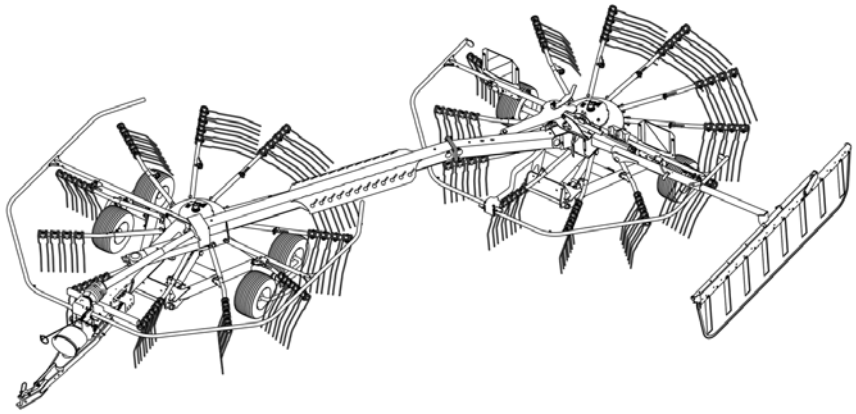

RA2071T EVO

Operator's manual

Original operator's manual

Edition	11.2013
Date of print	07.2014
Language	EN-US
Machine number	VF69626651 –
Model	VF6962
Document number	VF16661531.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	RA2071T EVO
Working width	7.10 m (23.30 ft)
Weight	1350 kg (2976 lbs)
Machine number	VF6962_ _ _ _
Accessories	
Supplier's address	
Manufacturer's address	Kverneland Group Kerteminde AS Taarupstrandvej 25 DK-5300 Kerteminde Denmark Tel: +45 65 19 19 00

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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 to 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 will receive training from your dealer concerning using the controls 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 accordance 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.

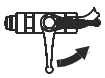
The spanner indicates tips for assembly or adjustment work.

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

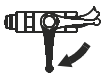
The brush indicates the points that must be lubricated using the brush.

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.

This arrow in the diagram shows the direction of travel.

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.

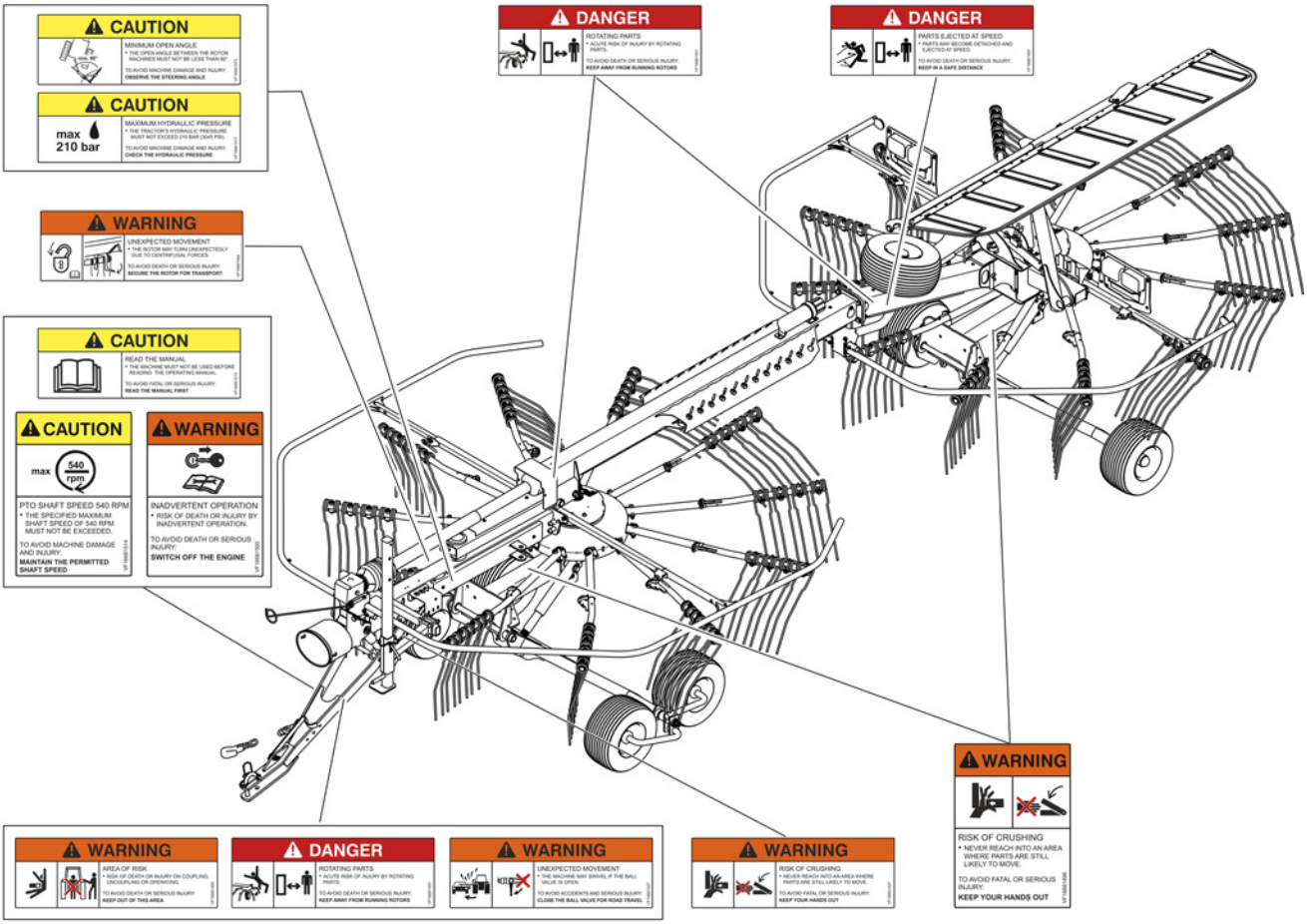
Numerous risks can result from handling agricultural machinery in the wrong way. Therefore, always work with particular care and never under time pressure.

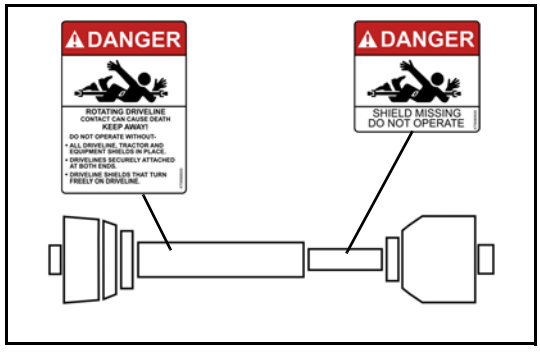
Information for the employer
Inform all persons who work with the machine about this safety information at regular intervals and in accordance with statutory regulations.

DANGER, WARNING and CAUTION labels

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

DANGER, WARNING and CAUTION labels on the machine





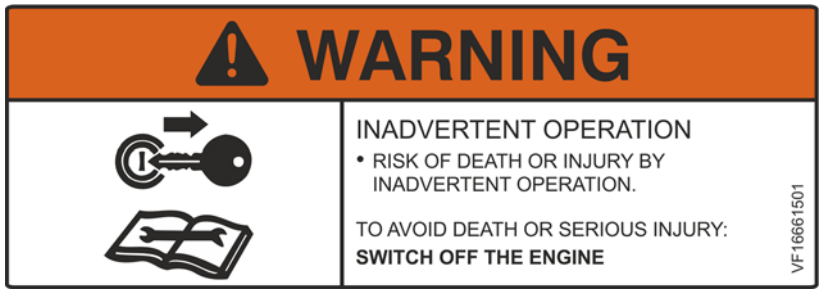
Meaning of DANGER, WARNING and CAUTION labels

Outer tube.

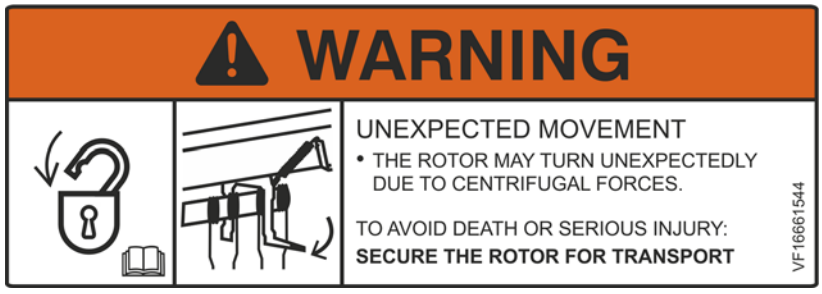
Inner tube.

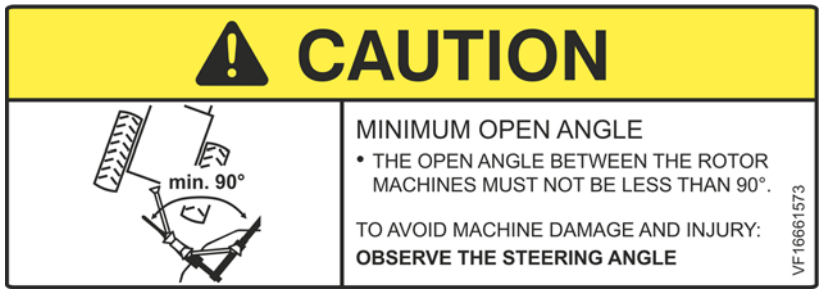

WARNING
RISK OF CRUSHING
• NEVER REACH INTO AN AREA WHERE PARTS ARE STILL LIKELY TO MOVE.
TO AVOID FATAL OR SERIOUS INJURY:
KEEP YOUR HANDS OUT
VF16661497

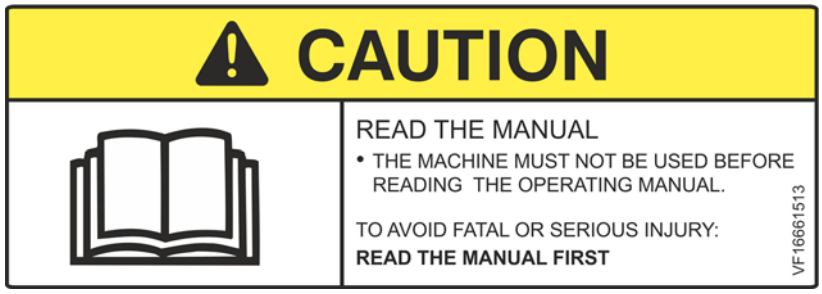

WARNING
AREA OF RISK
• RISK OF DEATH OR INJURY ON COUPLING, UNCOUPLING OR OPERATING.
TO AVOID DEATH OR SERIOUS INJURY:
KEEP OUT OF THIS AREA
VF16661499

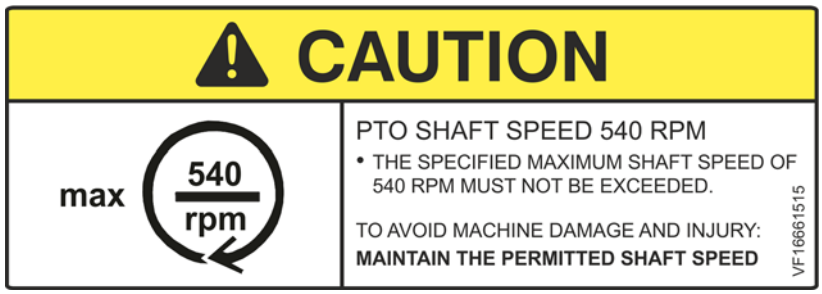

WARNING
INADVERTENT OPERATION
• RISK OF DEATH OR INJURY BY INADVERTENT OPERATION.
TO AVOID DEATH OR SERIOUS INJURY:
SWITCH OFF THE ENGINE
VF16661501

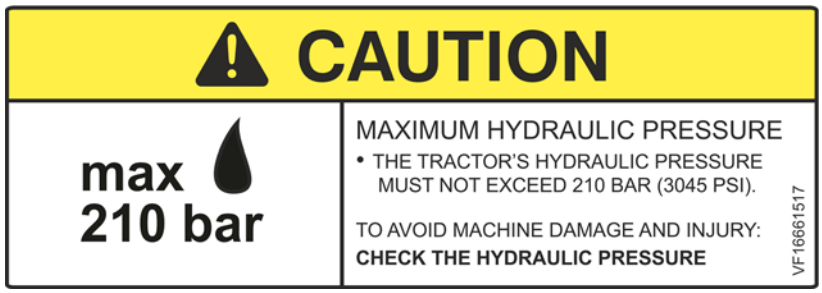

WARNING
UNEXPECTED MOVEMENT
• THE MACHINE MAY SWIVEL IF THE BALL VALVE IS OPEN.
TO AVOID ACCIDENTS AND SERIOUS INJURY:
CLOSE THE BALL VALVE FOR ROAD TRAVEL
VF16661507


WARNING
UNEXPECTED MOVEMENT
• THE ROTOR MAY TURN UNEXPECTEDLY DUE TO CENTRIFUGAL FORCES.
TO AVOID DEATH OR SERIOUS INJURY:
SECURE THE ROTOR FOR TRANSPORT
VF16661544









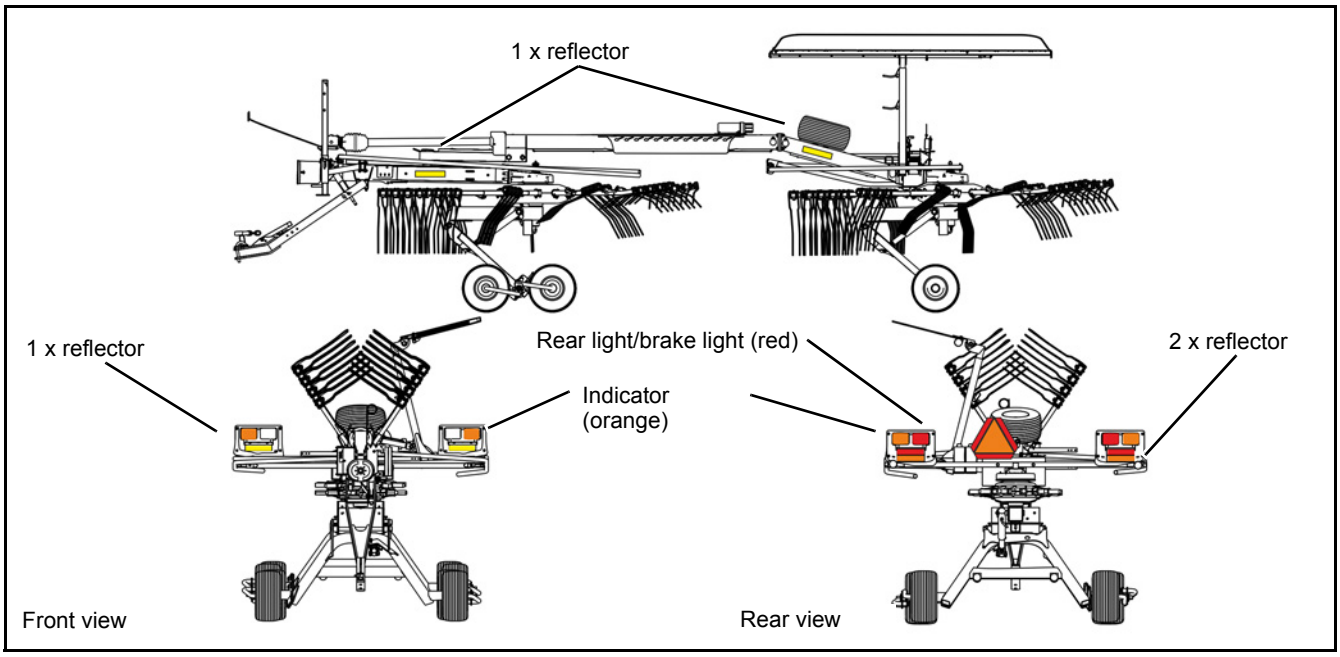
Lubrication points
Lubrication points are marked with an information label. Lubricate the machine in accordance with the instructions in the "Maintenance" chapter.

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 stickers should be replaced. You can obtain new stickers as replacement 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



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?

Only qualified persons may operate the machine
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 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.

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.

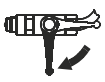
Uniquely coded hydraulic connections
The hydraulic connections are uniquely coded. Only matching hydraulic couplings between the tractor and machine must be connected. Wrongly connected hydraulic couplings can trigger unpredictable movements of the machine.

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 accordingly. A driving style which is not adapted to conditions can cause accidents. Accidents with serious or fatal injuries may be caused as a result.

Safety chain
When travelling on the road, always connect the machine and the tractor using a safety chain. Use a safety chain with a strength that corresponds to at least the total weight of the machine. Otherwise, serious or fatal injuries would 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 accord. 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 »Special tightening torques«, page 90 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.

- 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.

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 »Special tightening torques«, page 90 for proper torque values.

Further regulations

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

- Accident prevention regulations.
- Generally recognised safety regulations, occupational health requirements and road traffic regulations.
- The instructions provided in this operator’s manual.
- Regulations 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 overstressed, or if impermissible modifications are made to the machine.

Range of application

This product is classified as replaceable equipment in accordance with EC directive 2006/42/EC and agricultural implement in accordance with ASABE S390.

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

Proper use

Any use other than the use described above - such as silo spreading, any type of soil preparation, sweeping, or transmitting 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

Versatility – for one single swath or two single swaths
This rake meets all requirements applicable for modern fodder harvesting technology, whether your require a 12.5 m wide double swath for a high-powered forage harvester or small swaths for hay harvesting. The rake can be trailed using the pending attachment, hitch, or lift link drawbar.

The rake can be pulled by tractors of 30 kW (40 hp) or more.

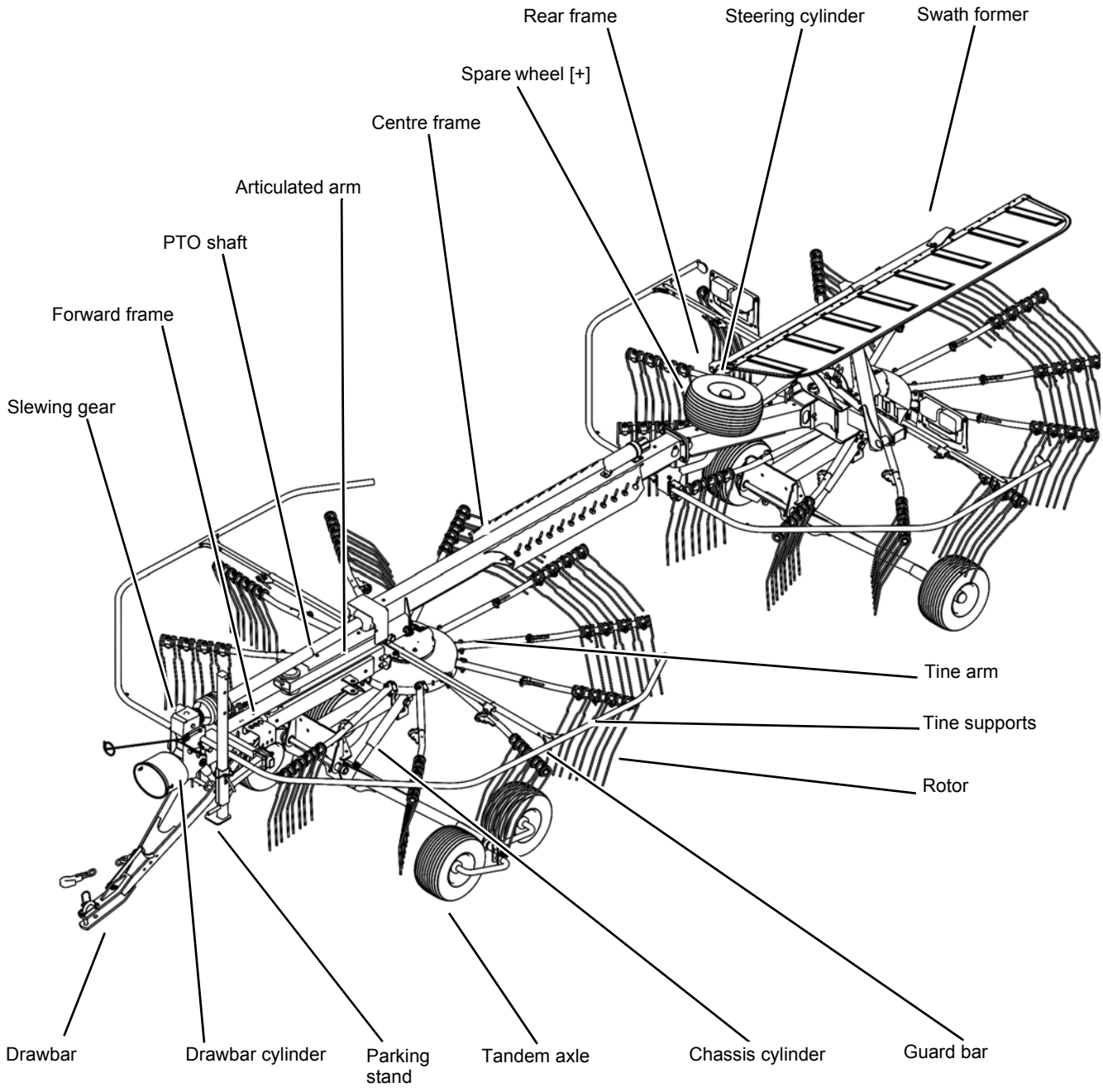
Extensive equipment
The machine has low-maintenance gear boxes and 11 tine arms on the front rotor and 12 tine arms on the rear rotor. Excellent raking quality is achieved thanks to the bent tines. If required, each chassis can be fitted with tandem axles with 18.5" wheels.
Together with the TerraLink support, the tandem axles guarantee excellent ground tracking.

Flexible due to swivelling of the rear rotor
The facility for laterally swivelling out the rear rotor offers many deployment options.

Easy changeover from work to transport position
The rake is easily changed over from the work to the transport position. Hydraulic cylinders raise the rake into the transport position and the rear swath former folds up hydraulically to give a transport width of less than 3.0 m (9.85 ft) with the tine arms fitted. If a smaller transport width is required, the tine arms can be removed and fixed in the park position and the guard bar can be pushed in.

Raise height of 50 centimetres (20 in)
For road transport and on headlands, the machine can be quickly raised by roughly 50 cm (20 in). For working, lower the rotary rakes hydraulically from transport position back to work position.

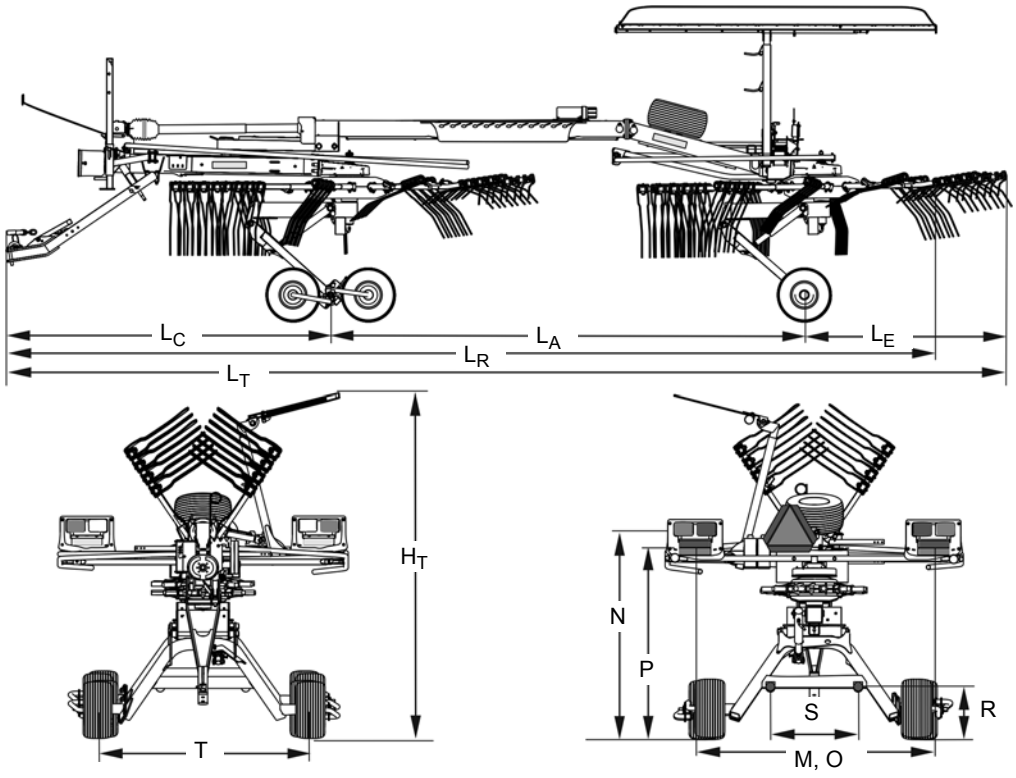
Designation of components



Technical specifications

Dimensions

		Work position [m]	Transport position [m]
L_T	Length, tine supports fitted	–	8.20 (26.90 ft)
L_R	Length, tine supports removed	–	7.55 (24.78 ft)
W_T	Width, tine supports fitted	2.99 - 6.77 (9.81 - 22.22 ft)	2.99 (9.81 ft)
W_R	Width, tine supports removed	–	2.21 (7.25 ft)
H_T	Height	1.90 - 2.40 (6.24 - 7.85 ft)	2.40 - 2.90 (7.85 - 9.52 ft)
L_C	Distance, drawbar eye - 1st axle	2.90 (9.52 ft)	2.80 (9.19 ft)
L_A	Distance, 1st axle to 2nd axle	3.80 (12.47 ft)	
L_E	Distance, 2nd axle to end of machine	0.95 (3.12 ft)	
T	Track width	1.62 (5.31 ft)	
M	Distance, lighting	1.77 (5.80 ft)	
N	Height, lighting		1.54 (5.05 ft)
O	Height, top reflector		1.43 (4.69 ft)
P	Distance, top reflector	1.77 (5.80 ft)	
R	Height, bottom reflector		0.38 (1.25 ft)
S	Distance, bottom reflector	0.65 (2.13 ft)	



Weights

	Transport position [m]	Work position [m]
Total weight	1350 kg (2976 lbs)	
Supported load on the contact roller [+]	130 kg (287 lbs)	120 kg (265 lbs)
Axle load of 1st chassis	620 kg (1367 lbs)	625 kg (1378 lbs)
Axle load of 2nd chassis	600 kg (1322 lbs)	605 kg (1334 lbs)

Tractor equipment required

Output / connections		
	Minimum output of the tractor	30 KW (40 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 - 3046 psi)
	Maximum PTO shaft speed	540 rpm
	Pending attachment	In accordance with ISO 6489-3
	Alternatively: lower link and lift link drawbar	Fixable in height and laterally

Machine equipment

Swath deposit		
	Swath former	Standard
	Swath former for front rotor	[+]
Rotors / tine supports / tines		
	Number of rotors	2
	Number of tine supports per rotor	11 front / 12 rear
	Number of tines per tine support	4
	Removable tine arms	Standard
	Rotor height adjustment	Mechanical
	Hydraulically controlled border swath device	Standard
	Hydraulically raisable swath former	Standard
	Tine saver	[+]
Wheels		
	Single axles	18.5 x 8.50-8
	Contact roller [+]	18.5 x 8.50-8
	Tandem axles, rear [+]	18.5 x 8.50-8
	Roller feeder [+]	18.5 x 8.50-8
Safety accessories		
	Lighting equipment	Standard
	Warning signs	Standard
	Safety chain	Standard
PTO shaft		
	Double wide-angle PTO shaft	Standard

Measurement of airborne sound emissions

The airborne sound emissions from the machine are below the levels stipulated by machinery directive 2006/42/EC.

- 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)

Checking the scope of delivery

Delivery is in the fully assembled state
The machine is delivered fully assembled. Using the check list, 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:

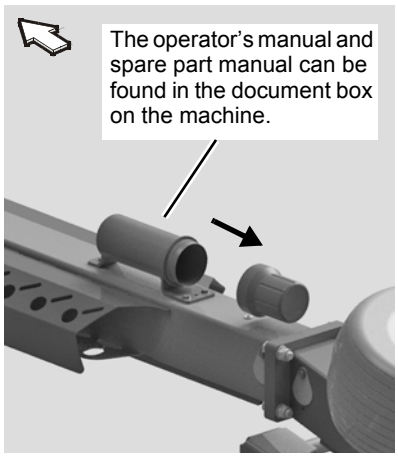
- Observance of the sequence of work steps.
- Compliance with tolerances and torques.
- Knowledge of work safety during assembly.

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.

Check list for parts which were supplied loose	Quantity
PTO shaft for drive	1
Tine support placing swaths on the left	23
Swath former	1
Operator's manual	1
Spare part manual	1
Additional equipment	See delivery note

Operator's manual



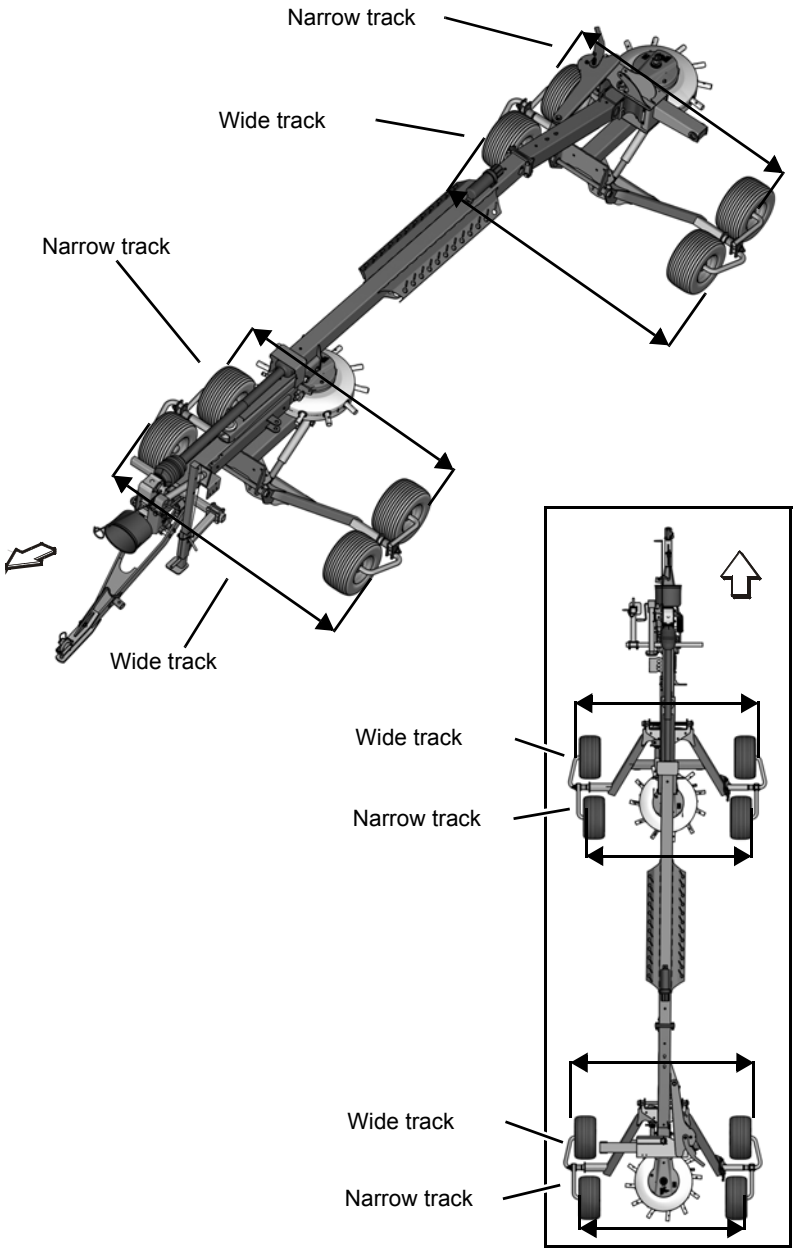
The operator's manual belongs with the machine and must always be kept on board. A document box for the operator's manual and spare part manual is mounted on the main frame.

Check tandem axle

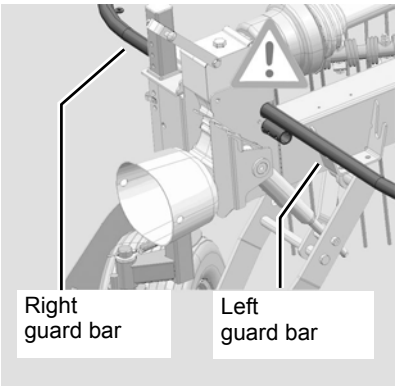
WARNING

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.



Check the guard bars



WARNING

Fit the guard bar correctly
Make sure that you fit the guard bars correctly. If fitted incorrectly, guard bars may cause damage to the machine.

- Insert the left guard bar through the **top** hole and secure.
- Insert the right guard bar through the **bottom** hole and secure.

Length of PTO shaft

The length of the PTO shaft was 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 on each tractor prior to first use.

A manufacturer's operator's manual for the PTO shaft is enclosed. This includes detailed information on the relevant version of the PTO shaft and must be observed.

Safety

WARNING

Switch off the tractor and secure it
Before you dismount:

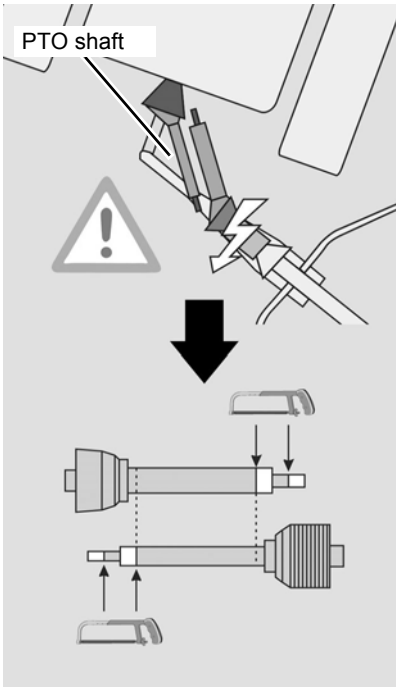
- Disengage the PTO
- Lower all implements to the ground
- Place all controls in their neutral or park position
- Set the parking brake
- Switch off the tractor.
- Remove the ignition key.
- Secure the tractor against rolling away.

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.

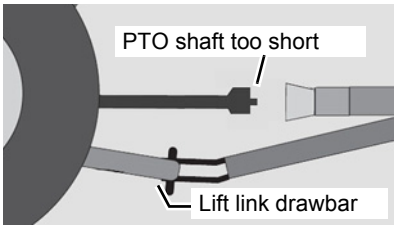
Correct length
A PTO shaft that is too long must not be used. This would result in damage to the drive bearings of the tractor and the machine.

Checking the length of the PTO shaft



- Couple the machine to the tractor without the PTO shaft.
- Completely raise the rotary rake using the tractor's hydraulic control device.
- Park the tractor at full steering lock.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Check the length of the PTO shaft and adjust as required.

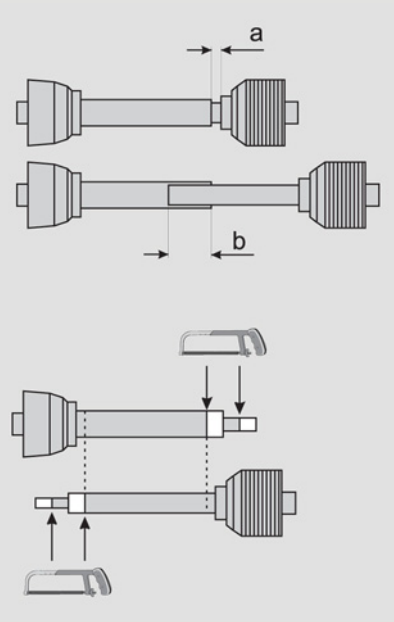
Replacing the PTO shaft



Only for USA and Canada:
For the USA and Canada, a PTO shaft is included in the delivery for the fitting of a pending attachment. This PTO shaft is too short for fitting to a lift link drawbar. A PTO shaft that is too short must be replaced.

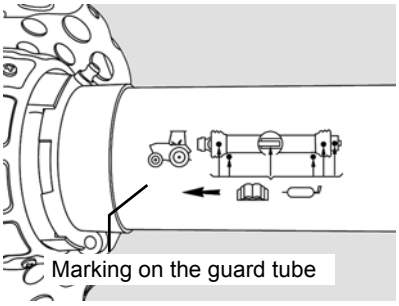
- Check which type of PTO shaft is included in the delivery and, in case of doubt, contact your dealer.

Shortening the PTO shaft



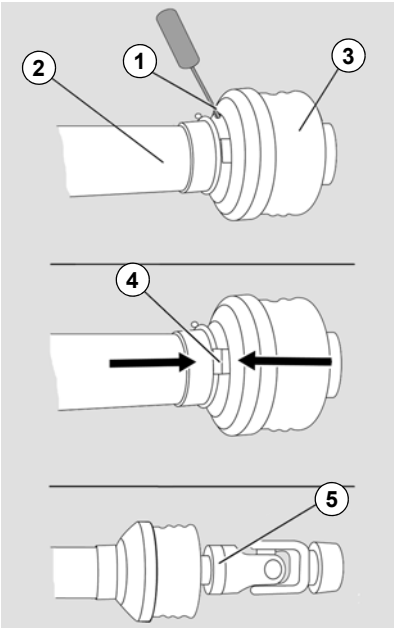
- Pull the PTO shaft apart and connect one half to the tractor PTO shaft drive and one to the machine and secure them.
- Place the two shaft halves next to each other and:
  - Check for a minimum of 250 mm (10 in) overlap (b).
  - Check that the PTO shaft is not blocked at each end Minimum distance (a) = 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.

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.

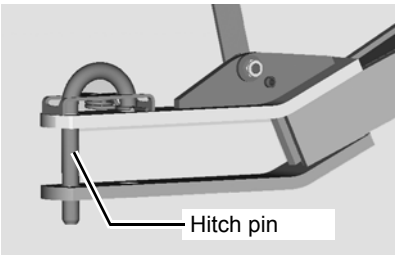
General

The machine is equipped at the factory for coupling to the pending attachment or a lift link drawbar.

The following work steps are described in this section:

- »Coupling the machine«
- »Coupling the PTO shaft«
- »Connections«
- »Hydraulic connections«

Coupling the machine



WARNING

Genuine hitch pins from the manufacturer
Use only genuine hitch pins from the manufacturer. These have the required strength. Other pins can break. The machine may be damaged or accidents caused as a result.

Avoid collisions
The PTO shaft and the drawbar must not collide with the lower link or any other part of the tractor when cornering or turning around. Fasten or remove the lower link and other parts outside of the collision range. Otherwise, damage to the machine or accidents may be caused as a result.

The rotary rake is coupled to the pending attachment or a lift link drawbar with a hitch pin and secured with a safety splint.

→ See »Stowing the height-adjustable parking stand [+]«, page 39.

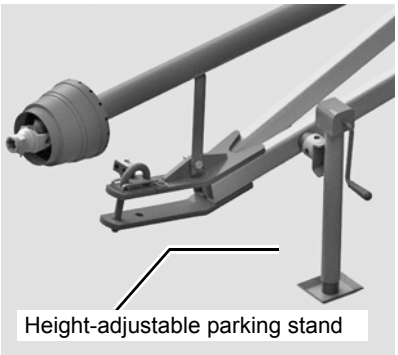
– or –

→ See »Coupling to the lift link drawbar«, page 40.

A freely turnable lift link drawbar is available as an optional accessory for coupling to lower links of category I-II.

→ See »Lift link drawbar«, page 96.

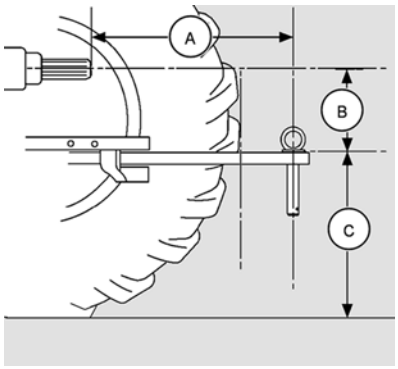
Coupling to the pending attachment



WARNING

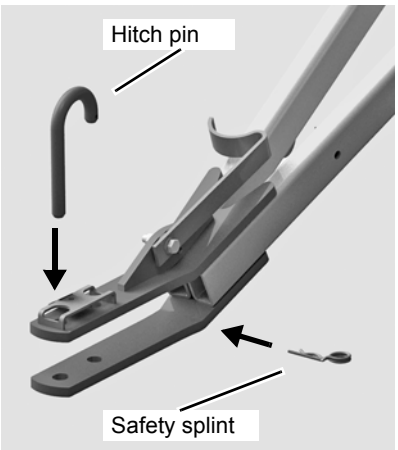
Lock the height adjustment of the lower link
Lock the height adjustment of the lower link. Comply with the tractor operator's manual. Unintentionally raising the lower links can irreparably damage the PTO shaft.

Lock the lateral setting of the lower links
Fix the lower links after coupling the implement. Lateral free movement of the lower links causes unstable drive properties during transport journeys and can cause accidents.



For coupling to a pending attachment in accordance with ISO 6489-3, proceed as follows:

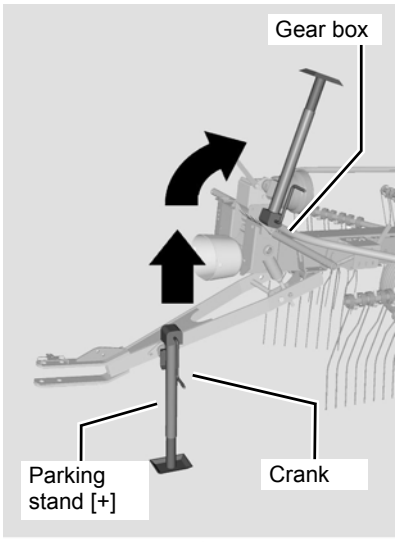
- (A) Distance between the PTO shaft drive and the drawbar hitching point: approximately 356 mm (14 in).
- (B) Height between the PTO shaft drive and the drawbar hitching point: approximately 203 – 305 mm (8.0 – 12.0 in).
- (C) Fix the lower link height at a distance of approximately 400 mm (15.75 in) from the ground.

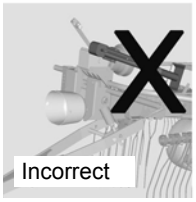


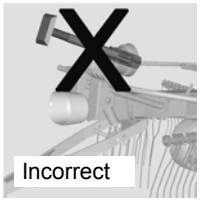
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Take the height-adjustable parking stand [+] out of the transport holder bracket and fit it to the drawbar.
- Adjust the drawbar height using the crank.
- Couple the rotary rake to the pending attachment with a hitch pin.
- Secure the hitch pin with a safety splint.
- Place the height-adjustable parking stand [+] in the transport holder and secure.
- Couple the rotary rake to the pending attachment with a hitch pin.
- Secure the hitch pin with a safety splint.

The working depth is adjusted on the chassis.
→ Chapter »Preparing for use«, section »Rotor pitch«, page 49.

Stowing the height-adjustable parking stand [+]







WARNING

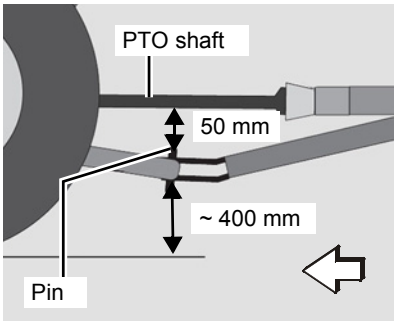
Parking stand in the correct park position
After removing the parking stand from the drawbar, make sure that it is correctly mounted on the machine. Otherwise, the machine may be damaged.

For coupling onto the pending attachment, you require a parking stand [+]. Adjust the drawbar height using the crank. The parking stand is removable. There is a park position bracket on the gear box. Make sure that the parking stand is correctly mounted while in the park position.

For coupling to a pending attachment, a height-adjustable parking stand [+] is required which can be obtained as additional equipment.
→ See »Height-adjustable parking stand«, page 96.

Coupling to the lift link drawbar

The factory-supplied PTO shaft only allows for coupling to the pending attachment. The PTO shaft supplied is too short for coupling to the lift link drawbar. For a longer PTO shaft, please contact your dealer.

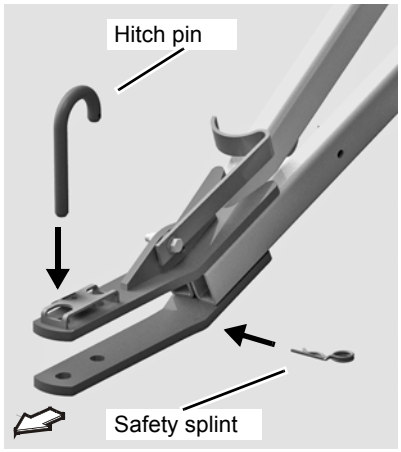


WARNING

Lock the height adjustment of the lower link
Lock the height adjustment of the lower link. Comply with the tractor operator's manual. Unintentionally raising the lower links can irreparably damage the PTO shaft.

Lock the lateral setting of the lower links.
Fix the lower links after coupling the implement. Lateral free movement of the lower links causes unstable drive properties during transport journeys and can cause accidents.

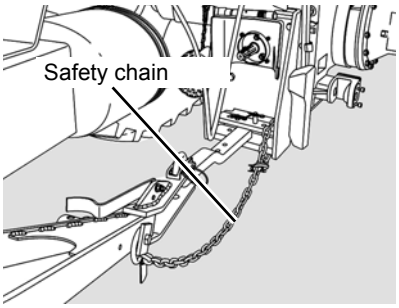
Ensure the minimum spacing
In the work position, the distance between the PTO shaft and the pin must never be less than 50 mm (2 in). Otherwise the PTO shaft may be damaged, for example when driving over an undulation in the ground. Damaged PTO shafts can cause injury to persons or damage the machine.



- Fix the lower link height at a distance of approximately 400 mm (15.8 in) from the ground.
- Couple the rotary rake to the lift link drawbar with a hitch pin.
- Secure the hitch pin with a safety splint.
- Fold in and secure the parking stand.
  → See »«, page 41.

The working depth is adjusted on the chassis.
→ Chapter »Preparing for use«, section »Rotor pitch«, page 49

Safety chain



WARNING

Safety chain
When travelling on the road, always connect the machine and the tractor using a safety chain. Use a safety chain with a strength that corresponds to at least the total weight of the machine. Otherwise, serious or fatal injuries would be caused as a result.

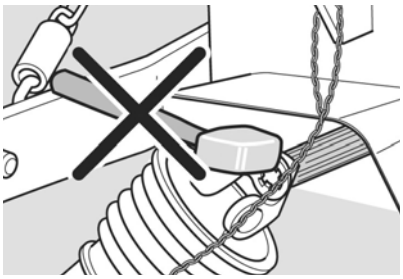
- Fasten the supplied safety chain between the tractor and the machine.

Choose an appropriate length of chain so that the movement of the drawbar is not adversely affected and the chain does not hang down too low.

Also observe the national regulations regarding the length and fitting of safety chains.

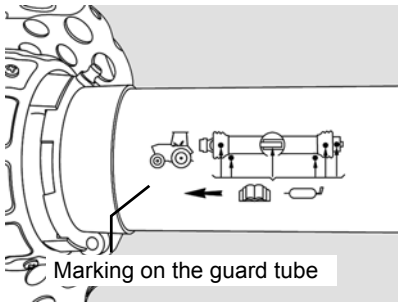
Coupling the PTO shaft

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.

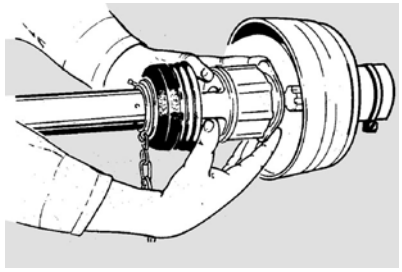


WARNING

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.

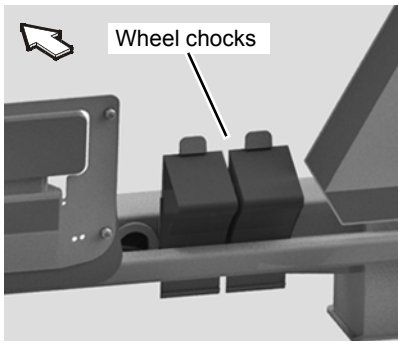


- Check whether the PTO shaft must be shortened before coupling.
- Shorten the PTO shaft if necessary.
  → »Length of PTO shaft«, page 33
- Check that the tractor's PTO stub shaft is clean and lubricated.
- Couple the PTO shaft to the tractor and the machine.
  - Fit the wide-angle joint on the tractor side.



- 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 single joint with slip clutch 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.

- Remove the wheel chocks from in front of the wheels.
- Place them in the holder next to the left-hand warning sign and lock into place.

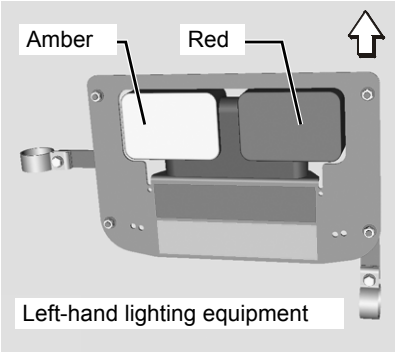
Connections

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



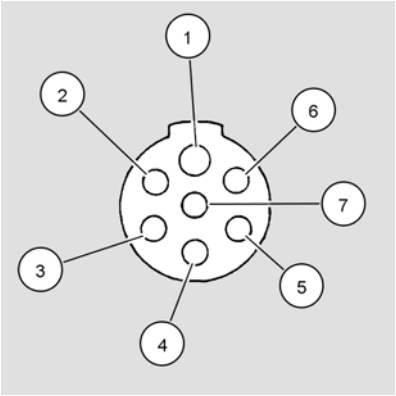
Left-hand lighting equipment

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 lights are only on if the tractor is in park position or the tractor's headlights are switched on.

SAE J560 plug arrangement



PIN	Cable	Connection to
1	White	Earth; all lights
2	Black	Not used
3	Yellow	Left amber flashing light
4	Red	Brake lights
5	Green	Right amber flashing light
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 “OFF”	Off	—	—	Off
Amber indicator “ON”	Flashing (same frequency as right)	—	—	Flashing (same frequency as left)
Brake lights (for tractors with brake lights)	—	Bright	Bright	—
Amber indicator “ON” No turning indicated (tractor with brake lights)	Flashing (same frequency as right)	Bright	Bright	Flashing (same frequency as left)
Amber indicator “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.

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.

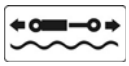
Avoid mixing oils
If the machine is used on different tractors, an impermissible mixing of oil may occur. Impermissible oil mixtures can destroy tractor components.

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

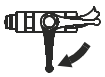
WARNING

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

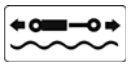


- Set the tractor hydraulics to floating position.

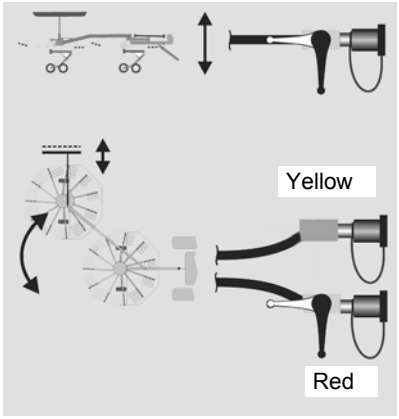
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.



- Close the ball valve.



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

General

The following applies when performing all adjustment work:

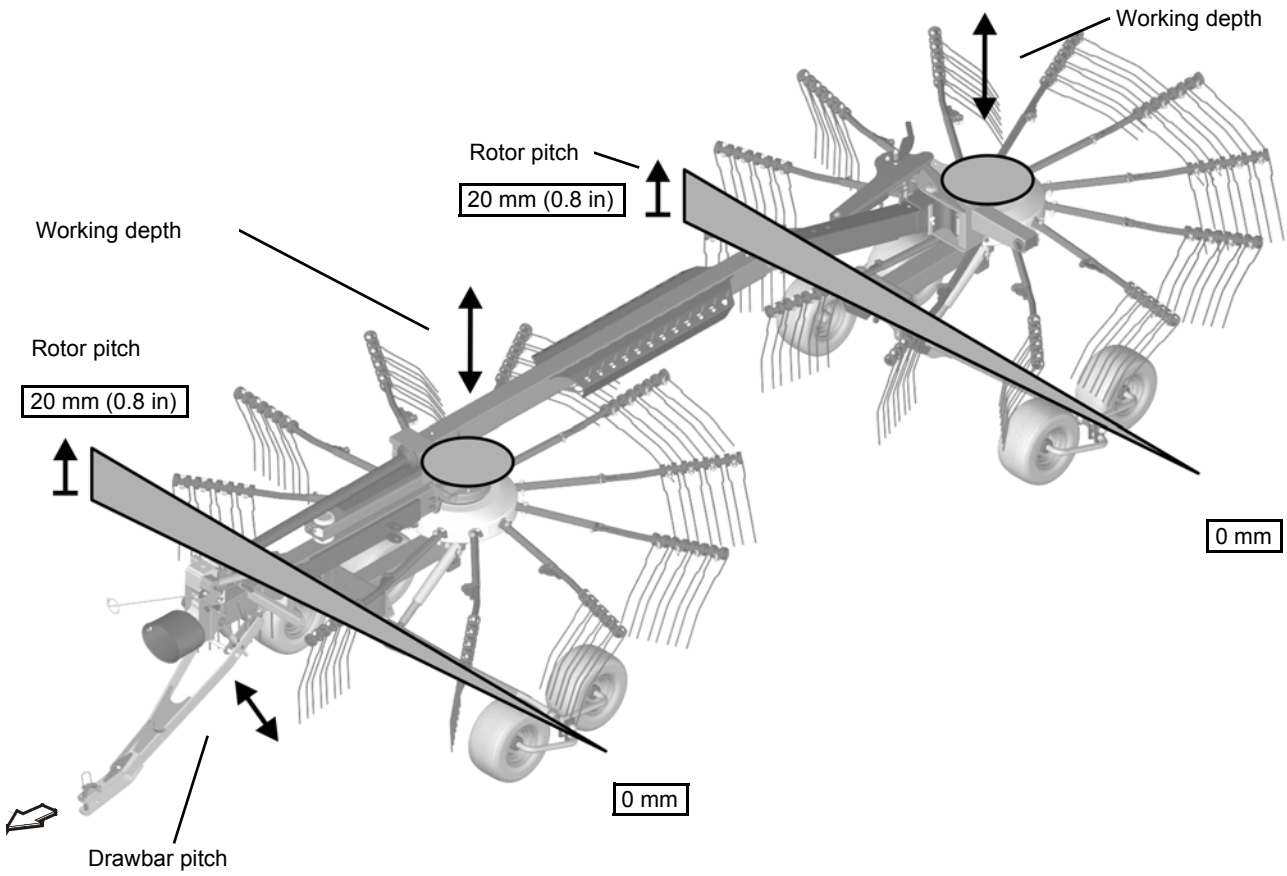
- Check the tire pressure.
- Secure the machine.
- Undo the appropriate bolts.
- Make the required adjustment.
- Retighten the bolts.
- Fit and secure the tine supports.

The following work steps are described in this section:

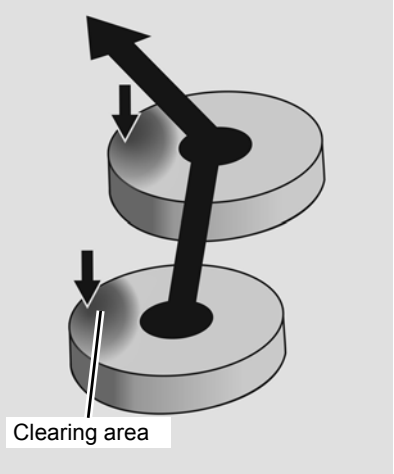
- »Rotor pitch«
- »Working depth«

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.



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.

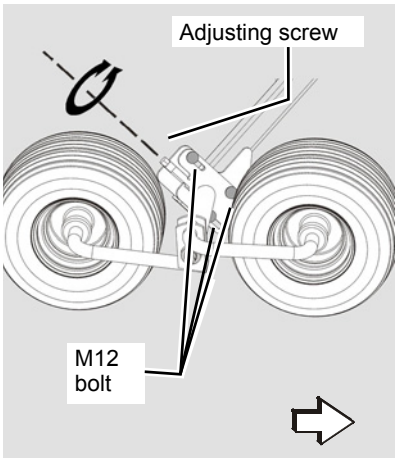
The rotor is inclined at an angle to the chassis so that the crop is picked up in the clearing area. The rotor is already inclined obliquely ex-factory. If the crop is not picked up cleanly, the raking quality can be improved by adjusting the rotor pitch.

The rotor pitch is adjusted as follows:

- Swing the machine into the headland position using the hydraulic control device in the tractor.
- 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.

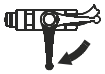
The optimum raking quality is achieved when the tines in the front working area and before the crop is deposited have the lowest possible ground clearance (see adjacent illustration).

Adjusting the rotor pitch



If the crop is not picked up cleanly, the raking quality can be improved by adjusting the rotor pitch. Proceed as follows:

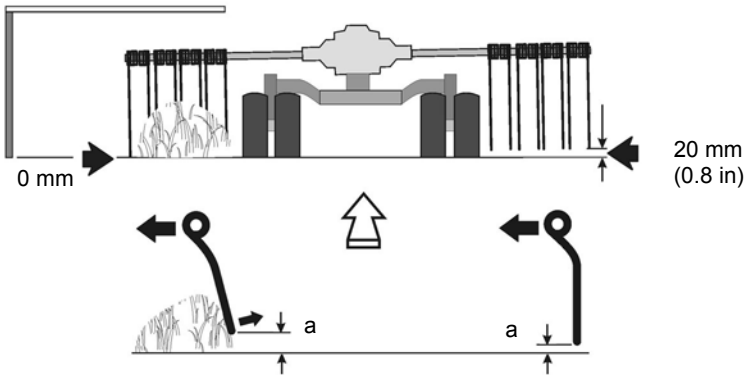
- Move the machine to the headland position using the tractor's control device.



- Close the ball valve.

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

- Remove the tine supports above the right-hand wheel carrier.
- Slightly loosen the three bolts on the right-hand wheel carrier.
- Move the wheel carriers into the required position using the adjusting screw (see illustration below).
- Retighten the bolts to a tightening torque of 85 Nm (62.7 ft. lbs).
- Fit and secure the tine supports.



Crop pickup increases the distance (a) between the tines and the ground.

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.

Working depth

When working, the machine is raised and lowered hydraulically. The machine is lowered as far as the preadjusted depth. The basic setting for the working depth is adjusted using an adjusting screw on the chassis cylinder.

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.

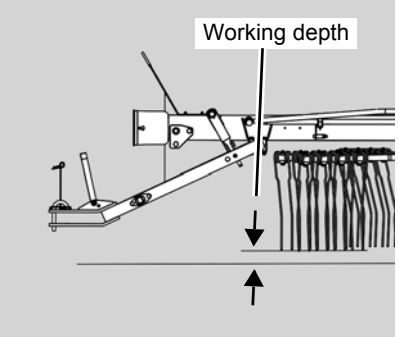
- First set the working depth on the front rotor, as this affects the pitch of the rear rotor, in relation to the direction of travel.
- The rear rotor is inclined forward by approx. 1° (in relation to the direction of travel) ex-works, in order to ensure improved crop pickup. The pitch must not be adjusted.

Basic working depth setting

Before the machine is adjusted for use, the following basic settings are necessary:

- Height of the drawbar or lift link drawbar: approx. 400 mm (15.8 in)
- Check the working depth of both rotors.

Checking the working depth



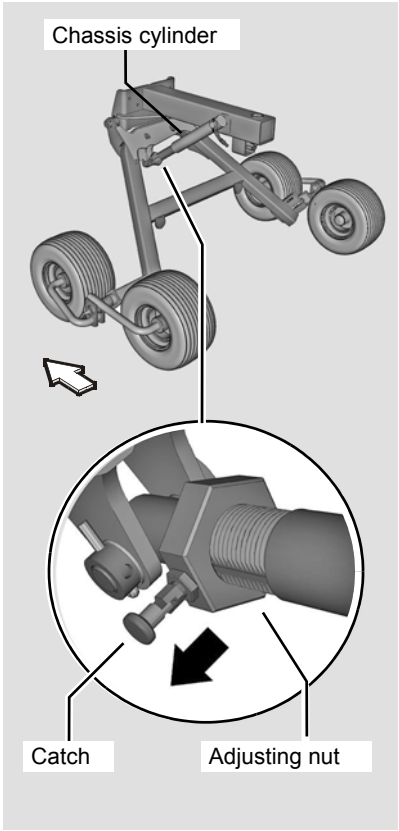
Check the preset working depth as follows:

- Fix the contact roller in the upper position.
- Fully lower the machine using the tractor's hydraulic control device.
- Switch off the tractor and secure it.
- Check the basic working depth setting:
  - The tips of the tines should lightly touch the ground in the clearing area when the height at the hitch is approx. 400 mm (15.8 in).

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

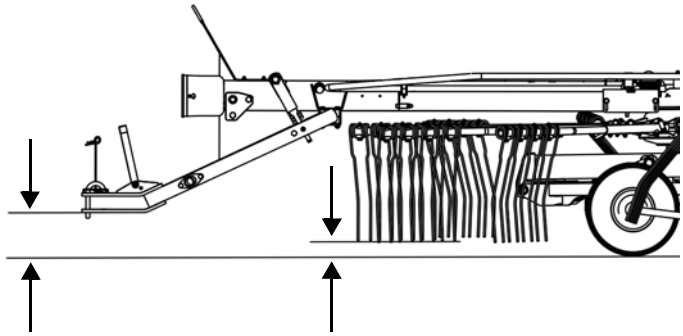
- If necessary, adjust the working depth to the field again.

Adjusting the working depth



The chassis cylinder is used to adjust the chassis end stop in the work position. Start with a horizontal chassis basic setting at a hitch height of 400 mm (15.8 in). The chassis pitch depends on the ground conditions and the crop. Adjust the working depth as follows:
Begin adjustment work with the front rotor:

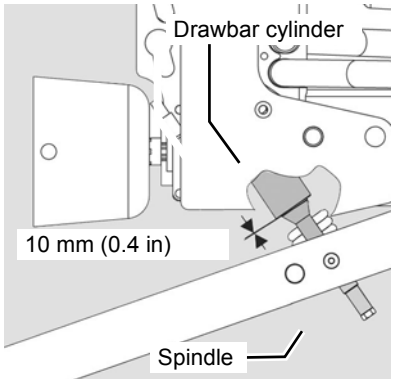
- Use the tractor's hydraulic control device to move the machine into the headland position.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Close the ball valve.
- Release the adjusting nut below the chassis using the catch and use the adjusting nut to adjust the working depth.
- Use the catch to prevent the adjusting nut from moving.
- Switch on the tractor.
- Lower the machine.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Check the working depth and readjust it if required.
  - The tips of the tines should lightly touch the ground in the clearing area when the height at the hitch is approx. 400 mm (15.8 in).
- Set the working depth on the rear rotor.



- Two turns of the adjusting nut change the height by 15 mm (0.6 in) on the tines.

- When using the optional roller feelers axles [+], match and adjust them to the height of the chassis axles.
  Basic setting H = 35 mm (1.4 in).
  → See »Adjusting the roller feelers [+]«, page 55.

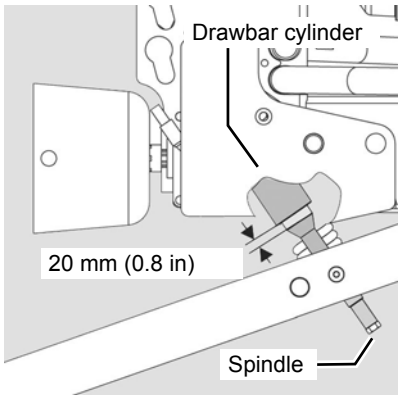
Adjusting the drawbar height



The drawbar cylinder is used to adjust the height of the drawbar and the machine pitch so that the crop can be picked up satisfactorily.
The drawbar cylinder is adjusted differently depending on the equipment: Proceed as follows.

Operation without optional contact roller:

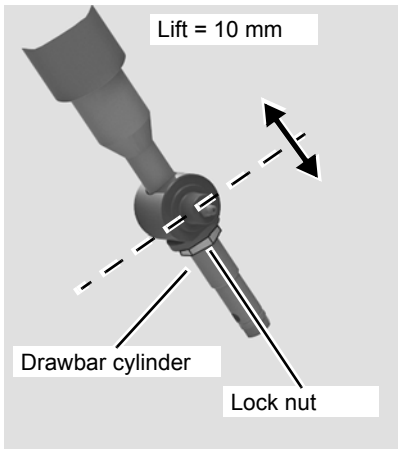
- Fully screw in the spindle on the drawbar cylinder.
- Set the tractor's hydraulic control device to the floating position.



When the optionally available contact roller is used, the spindle on the drawbar cylinder must be adjusted to compensate for the ground undulations.
Adjust the drawbar cylinder only when the load on the drawbar is relieved.

Operation with optional contact roller:

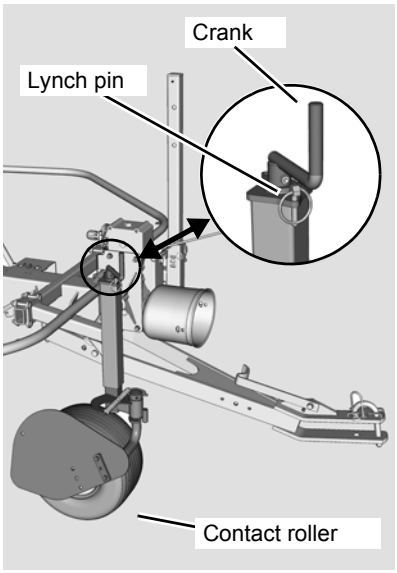
- Relieve the load on the drawbar using the optional contact roller.
- Undo the lock nut on the drawbar cylinder.
- Unscrew the spindle on the drawbar cylinder about 20 mm (0.8 in).
- Tighten the lock nut on the drawbar cylinder.



Spanner size "17" on the spindle

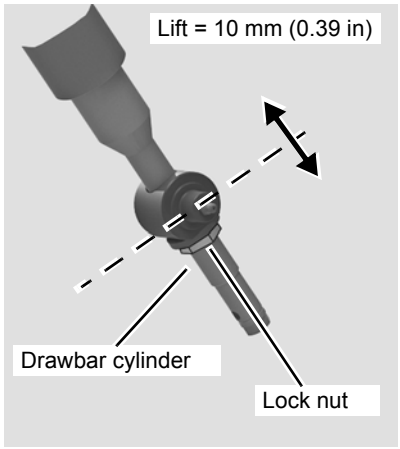
In the case of the optional contact roller, ensure that a lift of at least 10 mm (0.4 in) is always guaranteed for the drawbar cylinder.

Adjusting the contact roller [+]



The raking quality is optimised through the interaction of the working depth and the optional contact roller The machine is tilted forward or backwards using the contact roller. After adjusting the working depth, lower the machine:

- Adjust the drawbar cylinder for using the optional contact roller.
  → See »«, page 41.
- Use the tractor's hydraulic control device to lower the machine into the work position.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Close the ball valve.
- Release the lynch pin from the crank.
- Adjust the contact roller using the crank.
- Secure the crank with the lynch pin.



When the optionally available contact roller is used, the spindle on the drawbar cylinder must be adjusted to compensate for the ground undulations. Adjust the drawbar cylinder only when the load on the drawbar is relieved.

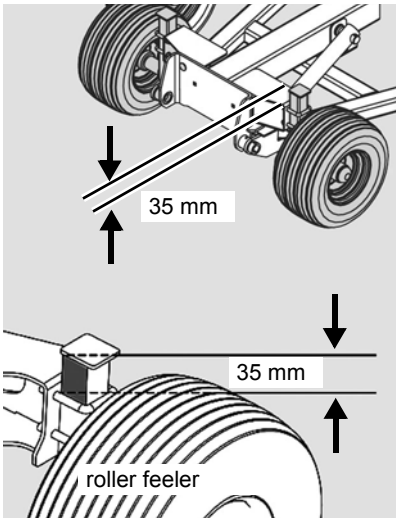
Operation with optional contact roller:

- Relieve the load on the drawbar using the optional contact roller.
- Undo the lock nut on the drawbar cylinder.
- Unscrew the spindle on the drawbar cylinder about 10 mm (0.4 in).
- Tighten the lock nut on the drawbar cylinder.

Spanner size "17" on the spindle

In the case of the optional contact roller, ensure that a lift of at least 10 mm is always guaranteed for the drawbar cylinder.

Adjusting the roller feelers [+]



The optional roller feelers provide improved adaptation to the contours of the land. This height must be adjusted to suit different crops and ground conditions. Adjust the roller feelers as follows:

- Slightly loosen the bolts on the two retainers.
- Match and adjust the contact roller axles to the height of the chassis axles.
  - Basic setting H = 35 mm (1.38 in).
- Tighten and secure the bolts on both retainers.

The roller feelers axles must not be placed under more load than the chassis axles.

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.

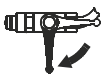
Ensuring road safety
The machine must conform to current national traffic regulations if you intend to drive it on public roads. Ensure the following:

- 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.

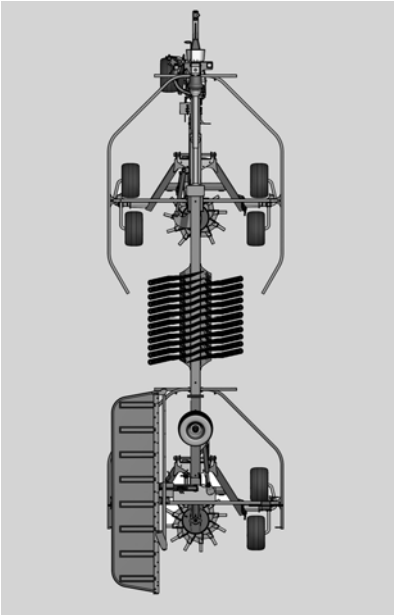
General

The following work steps are described in this section:

- »Moving the swath former to the transport position«
- »Straightening the machine«
- »Additional swath former [+] in park position«
- »Securing the rotors«
- »Checking the machine«

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.

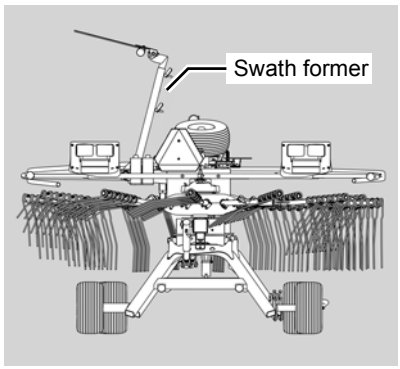
Prior to driving on public roads, the machine must be folded in, secured and moved into the transport position:

- Remove any crop and coarse dirt.
- »Moving the swath former to the transport position«
- »Straightening the machine«
- »Additional swath former [+] in park position«
- »Securing the rotors«
- »Checking the machine«

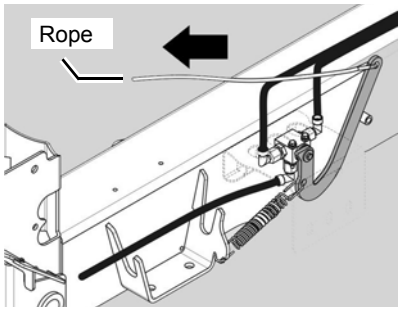
Moving the swath former to the transport position

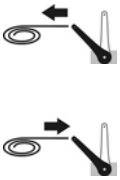
WARNING

No persons within the folding range of the swath former
While the swath former is being folded in, no persons are allowed within the slewing range. Persons might otherwise be hit by the swath former and injured.

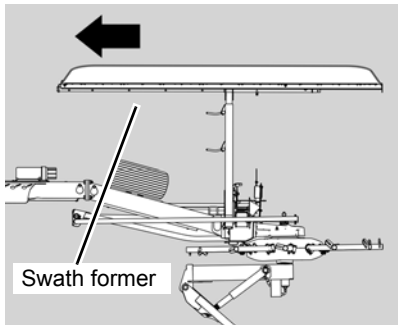


Move the rear swath former into the transport position as follows:





- Pull the rope for the 3-way ball valve to the end stop.
- Use the tractor's hydraulic control device to fold in the swath former.
- Release the rope for the 3-way ball valve.

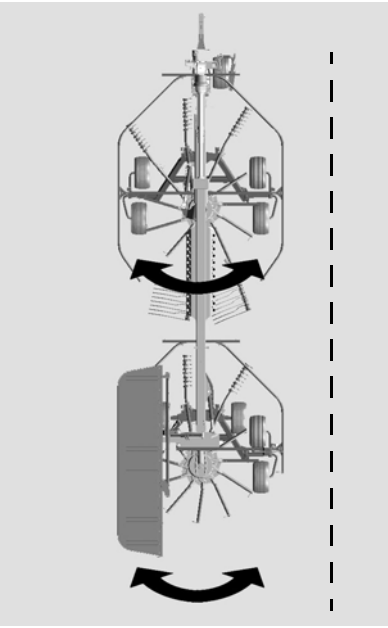


- Move the rear swath former forward in relation to the direction of travel.

Move the rear swath former forwards (in relation to the direction of travel) if it had been moved backwards (in relation to the direction of travel) during operation. Otherwise, the swath former protrudes over the end of the machine.

→ Chapter »Preparations on the field«, section »Adjusting the direction of travel«, page 67

Straightening the machine



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 are present in the slewing and working area of the machine. Persons could be caught by the machine within this area. Fatal injury may be caused as a result.

During transport journeys the rotors must be in line one behind the other. Align the front rotor first of all and then the rear one. Proceed as follows:

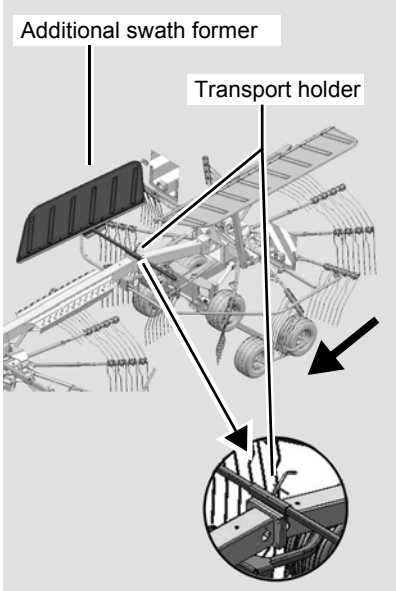
Aligning the rear rotor

- Carefully move forwards and straighten the rear rotor using the tractor's hydraulic control device.

Additional swath former [+] in park position

WARNING

Risk of collision
The additional swath former must be pushed to the **right** into the transport holder in the direction of travel. Otherwise, there is a risk of collision when folding in the rear swath former.



When it is not being used or during road transport, place the additional swath former in the park position from the right and secure it. Proceed as follows:

- Loosen the T-bolts for the additional swath former on the front rotor.
- Remove the additional swath former from the front rotor.
- Push the additional swath former into the transport holder from the right and secure in place.

Removing the tine supports

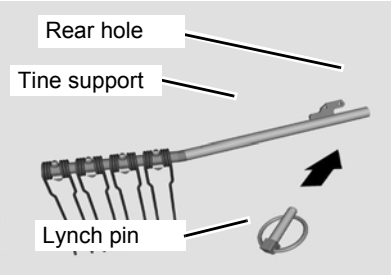
WARNING

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.

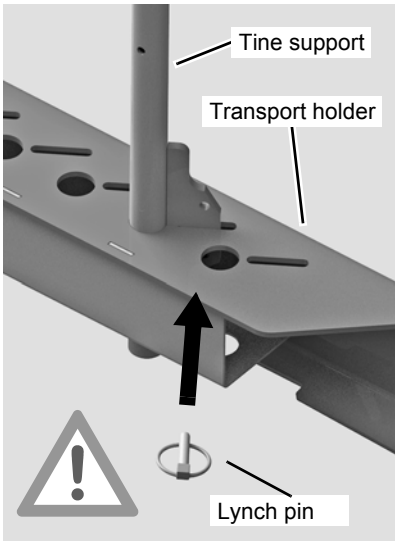
For road transport, all tine supports are removed and stowed in the transport holder. Exception: centre tine support for securing the rotor.

- Remove any crops and coarse dirt.
- Do not remove 3 of the tine supports on each rotor and secure using a rotor securing device.

Placing the tine supports in the transport holder

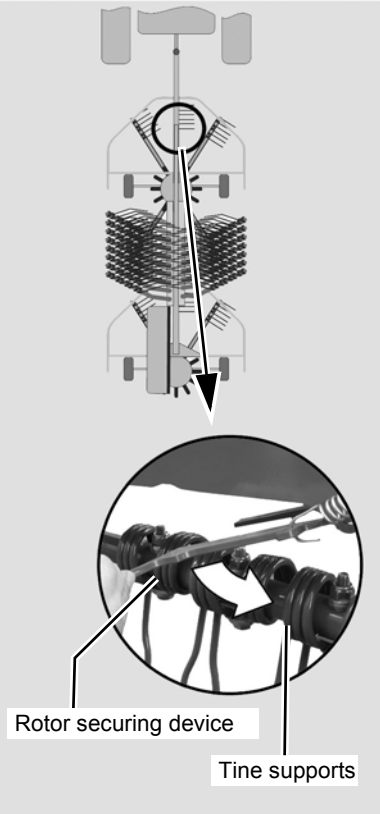


- Remove the tine supports from the rotor and secure them in the transport holder.
- Pull off the tine supports.



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

Securing the rotors



WARNING

Securing the rotors
Secure the front rotor before road travel. Unsecured rotors can rotate and the tine supports will protrude beyond the guard bars as a result. Protruding tine supports may cause accidents with serious injuries, for example to pedestrians.

A maximum of 6 tine supports can remain inserted on the front rotor for transport journeys:

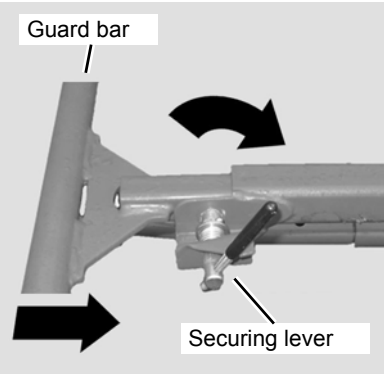
- 3 tine supports to the front in the direction of travel
- 3 counter to the direction of travel

Only three tine supports may remain on the rear rotor during road transport.

The rotor securing device is located on the front rotor under the frame. The rotor securing device is held by a spring in the park and secured positions. Fix the centre tine support with the rotor securing device as follows:

- Slew the rotor securing device downwards via the centre tine support.

Pushing in the guard bar



To obtain the smallest transport width, the guard bars must be fully pushed in:

- Loosen the securing lever.
- Push in the guard bar and lock the securing lever in place.

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 road transport, check the machine against this check list:

☑ PTO shaft drive off?

☑ Tire pressures correct?

☑ Crop residue and dirt removed?

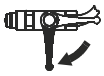
☑ Guard bar phushed in?

☑ Tine supports in the transport holder and secured?

☑ Machine in transport position?

☑ Rotor secured?

☑ When coupling onto the lift link drawbar, is the lower link laterally fixed?



☑ Ball valve closed?

☑ Lighting equipment in good working order?

☑ Safety chain attached?

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

☑ Hitch pins secured?

☑ Parking stand secured in the transport holder?

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:

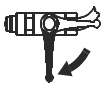
- Disengage the PTO
- Lower all implements to the ground
- Place all controls in their neutral or park position
- Set the parking brake
- Switch off the tractor.
- Remove the ignition key.
- Secure the tractor against rolling away.

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 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.

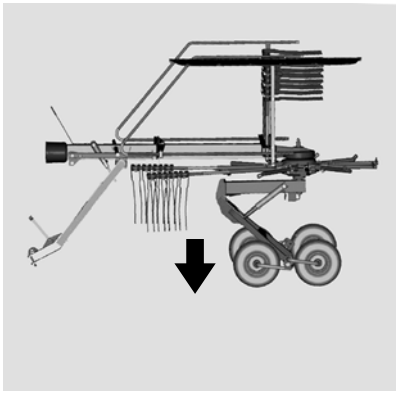
General

The following work steps are described in this section:

- »Lowering the machine«
- »Fitting the tine supports«

Lowering the machine

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



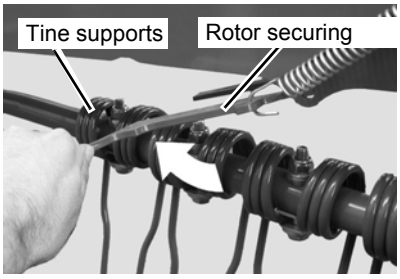
After road transport, the machine is brought into the work position on the field.

- Switch on the tractor.
- Lower the machine to the working 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.
- Switch off the pilotbox.
- Remove the ignition key.

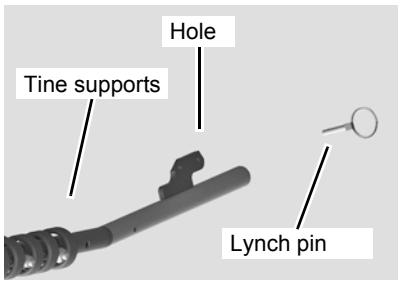
Fitting the tine supports

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.

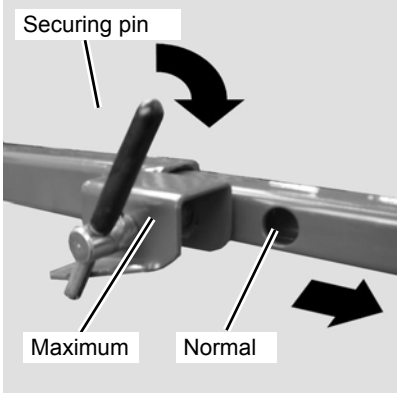


- Release the rotor securing device.



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

Pulling out the guard bar



After attaching the tines, all protective devices around the rotor must be locked from transport to work position.

In the work position, the front guard bar can be locked in two positions:

- Normal (single swath and two single swaths)
- Maximum (border swath and fodder slow gear)

Adjust the guard bar as follows:

- Loosen the securing lever.
- Push in or pull out the guard bar and lock the securing lever in place.

Adjusting the rear swath former

The rear swath former can be adjusted as follows in line with the fodder volume and swath type:

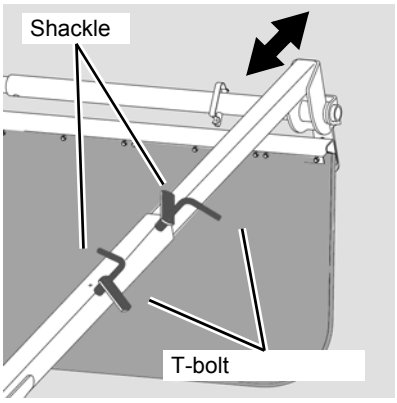
- Width and
- Direction of travel

WARNING

Observe the folding-down process
Nobody may be in the slewing range of the swath former while it is being folded out. When parts are folding down they can cause serious injuries. Observe the folding-down procedure.

- Lower the machine into the work position to adjust the swath former.

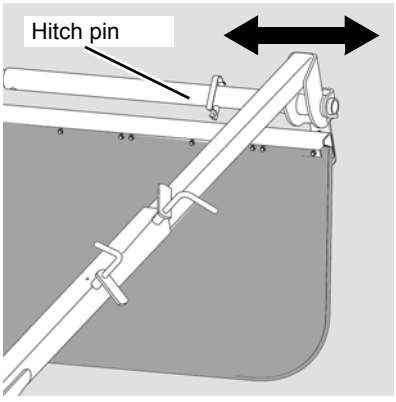
Adjusting the swath width



The swath width can be adjusted as follows:

- Loosen both T-bolts.
- Push in or pull out the swath former.
- Tighten the T-bolts, moving the swath former slightly up and down to get a secure connection.
- Secure the T-bolts with shackles.

Adjusting the direction of travel



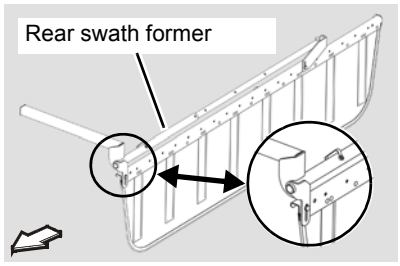
WARNING

Risk of collision with the swath former
When swathing in the two single swaths position, the swath former must be pushed completely to the rear. Otherwise, the swath former can be damaged by the front tines.

It is possible to adjust the direction of travel of the swath former as follows:

- Remove the hitch pin.
- Move the swath former in the direction of travel.
- Peg and secure the hitch pin.

Adjusting the height



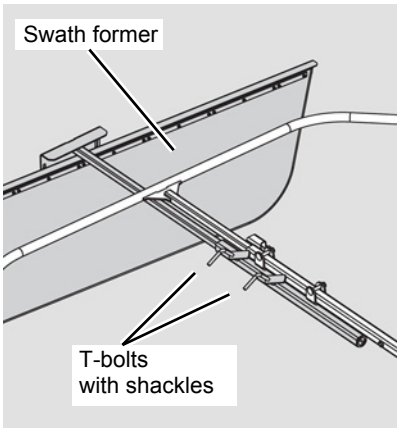
- Loosen the bolts.
- Adjust the height of the swath former.
- Tighten the bolts in the new position.

Additional swath former [+]

WARNING

Risk of collision with the additional swath former
When working with the additional swath former, ensure that the tine supports never collide with the front swath former. Otherwise, the swath former can be damaged.

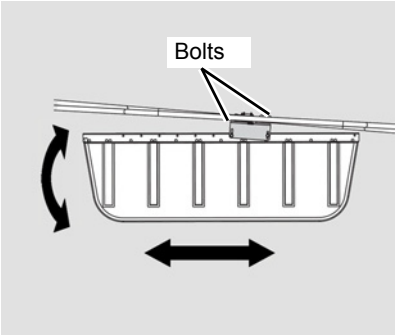
Adjusting the swath width



Adjust the width of the swath former as follows:

- Loosen the T-bolts.
- Push in or pull out the swath former.
- Tighten the T-bolts, moving the swath former slightly up and down to get a secure connection.
- Secure the T-bolts with shackles.

Adjusting the height and direction of travel

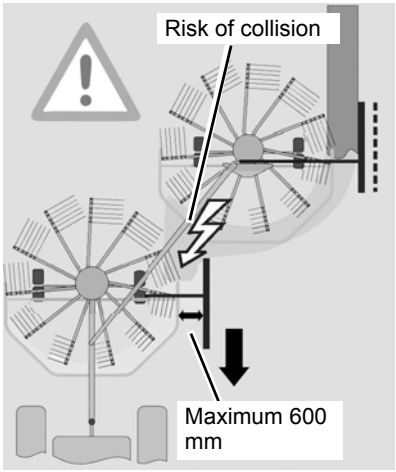


WARNING

Risk of collision on swath former
When swathing in the single swath position, move the swath former forward in the direction of travel and screw in place. Otherwise, the swath former can be damaged.

Adjust the height and direction of travel as follows on the additional swath former:

- Loosen and remove the bolts.
- Adjust the height and direction of travel of the additional swath former.
- Tighten and secure in the new position using bolts.



The illustration shows the "Single swath" work position with the additional swath former. Proceed as follows when using the additional swath former:

- Insert the additional swath former into the transport holder or
- Pull the additional swath former out by a maximum of 600 mm (23.7 in) and fasten to the rearmost hole pattern.

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.

Check the steering angle
Always observe the steering angle from the tractor to the first rotary assembly, and the angle between both rotary assemblies. 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.

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:

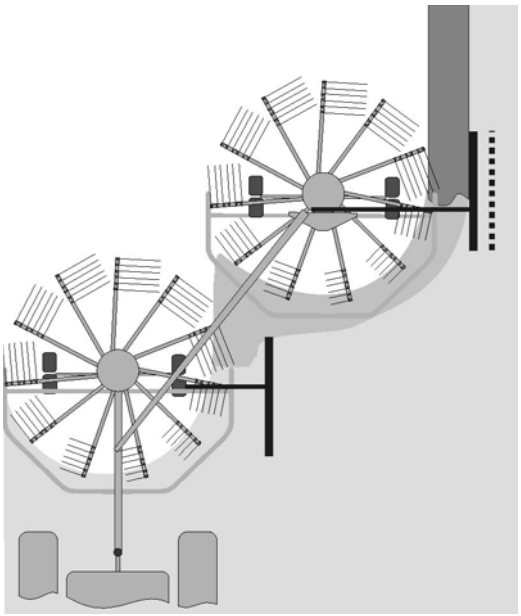
- »Crop processing«
- »Driving on headlands«

Swath width
The swath width depends on working width, working speed, tine lifting settings and transverse rotor pitch as well as crop condition.

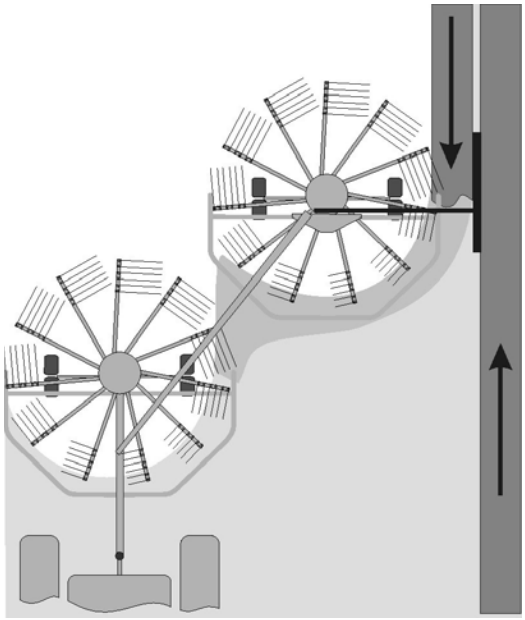
Crop processing

The following swath deposits are possible:

- Single swath
- Double swath

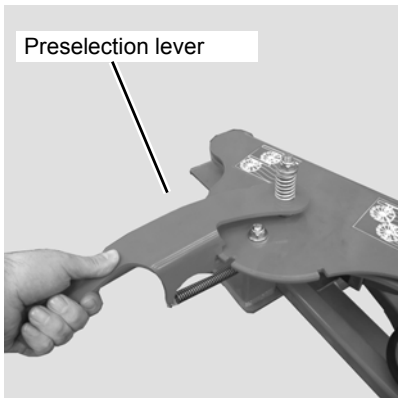


Single swath

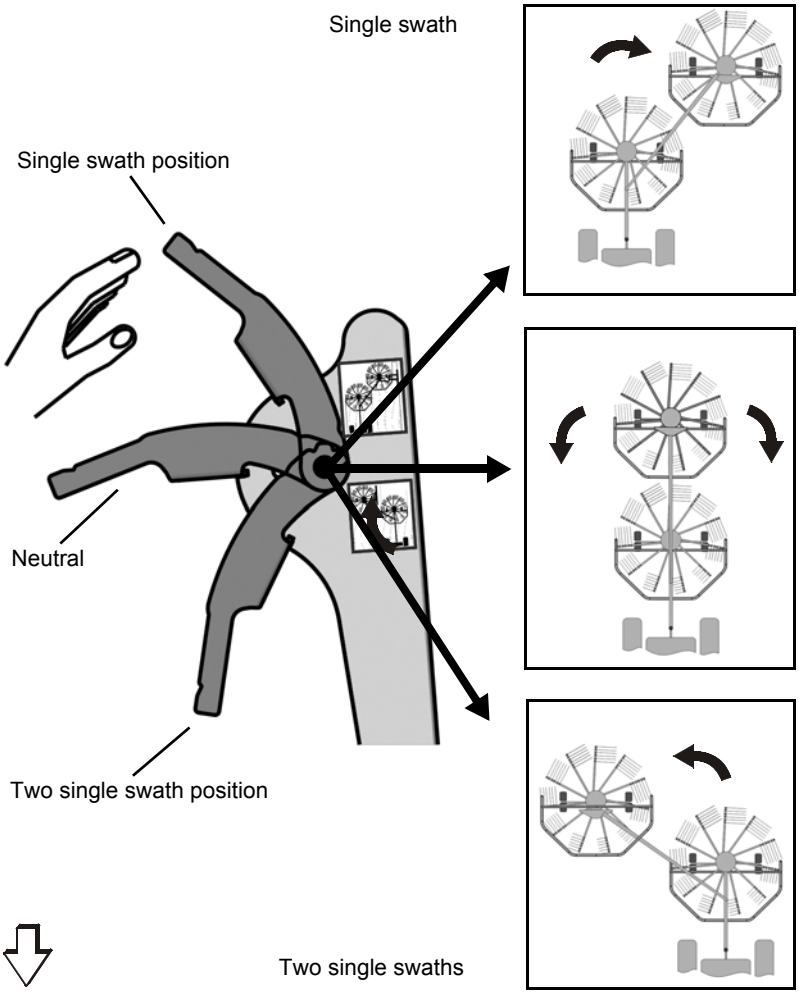


Double swath

Preselection lever



The following positions of the preselection lever are possible:

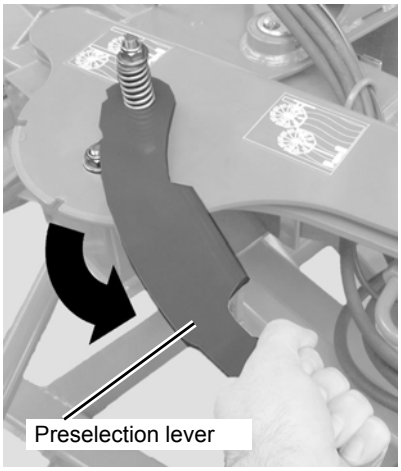


Single swath

In single swath mode, the rear rotor is swivelled to the left. By slewing the front rotor the following positions are possible:

- Fodder slow gear
- Border swaths.

Adjusting the single swath



WARNING

Risk of collision
Check that the rear swath former is fitted into the front hole pattern on the swath former carrier. The additional swath former on the front rotor must be removed, pushed into the transport holder from the right, and secured. Otherwise, there is a risk of collision and damage to the machine may be caused as a result.

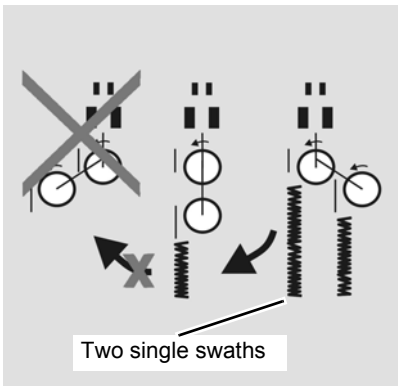
- Fold the machine into its work position.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.Switch off the pilotbox.
- Remove the ignition key.
- Check that the rear swath former is fitted to the front hole pattern.
- Additional swath former
  - Remove it from the front rotor.
  - Push it into the transport holder from the right and secure in place.
- Move the preselection lever to the single swath position and lock in place.
- Drive slowly forwards and swivel the rotor to the left using the tractor's hydraulic control device. The steering cylinder is fully retracted.

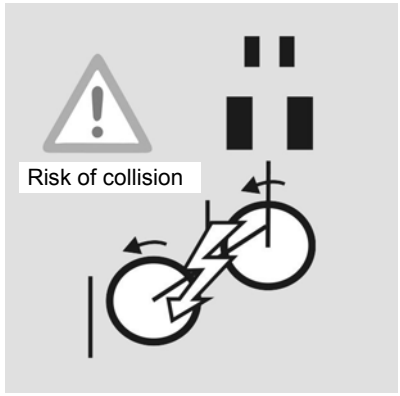
If necessary, briefly extend the steering cylinder before the automatic preselector is released and travel can proceed in the straight-ahead position.

Support the retraction of the steering cylinder by slowly driving forwards.

The rear rotor can be swivelled with this setting on the preselection lever only to the left and back to the middle. To swivel to the right to the two single swaths setting, you have to move the preselection lever.

Two single swaths





WARNING

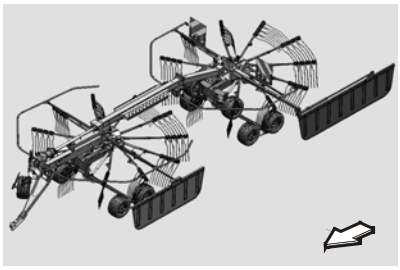
Risk of collision
In the "Two single swaths" work position, both swath formers are used. Adjustments must be made to both swath formers. There is a risk of collision. Damage to the machine may be caused as a result.

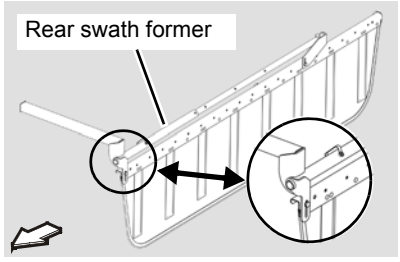
When both swath formers are being used, no swivel action may pass the central axis to the left in the direction of travel. There is a risk of collision. Damage to the machine may be caused as a result.

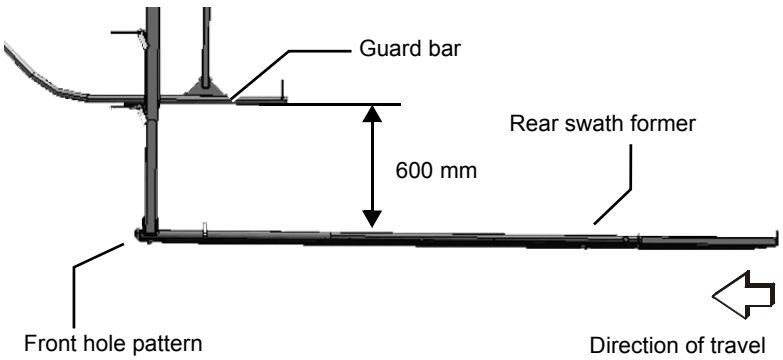
- Fold the machine into its work position.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Switch off the pilotbox.
- Remove the additional swath former from the transport holder on the machine, mount it on the front rotor, and secure with a T-bolt.
- Adjust the additional swath former, leaving a maximum distance of 450 mm (17.8 in) from the guard bar, and secure in place.
- Check that the rear swath former is fitted into the rear hole pattern.
- Push the rear swath former as far back as possible and secure in place.
- Adjust the rear swath former, leaving a maximum distance of 600 mm (23.7 in) from the guard bar, and secure in place.

The following illustrations depict the machine as follows:

- With both swath formers in position
- With the rear swath former in the front hole pattern and pushed as far backwards as possible.

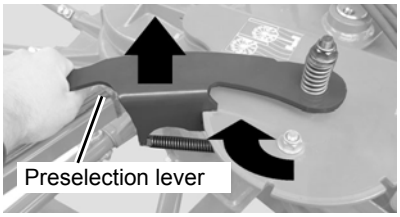






→ Chapter»Accessories«, section »Additional swath former« page 96.

Setting two single swaths



Set the “Two single swaths” position as follows:

- Set the preselection lever to the two single swaths position. To do so, turn the lever to the rear and lock it.
- Drive slowly forwards and swivel the rear rotor to the right using the tractor's hydraulic control device. The steering cylinder is fully extended.

If necessary, briefly retract the steering cylinder before the automatic preselector is released and travel can proceed in the straight-ahead position.

The rear rotor can only be swivelled to the right and back to the middle with this setting on the preselection lever. In order to swivel to the left to the single swath position, the preselection lever must be moved.

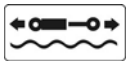
Using the machine

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

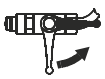
The machine is set correctly as follows:



- Swath former adjusted.
- Tine supports are attached and secured.
- Rotor securing device on the rotor released.
- Tractor's lower links are set to floating position.
- Machine in work position.

Start work as follows:

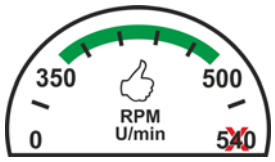
▸ Switch on the tractor.



▸ Open the ball valve.

▸ 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 a low engine 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 distributed evenly.

- 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.

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.

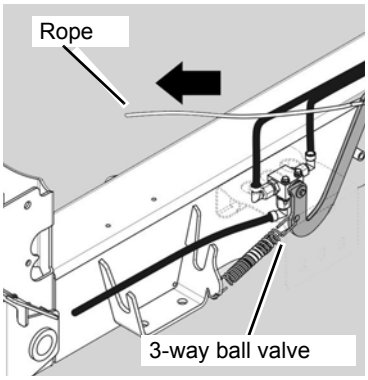
A constant working speed is essential for uniform crop processing. The working speed should be set between 4 and 12 km/h (between 2.5 and 7.5 mph) at which the crop is picked up cleanly and completely. The working speed depends on the machine settings, on ground and crop conditions.

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

3-way ball valve

The rotary rake is equipped with a 3-way ball valve. The following functions can be selected from the tractor seat with a rope and controlled using the double-acting control device:

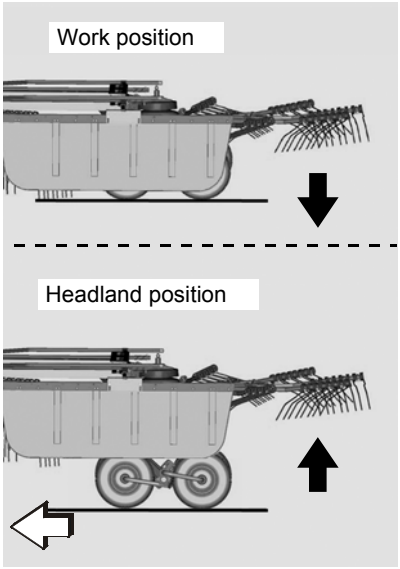
Preselection	Function
Neutral position	Rear steering cylinder. Default setting to swivel the rear rotor in or out using the tractor's hydraulic control device.
Rope pulled	The hydraulic swath former is swivelled in or out.



The rotary rake is operated with the 3-way ball valve as follows:

- Fasten the rope in the tractor cab so that it is easily accessible and firmly secured.
- Swivel the rear rotor using the tractor's double-acting control device (rope not pulled = neutral position).
- Pull the rope and use the tractor's double-acting control device to open out or fold back the rear swath former.

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 rotor 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.
- Raise the machine to the headland position using tthe tractor's single-acting hydraulic control device.
- Lower the machine again, in order to create a new swath.

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.

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

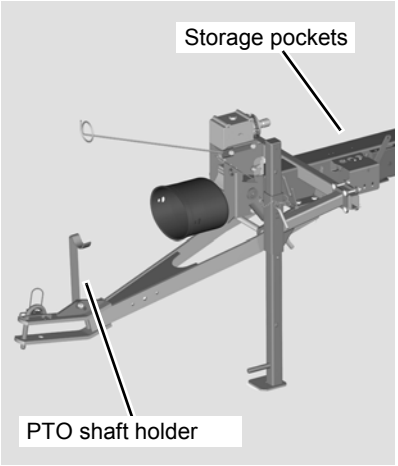
The following work steps are described in this section.

- »Uncoupling the machine«
- »After the end of the season«

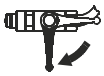
Uncoupling the machine

Uncoupling the machine is carried out in the reverse order to coupling the machine to the tractor. Proceed as follows:

→ Chapter »Coupling the machine«, page 37.



- Set the machine down on a firm, level surface and lower it to the work position.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Secure the machine against rolling away by using wheel chocks.
- Detach the PTO shaft, place it in the park position provided and secure it with the chain.



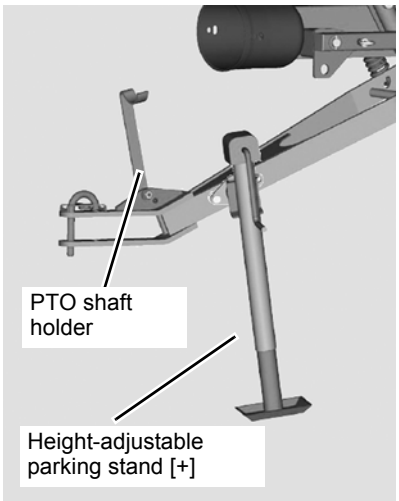
- Close the ball valve.
- Release the hydraulic connections and insert them into the parking pockets on the machine.
- Disconnect the lighting plug and place it into the storage pocket on the machine.
- Remove the tine supports.

When using a lift link drawbar:

- Lower the parking stand and secure with pins.
- Lower the lower link until the parking stand rests safely on the ground.
- Unhitch the machine.

- Switch on the tractor.
- Release tractor from machine.
- Drive tractor forward.

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



When using a pending attachment:

- Fasten the height-adjustable parking stand [+] to the drawbar, secure it, and relieve the drawbar with the parking stand.
- Disconnect the lighting plug and place it into the storage pocket on the machine.
- Unhitch the machine.

- Switch on the tractor.
- Release tractor from machine.
- Drive tractor forward.

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

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.
  → See »Special tightening torques«, page 90 for proper torque values.
- Repair or replace any damaged components.
- Repair any paint damage.
- Lubricate the machine in accordance with the lubrication schedule.
- Preserve the piston rods of the hydraulic cylinder.
- Check the tire pressure.
- Replace missing warning signs and DANGER, WARNING and CAUTION labels.

Safety

The following applies to all maintenance 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 accordance 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, unless 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 accordance with the instruction in the Maintenance chapter.
Inspection	Check the tire pressures, 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	Daily	After 20 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 bolts	●					●		●							**90**
Visual inspection		●					●					●			
Bearing						●						●			**91**
Hose connections						●						●			
Air pressure		●				●		●				●			**93**
Lighting equipment								●				●		●	
Hydraulics															
Hydraulic hoses every 6 years													●		**94**
Hydraulic cylinders						●						●			
Hydraulic couplings						●						●			
PTO shafts															
Wide-angle joint				●		●				●					**91**
PTO shaft guard						●				●		●			**92**
Profile section tube						●					●				**92**
Gear box															
Rotor gear						●						●			**93**
Angular gear box						●					●				**93**

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.

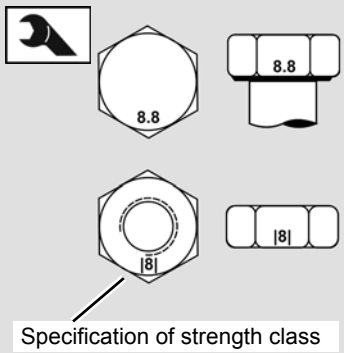
On this machine, screws with a minimum quality of “8.8” (can be seen on the screw head) are used.

Tightening bolts

All bolts must be retightened:

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

Screw and bolt tightening torques



WARNING

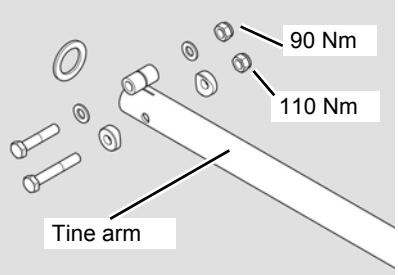
Use the correct screw and bolt tightening torque
Securely tighten screws, nuts and bolts to the specified torques. Damage to the machine and serious or fatal injury may be caused as a result.

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).

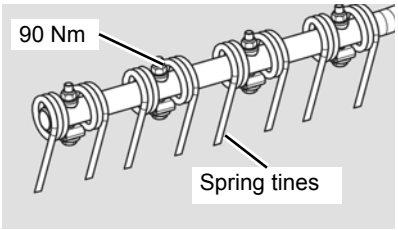
	8.8	10.9	12.9
M 6	9.9 Nm (7.3 ft.lbs)	14 Nm (10.3 ft.lbs)	17 Nm (12.5 ft.lbs)
M 8	24 Nm (17.7 ft.lbs)	34 Nm (25 ft.lbs)	41 Nm (30.3 ft.lbs)
M 10	48 Nm (35.4 ft.lbs)	68 Nm (50.2 ft.lbs)	81 Nm (59.8 ft.lbs)
M 12	85 Nm (62.7 ft.lbs)	120 Nm (88.6 ft.lbs)	145 Nm (104 ft.lbs)
M 14	135 Nm (99.6 ft.lbs)	190 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.

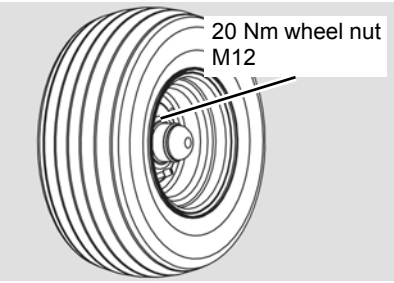
Special tightening torques



- 90 Nm (66.4 ft.lbs) tine arm clamping bolt.
- 110 Nm (81.2 ft.lbs) tine arm fixing bolt.



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



- 20 Nm (14.8 ft.lbs) wheel nuts.

Lubrication points for grease

Working with a grease gun
Before applying the grease gun

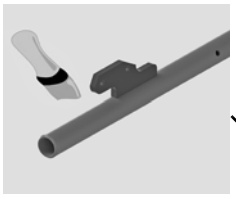
- Clean grease fittings on the machine and gun fittings on the grease gun.

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.

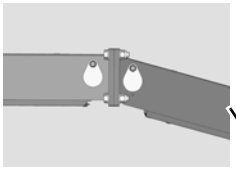
Lubrication points are marked with an information label. If any labels are illegible or have been lost, it is possible to order new labels as replacement parts and affix them to the implement.

Lubricate the places listed in the illustration as follows:

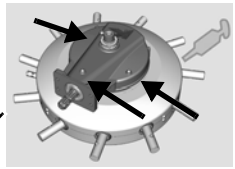
- after 50 hours of operation.
- before and after the season.
- each time after cleaning with a high-pressure cleaner.



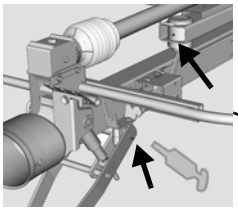
All tine arms



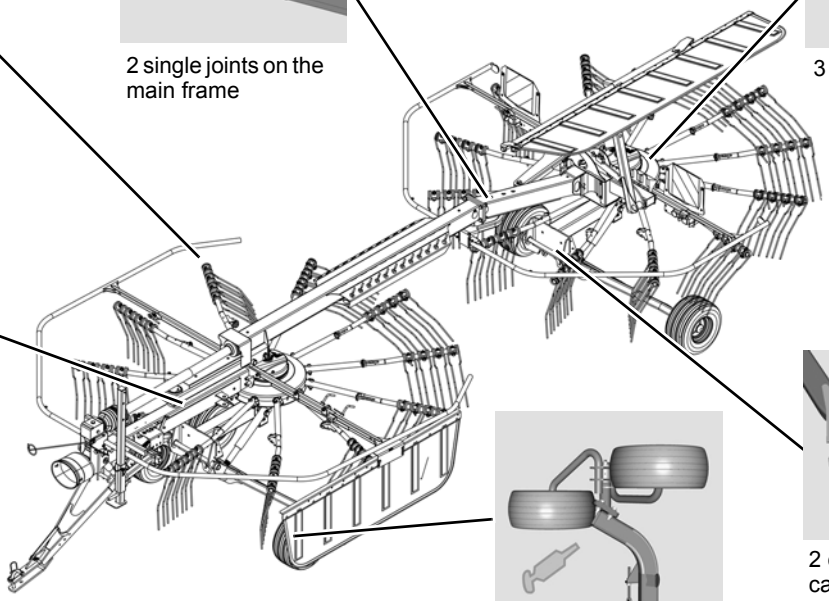
2 single joints on the main frame



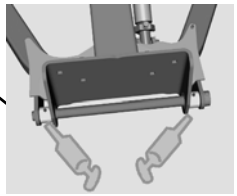
3 on each gear box



Drawbar and support arm



Tandem axle



2 on each axle carrier

Lubricating the PTO shafts

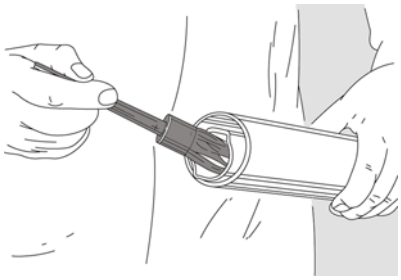
The PTO shaft manufacturer's own operator's manual is included with each PTO shaft. This includes detailed information on the relevant version of the PTO shaft.

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.



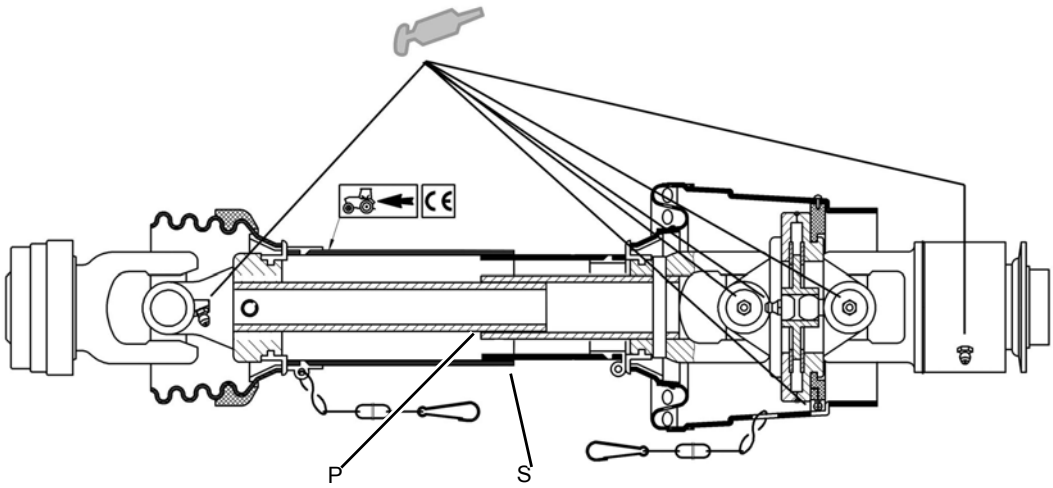
Grease the profile section tubes:

- 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 the main drive



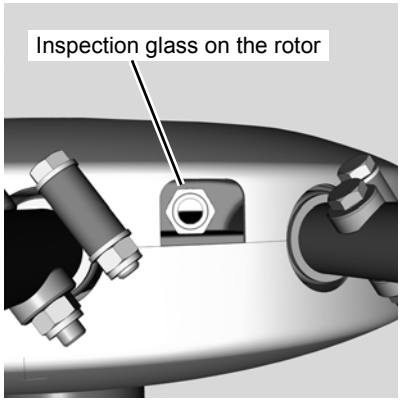
Filling quantities

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.

Gear box	Oil capacity
Angular gear box, front	0,5 l (0.53 US qt)
Rotor gear, front	6,2 l (6.55 US qt)
Rotor gear, rear	6,2 l (6.55 US qt)

Checking rotor gear



The rotor gear is equipped with a continuous oil lubrication system. Check the lubricants if there is visible loss of lubricant when the machine is in a horizontal position – at least once per season. If there is a visible loss of lubricant, consult your dealer. Otherwise, this will cause damage to the machine. The oil level at the rotor gear is indicated by an inspection glass.

- Check the oil level at the rotor using the inspection glass.
- 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
Rotor chassis	1,5 bar (22 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

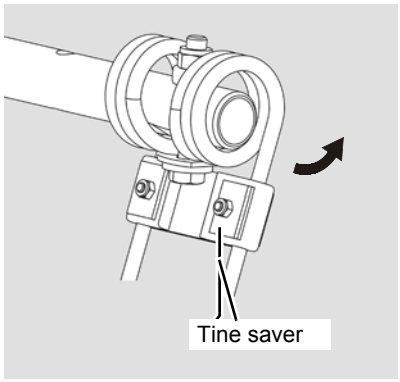
Replace hydraulic hoses every six years or earlier
Hydraulic hoses age without showing externally visible signs. Replace hydraulic hoses every six years, or earlier if aging or degradation is visible. Defective hydraulic lines can cause serious or fatal injuries.

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.

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

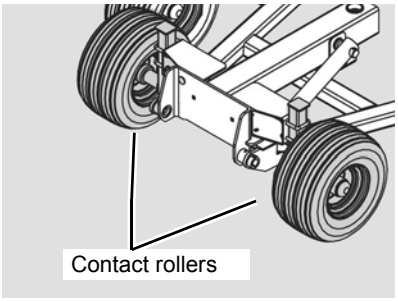


For a good swath deposit, both tine legs must run parallel to one another. This must also be ensured after fitting the tine saver.

Proceed as follows:

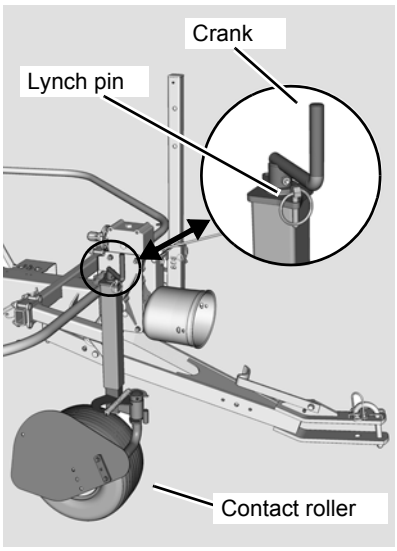
- Fit one tine saver on each tine.
- Check the direction of rotation of the rotor. The nuts must be attached against the rotor direction.
- Check the tine position. The tine legs must be parallel.
- If necessary, loosen the screwed connection until both tine legs run parallel.

Roller feelers



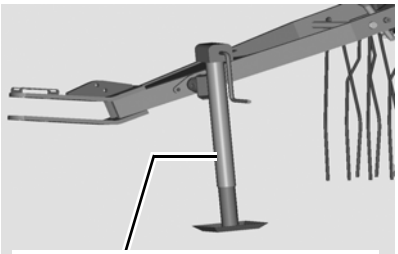
For better adaptation to ground contours and quieter running of the machine in the work position, the manufacturer can also supply roller feelers for the rotor chassis. The roller feelers can be combined with single wheel axles or tandem axles.

Contact roller



To ensure the machine offers better ground adaptation in the work position, the manufacturer can also supply an optional contact roller. The contact roller can be fitted on the right or on the left.

Height-adjustable parking stand



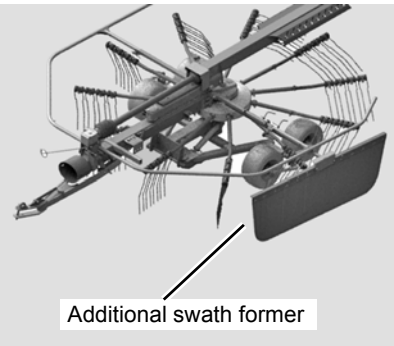
WARNING

Parking stand in the correct park position
After removing the parking stand from the drawbar, make sure that it is correctly mounted on the machine. Otherwise, the machine may be damaged.

For tractors with a pending attachment, a height-adjustable parking stand is available which makes coupling and uncoupling considerably easier.

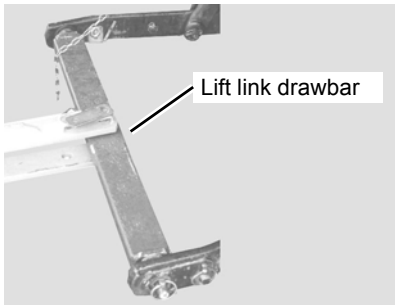
→ See »Stowing the height-adjustable parking stand [+]«,

Additional swath former



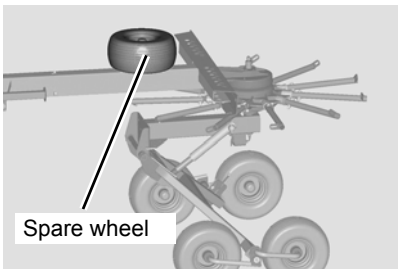
For the two single swaths position, the manufacturer can also supply an additional swath former for the front rotor. This ensures that the swath form on the front rotor is also ideal.

Lift link drawbar



As a special accessory, there is a freely rotatable lift link drawbar for “categories I + II”.

Spare wheel



The optional spare wheel is fitted to the frame.

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:

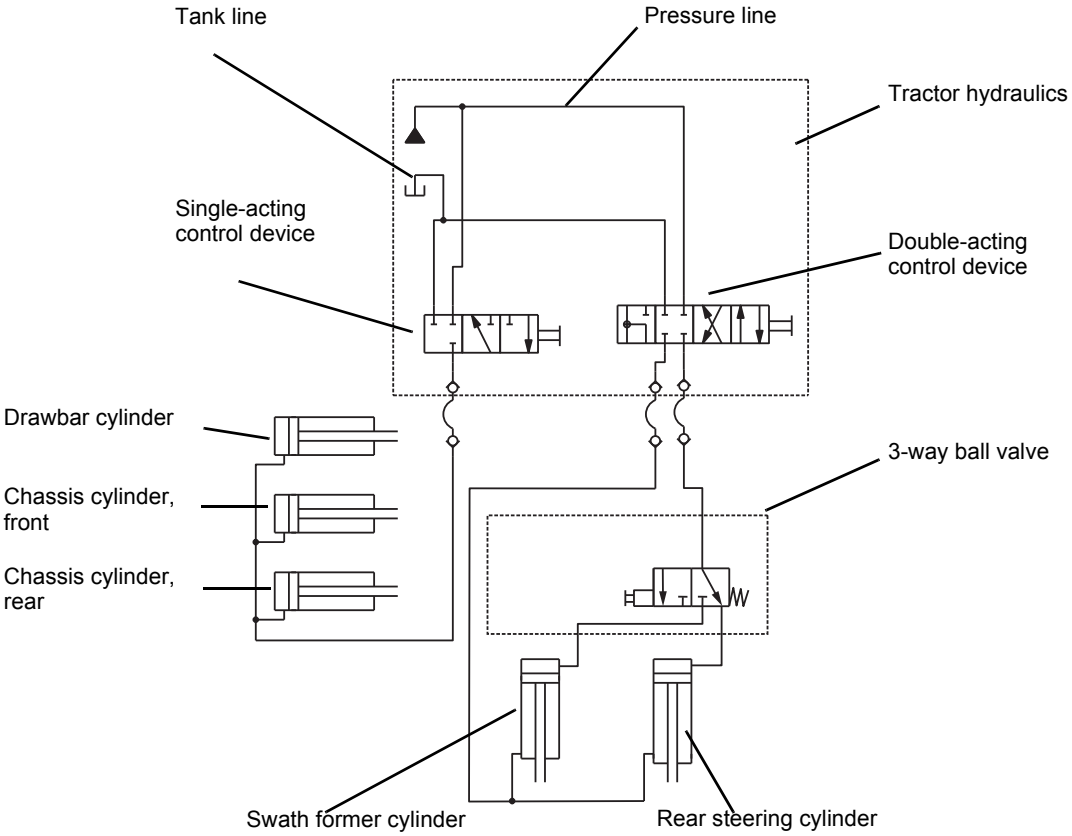
- Immediately stop operation.
- Switch off the PTO shaft drive.
- Place all controls in neutral or park.
- Set tractor parking brake.
- Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- Ensure the machine is standing on firm, secure and 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 behind 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 49
Rotor is leaving crop behind across the entire width.	Working depth set too high.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 49
Crop is heavily contaminated.	Rotor tines set too low.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 49
		→ Chapter »Coupling the machine«, section »Coupling the machine«, page 37
Machine not operating cleanly at high speed.	Rotor tines set too high. Uneven terrain.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 49
	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 49
Noise production during work	Loose screwed connections or worn-out tine supports. Tine support bent	Check tine supports and screwed connections on tines.

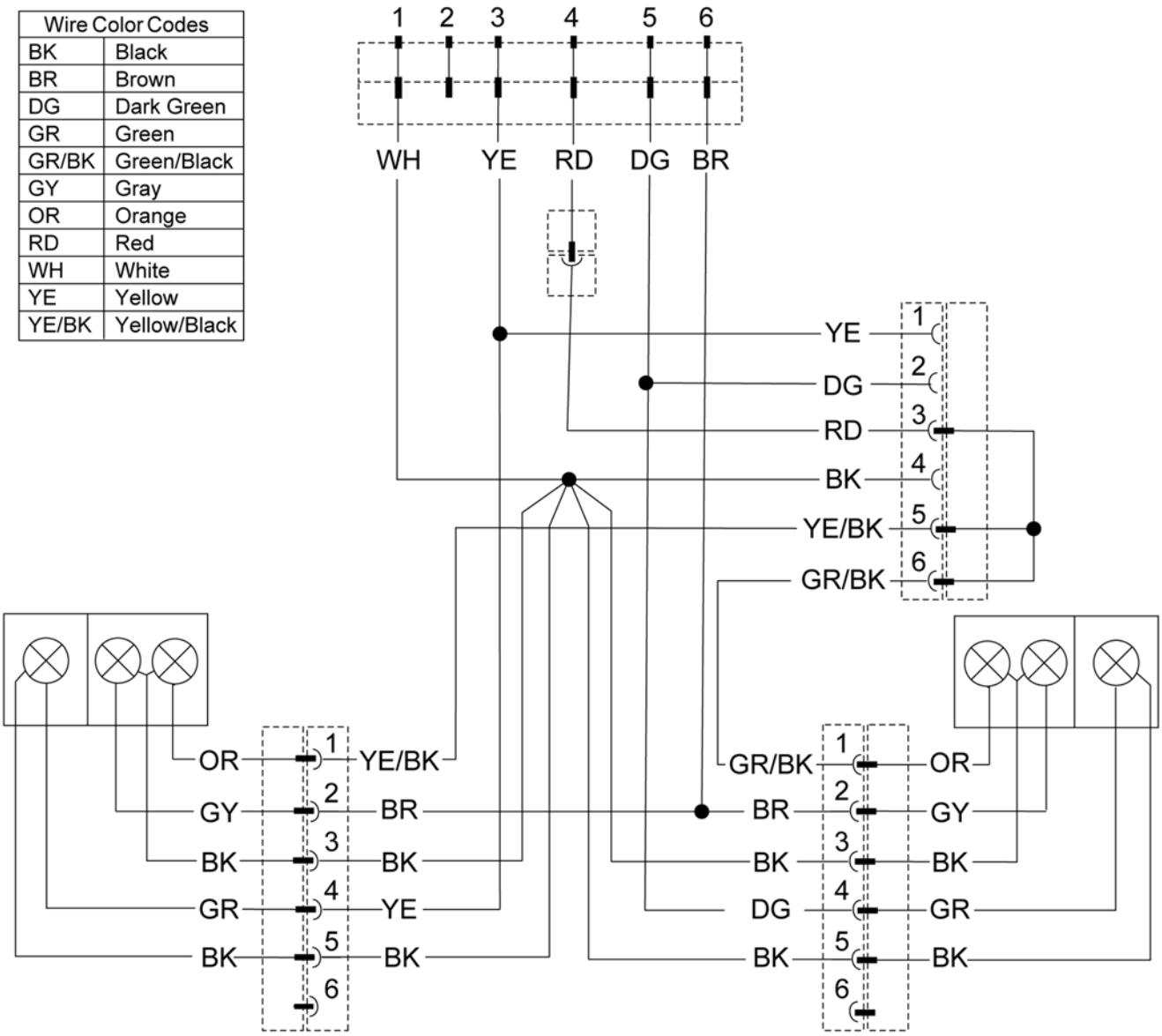
Problem	Cause	Solution
Machine rolls offset behind the tractor when driving in a straight line.	Steering/tracking incorrectly adjusted or worn out.	Contact dealer.
Rotor not working cleanly.	Poor adaptation to the contours of the land due to severe rotor load relief	Contact dealer.
Machine drops during transport journeys.	Ball valve not closed	Close the ball valve Chapter »Road transport«, section »General«, page 57
Rear rotor not picking up fodder	Rear tines too high	Chapter »Preparing for use«, section »Rotor pitch«, page 49
	Fodder mass too great	Reduce speed.
Poor fodder transfer on the rear rotor when cornering	Excessively tight cornering	Drive in a larger radius. After-steer the rear rotor when cornering.

Hydraulic circuit diagram



Lighting equipment 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.

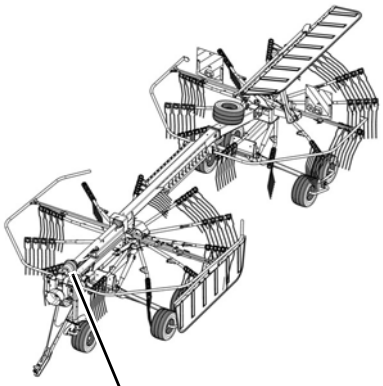
Metal parts
All metal parts can be sent for recycling.

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

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

EC Declaration of Conformity

Conforms to EC Directive 2006/42/EC



Type plate and CE marking

We

Kverneland Group Kerteminde AS
Taarupstrandvej 25
DK-5300 Kerteminde
Denmark

declare with sole responsibility that the product

SwatMaster 7132 Evo
Andex 714 T Evo
9471 S Evo
RA2071T Evo
and its accessories

Model: VF6962

Valid from machine number:
VF69626651 –

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

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

- DIN EN ISO 12 100:2010
- DIN EN ISO 4254-1:2013
- DIN EN ISO 4254-10:2009 + AC:2010

Kverneland Group Kerteminde AS
Kerteminde, 10.09.2013

Uwe Kellermeier

EC authorised representative

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