Lower the left rotor using the tractor's single-acting hydraulic control device.
• tractor's single-acting hydraulic control device. • Mechanical locking mechanism rope.		**Lowering the right rotor** • Remove the left side shaft. • Raise the machine to the transport position using the single-acting hydraulic control device until the lift arms lock. • Pull the mechanical locking mechanism rope of the right rotor. • Lower the right rotor using the tractor's single-acting hydraulic control device.

Steering	Machine position	Function
• Pilotbox [+] is switched on. • Preselect position "A" on the pilotbox [+].  • tractor's single-acting hydraulic control device.		**Swathing with left rotor [+]** • Switch on pilotbox [+]. • Preselect position "A" on the pilotbox [+]. • Using the tractor's single-acting hydraulic control device, raise the right rotor and then lower it.
• Pilotbox [+] is switched on. • Preselect position "C" on the pilotbox [+].  • tractor's single-acting hydraulic control device.		**Swathing with right rotor [+]** • Switch on pilotbox [+]. • Preselect position "C" on the pilotbox [+]. • Using the tractor's single-acting hydraulic control device, raise the left rotor and then lower it.
• tractor's double-acting hydraulic control device. • tractor's single-acting hydraulic control device.		**Swath width** • Raise the machine into the headland position using the tractor's single-acting hydraulic control device. • Adjust the swath width using the tractor's double-acting hydraulic control device. • Lower the machine to the work position using the tractor's single-acting hydraulic control device.
• Crank on left rotor.		**Working depth of left rotor** • Switch off the PTO shaft drive. • Switch off the tractor and secure it. • Set the working depth using the crank on the left rotor.
• Crank on right rotor.		**Working depth of right rotor** • Switch off the PTO shaft drive. • Switch off the tractor and secure it. • Set the working depth using the crank on the right rotor.

Checking the scope of delivery

Delivery is in the fully assembled state
The machine is delivered fully assembled. Using the checklist, check the loose parts on delivery. If any parts of the machine have not been fitted or are missing, please contact your dealer.

WARNING

Do not assemble the machine yourself
Trained personnel are required to assemble the machine. Do not perform assembly work yourself. The following points are required to be met for the machine to be in proper condition:

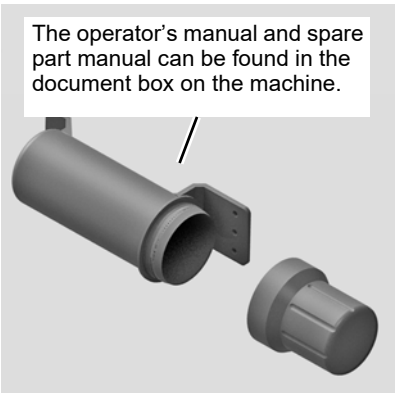
- Observance of the sequence of work steps.
- Compliance with tolerances and torques.
- Knowledge of work safety during assembly.

Incorrect assembly can result in damage to the machine or accidents.

If parts are missing or have been damaged during transportation, please inform the dealer, importer or manufacturer immediately.

Checklist for parts which were supplied loose	Quantity
PTO shaft for drive	1
PTO shaft for auxiliary drive	2
Tine supports placing swaths on the left	12
Tine supports placing swaths on the right	12
Swath former	1
Operator’s manual	1
Spare parts list	1
Additional equipment	See delivery note

Operator’s manual



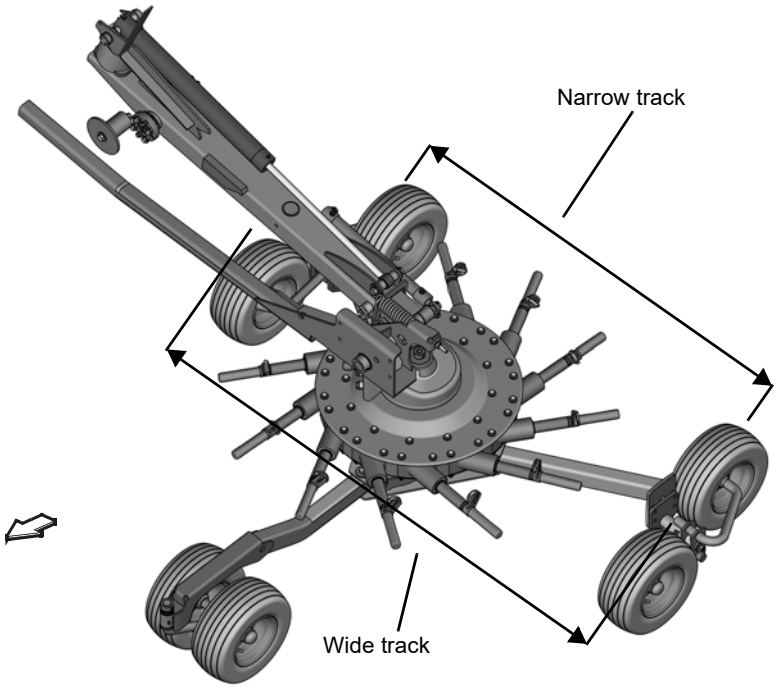
The operator’s manual belongs with the machine and must always be kept on board. A document box for the operator’s manual and spare part manual is mounted on the main frame.

Checking tandem axle [+]

WARNING

Ensure that the tandem axle is positioned correctly
Ensure that the tandem axles are positioned correctly. If they are positioned incorrectly, this will cause damage to the machine.

- Check that the tandem axles [+] are aligned correctly.
- The wide track is at the front in relation to the direction of travel.
- The narrow track is at the back in relation to the direction of travel.



Lenght of PTO shaft

The length of the PTO shaft has been selected at the factory to suit almost all types of tractorS. Only in exceptional cases is a correction of the PTO shaft length required on individual tractors. Check the length of the PTO shaft for each tractor prior to first use.

The operator's manual from the PTO shaft manufacturer is included. This includes detailed information on the relevant version of the PTO shaft and must be observed.

WARNING

Switch off the tractor and secure it
Before you dismount:

- Disengage the PTO
- Lower all implements to the ground
- Place all controls in their neutral or park position
- Set the parking brake
- Switch off the tractor.
- Remove the ignition key.
- Secure the tractor against rolling away.

An unsecured tractor can run you over or trap you.
Otherwise, serious or fatal injury may be caused as a result.

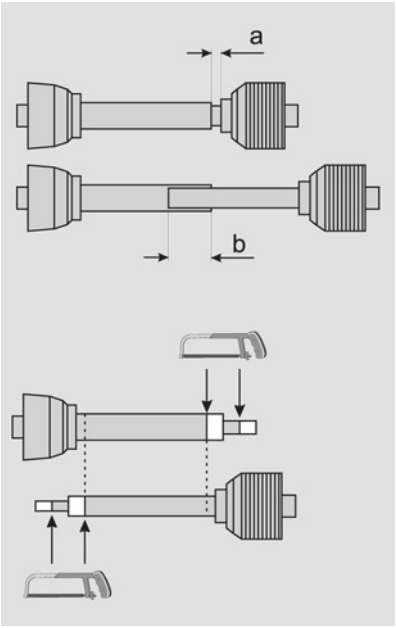
Checking the angle of lock
The PTO shaft has a wide hinge joint giving the tractor a steering angle of up to 80°. Make sure that the PTO shaft is not damaged during sharp cornering. This would result in damage to the machine.

Correct length
A PTO shaft that is too long must not be used. This would result in damage to the drive bearings of the tractor and the machine.

Checking the length of the PTO shaft

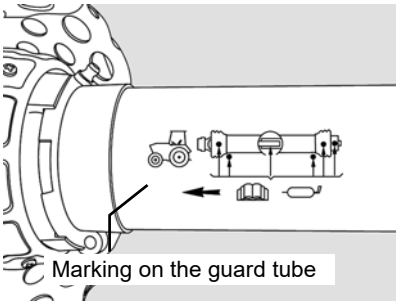
- Couple the machine to the tractor without the PTO shaft.
- Lower the lower link of the tractor.
- Set the combination (tractor and machine) to the smallest steering angle.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

Shortening the PTO shaft



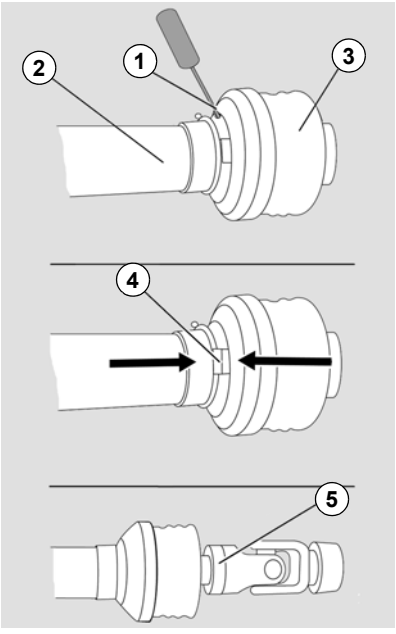
- Pull the PTO shaft apart and connect one half to the tractor PTO shaft drive and one to the machine and secure them.
- Place the two shaft halves next to each other and:
  - Check for a minimum of 250 mm (10 in) overlap (b).
  - Check that the PTO shaft is not blocked at each end Minimum distance (a) = 20 mm (1 in).
- Shorten both the sliding tube and guard tube to the same size.
- Deburr the ends of the tubes.
- Remove the shavings.
- Grease the sliding surfaces well.

Fitting the PTO shaft


Marking on the guard tube

Make sure that you fit the PTO shaft in the correct installation position. There is a marking on the guard tube of the PTO shaft.

- Check the length of the PTO shaft and shorten it if necessary.
- Place the PTO shaft onto the PTO stub shaft of the machine.
- Secure the PTO shaft with a locking pin.



- Remove the locking screw (1) between the guard tube (2) and the guard cone (3).
- Twist the guard cone (3) and the guard tube (2) in opposite directions so that the "noses" of the slide ring (4) are positioned directly over the slots on the guard cone (3).
- Pull the guard cone (3) and guard tube (2) back until the single joint (5) is accessible.
- Connect the PTO shaft to the machine.
- Push the guard cone (3) and guard tube (2) back over the single joint (5).
- Tighten the locking screw (1).
- Secure the guard cone to the gear box using a jubilee clip.

Steering

The following applies to all instructions below:

- Please note the following instructions and safety information:
- »Coupling the machine«. Page 39.
- »Coupling the lower link«, page 40.
- »Coupling the PTO shaft«, page 42.

Checking the steering

WARNING

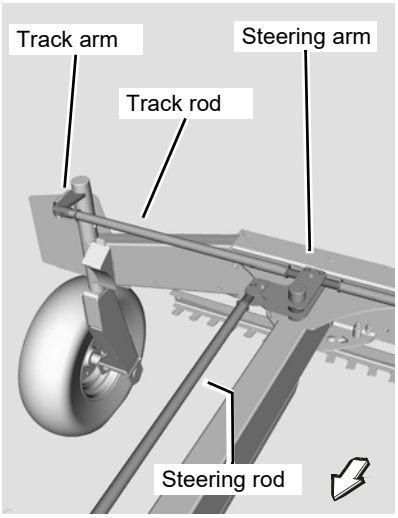
Never carry out work on the steering
Contact your dealer if specifications differ. Never carry out any work on the steering or track yourself.
This can result in traffic accidents and accidents causing serious or fatal injuries.

The steering is fitted and calibrated in the factory. Check the adjustment of the steering with a hitched machine.

- Drive along a straight line with the entire combination (tractor with hitched machine). For example, a straight kerb.
- Check if the machine follows the tractor in the same track.

If the machine is pulled at an offset angle behind the tractor, the tracking must be checked and adjusted. This work must be carried out by a dealer.

Checking the track



If the machine rolls at an offset angle to the tractor when driving a straight line, the directional stability is set incorrectly. Proceed as follows:

- See chapter »Checking the track«, page 96.
- Consult your dealer. Never carry out any work on the steering or tracking yourself.

Safety

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury.
See chapter »Safety«, page 7.

Increased risk of injury
When the machine is being coupled to the tractor, there is an increased risk of injury. Therefore:

- Never stand between the tractor and machine.
- Secure the tractor against rolling away.

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

General

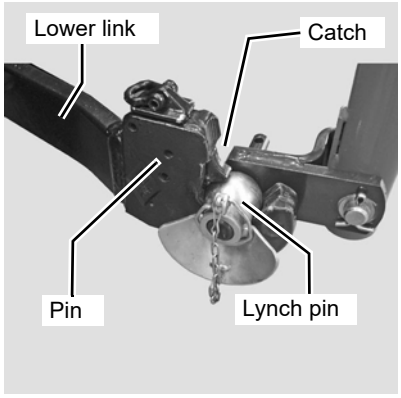
The machine is equipped at the factory for coupling to the lower link of the three-point power lift system.

The following work steps are described in this section:

- »Coupling the lower link«
- »Swivelling in the parking stand«
- »Coupling the PTO shaft«
- »Wheel chocks«
- »Electrical connections«
- »Hydraulic connections«

Coupling the lower link

Tractors with quick-release couplings



WARNING

Follow the instructions for the quick-release coupling
Follow the instructions below for tractors with quick-release couplings. If this requirement is ignored, the consequence may be damage to the machine and even life-threatening injuries.

- Slide collecting trays suitable for the tractor onto the lower link hitching system of the machine.
- To couple the machine, raise the lower link until the catch engages.
- Secure the quick-release coupling with lynch pins.
- Secure the catch with pins.
- Follow the instructions for »Tractors without quick-release coupling«.

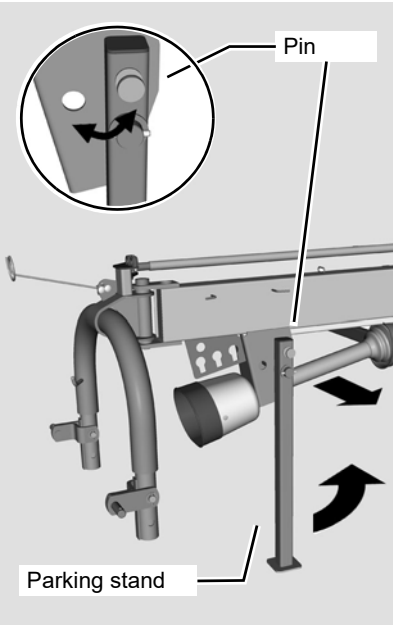
Tractors without quick-release coupling

The following applies to all tractors, with or without quick-release couplings:

- Couple the machine to the lower link - in accordance with the operator's manual of the tractor manufacturer - lift slightly and secure.
- Slightly raise the lower link.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Swivel in the parking stand.
  → See »Swivelling in the parking stand«, page 41.
- With the lower link in the work position, lift it off the ground until the main frame of the machine is tilted approximately 1 degree forwards.
- Engage the lower link at the sides.
- Adjust the lower link such that a uniform ground clearance is maintained.

Note the instructions and warnings in the operator's manual of the tractor manufacturer for tractors with lower link quick-release couplings.

Swivelling in the parking stand

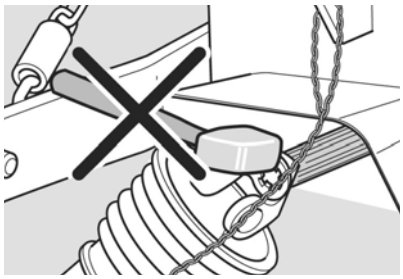


After coupling the machine to the tractor, raise and secure the parking stand.

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Pull the pin on the parking stand.
- Swivel in the parking stand.
- Undo the pins on the parking stand and engage them.

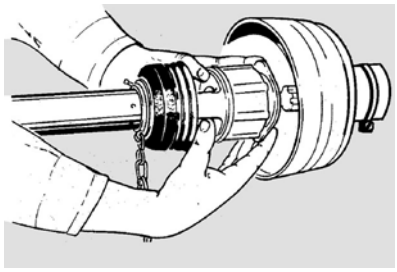
Coupling the PTO shaft

Make sure that you fit the PTO shaft in the correct installation position. There is a marking on the guard tube of the PTO shaft.



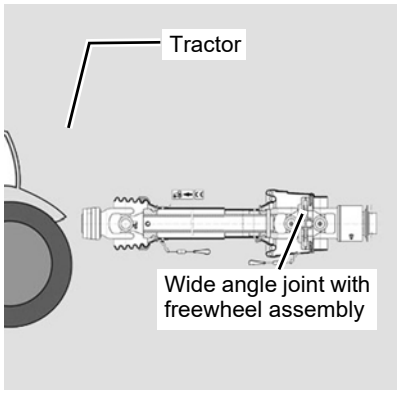
WARNING

Do not use force
When coupling the PTO shaft, do not use a hammer or any similar tools. Using these types of tool can severely damage the PTO shaft. A damaged PTO shaft can cause damage to the tractor and the machine.

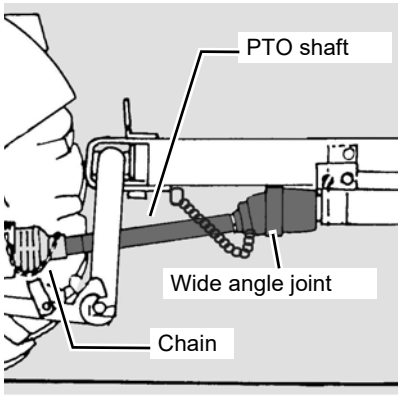


- Check whether the PTO shaft must be shortened before coupling.
- Shorten the PTO shaft if necessary.
  → »Lenght of PTO shaft«, page 36

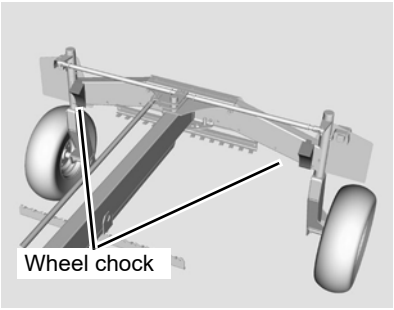
- Check that the tractor's PTO stub shaft is clean and lubricated.
- Couple the PTO shaft to the tractor and the machine.



- Ensure that the PTO shaft is engaged on the shaft ends.
- Secure the guard tubes so that they cannot rotate at the same time.
- Couple the wide-angle joint to the machine's PTO stub shaft.



Wheel chocks



WARNING

Use wheel chocks
Never remove the wheel chocks before the machine has been coupled to the tractor. Persons could be run over by the machine or the tractor. Serious or fatal injury would be caused as a result.

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Remove the wheel chocks from in front of the wheels.
- Place them in the brackets provided on the left and right behind the warning plates on the transport chassis and engage them securely.

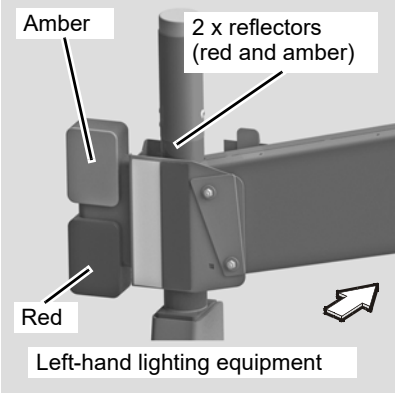
Connections

Electrical connections

WARNING

Checking the electrical cables
Check the electrical cables. The electrical cables must not chafe or hang loose. Electrical cables that have been torn away or worn through must be replaced. Damage to the machine may be caused as a result.

Lighting equipment – USA



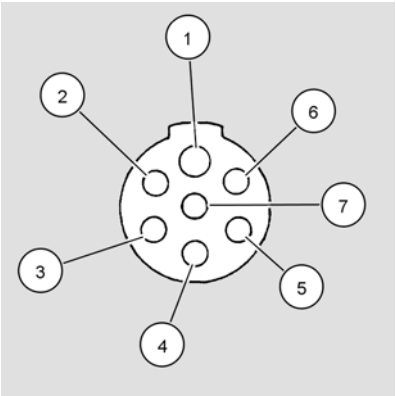
Left-hand lighting equipment

The machine is fitted with lighting equipment for road transport. The lighting equipment is mounted on the left and right-hand side of the rear guard bar and connected to the tractor by a 7-pin plug. The corresponding connection must be present on the tractor (SAE J560).

If your tractor does not have the corresponding connection, this must be retrofitted. Consult your dealer.

The lighting equipment is controlled by the lighting controls in the tractor. The lamps on the machine are only switched on when either the parking lights or the headlight of the tractor is switched on.

SAE J560 plug arrangement



PIN	Cable	Connection to
1	White	Earth; all lights
2	Black	Not used
3	Yellow	Left indicator (amber)
4	Red	Brake lights
5	Green	Right indicator (amber)
6	Brown	Rear lights (red)
7	Blue	Not used

- Connect the plug for the 12 V power supply to the 7-pin plug socket on the tractor.

Function overview of lighting equipment – USA

- Check that the lighting equipment is functioning using the following table.

	Device lights			
Tractor lights	**Left amber**	**Left red**	**Right red**	**Right amber**
Headlight “OFF”	—	Off	Off	—
Headlight “ON”	—	Dimmed	Dimmed	—
Amber indicator light “OFF”	Off	—	—	Off
Amber indicator light “ON”	Flashing (same frequency as right)	—	—	Flashing (same frequency as left)
Brake lights (for tractors with brake lights)	—	Bright	Bright	—
Amber indicator light “ON” No turning indicated (tractor with brake lights)	Flashing (same frequency as right)	Bright	Bright	Flashing (same frequency as left)
Amber indicator light “ON” No turning indicated (no tractor brake lights)	Flashing (same frequency as right)	Off	Off	Flashing (same frequency as left)
Turning left indicated	Higher flashing frequency	Depending on tractor equipment: Off, dimmed or flashing in sync with the left-hand light	Off or dimmed	Illuminated, no flashing
Turning right indicated	Illuminated, no flashing	Off or dimmed	Depending on tractor equipment: Off, dimmed or flashing in sync with the right-hand light	Higher flashing frequency

Observe local regulations governing lighting equipment for travelling on the road. Consult your dealer if the lighting equipment does not function as stated.

Pilotbox [+]

WARNING

Switch off the pilotbox for all tasks on the machine
Always switch off the pilotbox when coupling or uncoupling and when carrying out service or maintenance work or any task on the machine. If the pilotbox is switched on and accidentally actuated, unpredictable movements of the machine may be triggered. This can cause accidents with fatal consequences.

- Mount the pilotbox in the driver's cab so that it is secure and easily reachable.

Pilotbox	Solenoid valve connection	Function
A	Y1	Raise and lower the left-hand lift arm.
B	Y2	No function.
C	Y3	Raise and lower the right-hand lift arm.

Hydraulic connections

WARNING

Check hoses and couplings
Check all hydraulic hoses for damage before connecting them. Check all hydraulic couplings for firm seating after connecting them. Defective hydraulic hoses and poorly fitting hydraulic connections can trigger unanticipated movements in the machine, causing severe damage to the machine as well as personal injury. Serious or fatal injury may be caused as a result.

Secure the tractor's control devices
In the transport position, secure the control devices on the tractor against unintended actuation and lock them if possible. Unintentional activation of a control device can trigger unpredictable movements of the machine and cause serious machine damage and personal injury. Serious or fatal injury may be caused as a result.

Check the routing of the hydraulic hoses
Close or disconnect the quick couplings with great care. Remove any dirt or air which has entered the hydraulic system. The hydraulic system may otherwise be seriously damaged. Material damage or personal injury may be caused as a result.

Hydraulic connection at zero pressure only
Only connect hydraulic hoses to the tractor hydraulic system if the tractor and machine hydraulic system is at zero pressure. A hydraulic system which is under pressure can cause unforeseen movements on the machine.

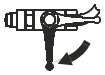
Avoid mixing oils
If the machine is used on different tractors, an impermissible mixing of oil may occur. Impermissible oil mixtures can destroy tractor components.

High pressures in the hydraulic system
The hydraulic system is under high pressure. Regularly check all lines, hoses, and screwed connections for leaks and externally visible damage. Do not use hands to search for suspected leaks. Only use suitable equipment when looking for leaks. Rectify any damage immediately. Fluid escaping under pressure can penetrate skin may result in injuries and fires. Seek medical attention immediately if injuries occur.

Connecting the hydraulic couplings

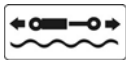
Make sure the connection is correct
Ensure that the hydraulic system is connected correctly, otherwise damage to the machine and personal injury will be caused as a result.

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

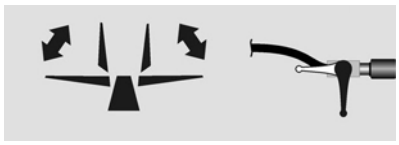


- Close the ball valve.

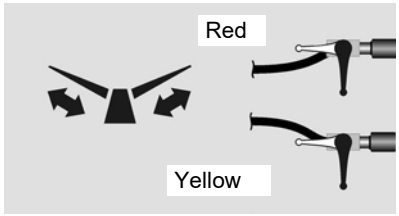
- Roll up the control ropes and store them in the tractor cab.



- Connect the hydraulic coupling of the machine to the single-acting control device when it is set to the floating position.
- Connect the hydraulic coupling on the machine to the double-acting control device.



The rotors are raised and lowered and single-swath mode is controlled using the single-acting control unit (hydraulic connection not colour-coded).



The swath width is controlled using the double-acting control device.

Hydraulic line	Marking
Single-acting hydraulic control device pressure line	Black
Double-acting hydraulic control device Pressure line	Red
Double-acting hydraulic control device Return line	Yellow

Safety

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury.
See chapter »Safety«, page 7.

Securing the machine
Secure the machine against unintentional starting and rolling away. Use wheel chocks. The machine must stand on a level, firm and secure surface and be supported during the work, if necessary. Unsecured or non-supported machines can cause accidents. Otherwise, serious or fatal injury may be caused as a result.

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.

Remove tine supports
When carrying out adjustment work on the machine, tine supports which hinder work on the machine must be removed. Tine supports that are not removed can cause serious injuries.

Avoid the hazard area
The rotors are considered a hazard area. Do not stand in the hazard area. The rotors may lower or turn. This could result in fatal injury.

Unfold fully and evenly
Ensure that the side devices are evenly unfolded. If there is a malfunction, fold the side devices back in and repeat the process at a higher engine speed. The hydraulic cylinders must be completely extended in the work position, otherwise the machine may be damaged.

General

The following applies when performing all adjustment work:

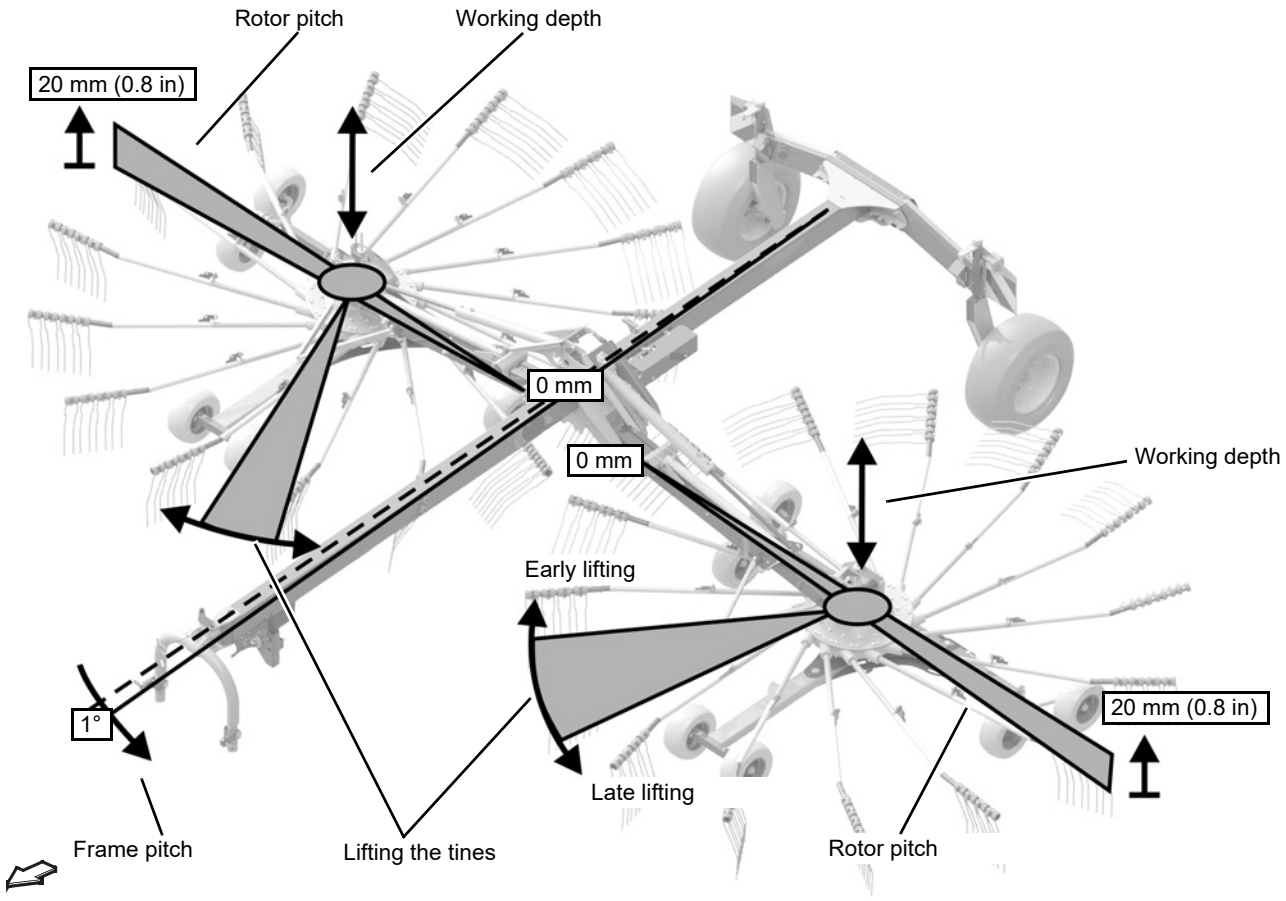
- Check the tire pressure.
- Secure the machine.
- Lower the machine to the work position.
- Loosen the appropriate bolts.
- Make the required adjustment.
- Retighten the bolts.
- Fit and secure the tine supports.

The following work steps are described in this section:

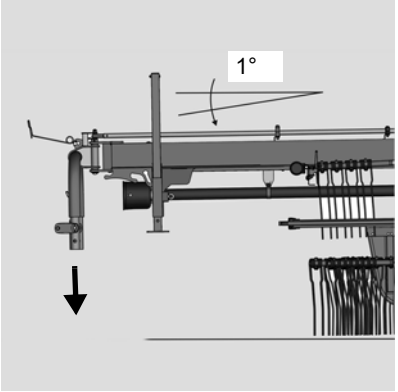
- »Rotor pitch«
- »Lifting the tines«
- »The swath form is affected by the position of the adjusting screw.«

Adjusting the machine

The machine is preset at the factory. The following illustration shows an overview of the basic settings. Detailed information can be found on the following pages.



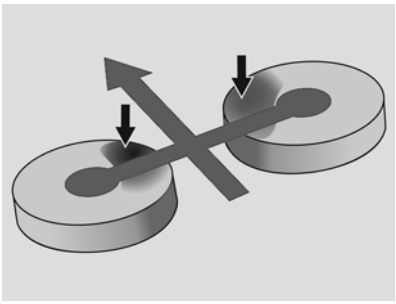
Frame pitch



For improved pick-up of the crop, use the three-point power lift system to incline the main frame approx. 1° further to the front.

- Use the three-point power lift system to incline the main frame approx. 1° further to the front.

Rotor pitch



WARNING

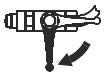
Close the ball valve
Close the ball valve before working on the machine or carrying out any adjustment work. If the ball valve is open and there is an operating error, the machine can lower itself and cause serious injuries.

The rotors are inclined transversely to the chassis. The rotor is already inclined transversely ex-factory. If the crop is not picked up cleanly, the raking quality can be improved by adjusting the rotor pitch.

The optimum raking quality is achieved when the tips of the tines in the front working area and before the crop is deposited have the lowest possible ground clearance (see adjacent illustration).

Adjusting the rotor pitch

Before carrying out any adjustment work, you must secure the machine:



- Move the machine to the headland position using the tractor's control device.
- Close the ball valve.

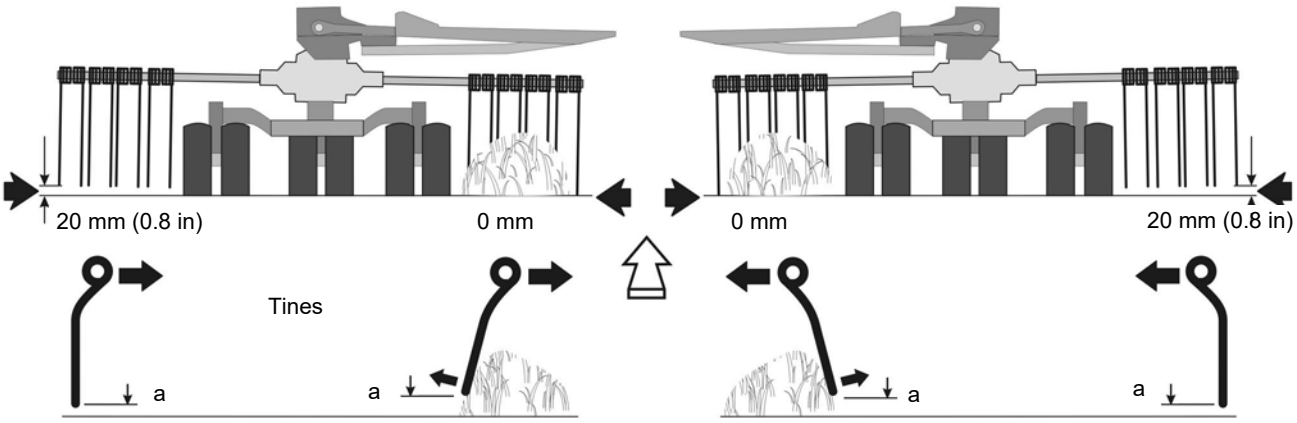
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away
- Secure the rotors using supports.
- Remove the tine supports.

Then carry out one of the following steps:

- Adjust the rotor pitch for a single axle
  → »Adjust the rotor pitch for a single axle«, page 53.

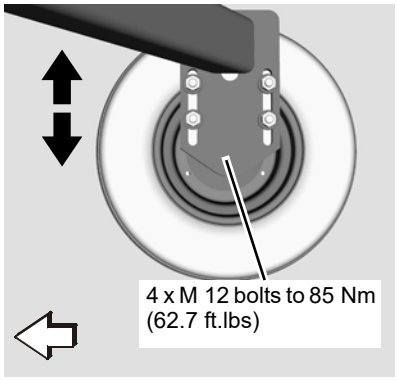
– or –

- Adjust the rotor pitch for a tandem axle [+]
  → »Adjust the rotor pitch for a tandem axle [+]«, page 53.

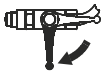


Crop pick-up increases the distance (a) between the tines and the ground.

Adjust the rotor pitch for a single axle



It is possible to alter the position of the rotors lateral to the direction of travel.



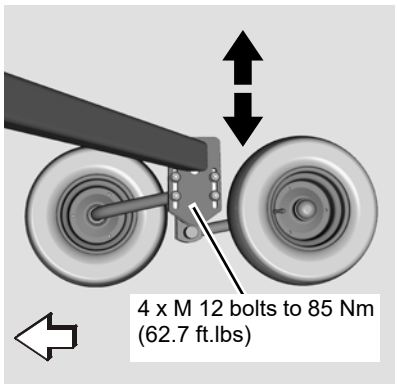
- Close the ball valve.

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

- Remove the tine supports via the wheel carrier.
- Slightly loosen the four bolts on the wheel carrier.
- Move the wheel carriers into the required position using the adjusting screw (see illustration below).
- Retighten the bolts.
- Fit and secure the tine supports.

- On the side opposite the swath former, the distance between the tines and the ground must be approximately 20 mm (0.8 in) greater than on the swathing side.

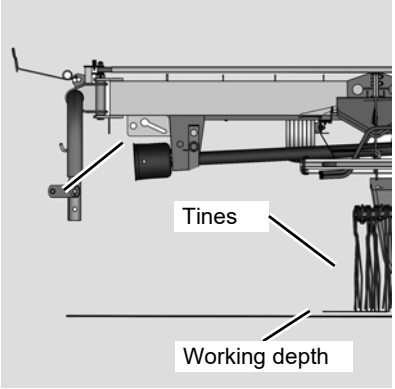
Adjust the rotor pitch for a tandem axle [+]



It is possible to alter the position of the rotors lateral to the direction of travel.

- Slightly loosen the four bolts on the wheel carrier.
- Move the wheel carriers into the required position using the adjusting screw (see illustration below).
- Retighten the bolts.
- Fit and secure the tine supports.

Working depth



WARNING

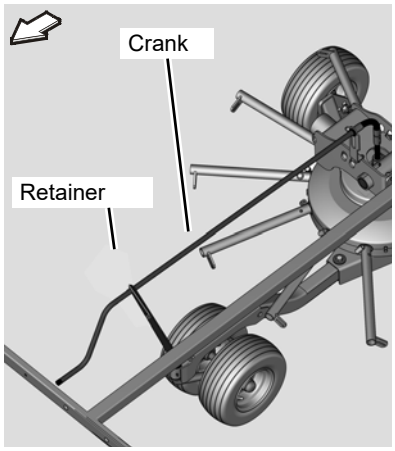
Never set the tines too deep
If the tines are set too deep:

- The tines are overstressed.
- The tines will soil the crop.
- This can result in damage to the machine.

Adjust the working depth as follows:

- Fully lower the machine using the hydraulic control device on the tractor and advance approximately 2 metres (7 ft).
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Check the working depth to the ground.

Adjusting the working depth



The working depth is set using the crank on the rotor.

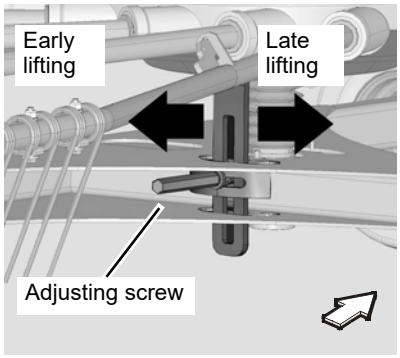
- Release the crank retainer on the rotor chassis and adjust the working depth by turning the crank.
  - Basic setting: the tines lightly touch the ground.
  - One turn of the crank equates to a rotor tine height adjustment of about 5 mm. The thread is left-handed.
- After adjusting, secure the crank against turning using the retainer.
- Adjust the working width on the second rotor in the same way.
- Readjust the working depth to suit the field conditions if necessary.

Tines that are set too low will soil the crop. The load on the rotor tines and the drive is increased.

- If necessary, adjust the working depth to the field again.

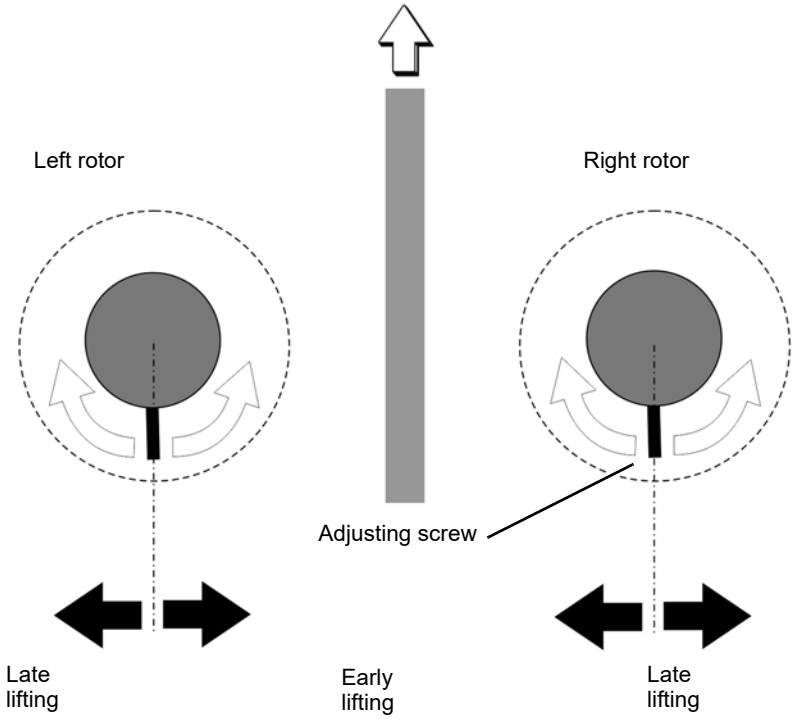
Lifting the tines

The time for lifting the tines can be adapted to the crop (early or late lifting). The control cam (cam disk) can be infinitely adjusted. To do this, the following steps are required.



- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Remove the tine supports via the adjusting screw.
- Loosen the adjusting screw on the rotor chassis.
- Adjust the control cam.
  - The adjacent illustration shows the position of the adjusting screw on the right rotor.
  - On the left rotor, the position of the adjusting screw is set the other way round.

- Tighten the adjusting screw.
- Fit and secure the tine supports.



The swath form is affected by the position of the adjusting screw.

- Move the adjusting screw in the rotational direction of the rotor:
  - Late lifting of the tines increases the swath width.
- Move the adjusting screw against the rotational direction of the rotor:
  - Early lifting of the tines means that the working speed can be increased.

In the basic setting, the adjusting screw is positioned centrally.

Safety

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

⚠ WARNING

Observe the safety information
Observe the safety information. Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 7.

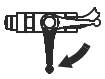
Ensuring road safety
The machine must conform to current national traffic regulations if you intend to drive it on public roads. Ensure the following:

- Lighting, warning and protective equipment must be fitted.
- The permissible transport widths and weights, axle loads, tire load-bearing capacities, laden weights and national speed restrictions must be observed.
- The maximum permissible road transport speed must be complied with, but not exceed 40 km/h (25 mph).
- The machine should only be towed by agricultural or forestry tractors.
- The empty weight of the tractor must be greater than the weight of the machine.

The driver and keeper of the vehicle are liable should these conditions not be observed.

Observe the contour of the terrain
Move the machine onto ground that is as flat as possible before changing from the working to the transport position. Avoid inclines on which the combination (tractor and machine) could slip or overturn. There is an increased risk of tipping and injury in a position at right angles to the direction of the slope.

Observe transport width
Observe the permissible transport widths. Put the machine in the transport position and attach lights, warning signs and protective equipment. The driver and keeper of the vehicle are liable for any non-compliance with national traffic regulations.



Close the ball valve
Close the ball valve before driving on the road. If the ball valve is open and there is an operating error, the machine may drop or swing out unexpectedly. This could cause traffic accidents and accidents with fatal consequences.

Remove tine supports
For operation on public roads and in the park position, the tine supports which are level with the field of vision (2.0 m) (6.6 ft). must be removed. There is otherwise the risk of traffic accidents and accidents with fatal consequences.

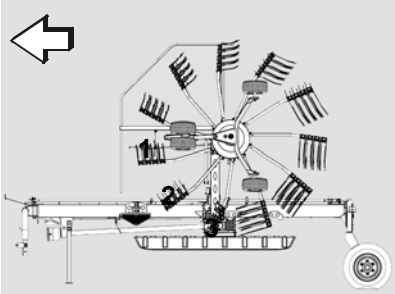
General

The following work steps are described in this section:

- »Prior to road transport«
- »Folding in the guard bars«
- »Fold the machine into the transport position«
- »Road transport«
- »«

Prior to road transport

When driving on public roads, the machine must be in the transport position



WARNING

Clean the machine before travelling on the road
Before any road transport, remove all coarse dirt, crop residues and clods of earth from the machine and clean it. Crops or dirt that drop onto the road can cause slippery road conditions. This could cause traffic accidents and accidents with fatal consequences.

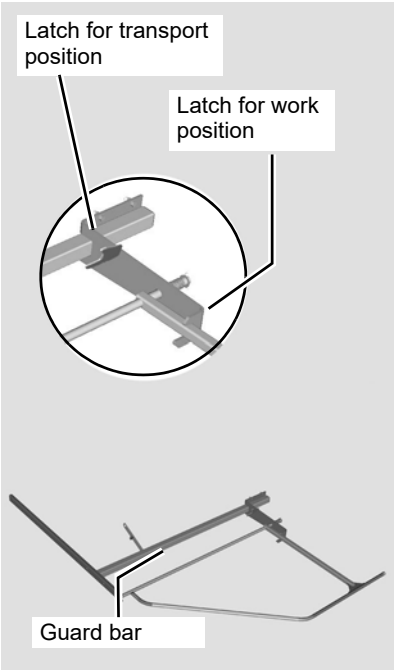
Cleaning lighting equipment before travelling on the road
All lighting equipment must be cleaned before road transport. Crop residue or dirt may cover up the lighting equipment and adversely affect its correct operation. This could cause traffic accidents and other accidents with fatal consequences.

- Remove any crop and coarse dirt.
- »Setting the lowest transport height«
- »Folding in the guard bars«
- »Removing the outer tine supports«
- »Placing the tine supports in the transport holder«
- »Fold the machine into the transport position«
- »Road transport«
- Move the machine onto ground that is as flat as possible before changing from the working to the transport position.

Setting the lowest transport height

- Move the machine to the headland position using the tractor's single-acting hydraulic control device.
- Adjust the swath to the smallest width using the tractor‘s double-acting hydraulic control device.

Folding in the guard bars



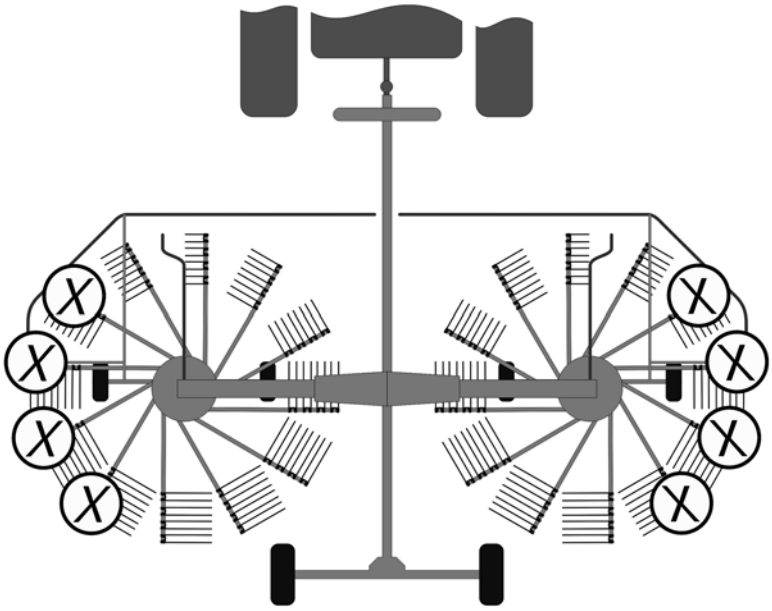
Before removing the tines, move all the protective devices around the rotors from the transport to the work position, and lock them in place. Fold in the guard bar as follows:

- Lower the machine to the work position using the tractor's single-acting hydraulic control device.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Release the guard bar by pulling it out of the latch for the work position.
- Fold the guard bar through 180° and engage it in the latch for the transport position.

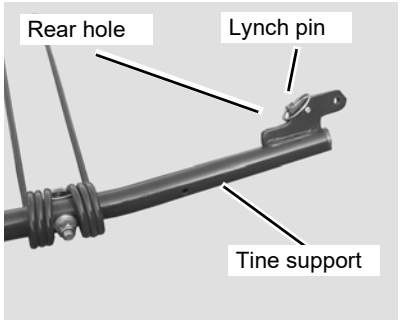
Removing the outer tine supports

- Remove any crops and coarse dirt.
- Remove the 4 outer tine supports from both rotors, plug them into the transport holder and secure them (see following illustration).

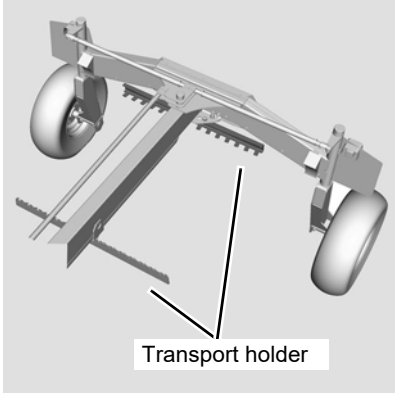
  → See »Placing the tine supports in the transport holder«, page 59.



Placing the tine supports in the transport holder



- Loosen and remove the lynch pin from the tine support.
- Remove the tine supports from the rotor and secure them in the transport holder.
- Pull off the tine supports.



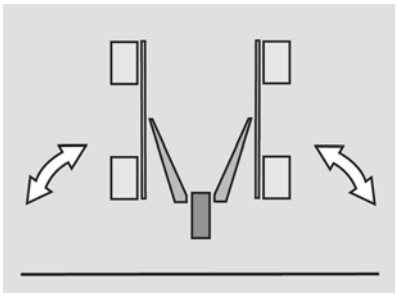
- Insert the tine support into the transport holder.
- Secure the tine support with a lynch pin.

Fold the machine into the transport position

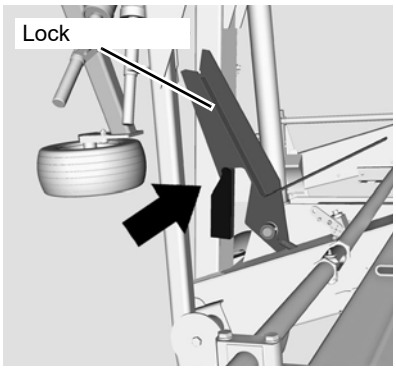
WARNING

No persons within the folding range
No persons may be present within the folding range and working area. Persons can be trapped by the machine. Serious or fatal injury may be caused as a result.
Ensure that hydraulic connections are correct
Before slewing, always check that the hydraulics for the slewing device are correctly connected to a double-acting control valve. Wrongly connected hydraulic hoses can trigger unpredictable movements of the machine.

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.



- Observe the instructions in »Prior to road transport«, page 57.
- Pull the rope on the mechanical lock and keep tensioned.
- Lift the rotors into the transport position using the tractor‘s single-acting hydraulic control device.
- Release the mechanical lock rope to secure the rotors.

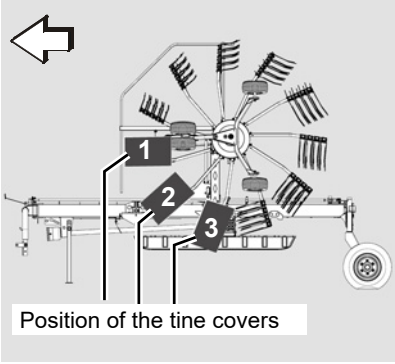


- Check that the locks of both lifting arms are engaged.

Attaching the tine cover

WARNING

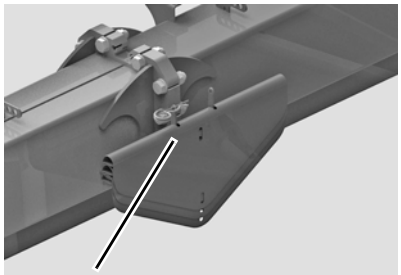
Exercise caution when close to unprotected tines
Maintain a sufficiently safe distance from exposed tines. When working in the vicinity of the tines, ensure that you have a firm footing (risk of slipping on wet ground). Otherwise, serious or fatal injury may be caused as a result.



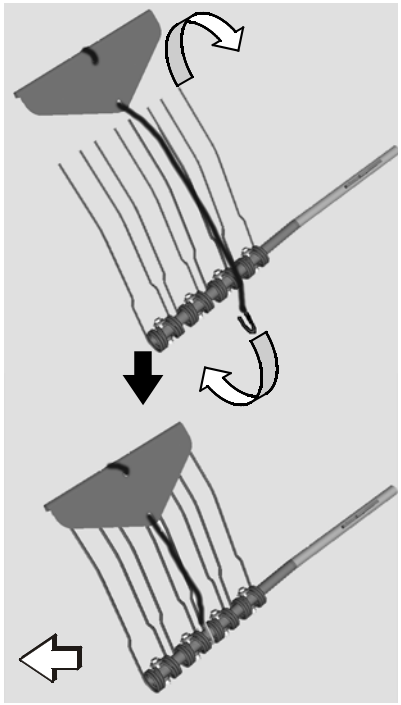
Position of the tine covers

All tine supports which have tips that point at right angles to the direction of travel and which are at a height of less than 2 metres must be safeguarded using the tine covers provided.

- On each side of the machine, fit the tine cover on three tine supports.


Tine cover holder

The tine covers are stowed in two holders on the left and right of the main frame.



Proceed as follows to complete the assembly:

- Take a tine cover from the holder.
- Fit the tine cover on the tine support.
- Fit all tine covers on the tine supports provided.

Road transport

⚠ WARNING

Follow the instructions below for road transport. This could cause traffic accidents and other accidents with fatal consequences.

- Before pulling away, check the immediate vicinity. Always make sure that you have a clear field of vision and, in particular, look out for children within the operating area of the machine.
- Lock the control devices on the tractor before driving on public roads.
- Do not transport people or objects on the machine.
- Adjust your speed to road conditions.
- Do not exceed a maximum speed of 40 km/h (25 mph). Comply with the national speed limits.
- Ensure sufficient steering and braking capability. Driving characteristics, steering, and braking capability are all influenced if the machine is coupled (increased braking distance as a result of greater inertia).

There is a danger of tipping on slopes and if corners are taken too fast.

Checking the machine

Prior to driving on the road, check the machine against the check list:

☑ PTO shaft drive off?

☑ Tire pressures correct?

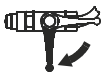
☑ Crop residue and dirt removed?

☑ Guard bar folded in?

☑ Tine supports in the transport holder and secured?

☑ Machine in transport position?

☑ Rotor secured?



☑ Ball valve closed?

☑ Lighting equipment in good working order?

☑ Lower link secured at the sides?

☑ Parking stand secured in the transport position?

☑ Lighting cables routed so that they are not strained and cannot become caught in the tractor's wheels when cornering?

Safety

The following applies for all preparations on the field:

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury.
See chapter »Safety«, page 7.

Switch off the tractor and secure it
Before you dismount:

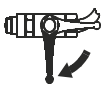
- Disengage the PTO
- Lower all implements to the ground
- Place all controls in their neutral or park position
- Set the parking brake
- Switch off the tractor.
- Remove the ignition key.
- Secure the tractor against rolling away.

An unsecured tractor can run you over or trap you. Otherwise, serious or fatal injury may be caused as a result.

Avoid the hazard area
The rotors are considered a hazard area. Do not stand in the hazard area. The rotors may lower or turn. Serious or fatal injury may be caused as a result.

Securing the machine
Secure the machine against unintentional starting and rolling away. Use wheel chocks. The machine must stand on a level, firm and secure surface and be supported during the work, if necessary. Unsecured or non-supported machines can cause accidents. Otherwise, serious or fatal injury may be caused as a result.

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.



Close the ball valve
Close the ball valve before adjusting. If the ball valve is open and there is an operating error, the machine may drop or swing out unexpectedly. This may cause damage to the machine or accidents with fatal consequences.

Change the swath width in the headland position
When the rotors are extended with the machine at a standstill, the tines must not be in contact with the ground. Only change the swath width in the headland position. Otherwise, the machine may be damaged.

No ground contact
When the rotors are extended with the machine at a standstill, the tines must not be in contact with the ground. Otherwise, the machine may be damaged.

General

The following work steps are described in this section:

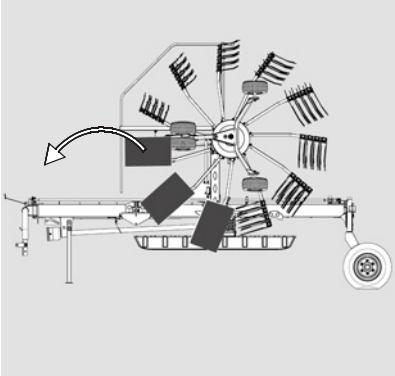
- »Lowering the machine in work position«
- »Fitting the outer tine supports«
- »Folding out the guard bars«
- »Adjusting the swath former«

Lowering the machine

After road transport, the machine is brought into the work position on the field.

- Place the machine onto ground that is as flat as possible.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

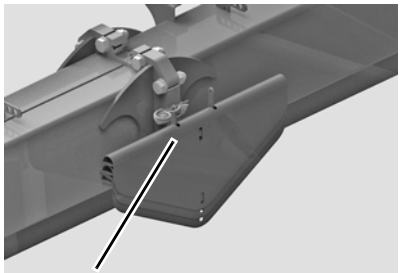
Removing the tine covers



WARNING

Firmly secure the accessories
Accessories not in use must always be stowed and secured in the holders provided. When the machine is in motion, unsecured accessories can come loose. Damage to the machine and serious or fatal injury may be caused as a result.

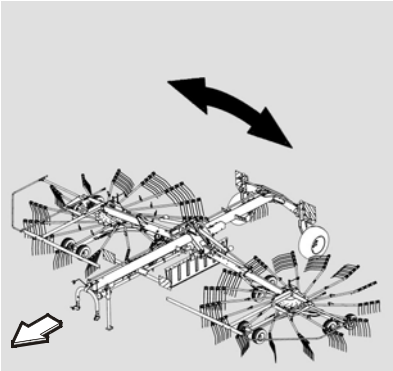
- Remove all of the tine covers.



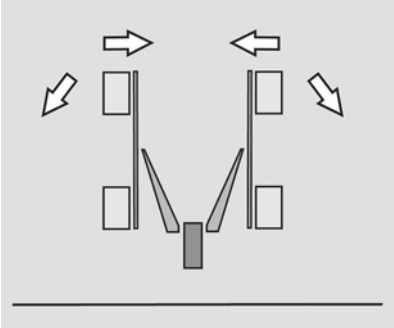
Tine cover holder

- Place the tine covers in the two holders on the left and right of the main frame.
- Secure the tine covers in the holder with safety splints.

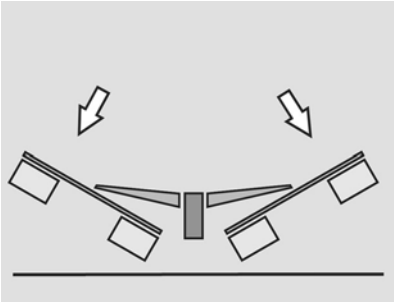
Lowering the machine in work position



- Place the machine onto that is as flat as possible before changing from work to transport position.



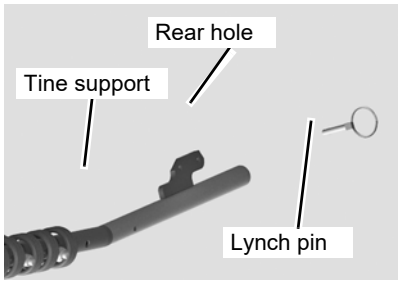
- Switch on the tractor.
- Use the tractor's single-acting hydraulic control device to release the lifting arm locking mechanism.
- Pull the rope on the mechanical lock and keep tensioned.



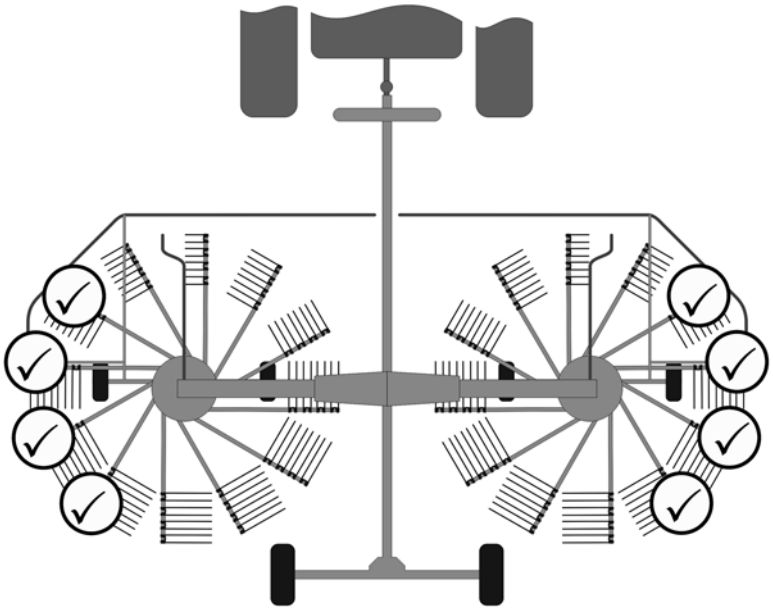
- Lower the machine into the work position using the tractor's single-acting hydraulic control device.
- Release the mechanical lock rope.

Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

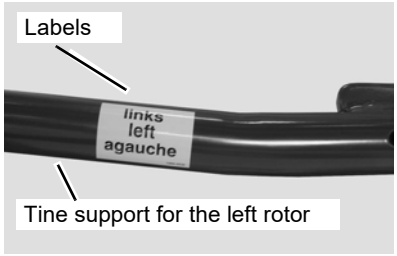
Fitting the outer tine supports



- Remove the tine supports from the transport holder.
- Attach the tine supports to the bushed bearing tube and secure with lynch pins.

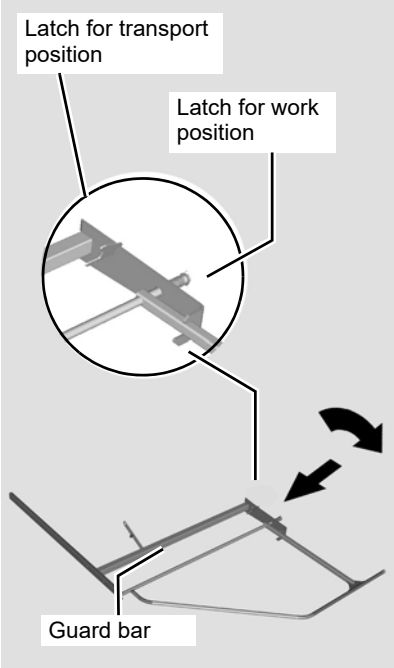


- Move the guard bar to the work position until the latch engages.
  → See »Folding out the guard bars«, page 67.
- Observe the instructions in chapter »Preparing for use«, section »The swath form is affected by the position of the adjusting screw.« on page 55.



- The tine supports for the left rotor are labelled.
- The tine supports for the right rotor are not labelled.

Folding out the guard bars



After the tines have been attached, all protective devices must be moved from transport to work position.

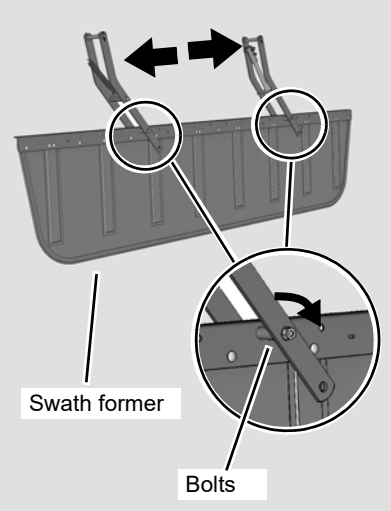
Fold out the guard bar as follows:

- Release the guard bar by pulling it out of the latch for the transport position.
- Fold the guard bar through 180° and engage it in the latch for the work position.

Adjusting the swath former

The swath former is folded into the correct position when changing from the transport to the work position.

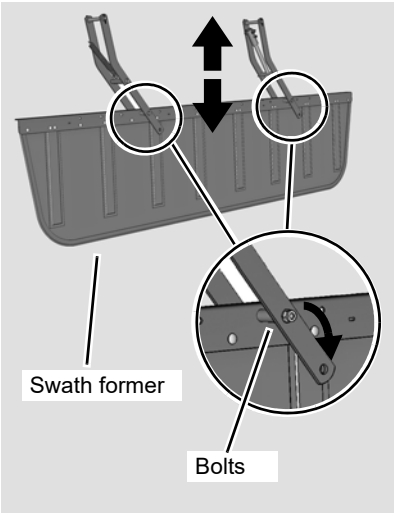
Adjusting the swath former in direction of travel



Adjusting the direction of travel of the swath former as follows:

- Remove the bolts.
- Move the swath former into the desired position.
- Fit the bolts and tighten them in the new position.

Adjusting the swath former's height



Adjusting the height of the rear swath former as follows:

- Loosen the screws.
- Adjust the height of the swath former.
- Tighten the bolts in the new position.

Safety

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 7.

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

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.

Maximum PTO speed 540 rpm
The PTO shaft speed must not exceed 540 rpm and must be adapted to the condition of the crop. Higher revolution rates can cause damage to the machine.

Only allow the PTO shaft clutch to respond for a short time
Do not allow the slip clutch to respond for longer than 3 seconds. If the clutch responds for a longer period of time, it will become worn and the disconnect torque will drop.

Do not compress the PTO shaft
The PTO shaft between the tractor and machine must not be compressed when in the work or transport position. If compressed, PTO shafts can cause damage to the machine and tractor.

Observe the contour of the terrain
Pay even more attention when driving on an incline. Avoid inclines on which the combination (tractor and machine) could slip or overturn. There is an increased risk of tipping and injury in a position at right angles to the direction of the slope.

Changes in the centre of gravity
When in work position, the machine's centre of gravity changes. Pay even more attention when driving on an incline. Avoid inclines on which the combination (tractor and machine) could slip or overturn. There is an increased risk of tipping and injury in a position at right angles to the direction of the slope.

General

The following work steps are described in this section:

- »Using the machine«
- »Twin rotor operation«
- »Single rotor operation with active rotor«
- »Single rotor operation with pilotbox [+]«
- »Adjusting the swath width«
- »Driving on headlands«

Suitable working speeds
Select a driving speed (approx. 4 to 12 km/h (2.5 to 7.5 mph)) at which the crop is picked up cleanly and completely. The working speed depends on the machine settings and the particular crop.

Swath width
The swath width depends on working width, working speed, tine lift settings and transverse rotor pitch as well as crop condition. The swath width is between approx. 1.50 m and approx. 2.00 m (4.92 ft and 6.56 ft)

Crop processing

The following basic types of swath deposit are possible:

- »Central swath with two rotors«, page 72.
- »Single rotor operation with pilotbox [+]«, page 75.
- »Single swath with left rotor«, page 75.
- »Single swath with right rotor«, page 75.
- »Single swath with right rotor in transport position«, page 74.
- »Single swath with left rotor in transport position«, page 74.

Using the machine

WARNING

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.

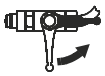
Requirements

The machine is set correctly as follows:

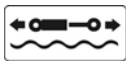
- Swath former adjusted.
- Tine supports attached and secured.
- Rotor securing device on the rotor released.
- Machine in work position.

Start work as follows:

▸ Switch on the tractor.



▸ Open the ball valve.



▸ Set the tractor's single-acting hydraulic control device to the floating position.

▸ Check that there is nobody in the working area of the machine.

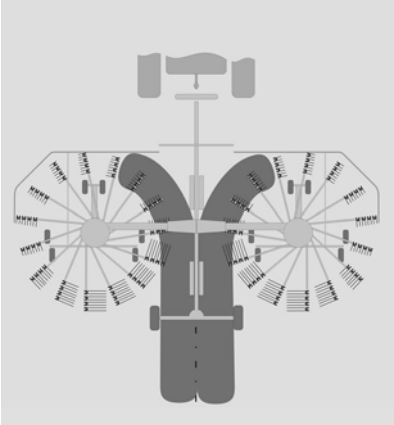
Switching on the PTO shaft drive

▸ Switch on the PTO shaft drive at low speed.
▸ Slowly increase the speed. Do not exceed the maximum speed of 540 rpm.
▸ Select a driving speed at which the crop is picked up cleanly and completely.

- Start swathing at the edge of the field and at headlands to avoid subsequently driving over the crop.
- The slip clutch of the machine may also respond at low speed if resistance is increased due to excess crop or obstacles.
- Select PTO shaft speed depending on crop processing requirements.

Twin rotor operation

Central swath with two rotors



WARNING

Distance from the rotor
Maintain a safe distance from the rotor when it is rotating. Nobody may remain in close proximity to the machine when rakes are running. Otherwise, serious or fatal injury may be caused as a result.

- Switch on the drive for the PTO shaft at a low speed.
- Select a driving speed at which the crop is picked up cleanly and completely.

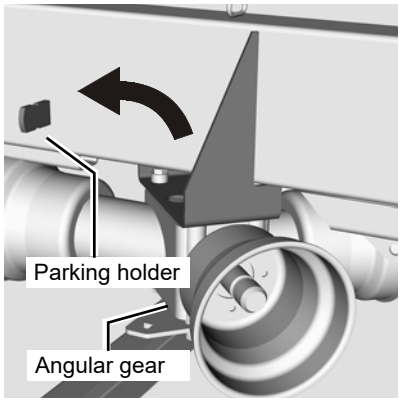
Single rotor operation with active rotor

WARNING

Switch off the tractor and secure it
Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away. An unsecured tractor can run you over or trap you. Serious or fatal injury may be caused as a result.

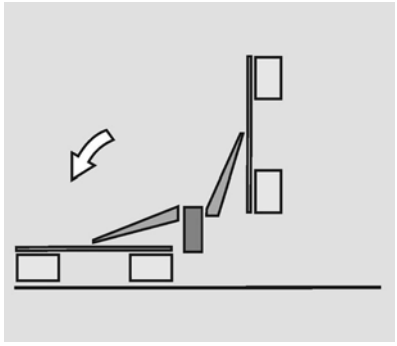
- The machine is in the work position for twin rotor operation.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

Remove the side shaft



- Remove the side shaft from the inactive rotor.
- Secure the side shaft in the parking holder.

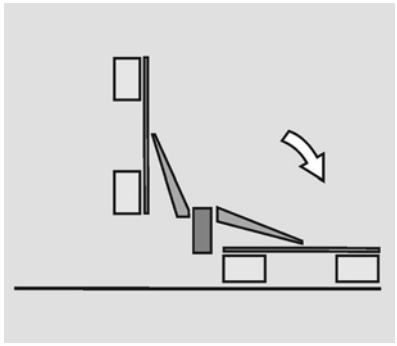
Single swath with right rotor in transport position



- The inactive side shaft is removed.
  → See »Remove the side shaft«, page 73.
- Move the machine to the transport position using the tractor's single-acting control device.
- Pull the rope on the right rope-controlled ball valve once.
- Lower the left rotor using the tractor‘s single-acting hydraulic control device.

- Switch on the PTO shaft drive at low speed.
- Select a driving speed at which the crop is picked up cleanly and completely.
  - The left rotor picks up the crop.

Single swath with left rotor in transport position



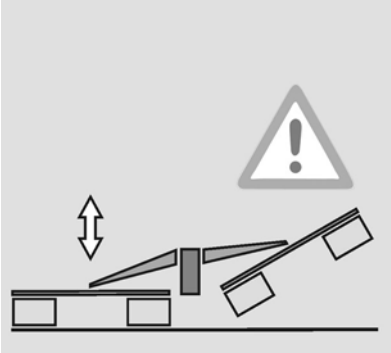
- The inactive side shaft is removed.
  → See »Remove the side shaft«, page 73.
- Move the machine to the transport position using the tractor's single-acting control device.
- Pull the rope on the left rope-controlled ball valve once.
- Lower the right rotor using the tractor‘s single-acting hydraulic control device.

- Switch on the PTO shaft drive at low speed.
- Select a driving speed at which the crop is picked up cleanly and completely.
  - The right rotor picks up the crop.

Single rotor operation with pilotbox [+]

WARNING

Distance from the rotor
Maintain a safe distance from the rotor when it is rotating. Nobody may remain in close proximity to the machine when rakes are running. Otherwise, serious or fatal injury may be caused as a result.



The optional electro-hydraulic single lift makes it possible to deposit the crop using either the right or left rotor.

Single swath with left rotor

- Switch on the pilotbox and set the 3-way switch to "C".
- Raise the right rotor using the tractor's single-acting hydraulic control device.
- Switch the 3-way switch to the neutral position and switch off the pilotbox.
  - The left rotor picks up the crop.

Single swath with right rotor

- Switch on the pilotbox and set the 3-way switch to "C".
- Raise the left rotor using the tractor's single-acting hydraulic control device.
- Switch the 3-way switch to the neutral position and switch off the pilotbox.
  - The right rotor picks up the crop.

Working speed

WARNING

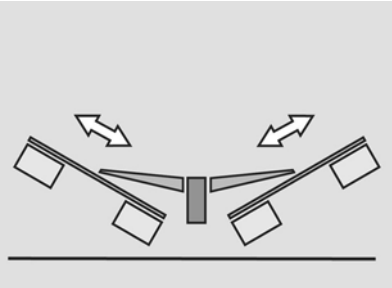
Prevent crossing swathes
As a general measure, prevent the crossing of mowing swathes. The crop is distributed unevenly and the machine is subjected to abrupt stresses. Damage to the machine may be caused as a result.

Allow ample space when driving around obstacles
Obstacles must be circumnavigated in good time and at a distance. Due to the large width and length of the machine, it reacts slowly and tends to overrun. Damage to the machine may be caused as a result.

A constant working speed is essential for uniform crop processing. The working speed should be set between 4 and 12 km/h (between 2.5 and 7.5 mph) at which the crop is picked up cleanly and completely. The working speed depends on the machine settings, on ground and crop conditions.

Select a working speed at which the crop is picked up cleanly and completely.

Adjusting the swath width

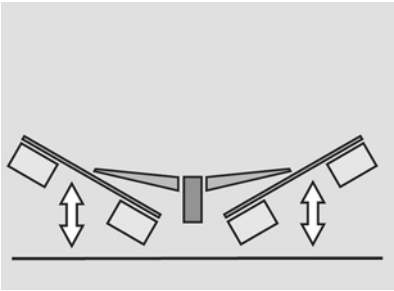


By extending the rotors, the swath width can be adjusted to suit the crop volume and the swath type using the tractor’s double-acting hydraulic control device.

For adjustment of the swath width, the machine should be in the headland position. Otherwise, the machine may be damaged.

- Move the machine to the headland position using the tractor's single-acting control device.
- Use the tractor‘s double-acting hydraulic control device to increase the pressure in order to extend the swath width.
- Use the tractor‘s double-acting hydraulic control device to decrease the pressure in order to reduce the swath width.

Driving on headlands



WARNING

Observe the contour of the terrain
Pay even more attention when driving on an incline. Avoid inclines on which the combination (tractor and machine) could slip or overturn. There is an increased risk of tipping and injury in a position at right angles to the direction of the slope.

Before raising, reduce the tractor speed and tine rotational speed
Before raising to the headland position, significantly reduce the speed and PTO stub shaft speed. Only raise the machine to the headland position so that the inner side devices are horizontal. Otherwise, damage to the machine may be caused as a result.

Observe the slewing range
The rear wheels of the tractor must not come into contact with the drawbar or the attachment carrier when cornering. This may happen when turning sharply. Unsuitable driving behaviour can cause serious damage.

Check the steering angle
Always observe the steering angle from the tractor to the first rotary assembly, and the angle of both rotary assemblies in relation to each other. If one of the angles – between the tractor and the first rotary assembly, or between the two rotary assemblies – is less than 90°, damage to the machine or injury may be caused as a result.

The rotors can be raised for crossing swaths that have already been harvested.

Manoeuvring which involves tight turns on the field must only be performed at walking speed.

- Before raising, significantly reduce the speed and PTO stub shaft speed (≤ 4 km/h).
- Switch off the tractor PTO shaft drive.
- Move the machine to the headland position using the tractor's single-acting control device.
- Lower the rotor again, in order to create new swath.

Check list for operation

☑ Guard bar folded down?

☑ All tine supports fitted and secured?

☑ Swath former adjusted and secured?

☑ All lynch pins secured?

☑ Machine set correctly?

Safety

The following applies to all cleaning and care work:

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury.
See chapter »Safety«, page 7.

Securing the machine

- Switch off the PTO shaft drive.
- Depressurise the hydraulic system.
- Whenever possible, uncouple the tractor.
- Place all controls in neutral or park.
- Set tractor parking brake.

- Switch off the tractor and remove the ignition key.
- Ensure the machine is standing on firm, secure and level ground, and provide additional support, if necessary.
- Secure the machine against rolling away (use wheel chocks).

Only if these regulations are observed can safe working be ensured during care and maintenance work. Unsecured or non-supported machines can cause accidents.

No persons in the working area
Ensure that no persons, especially children, are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. This could result in fatal injury.

Do not clean bearings or hydraulic parts with high pressure cleaners
Do not clean bearings or hydraulic parts with high pressure cleaners. The high-pressure cleaner removes the grease film from the bare metal surfaces. Metal surfaces treated in this way can corrode. After each cleaning procedure, lubricate the bearing points and grease uncoated parts.

Clean the bearings and hydraulic parts with care
Exercise caution when cleaning with a high-pressure cleaner. Bearings, seals and pipe unions are not waterproof. In order to prevent damage to the machine, the bearings, seals and pipe unions must not be exposed to direct contact with the high pressure water jet.

Cleaning and care

General

The following work steps are described in this section:

- »Cleaning«
- »Care«

Cleaning

- Switch off the tractor PTO shaft drive.
- Use the tractor's hydraulic control device to fold the machine into its work position.
- Leave the machine coupled to the tractor.
- Lock the tractor's hydraulic control device.

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Do not clean the bearings and piston rods of hydraulic cylinders using a high-pressure cleaner.
- After each use, clean the machine of any coarse dirt and crop residue.

- Cleaning with solvents may lead to corrosion.

After cleaning

- Lubricate all bearings after cleaning.
  → See chapter »Maintenance« and the following pages.
- Replace missing warning signs and DANGER, WARNING and CAUTION labels.

Care

For a long service life, we recommend the following:

- Apply a protective layer of oil to all uncoated work tools. Only use approved, biodegradable oil, e.g. rapeseed oil.
- Repair any paint damage.

Safety

When setting down and parking the machine, special safety precautions have to be observed:

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury.
See chapter »Safety«, page 7.

Keep children away from the machine
Forbid children from playing on or around the machine. Select a parking area to which no unauthorised persons have direct access. Metal edges and machine work tools can cause serious injury.

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 roll away, particularly on hillside locations. Damage to the machine and serious or fatal injury may be caused as a result.

On uneven terrain, park in the work position only
Always park the machine in the work position on uneven terrain. Secure the machine against rolling away. Machines that are parked in the park position or transport position on uneven terrain could tip over. Damage to the machine and serious or fatal injury may be caused as a result.

Use wheel chocks
Never remove the wheel chocks before the machine has been coupled to the tractor. Persons could be run over by the machine or the tractor. Serious or fatal injury would be caused as a result.

General

The machine must be uncoupled in the reverse order to that in which it was coupled.

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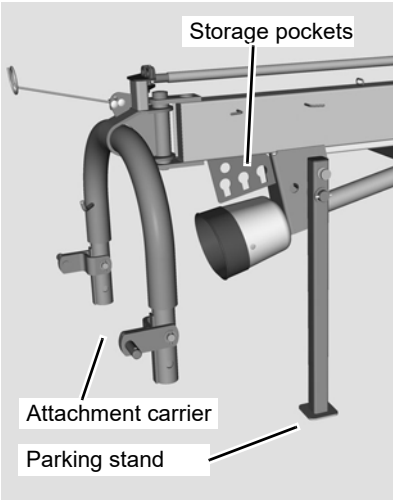
Uncoupling and securing the machine



To uncouple the machine from the tractor, proceed as follows:

- Bring the machine into the transport position.
- Set the machine down on a firm, level surface.
- Secure the tractor against rolling away, turn off the engine and remove the ignition key.
- Secure the machine against rolling away by using chocks.
- Pull off the PTO shaft and place it on the holder provided.
- Close the ball valve and release the hydraulic couplings.
- Place hydraulic couplings in storage pockets.
- Secure all tine supports which have tips that point at right angles to the direction of travel and which are at a height of less than 2 metres with tine covers.
- Disconnect the lighting plug and place it in the storage pocket.
- Lower the parking stand and secure with pins.
- Wind the electric cables onto the hook.
- Lower the lower link until the parking stand rests safely on the ground.
- Release the latch between lower link and attachment carrier.
- Unhitch the machine.

After the end of the season

After the end of the season and if the machine is to be stored for a long period of time, perform the following work:

- Clean the machine thoroughly.
- Check all the screw joints and tighten the screws.
- Repair or replace any damaged components.
- Repair any paint damage.
- Lubricate the machine in acropeance with the lubrication schedule.
- Check the tire pressure.
- Replace missing warning signs and stickers.

For your safety

The following applies to all servicing work:

WARNING

Observe the safety information
Disregard for safety information can lead to serious or fatal injury.
See chapter »Safety«, page 7.

Requirements for maintenance work
Only perform the maintenance work if you have the required expert knowledge and suitable tools. A lack of technical knowledge or suitable tools can cause accidents and injuries.

Protect the machine against unintended starting
The following conditions must be observed for carrying out repairs and maintenance work and rectifying malfunctions on the machine when it is coupled:

- Switch off the PTO shaft drive.
- Place all controls in neutral or park.
- Set tractor parking brake.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Ensure the machine is standing on firm, secure and level ground, and provide additional support, if necessary.
- Secure the machine against rolling away (use wheel chocks).

Serious accidents may be caused if the machine starts unintentionally.

Use OEM replacement parts
Many components have special properties that are decisive for the stability and correct operation of the machine. Only spare parts and accessories supplied by the manufacturer have been tested and approved. Other products may adversely affect the correct operation of the machine and safety. The use of non-OEM replacement parts renders the manufacturer's guarantee null and void and frees the manufacturer from all liability.

Securing moving parts
Moving parts must be secured with lifting gear against sliding, folding or swivelling. Otherwise, serious injury to persons or damage to the machine may be caused as a result.

Disconnect electrical connections before performing welding work
Disconnect all electrical connections from the tractor when carrying out welding on the hitched machine. Otherwise, electrical and hydraulic systems will be damaged as a result.

Protective measures when handling oils or lubricants

Additives in oils and lubricants may have adverse effects on health. As marking in acropeance with the hazardous goods regulation is not necessary, please always ensure the following:

WARNING

Avoiding skin contact
Avoid skin contact with these materials. Protect your skin by means of protective skin cream or oil-resistant gloves. Contact can result in skin damage.

Do not use oils for cleaning
Do not use oils or lubricants to clean your hands. Swarf and abraded material in these materials can also result in injuries.

Change out of soiled clothing
Change out of clothing that is heavily soiled with oil as soon as possible. Oils can be hazardous to your health.

- Used oil must be collected and disposed of.
- If the skin is damaged by oil or lubricant, seek medical advice immediately.

General

This information relates to general maintenance work. For all maintenance work, the machine must be locked in the work position. If the transport position is required for maintenance work, refer to the relevant instructions for the work.

- Lower the machine to the work position.
- Secure the machine against rolling away by using wheel chocks.

Direction information

Direction information (right, left, front, rear) is given in relation to the direction of travel. Rotary direction is defined as follows:

- Rotary direction right = clockwise.
- Rotary direction left = counterclockwise.
- Rotation about a vertical axis, viewed from top to bottom.
- Rotation about a horizontal axis, viewed at right angles to the direction of travel, from left to right.
- The rotation of bolts and nuts, etc. is always viewed from the operating side.

Maintenance terms

Listed in this table are short explanations of the most important maintenance terms.

Task	Explanation
Greasing	Apply grease to the slide surfaces using a brush.
Lubrication	One or two presses of the grease gun, if not specified otherwise.
Oiling	Unless specified otherwise, use only plant-based oils, such as rapeseed oils. The use of used oil will endanger your health and is also strictly prohibited.
Replacement	Replace the appropriate part in acropeance with the instruction in the Maintenance chapter.
Inspection	Check the tire pressure, adjustment dimensions and seal tightness as required, and replace any worn parts or seals.
Observe the maintenance intervals	The specifications relate to an average usage of the machine. If subjected to heavier duty (e.g. by contracting companies), select the maintenance intervals to be shorter. Also, for extreme working conditions (for example heavy dust creation), shorter maintenance intervals are possible.

Lubricant

Gear Oil and Grease used on this machine has to meet the following requirements:

Lubricant	Specifications
Gear oil	SAE 90 API-GL-4 or 5
e.g.: KUBOTA HEAVY DUTY 80W-90 GEAR OIL	
Grease	NLGI GC/LB
e.g.: KUBOTA Polyurea Grease	

Maintenance intervals

	After 5 hours of operation	Once a day	After 20 hours of operation	After 30 hours of operation	After 60 hours of operation	After 250 hours of operation	Once per season	After heavy use	As required	In case of wear	Lubrication	Greasing	Inspection	Replacement	Cleaning	Page
General																
All screws	●						●		●							87
Visual inspection		●						●					●			
Bearing				●	●			●			●					89
Hose connections							●						●			
Air pressure		●							●				●			92
Lighting equipment									●				●		●	
Hydraulics																
Hydraulic hoses every 6 years							●		●					●		93
Hydraulic cylinders							●	●	●				●			
Hydraulic couplings									●						●	
PTO shafts																
Single joints		●	●		●		●	●			●					89
PTO shaft guard		●			●	●	●				●		●			90
Profile section tube		●	●				●					●				90
Gearbox																
Rotor gear									●				●			92
Angular gear									●				●			92

Screwed connections

WARNING

Use original parts
Machine components have special properties that are essential for the stability and correct operation of the machine. Only spare parts and accessories supplied by the manufacturer have been tested and approved. Other products may adversely affect the correct operation of the machine and safety. The use of non-OEM replacement parts renders the manufacturer's guarantee null and void and frees the manufacturer from all liability.

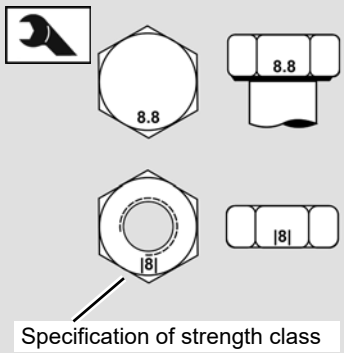
On this machine, screws with a minimum quality of “8.8” (can be seen on the screw head) are used.

Tightening screws

All screws must be retightened:

- After the first 5 hours of operation.
- Acropeing to the frequency of use.
- At least once a season.

Screw and bolt tightening torques



WARNING

Use the correct screw and bolt tightening torque
Securely tighten screws, nuts and bolts to the specified torques. Damage to the machine and serious or fatal injury may be caused as a result.

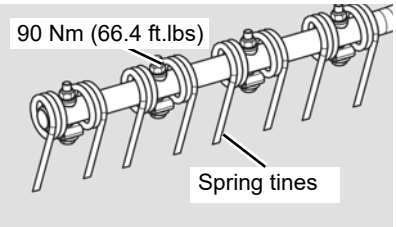
Note the strength class specification for screws, nuts and bolts. Refer to the table for the corresponding tightening torque. Securely tighten screws, nuts and bolts to the specified values, provided that no other value is specified. The torque specifications refer to a dry coefficient of friction (0.12).

	8.8	10.9	12.9
M 6	9.9 Nm (7.3 ft.lbs)	14 Nm (10.3 ft.lbs)	17 Nm (12.5 ft.lbs)
M 8	24 Nm (17.7 ft.lbs)	34 Nm (25 ft.lbs)	41 Nm (30.3 ft.lbs)
M 10	48 Nm (35.4 ft.lbs)	68 Nm (50.2 ft.lbs)	81 Nm (59.8 ft.lbs)
M 12	85 Nm (62.7 ft.lbs)	120 Nm (88.6 ft.lbs)	145 Nm (104 ft.lbs)
M 14	135 Nm (99.6 ft.lbs)	190 Nm (140 ft.lbs)	230 Nm (166 ft.lbs)
M 16	210 Nm (155 ft.lbs)	290 Nm (214 ft.lbs)	350 Nm (258 ft.lbs)
M 20	410 Nm (302 ft.lbs)	580 Nm (428 ft.lbs)	690 Nm (509 ft.lbs)

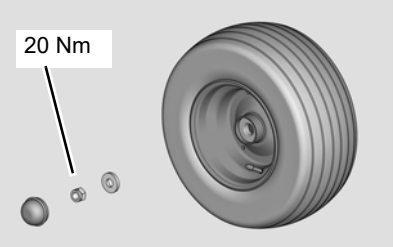
Tighten safety bolts and lock nuts to a 10% higher value.

Special tightening torques

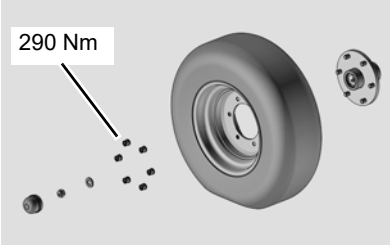
Observe the special tightening torques for the following screw connections:



- 90 Nm (66.4 ft.lbs) spring tines.



- 20 Nm (15 ft.lbs) Rotor chassis wheel nuts.



- 290 Nm (215 ft.lbs) Transport chassis wheel nuts.

Lubrication points for grease

Working with a grease gun
Before applying the grease gun

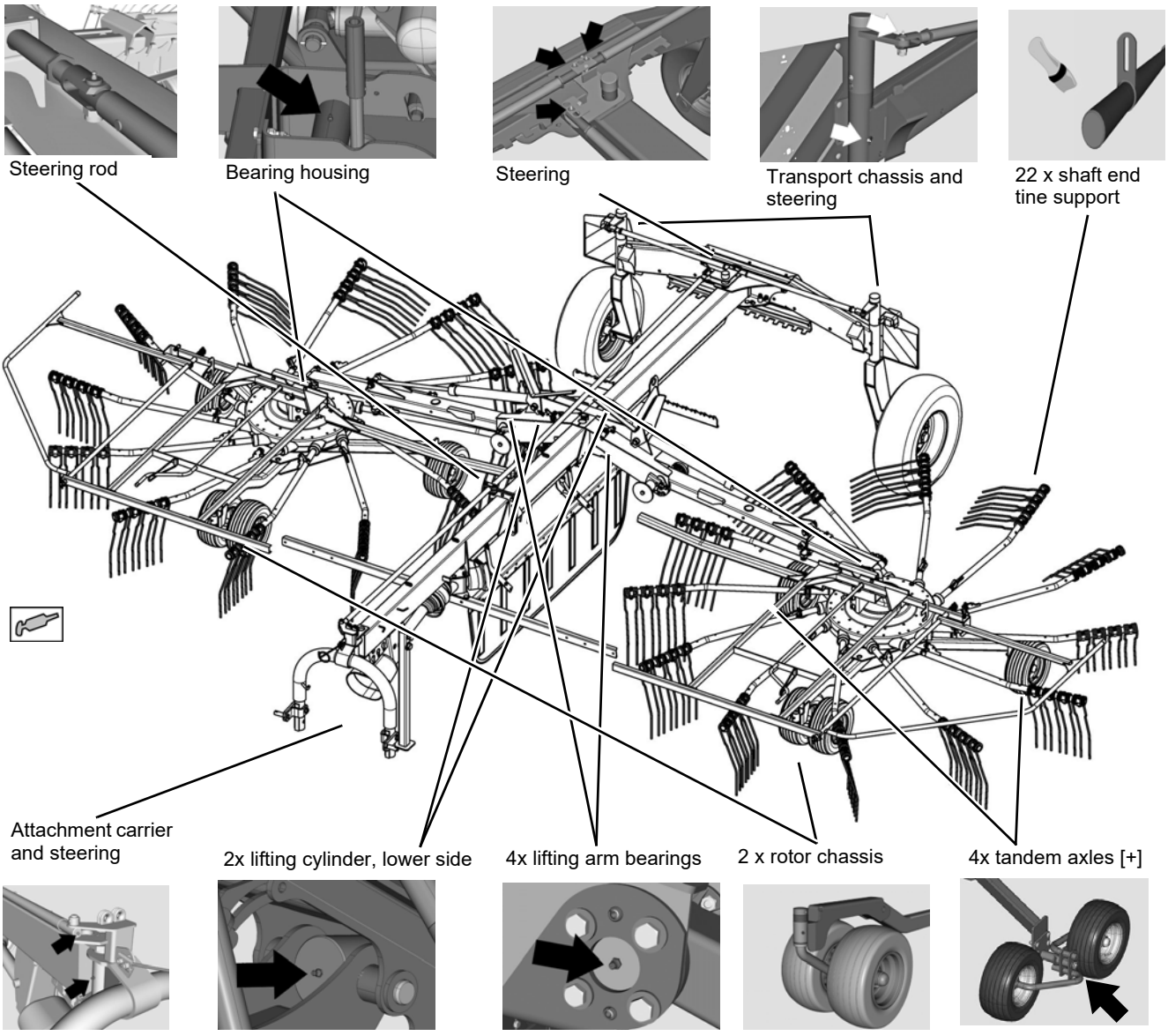
- Clean grease fittings on the machine and gun fittings on the grease gun.

Lubricate the bearings with one or two presses of the grease gun. If you feel resistance at the second press, do not press a second time. Too much grease will force the bearings apart. This could allow dust and dirt to enter the bearing, resulting in premature wear.

Lubrication points are marked with an information label. If any labels are illegible or have been lost, it is possible to order new labels as replacement parts and affix them to the implement.

Lubricate the places listed in the illustration as follows:

- after 50 hours of operation.
- before and after the season.
- each time after cleaning with a high-pressure cleaner.



Lubricating the PTO shafts

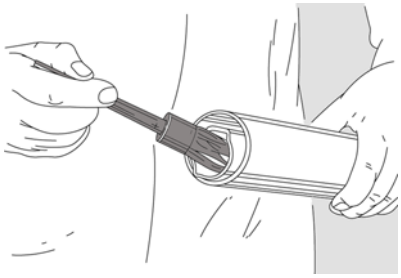
The manufacturer's own operator’s manual is included with each PTO shaft. This includes detailed information on the relevant version of the PTO shaft.

WARNING

Check the guard components
Check all guard components of the PTO shafts for wear or damage (visual inspection). Replace any defective guard components. An unguarded PTO shaft or damaged guard components can cause very serious injuries during operation.

Lubricate the single joints and their couplings as follows:

- after 60 hours of operation.
- before and after the season.
- each time after cleaning with a high-pressure cleaner.



Grease the profile section tubes:

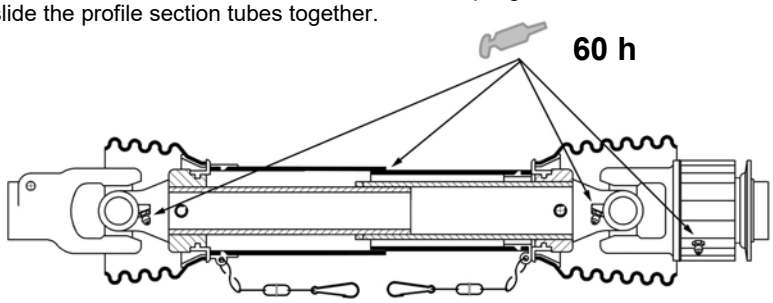
- after 60 hours of operation.
- before and after the season.
- each time after cleaning with a high-pressure cleaner.

Lubricate the guard as follows:

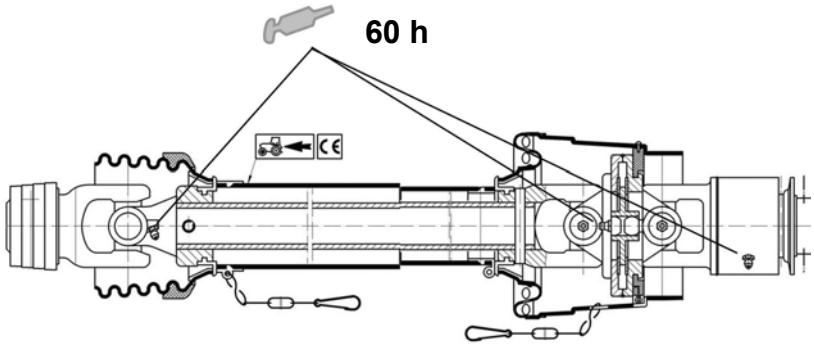
- after 250 hours of operation.
- before and after the season.
- each time after cleaning with a high-pressure cleaner.

PTO shaft for rotors (side shaft)

To lubricate the PTO shaft, remove it on the coupling side and slide the profile section tubes together.



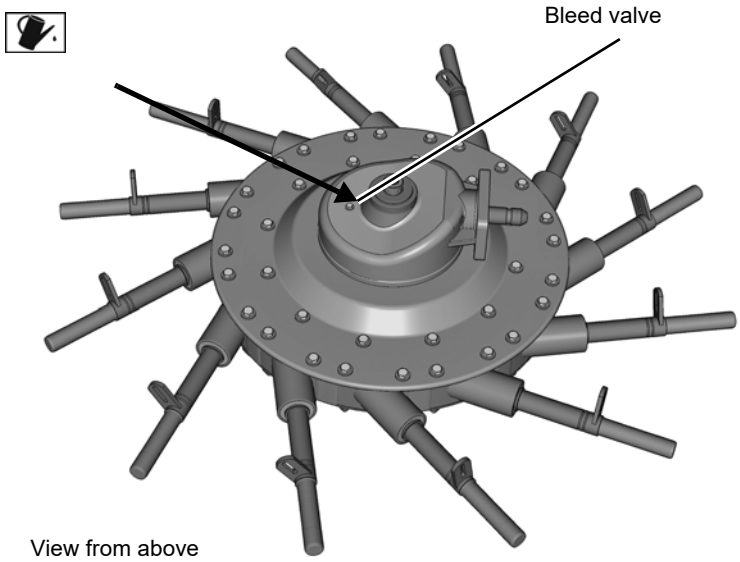
PTO shaft for main drive



Lubricate rotors

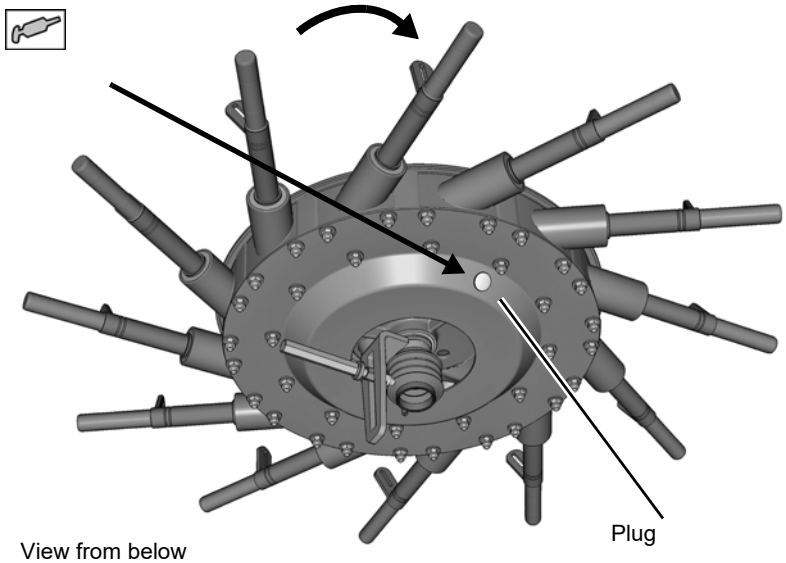
Check the oil level with the machine horizontal only if there is visible loss of oil.

- Check the oil level at both rotor gears using the bleed valve.
- If there is a visible loss of oil, top up to the required volume.



View from above

- Remove all tine supports and the plug under the rotor.
- Turn rotor by hand so that the filling port is between two tine arms.
- Once per season, fill between the cam track with 2-3 pumps on the grease gun.
- Move the rotor further and repeat the process until the cam track is fully lubricated.
- Refit plug and tine supports.



View from below

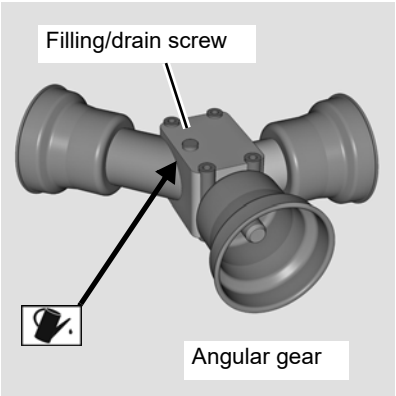
Filling quantities

CAUTION

Observe the correct fill quantities
Observe the correct lubricant fill quantities. Check them regularly. A lubricant level which is too low or too high may result in damage to the machine.

Gearbox	Max. oil volume
Angular gear box (Y-transmission)	0.9 l (0.95 US qt)
Rotor gear, left	0.6 l (0.63 US qt)
Rotor gear, right	0.6 l (0.63 US qt)

Checking angular gear box



- Check the oil level at the angular gear box using the filling/drain screw.
- If there is a visible loss of oil, top up to the required volume.

Tires

WARNING

Do not drive with worn or damaged tires
Replace worn or damaged tires immediately. There is a high risk of accident when driving on the road with such tires.

Tire pressure

Check the tire pressures on a regular basis:

- daily.
- before any road transport
- as required (for example before setting the tine height).
- before and after the season.

	Tire pressure [bar]
Rotor chassis	1.5 bar (22 psi)
Transport chassis	2.5 bar (36 psi)

Hydraulics

WARNING

Hydraulic system at zero pressure
Work must only be performed on the hydraulic system if the tractor and machine hydraulic system is at zero pressure. A pressurised hydraulic system can trigger unforeseen movements on the machine and can cause serious machine damage and personal injury. Serious or fatal injury may be caused as a result.

Exercise caution when welding
Do not perform any welding work in the vicinity of the hydraulic hoses. Hydraulic oil can catch fire very easily.

Clean hydraulic system
Close or disconnect the quick couplings with great care. Remove any dirt or air which has entered the hydraulic system. The hydraulic system may otherwise be seriously damaged. Material damage or personal injury may be caused as a result.

Collect escaping oil
Escaping oil must be collected and disposed of in accordance with national regulations. Otherwise, damage may be caused to the environment.

Hydraulic hoses

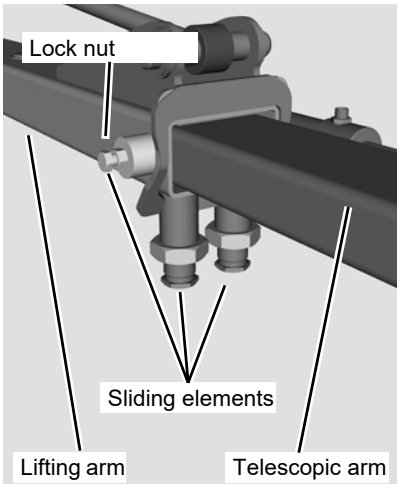
WARNING

Replace hydraulic hoses every six years or earlier
Hydraulic hoses age without showing externally visible signs. Replace hydraulic hoses every six years, or earlier if aging or degradation is visible. Defective hydraulic lines can cause serious or fatal injuries.

Hydraulic hoses age without showing externally visible signs. We therefore recommend replacing the hydraulic hoses every six years.

- Lower the machine to the work position.
- Depressurise the system.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Disconnect the hydraulic hoses.
- Replace hydraulic hoses.

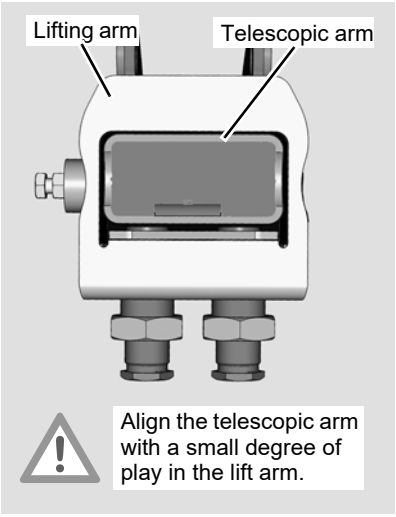
Checking sliding elements



The sliding elements on the two lifting arms ensure smooth and even running of the telescopic arms. The sliding elements must be checked on a regular basis, and readjusted and the sliding surfaces lubricated if necessary.

- Check that the telescopic arms retract and extend correctly in the headland position. Readjust the sliding elements in the case of:
  - Uneven or jerky movements of the lift arms in the headland position.
  - Inclined position of the telescopic arm in the lift arm.
  - Large vibrations of the rotor in the headland position.

Adjusting the sliding elements



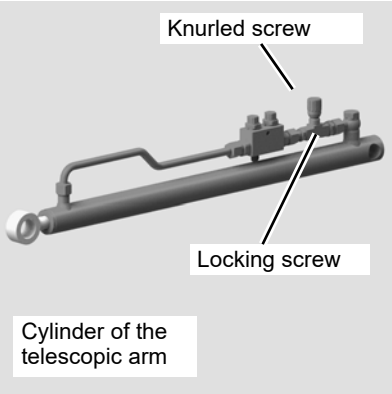
- Fold the machine into its work position.
- Undo the lock nut.
- Adjust the sliding element by means of bolts so that the inner telescopic arm moves in and out evenly and freely in the headland position.
- Tighten the counter nut.
- Using a brush, apply grease to the sliding surfaces of the inner telescopic arms.

When readjusting the sliding elements, make sure that you first tighten the bolts until they lock (max. 20 Nm) (max. 14.75 ft.lbs), then slacken them slightly (approx. 1/2 turn).

- If the sliding elements are fastened too tightly, the telescopic arms will not travel smoothly.
- If the sliding elements are not fastened sufficiently, the rotor will vibrate.

In both cases, this may result in damage to the machine.

Adjusting the cylinder of the telescopic arm



Cylinder of the telescopic arm

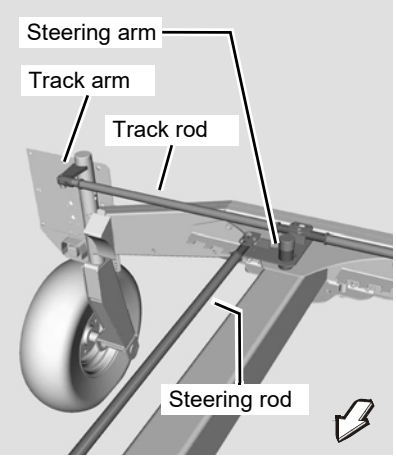
Both telescopic arms must extend and retract evenly and at the same time. The cylinder is adjustable. Proceed as follows:

- Undo the locking screw on the knurled screw.
- Set the lifting speed correctly with the knurled screw.
- Tighten the locking screw on the knurled screw.

Checking the track

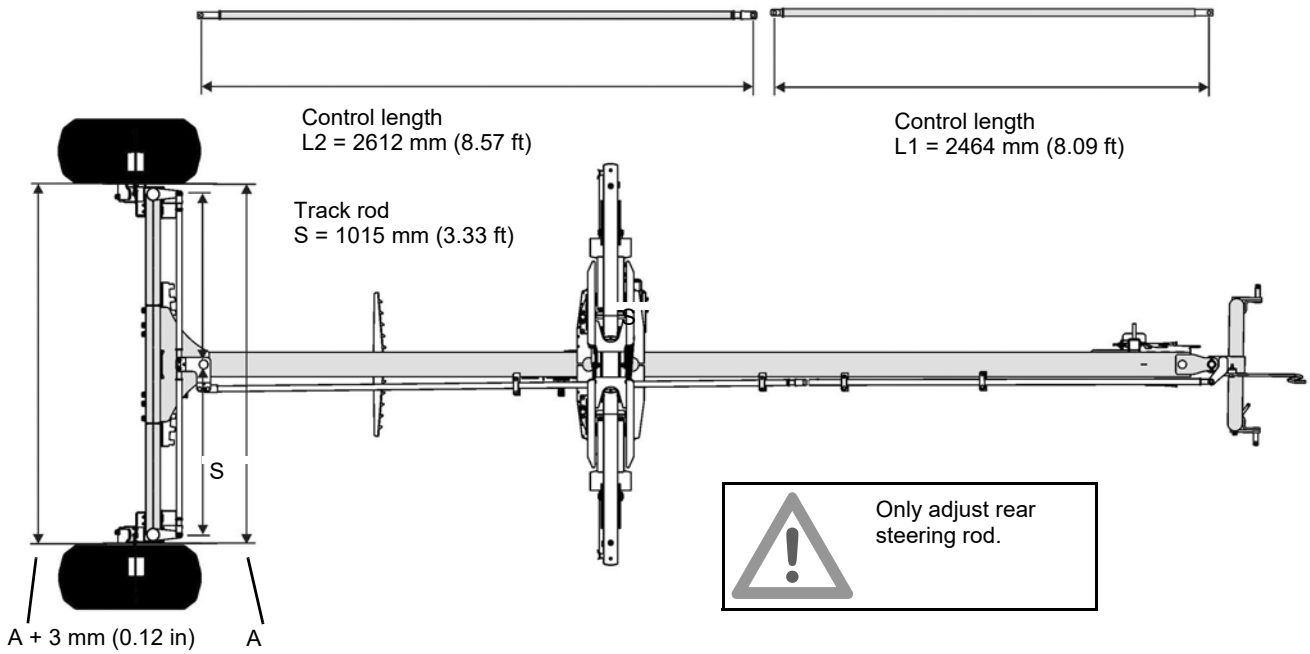
WARNING

Never carry out work on the steering
Contact your dealer if specifications differ. Never carry out any work on the steering or tracking yourself. This can result in traffic accidents and accidents causing serious or fatal injuries.



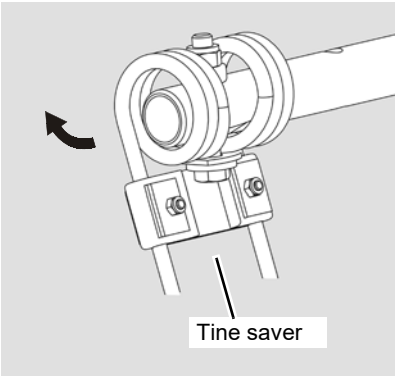
If the machine rolls at an offset angle to the tractor when driving a straight line, the directional stability is set incorrectly. Proceed as follows:

- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Control length
  - of the front steering rod. L1 = approx. 2464 mm (8.09 ft).
  - of the rear steering rod. L2 = approx. 2612 mm (8.57 ft).
  - of the track rods: S = 1015 mm (3.33 ft).
- Check track A at the front and rear sides of the tires.
- Front: A/Rear: A + 3 mm (0.12 in).



Optional additional equipment does not form part of the standard scope of delivery, and, in this manual, is indicated by a plus symbol [+]. Additional equipment is available to order from your dealer.

Tine saver

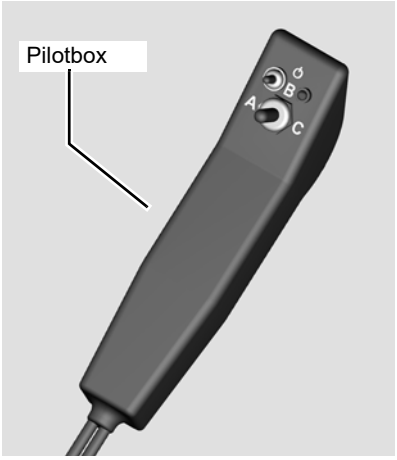


For a good swath deposit, both tine legs must run parallel to one another. This must also be ensured after fitting the tine saver.

Proceed as follows:

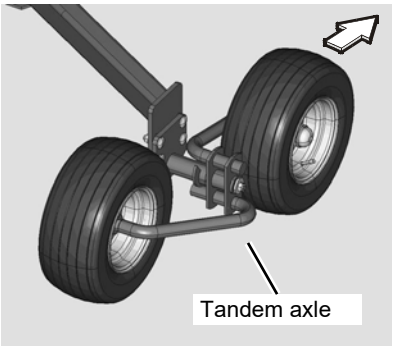
- Fit one tine saver on each tine.
- Check the direction of rotation of the rotor. The nuts must be attached against the rotor direction.
- Check the tine position. The tine legs must be parallel.
- If necessary, loosen the screwed connection until both tine legs run parallel.

Electro-hydraulic single lift



The optional electro-hydraulic single lift makes it possible to deposit the crop using either the right or left rotor.

Tandem axles

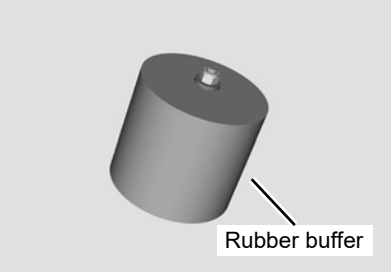


The optional tandem axles make for better contours.

- Note: The wide track is in front.

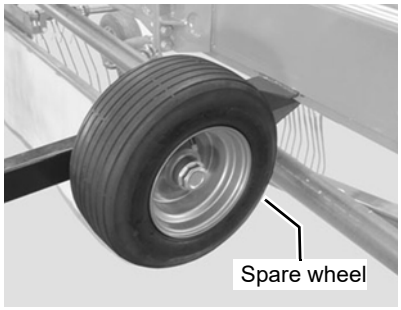
The tandem axles replace the rear running wheels of the rotor chassis. Separate assembly instructions are supplied.

Autan-Buffer



The optional Autan-buffer provides better contour guidance and reduces the load on the lift arms.

Spare wheel



The optional spare wheel is fitted to the guard bar of the machine.

The spare wheel can be fitted to the machine's guard bar. Separate assembly instructions are supplied.

Troubleshooting

Faults can often be eliminated quickly and easily. Before contacting Customer Service, refer to the table to check whether you can remedy the fault yourself.

WARNING

In case of a fault, proceed as follows:

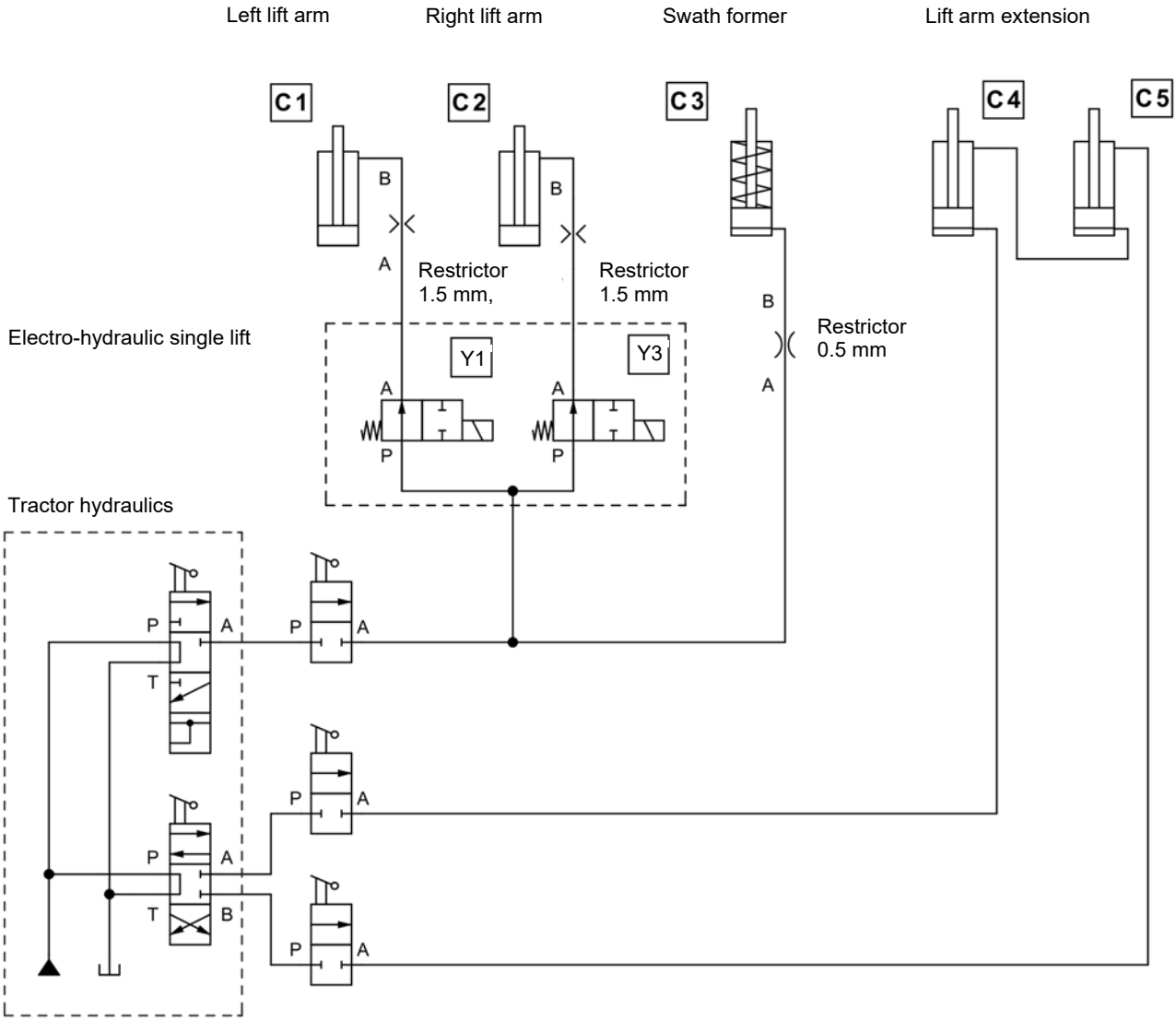
- Immediately stop operation.
- Switch off the PTO shaft drive.
- Place all controls in neutral or park.
- Set tractor parking brake.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Ensure the machine is standing on firm, secure and level ground, and provide additional support, if necessary.
- Secure the machine against rolling away (use wheel chocks).

The fault must be repaired before work can be resumed. Otherwise, damage to the machine and serious or fatal injury may be caused as a result.

Problem	Cause	Solution
Rotor is leaving crop in situ on one side and is digging too deeply into the ground on the other side.	Incorrect adjustment of rotor pitch.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 51
Rotor is leaving crop in situ across the entire width.	Working depth set too high.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 51
Crop is heavily contaminated.	Rotor tines set too low.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 51
		→ Chapter »Coupling the machine«, section »Coupling the lower link«, page 40
Machine not operating cleanly at high speed.	Rotor tines set too high. Uneven terrain.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 51
	Speed too high to process crop mass	Reduce speed.
Rotor dragging crop along – Unclean swath form	Crop mass too large.	Reduce speed.
	Rotary speed too high.	Reduce speed.
PTO shaft coupling responding frequently.	Crop mass too large or uneven.	Reduce speed.
	Rotor tines set too low.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 51
Noise production during work	Loose screwed connections or worn-out tine supports. Tine support bent	Check tine supports and screwed connections on tines.

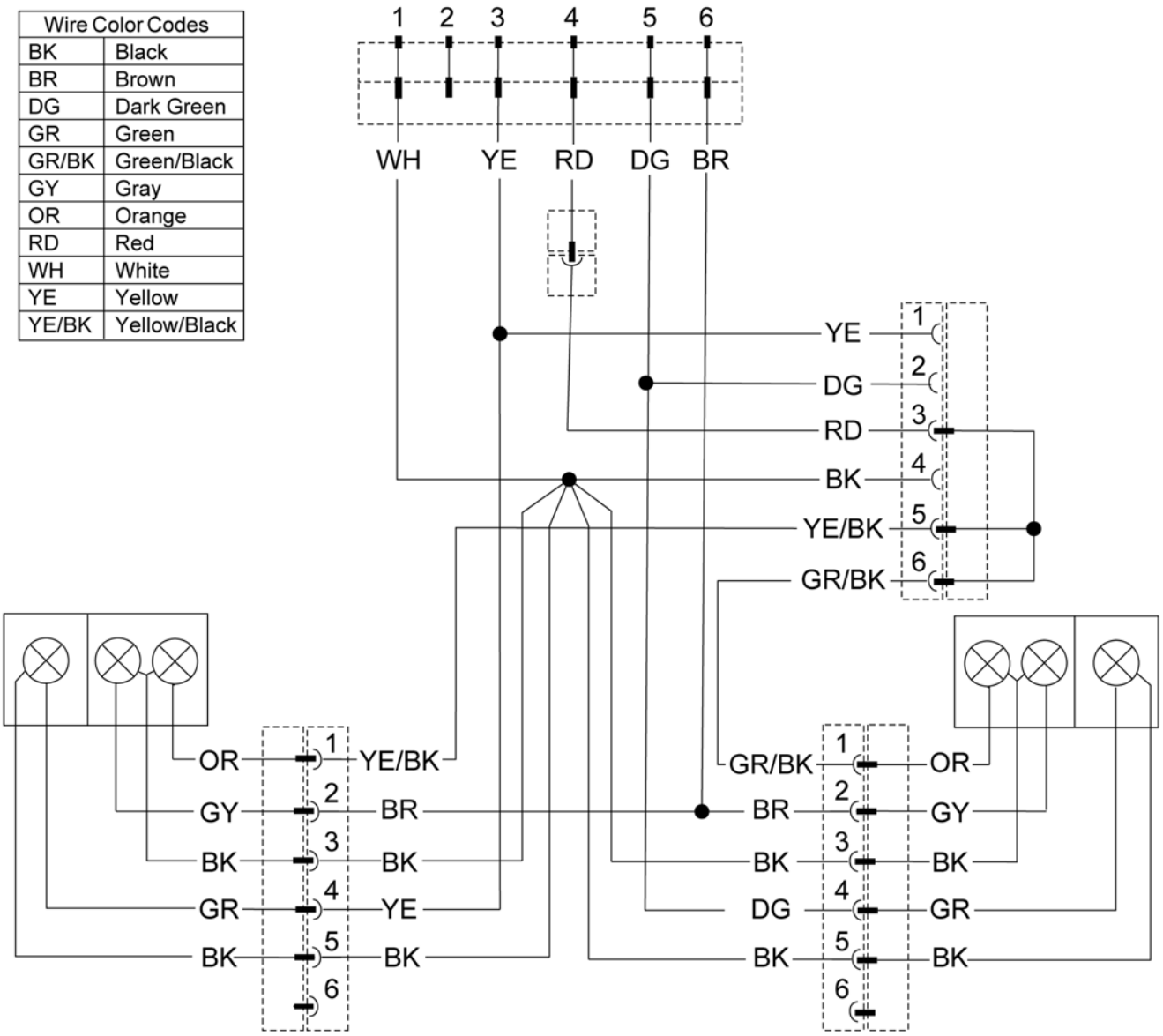
Problem	Cause	Solution
Machine rolls offset behind the tractor when driving in a straight line.	Steering/tracking incorrectly adjusted or worn out.	Contact dealer.
Rotor not working cleanly.	Poor adaptation to the contours of the land due to severe rotor load reduction.	Please consult your dealer. You will find assistance under »Circuit diagrams«, page 101.
Telescopic arms not running smoothly.	Sliding elements wrongly adjusted. Not enough play set.	Adjust sliding elements correctly. See »Checking sliding elements«, page 94.
Attach tine supports to the frame in the headland position.	Sliding elements wrongly adjusted. Too much play set.	Adjust sliding elements correctly. See »Checking sliding elements«, page 94.

Hydraulic circuit diagram



Lighting circuit diagram – USA

Wire Color Codes	
BK	Black
BR	Brown
DG	Dark Green
GR	Green
GR/BK	Green/Black
GY	Gray
OR	Orange
RD	Red
WH	White
YE	Yellow
YE/BK	Yellow/Black



Disposal

During decommissioning, the individual parts must be disposed of properly and in an environmentally friendly manner. Please observe the waste disposal guidelines that are currently in force.

Plastic parts
Plastic parts can be disposed of in normal household waste (residual waste), depending on the laws specific to your country.

Metal parts
All metal parts can be sent for recycling.

Oil
In terms of waste legislation, environmentally-compatible hydraulic oils must be stored, collected and disposed of separately in acropeance regulations.

Rubber
Rubber parts, such as hoses or tires, must be brought to a rubber recycling centre.

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