

RA2071T Vario

Operator's manual Original operator's manual

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Model	VF6962
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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 Vario
Operating width	7.10 m (23.30 ft)
Weight	1400 kg (3087 lbs)
Machine number	VF6962_ _ _ _ _
Accessories	
Address of supplier	
Address of manufacturer	Kverneland Group Kerteminde AS Taarpstrandvej 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.

For your safety

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

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

Demonstration and training

You will receive training concerning the use, maintenance and care of the machine from your dealer.

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

- 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.

WARNING

The warning triangle with the signal word "WARNING" indicates warning information. Failure to observe these safety instructions can result in:

- Moderate to serious injury
- Fatal injury

The warning information in the operator's manual is specifically associated with individual operations and instructions. It is important to observe the warning information before these operations are carried out.

In the »Safety« chapter, you will also find safety information which is not related to individual operations, but rather is designed to encourage safety-conscious behaviour in various situations.

CAUTION

The warning triangle with the signal word "CAUTION" indicates important information. Failure to observe these safety instructions can result in:

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

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



The "Information" pictogram indicates tips and additional information.



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



The spanner indicates tips for assembly or adjustment work.



This arrow in the diagram shows the direction of travel.

Preface



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



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



▶ Switch on the tractor engine.



▶ 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.



▶ Switch the pilotbox on.



▶ Switch off the pilotbox.



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, will 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 its limitations. Read the entire manual before attempting to put the machine into operation and to use it.

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

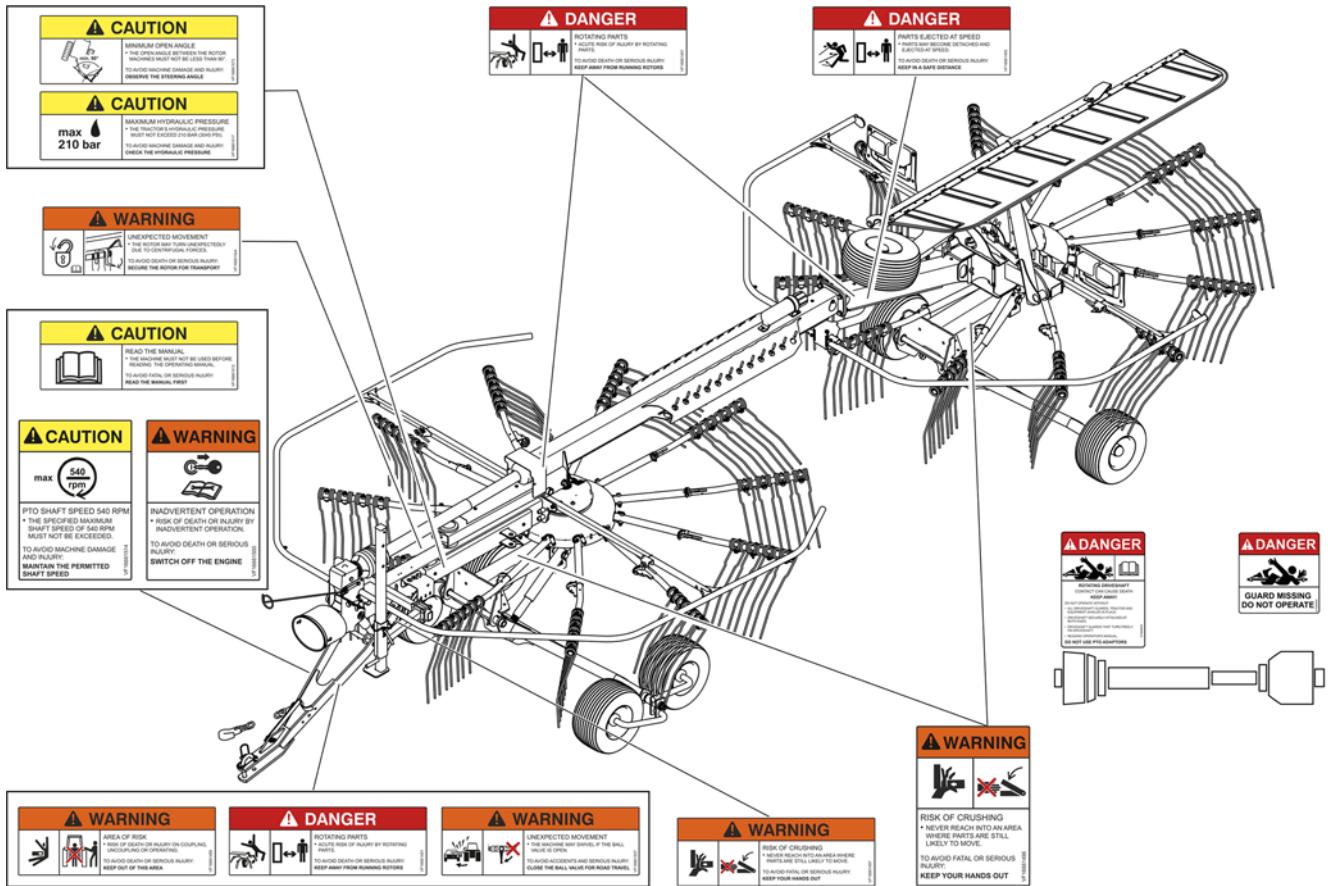
Inform all persons who work with the machine about this safety information at regular intervals and in accordance with statutory regulations.



DANGER, WARNING and CAUTION labels

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

DANGER, WARNING and CAUTION labels on the machine





Meaning of DANGER, WARNING and CAUTION labels

 DANGER		
		<p>PARTS EJECTED AT SPEED</p> <ul style="list-style-type: none">• PARTS MAY BECOME DETACHED AND EJECTED AT SPEED. <p>TO AVOID DEATH OR SERIOUS INJURY: KEEP IN A SAFE DISTANCE</p>

VF16661493

 WARNING		
		<p>RISK OF CRUSHING</p> <ul style="list-style-type: none">• NEVER REACH INTO AN AREA WHERE PARTS ARE STILL LIKELY TO MOVE. <p>TO AVOID FATAL OR SERIOUS INJURY: KEEP YOUR HANDS OUT</p>

VF16661497

 WARNING		
		<p>AREA OF RISK</p> <ul style="list-style-type: none">• RISK OF DEATH OR INJURY ON COUPLING, UNCOUPLING OR OPERATING. <p>TO AVOID DEATH OR SERIOUS INJURY: KEEP OUT OF THIS AREA</p>

VF16661499


 WARNING		
 		<p>INADVERTENT OPERATION</p> <ul style="list-style-type: none">• RISK OF DEATH OR INJURY BY INADVERTENT OPERATION. <p>TO AVOID DEATH OR SERIOUS INJURY: SWITCH OFF THE ENGINE</p>


VF16661501




! WARNING	
	
<p>UNEXPECTED MOVEMENT</p> <ul style="list-style-type: none"> • THE MACHINE MAY SWIVEL IF THE BALL VALVE IS OPEN. <p>TO AVOID ACCIDENTS AND SERIOUS INJURY: CLOSE THE BALL VALVE FOR ROAD TRAVEL</p>	
<small>VF16661507</small>	



! WARNING	
	
<p>UNEXPECTED MOVEMENT</p> <ul style="list-style-type: none"> • THE ROTOR MAY TURN UNEXPECTEDLY DUE TO CENTRIFUGAL FORCES. <p>TO AVOID DEATH OR SERIOUS INJURY: SECURE THE ROTOR FOR TRANSPORT</p>	
<small>VF16661544</small>	

! CAUTION	
	<p>MINIMUM OPEN ANGLE</p> <ul style="list-style-type: none"> • THE OPEN ANGLE BETWEEN THE ROTOR MACHINES MUST NOT BE LESS THAN 90°. <p>TO AVOID MACHINE DAMAGE AND INJURY: OBSERVE THE STEERING ANGLE</p>
<small>VF16661573</small>	

! CAUTION	
	<p>READ THE MANUAL</p> <ul style="list-style-type: none"> • THE MACHINE MUST NOT BE USED BEFORE READING THE OPERATING MANUAL. <p>TO AVOID FATAL OR SERIOUS INJURY: READ THE MANUAL FIRST</p>
<small>VF16661513</small>	

! CAUTION	
<p>max</p> 	<p>PTO SHAFT SPEED 540 RPM</p> <ul style="list-style-type: none"> • THE SPECIFIED MAXIMUM SHAFT SPEED OF 540 RPM MUST NOT BE EXCEEDED. <p>TO AVOID MACHINE DAMAGE AND INJURY: MAINTAIN THE PERMITTED SHAFT SPEED</p>
<small>VF16661515</small>	



 CAUTION	
max  210 bar	MAXIMUM HYDRAULIC PRESSURE • THE TRACTOR'S HYDRAULIC PRESSURE MUST NOT EXCEED 210 BAR (3045 PSI). TO AVOID MACHINE DAMAGE AND INJURY: CHECK THE HYDRAULIC PRESSURE
	VF-16661517

 DANGER

ROTATING DRIVELINE CONTACT CAN CAUSE DEATH KEEP AWAY! DO NOT OPERATE WITHOUT- • ALL DRIVELINE, TRACTOR AND EQUIPMENT SHIELDS IN PLACE. • DRIVELINES SECURELY ATTACHED AT BOTH ENDS. • DRIVELINE SHIELDS THAT TURN FREELY ON DRIVELINE.
KT5696000

Outer tube.

 DANGER

SHIELD MISSING DO NOT OPERATE
KT5696000

Inner tube.



Lubrication points

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



Check tyre pressures

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

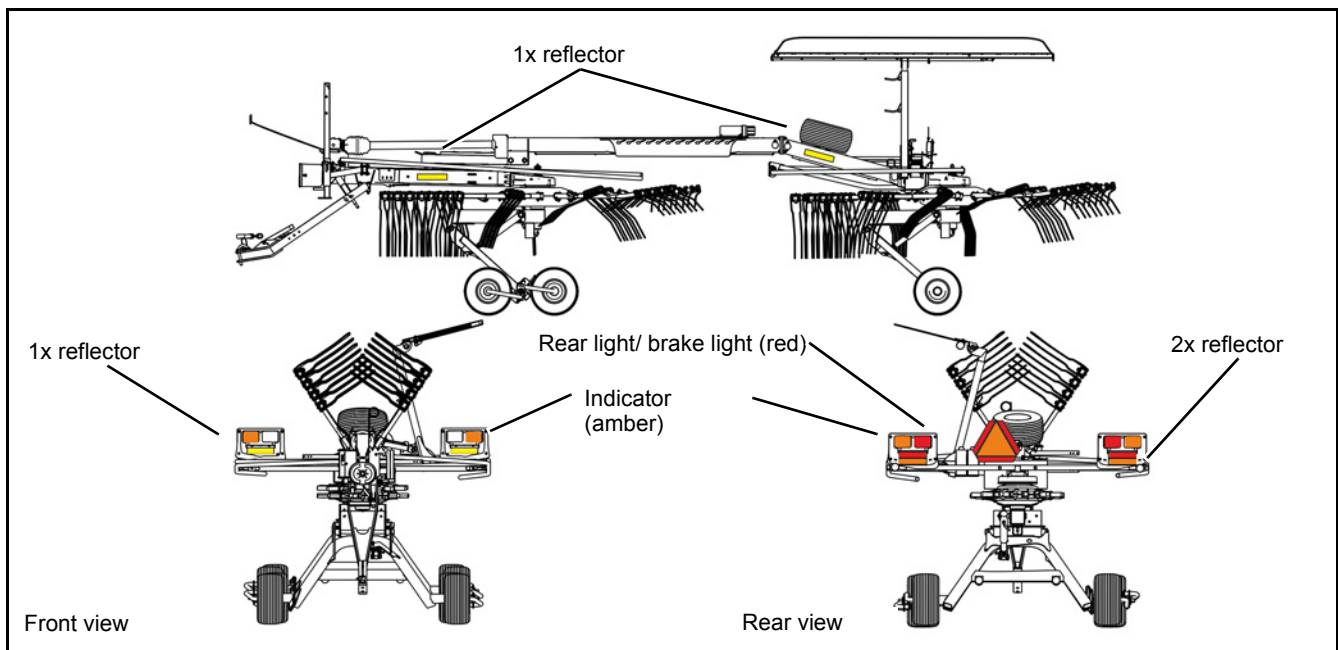


Signalling equipment – USA

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

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

Signalling equipment





Signs

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



Marking for slow-moving vehicles (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 permissible speed (Speed identification symbol – SIS)

The scope of this sign 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:

- ▶ Switch off the PTO shaft drive.
- ▶ Lower all implements.
- ▶ Place all controls in neutral or park.
- ▶ Set the tractor's parking brake to the park position.
- ▶ Switch off the tractor.
- ▶ Remove the ignition key.
- ▶ Secure the tractor against rolling away.

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

Operate for the first time only after proper training

The machine may only be put into operation after proper training has been provided by an authorized dealer. Operation without proper training can lead to damage to the machine due to incorrect operation, or may cause accidents.

Safety is your responsibility

Follow the safety instructions. Ensure that all operators read and understand the manual and comply with the safety instructions. Prevent serious or fatal accidents by following the safety instructions.

Instructions in the event of malfunctions

In the event of a malfunction:

- ▶ shut down,
- ▶ stop and secure the machine immediately.
- ▶ Rectify the malfunction immediately yourself if qualified to do so,
- ▶ or seek the assistance of an authorized dealer.

Operating a faulty machine can cause accidents or damage.

No persons in the working area

Ensure that no persons, especially children, are present in the folding and working area of the machine. Persons could be caught by the machine within this area. Fatal injury may be caused as a result.



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 PTO shaft drive when raising the machine

Switch off the tractor's PTO shaft drive if people could enter the working area when the rotors are raised.

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



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 if these guidelines are not followed.

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 if these guidelines are not followed.

Safety distance from raised and unsecured loads

Never work under suspended loads. Maintain a sufficient distance from raised and unsecured loads. Serious or fatal injury may be caused if these guidelines are not followed.

PTO shaft

Only use PTO shafts which have been specified by the manufacturer. Read the attached operator's manual carefully and follow the instructions described. Check the length of the PTO shaft and adjust if necessary. Incorrect operation and 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.

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.

Make sure the machine is standing level

Before changing from the transport to the work position (and vice versa), make sure the machine is standing level. The machine could tip over, particularly on hillside locations. 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.

Unrestricted field of vision to the rear

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

Checking the angle of lock

On machines with attachment carriers, a steering angle of 80° is possible. This angle must not be exceeded. Otherwise, the PTO shaft and the machine may be damaged 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 damage to the machine and even life-threatening injuries.

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 may occur and the electronic system may be damaged.

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

Only connect hydraulics at zero pressure

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. Serious or fatal injury may be caused if these guidelines are not followed.

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. Never use your hands to search for suspected leaks. Only use suitable equipment when looking for leaks. Rectify any damage immediately. Fluid escaping under pressure can penetrate skin may result in injuries and fires. Seek medical attention immediately if injuries occur.

Replace hydraulic hoses every six years or earlier

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



Road transport

Ensuring road safety

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

- Lighting, warning and protective equipment must be fitted.
- The permissible transport widths and weights, axle loads, tire load-bearing capacities, laden weights and national speed restrictions must be observed.
- The maximum permissible road transport speed must be complied with, but not exceed 40 km/h (25 mph).
- Before driving on public roads, fold in all guard bars and rotors and secure the machine. All tine supports which have tips that point at right angles to the direction of travel and which are at a height of less than 2 metres (6.6 ft) must be removed or covered.
- 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. Traffic accidents and accidents with fatal injuries may be caused as a result.

Check tire pressures

Check the tire pressures 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.

Check release ropes on quick release couplings

Release ropes must hang loose and must not allow a release in their lowered position. Hitched machines may otherwise detach themselves from the lower link hitching system of their own 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 if these guidelines are not followed.



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 chapter »Screw tightening torques«, page 97 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 active during cornering. The machine's centre of gravity at the rear of the tractor is displaced. Be aware of the turning radius and the moment of inertia. A driving style which is not adapted to conditions can cause accidents. Accidents with serious or fatal injuries may be caused as a result.

Uncoupling

Increased risk of injury

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 the tractor's parking brake to the park position.
- 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 equipment can be caused by loose pin and screwed connections.

→ See chapter »Screw tightening torques«, page 97 for proper torque values.

Further regulations

Observe the regulations

In addition to the safety information given above, please observe the following:

- Accident prevention regulations in your local area..
- Generally recognised safety regulations, occupational health requirements and road traffic regulations.
- The instructions provided in this operator's manual.
- Standards and instructions 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.

Getting to know 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-wheel rake that is solely to be used for raking together 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 of the machine

Versatility – for one single swath or two single swaths

This rake meets all requirements applicable for modern fodder harvesting technology, whether you 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 by tractors with 30 kW power 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

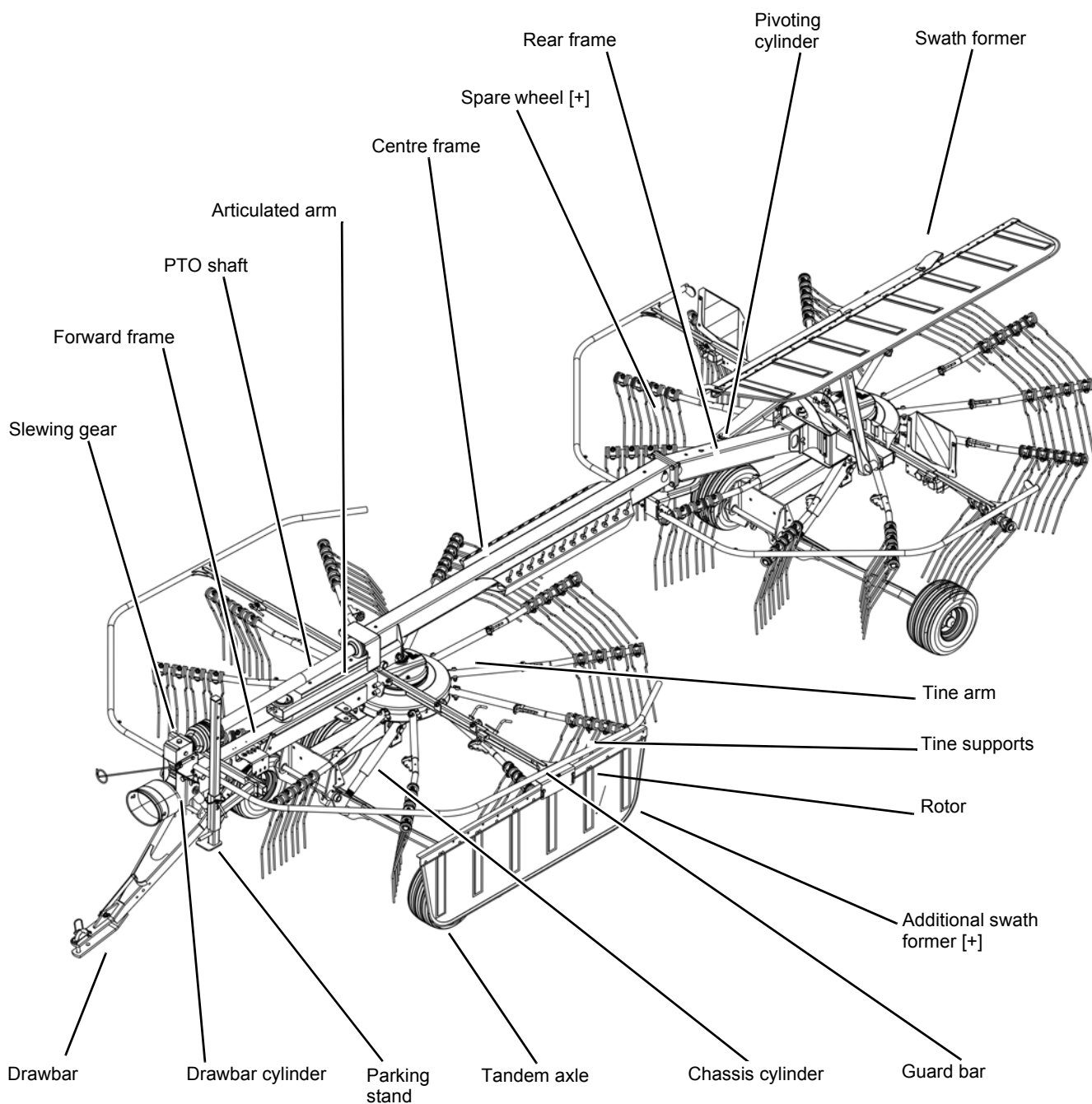
The rake is easily changed over from the work to the transport position. Hydraulic cylinders raise the rake into the transport position and the rear swath former folds up hydraulically to give a transport width of less than 3.0 m with the tine arms fitted. If a smaller transport width is required, the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

Raise height of 50 centimetres

For road transport and on headlands, the machine can be quickly raised by roughly 50 centimetres. For working, lower the rotary rakes hydraulically from transport position back to work position.

Getting to know the machine

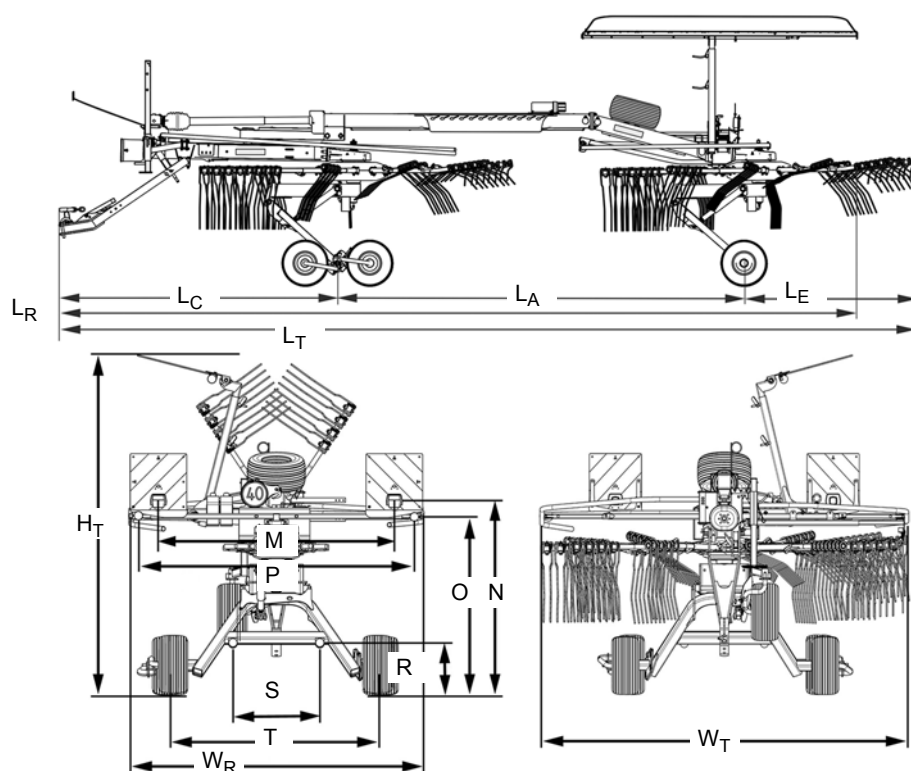
Designation of components



Getting to know the machine

Technical specifications

		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)	



Getting to know the machine

Weights

	Transport position [kg]	Work position [kg]
Gross weight	1400 kg (3087 lbs)	
Load supported on the support wheel	140 kg (309 lbs)	130 kg (287 lbs)
Axle load of 1st chassis	640 kg (1411 lbs)	645 kg (1422 lbs)
Axle load of 2nd chassis	620 kg (1367 lbs)	625 kg (1378 lbs)

Tractor equipment required

Output / connections		
	Minimum output of the tractor	30 kW (40 hp)
	Lighting power supply	12 V, 7-pin plug socket in accordance with ISO 1724
	Power supply to pilotbox	12 V, 3-pin plug socket in accordance with DIN 9680
	Hydraulic connections	1 x double-acting hydraulic control device with floating position 1 x single-acting hydraulic control device with floating position
	Hydraulic pressure	150 – 210 bar (2176 – 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

Getting to know the machine

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
	Support wheel [+]	18.5 x 8.50-8
	Tandem axles, rear [+]	18.5 x 8.50-8
	Contact rollers [+]	18.5 x 8.50-8
Safety accessories		
	Lighting equipment	Standard
	Warning plates	Standard
PTO shaft		
	Double wide-angle PTO shaft	Standard

Measurement of airborne sound emissions

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

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

Getting to know the machine

Pilotbox




WARNING

Protect electrical parts against moisture

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

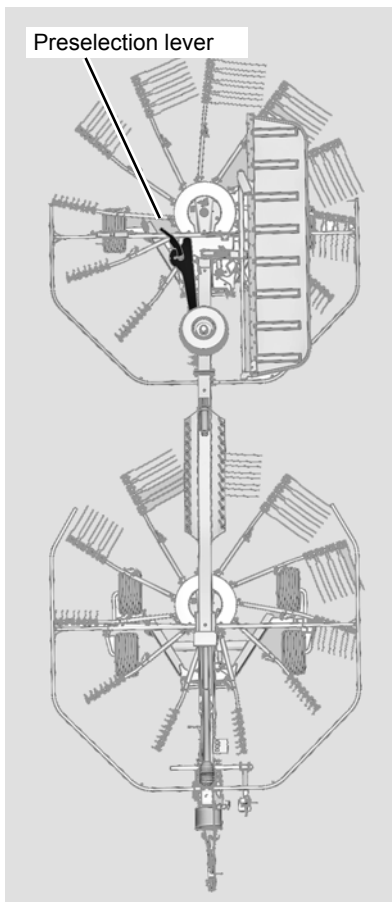
The rotary rake Vario version is fitted with an electro-hydraulic control device – the pilotbox. The following functions can be selected from the tractor seat and controlled using a double-acting hydraulic control device:



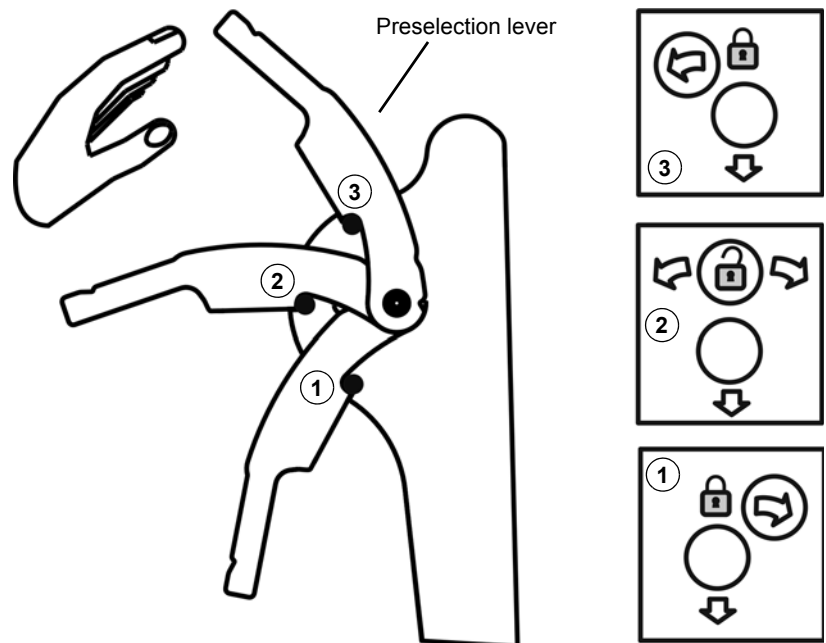
Preselection	Function
Pilotbox OFF	
Pilotbox ON	Control LED lights up. The A, B and C functions are available.
	A: Slews the rear rotor of the tractor to the left or the right using the hydraulic control device.
	B: Folds in or folds out the swath former using the hydraulic control device.
	C: Slews the front rotor of the tractor to the left or the right using the hydraulic control device.

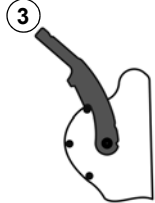
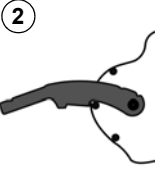
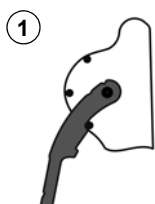
Getting to know the machine

Preselection lever



Various functions for the rear rotor are set using the preselection lever. The rear rotor can be slewed to the left or to the right, or be slewed directly from the left to the right.

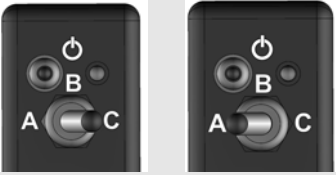
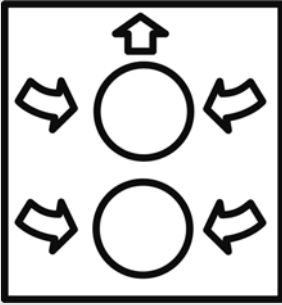


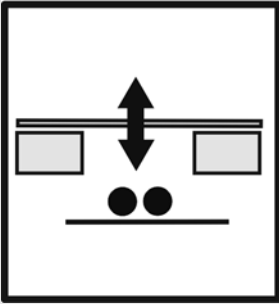


Preselection	Function
	<ul style="list-style-type: none"> The rear rotor can slew from the middle to the right. The left side is disabled. Swath type: Night swath,
	<ul style="list-style-type: none"> The rear rotor slews from the right to the left, through the middle. Slewing the rear rotor directly from the left to the right, and vice versa, is possible. Caution: Observe the safety instructions. Swath type: All swath types
	<ul style="list-style-type: none"> The rear rotor can slew from the middle to the left. The right side is disabled. Swath type: Single swath

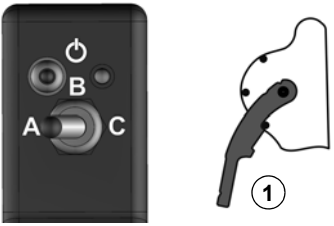
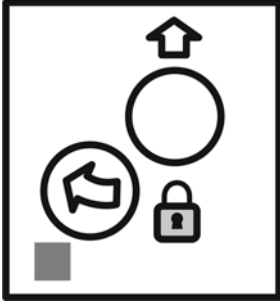
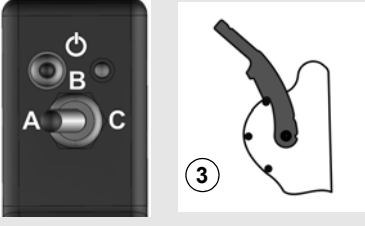
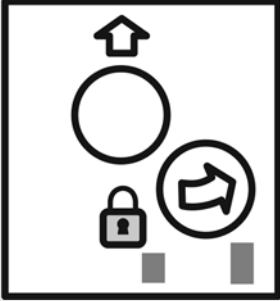
Getting to know the machine

Function overview

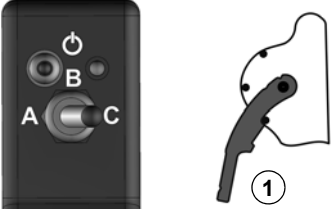
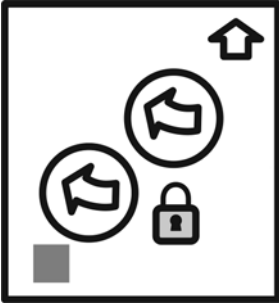
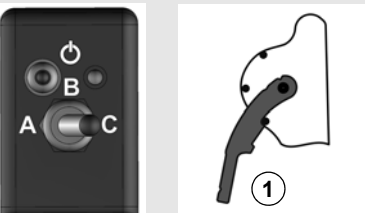

The table below provides a summary of the functions. Be sure to follow the other instructions and note the safety information in the operating manual.

Steering	Machine position	Function
<ul style="list-style-type: none"> Double-acting hydraulic control device. 		<p>Transport position</p> <ul style="list-style-type: none"> Switch off the PTO shaft drive. Clean the machine. Preselect position [C] on the pilot-box. Drive forwards slowly and straighten the front rotor using the hydraulic control device. Preselect position [A] on the pilot-box. Drive forwards slowly and straighten the rear rotor using the hydraulic control device. Close the ball valve
<ul style="list-style-type: none"> Double-acting hydraulic control device. 		<p>Work position</p> <ul style="list-style-type: none"> Set the required swath deposit on the rear rotor using the preselection lever. Open the ball valve. Switch on the tractor engine. Switch the pilotbox on. Preselect position [A] on the pilot-box. Drive forwards slowly and use the hydraulic control device to slew the rear rotor according to the selected swath deposit.
<ul style="list-style-type: none"> Single-acting hydraulic control device. 		<p>Headlands</p> <ul style="list-style-type: none"> Using the single-acting hydraulic control device, raise both rotors to the headland position, then lower them.

Getting to know the machine

Steering	Machine position	Function
<ul style="list-style-type: none"> Pilotbox is switched on. Preselect position [A] on the pilotbox. Preselection lever at position [1]. Double-acting hydraulic control device. 		<p>Single swath</p> <ul style="list-style-type: none"> Use the preselection lever to set position [1] on the rear rotor. Open the ball valve. Switch on the tractor engine. Switch the pilotbox on. Preselect position [A] on the pilotbox. Drive forwards slowly and use the hydraulic control device to slew the rear rotor to the left.
<ul style="list-style-type: none"> Pilotbox is switched on. Preselect position [A] on the pilotbox. Preselection lever at position [3].  <ul style="list-style-type: none"> Double-acting hydraulic control device. 		<p>Two single swaths</p> <ul style="list-style-type: none"> Use the preselection lever to set position [3] on the rear rotor. Preselect position [A] on the pilotbox. Drive forwards slowly and use the hydraulic control device to slew the rear rotor to the left. Ensure that the swath formers are in the correct position.

Getting to know the machine

Steering	Machine position	Function
<ul style="list-style-type: none"> Pilotbox is switched on. Preselect position [C] on the pilotbox. Preselection lever at position [1].  <ul style="list-style-type: none"> Double-acting hydraulic control device. 		<p>Fodder slow gear</p> <ul style="list-style-type: none"> The rake is set to single swath Use the preselection lever to set position [1] on the rear rotor. Preselect position [C] on the pilotbox. Drive forwards slowly and use the hydraulic control device to slew the front rotor to the left. Ensure that the swath formers are in the correct position.
<ul style="list-style-type: none"> Pilotbox is switched on. Preselect position [C] on the pilotbox. Preselection lever at position [1].  <ul style="list-style-type: none"> Double-acting hydraulic control device. 		<p>Border swaths</p> <ul style="list-style-type: none"> The rake is set to single swath Use the preselection lever to set position [1] on the rear rotor. Preselect position [C] on the pilotbox. Drive forwards slowly and use the hydraulic control device to slew the front rotor to the right. Ensure that the swath formers are in the correct position.

Checking the scope of delivery

Delivery is in the fully assembled state

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

WARNING

Do not assemble the machine yourself

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

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

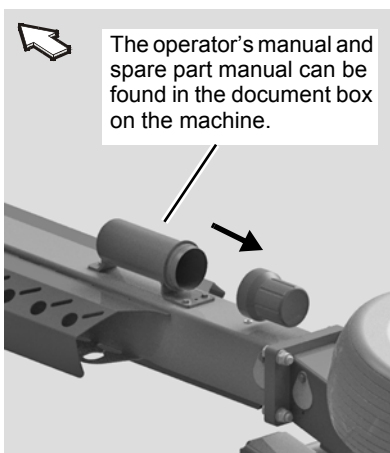
Incorrect assembly can result in damage to the machine or accidents.



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

Checklist for parts which were supplied loose	Quantity
PTO shaft for drive	1
Tine supports swathing 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.

Delivery and assembly

Checking the machine

Before using the machine for the first time, the PTO shaft length and the steering setting must be checked and corrected if necessary.

The following work steps are described in this section:

- »Checking the length of the PTO shaft«



In addition to the following handling instructions, please also note the instructions and safety information in the chapters:

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:

- ▶ Switch off the PTO shaft drive.
- ▶ Lower all implements to the ground.
- ▶ Switch all operating controls to their neutral or park position.
- ▶ Set the tractor's parking brake to the park position.
- ▶ 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

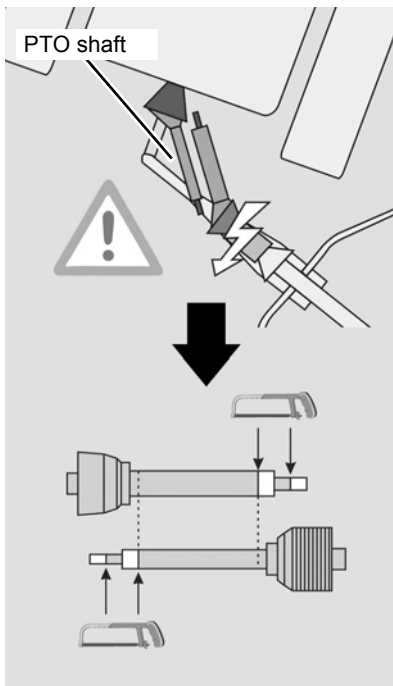
The PTO shaft has a wide hinge joint giving the tractor a steering angle of up to 80°. Make sure that the PTO shaft is not damaged during sharp cornering. This would result in damage to the machine.

Correct length

A PTO shaft that is too long must not be used. Otherwise, damage to the drive bearings on the tractor and machine may be caused as a result.



Checking the length of the PTO shaft



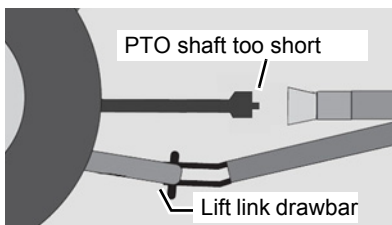
Adjust the PTO shaft as follows:

- ▶ Couple the machine to the tractor without the PTO shaft.
- ▶ Use the hydraulic control device to fully raise the rotary rake.
- ▶ 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.



If the PTO shaft has been shortened, the minimum overlap and the minimum distance must be checked again when it is operated with another tractor.

Replacing the PTO shaft



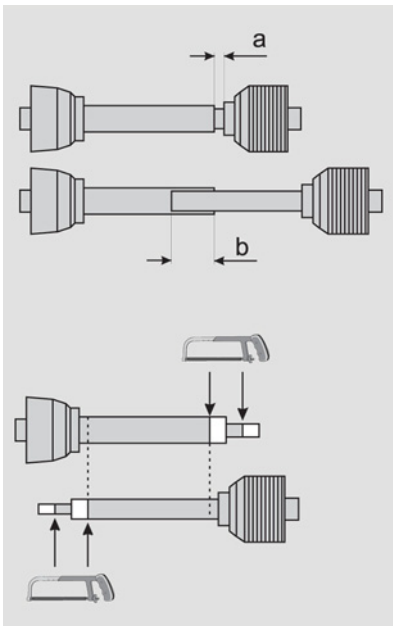
Only for USA and Canada:

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.

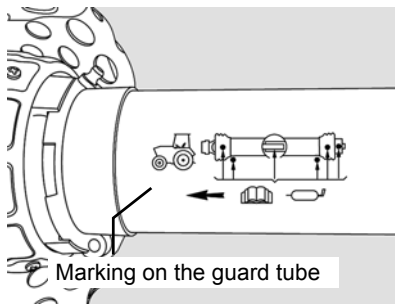
Delivery and assembly

Shortening the PTO shaft



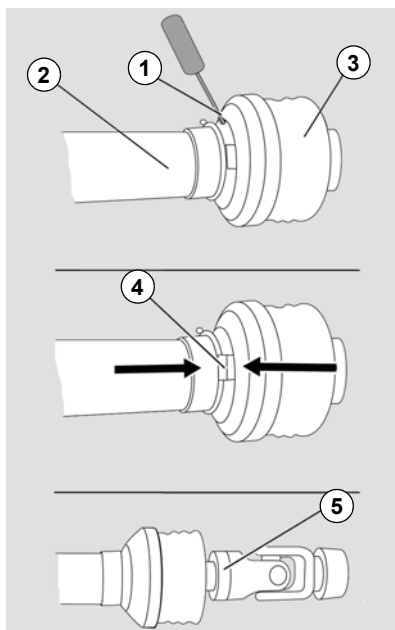
- ▶ Pull the PTO shaft apart and connect one half to the tractor PTO shaft drive and one to the machine and secure them.
- ▶ Place the two shaft halves next to each other and:
 - Check for a minimum of 200 mm overlap (b).
 - Check that the PTO shaft is not blocked at one end (minimum distance (a) = 20 mm).
- ▶ Shorten the slide tube and guard tube by the same dimension.
- ▶ Deburr the ends of the tube.
- ▶ Remove the swarf.
- ▶ Grease the sliding surfaces well.

Fitting 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.

- ▶ Check the length of the PTO shaft and shorten it if necessary.
- ▶ Fit the PTO shaft onto the machine's PTO stub shaft.
- ▶ 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.

Coupling the machine

Safety



WARNING

Observe the safety information

Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.

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.
- Slowly and carefully actuate the three-point power lift system.

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

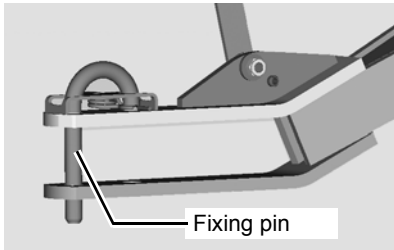
General

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«
- »Electrical connections«
- »Hydraulic connections«

Coupling the machine



WARNING

Use genuine fixing pins from the manufacturer

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

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

→ See »Stowing the height-adjustable parking stand [+]«, page 43.

– or –

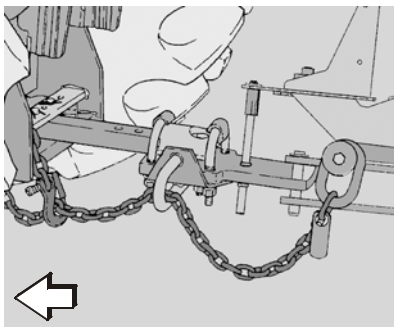
→ See »Coupling to the lift link drawbar«, page 44.



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

→ See »Lift link drawbar«, page 104.

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.



In the USA and Canada, it is obligatory to secure the rotary rake to the tractor with a rip chain. A suitable chain can be supplied as an accessory.



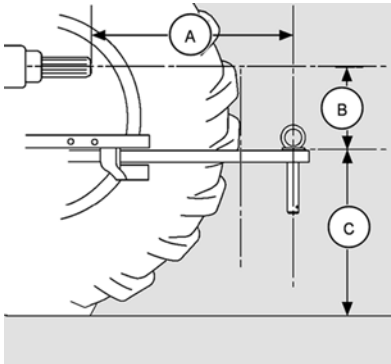
Choose an appropriate length of chain to ensure that the movement of the drawbar is not adversely affected and that the chain does not sag too much.



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

Coupling the machine

Coupling to the pending attachment



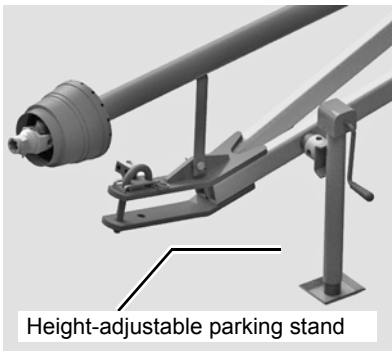
WARNING

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 driving characteristics during transport journeys. Accidents with serious or fatal injuries may be caused as a result.

Lock the height adjustment of the lower link

Lock the height adjustment of the lower link. Comply with the tractor operating manual. Unintentionally raising the lower links can irreparably damage the PTO shaft. Damage to the machine may be caused as a result.

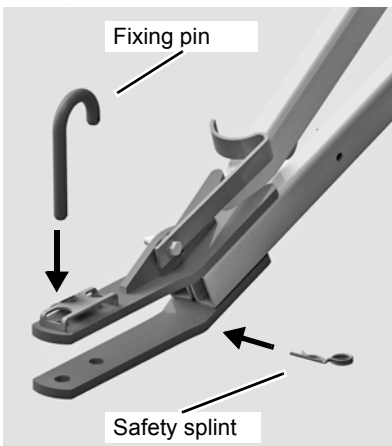


Only use a pending attachment in accordance with ISO 6489-3. For coupling to a pending attachment, proceed as follows:

- ▶ (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.

Proceed as follows:

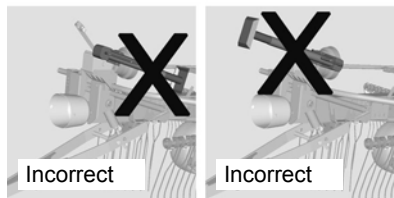
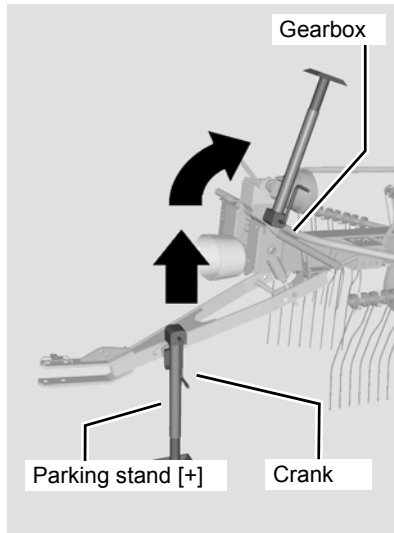
- ▶ Take the height-adjustable parking stand [+] out of the transport holder bracket and fit it to the drawbar.
- ▶ Adjust the drawbar height using the crank.
- ▶ Couple the rotary rake to the pending attachment with a fixing pin.
- ▶ Secure the fixing pin with a safety splint.
- ▶ Place the height-adjustable parking stand [+] in the transport holder and secure.
- ▶ Couple the rotary rake to the pending attachment with a fixing pin.
- ▶ Secure the fixing pin with a safety splint.



The working depth is adjusted on the chassis.

→ Chapter »Preparing for use«, section »Rotor pitch«, page 54

Stowing the height-adjustable parking stand [+]



WARNING

Park the parking stand in the correct position

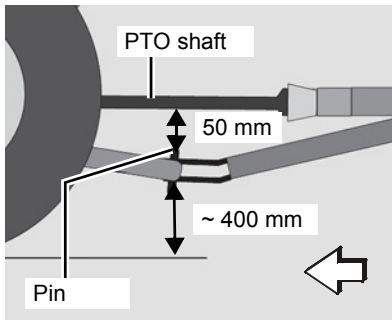
After removing the parking stand from the drawbar, make sure that it is correctly mounted on the machine. Damage to the machine may be caused as a result.

For coupling to the pending attachment, you require a removable parking stand [+]. The drawbar height can be adjusted using a crank. The bracket for the removable parking stand [+] is located on the gearbox. Make sure that the parking stand is correctly mounted while in the park position.

→ See »Height-adjustable parking stand [+]«, page 104.

Coupling the machine

Coupling to the lift link drawbar



The factory-supplied PTO shaft can only be used 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

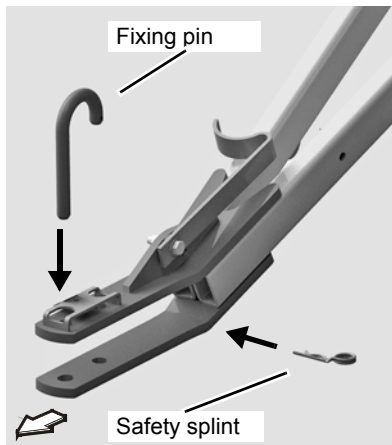
Lock the height adjustment of the lower link. Comply with the tractor operating manual. Unintentionally raising the lower links can irreparably damage the PTO shaft. Damage to the machine may be caused as a result.

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. Accidents with serious or fatal injuries may be caused as a result.

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 will be damaged if, for example, a bump in the ground is driven over. Damaged PTO shafts can cause injury to persons or damage the machine. Accidents with serious or fatal injuries may be caused as a result.



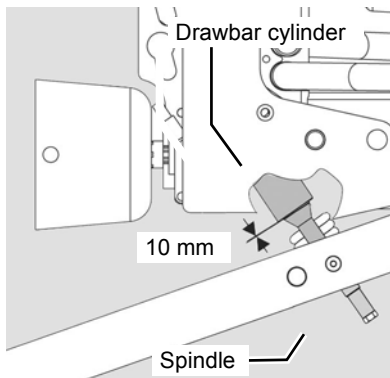
- ▶ Fix the lower link height at a distance of approximately 400 mm (15.75 in) from the ground.
- ▶ Couple the rotary rake to the lift link drawbar with a fixing pin.
- ▶ Secure the fixing pin with a safety splint.
- ▶ Fold in and secure the parking stand.
→ See »Adjusting the drawbar cylinder«, page 45.



The working depth is adjusted on the chassis.

→ Chapter »Preparing for use«, section »Rotor pitch«, page 54

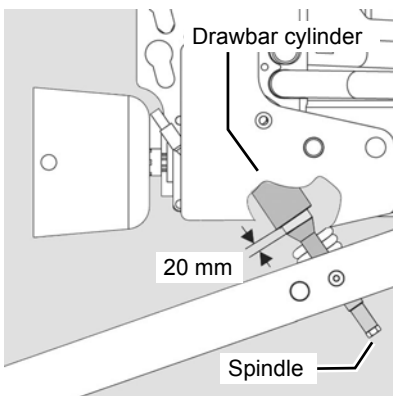
Adjusting the drawbar cylinder



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 support wheel:

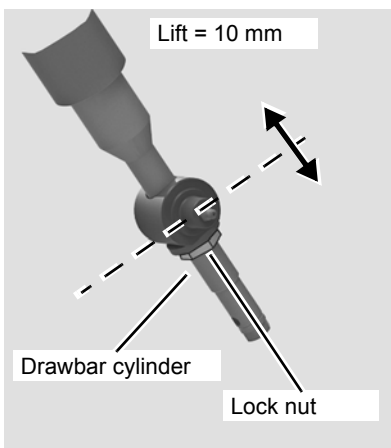
- ▶ Fully screw in the spindle on the drawbar cylinder.
- ▶ Set the hydraulic control device to floating position.



When the optionally available support wheel 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 support wheel:

- ▶ Relieve the load on the drawbar using the optional support wheel.
- ▶ Undo the lock nut on the drawbar cylinder.
- ▶ Unscrew the spindle on the drawbar cylinder about 10 mm.
- ▶ Tighten the lock nut on the drawbar cylinder.



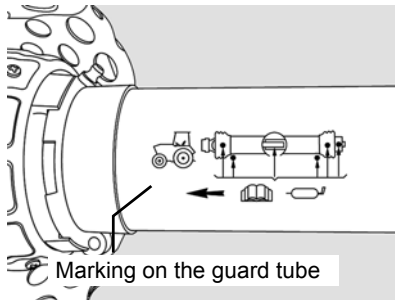
Spanner size "17" on the spindle



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

Coupling the machine

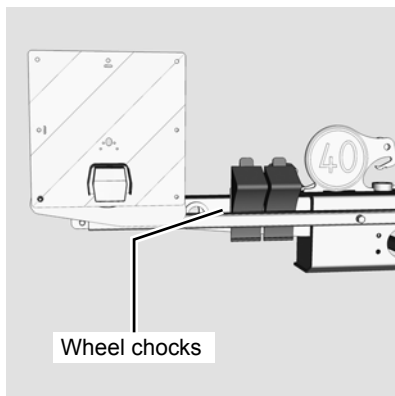
Coupling the PTO shaft



When coupling the PTO shaft, make sure it is in the correct position.

- ▶ Check whether the PTO shaft must be shortened before coupling.
- ▶ Shorten the PTO shaft if necessary.
→ »Length of PTO shaft«, page 36
- ▶ Check that the tractor's PTO stub shaft is clean and lubricated.
- ▶ Couple the PTO shaft to the tractor and the machine.
- ▶ Ensure that the PTO shaft is engaged on the shaft ends.
- ▶ Secure the guard tubes so that they cannot rotate at the same time.
- ▶ Couple the 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 may be caused if these guidelines are not followed.

- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Remove the wheel chocks from in front of the wheels.
- ▶ Insert the wheel chocks into the holders provided and lock them securely in place.

Connections

Electrical connections

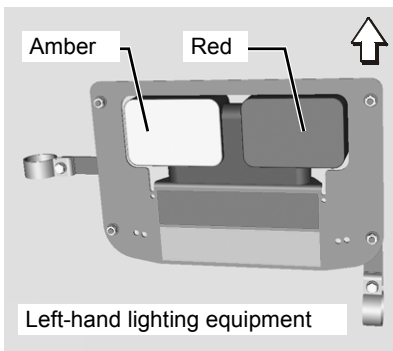
WARNING

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.

Attach the following electrical cables to the tractor:

Lighting equipment – USA



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).

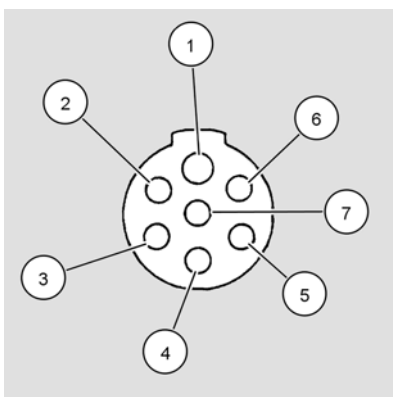


If your tractor does not have the corresponding connection, a corresponding connection must be retrofitted. Consult your dealer.



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

SAE J560 plug arrangement



PIN	Cable	Connection
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.

Coupling the machine

Function overview of lighting equipment – USA

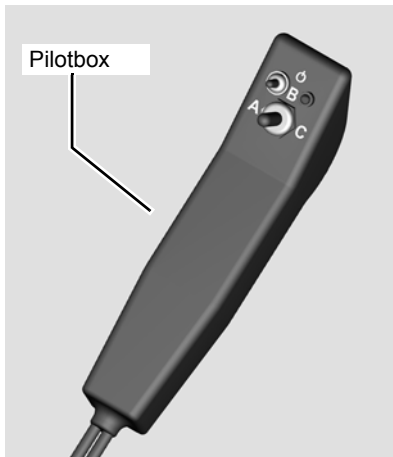
- ▶ Check that the lighting equipment is functioning using the following table.

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



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

Pilotbox



WARNING

Switch off the pilotbox for all tasks on the machine

Always switch off the pilotbox when coupling or uncoupling, when in the transport position and when carrying out service or maintenance work or any task on the machine. If the pilotbox is switched on and accidentally actuated, unpredictable movements of the machine may be triggered. Accidents with serious or fatal injuries may be caused as a result.

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

Pilotbox	Solenoid valve connection	Function
A	Y1	Slews the rear rotor of the tractor to the left or the right using the hydraulic control device.
B	Y2	Folds in or folds out the swath former using the hydraulic control device.
C	Y3	Slews the front rotor of the tractor to the left or the right using the hydraulic control device.

Coupling the machine

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 if these guidelines are not followed.

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 if these guidelines are not followed.

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. Serious or fatal injury may be caused if these guidelines are not followed.

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. Never use your 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

Make sure that the hydraulics are connected correctly. Otherwise, damage to the machine and personal injury may be caused as a result.



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



- ▶ Set the tractor hydraulics to "free float".

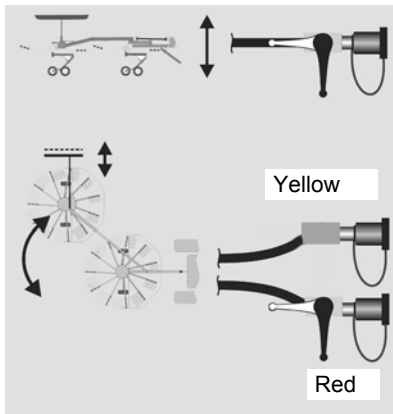


- ▶ Close the ball valve.

- ▶ 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.

The rotors are raised and lowered via the single-acting hydraulic control device.

The machine is slewed using 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

The following applies to all preparations for operation:



WARNING

Observe the safety information

Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.

Securing the machine

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

No persons in the working area

Ensure that no persons, especially children, are present in the folding and working area of the machine. Persons could be caught by the machine within this area. Fatal injury may be caused as a result.

Switch off the pilotbox for all tasks on the machine

Always switch off the pilotbox for any task carried out on the machine. If the pilotbox is switched on, unpredictable movements of the machine may be triggered. Accidents with serious or fatal injuries may be caused as a result.

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. Fatal injury may be caused as a result.

Unfold fully and evenly

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

General

The following applies when performing all adjustment work:

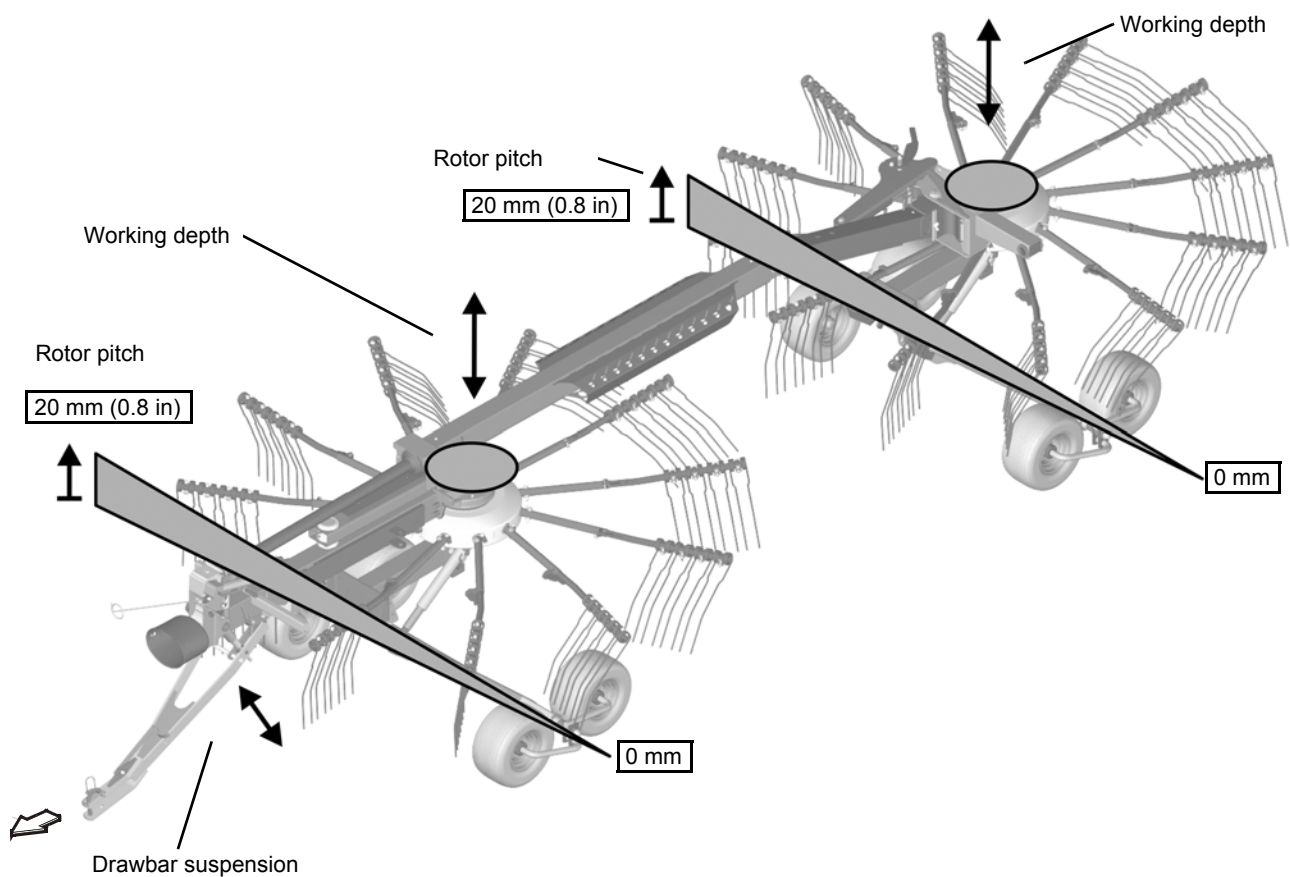
- ▶ Check the tire pressure.
- ▶ Secure the machine.
- ▶ Undo the appropriate bolts.
- ▶ Make the required adjustment.
- ▶ Retighten the bolts.
- ▶ Fit and secure the tine supports.

The following work steps are described in this section:

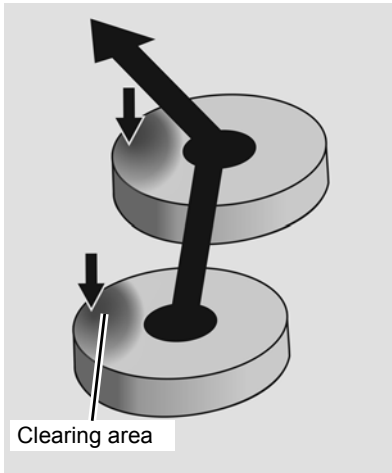
- »Rotor pitch«
- »Working depth«

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

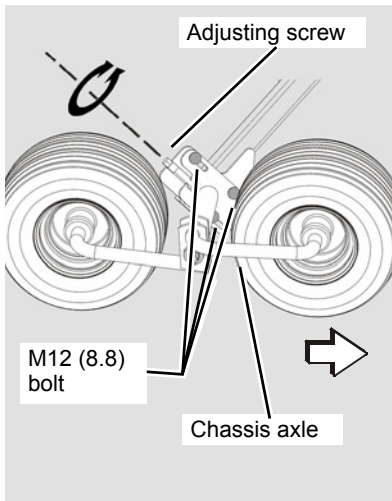
Close the ball valve before working on the machine or carrying out any adjustment work. If the ball valve is open and there is an operating error, the machine can lower itself and cause serious injuries.

The rotors are inclined at an angle to the chassis to ensure that the crop is picked up in the clearing area. The rotor is already inclined obliquely ex-factory.



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

Adjusting the rotor pitch



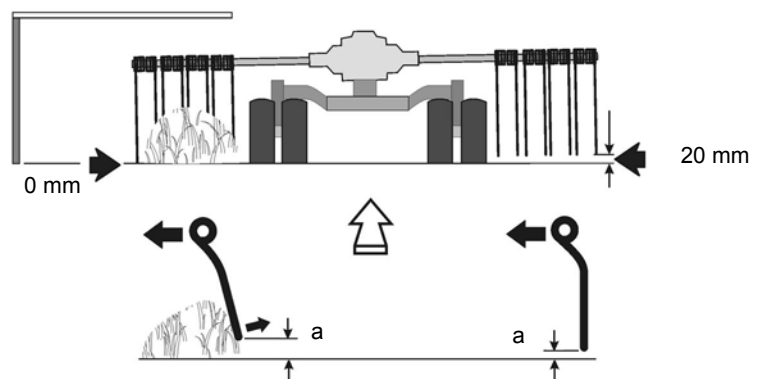
WARNING

Securing the machine

Secure the machine against accidental 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. Serious or fatal injury may be caused if these guidelines are not followed.

The lateral rotor pitch is adjusted on the chassis axles of the rotors. If the crop is not picked up cleanly, the raking quality can be improved by adjusting the rotor pitch. In this case, proceed as follows:

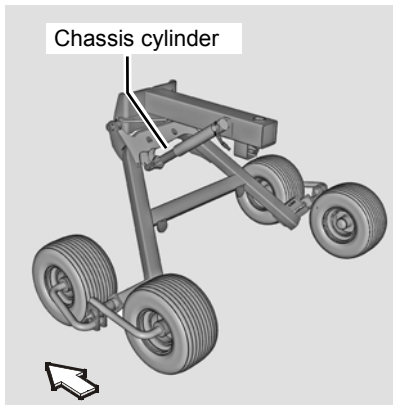
- ▶ Fully raise the machine using the hydraulic control device.
- ▶ Close the ball valve.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Remove the tine support over the right-hand chassis axle on the rotor chassis.
- ▶ Slightly loosen the three bolts on the chassis axle.
- ▶ Move the chassis axle into the required position using the adjusting screw (see illustration below).
- ▶ Retighten the bolts to a tightening torque of 85 Nm.
- ▶ Fit and secure the tine supports.



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

Preparing for use

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 on both rotors using an adjusting screw on the chassis cylinder.

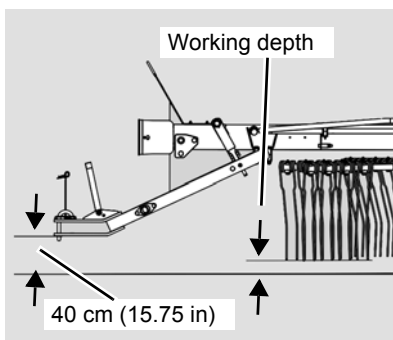
- First set the working depth on the front rotor, as this affects the pitch of the rear rotor, in relation to the direction of travel.
- The rear rotor is inclined forward by approx. 1° (in relation to the direction of travel) ex-works, in order to ensure improved crop pickup.

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. 40 cm (15.75 in).
- ▶ Check the working depth of both rotors.

Checking the working depth



Check the preset working depth as follows:

- ▶ Fix the optional support wheel [+] in the upper position.
- ▶ Fully lower the machine using the hydraulic control device.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ 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. 0.4 m or 15.75 in).



The ideal working depth depends on several factors. Decisive, among others, are:

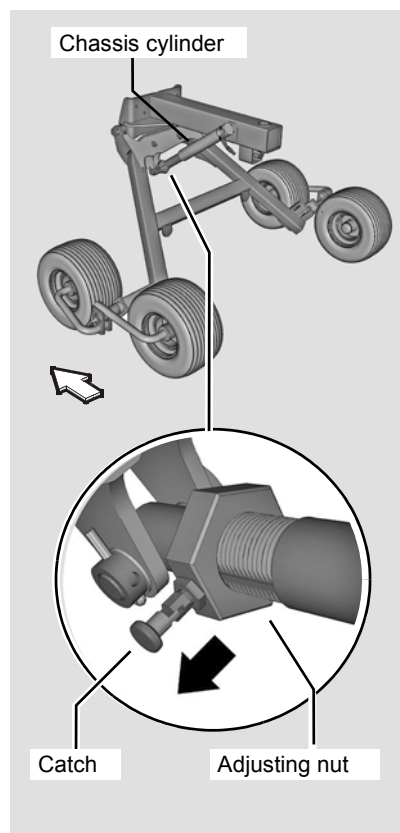
- The soil condition and the stubble length.
- The type and quantity of fodder



If the tines are adjusted too low, the crop will be contaminated with soil. The load on the rotor tines and the drive is thereby increased.

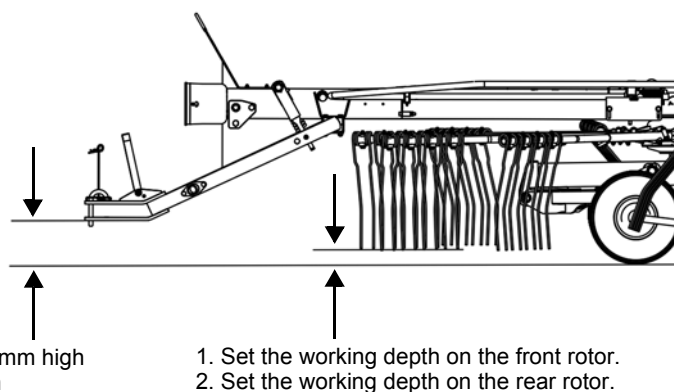
- If necessary, adjust the working depth to the field again.

Adjusting the working depth



Begin adjustment work with the front rotor:

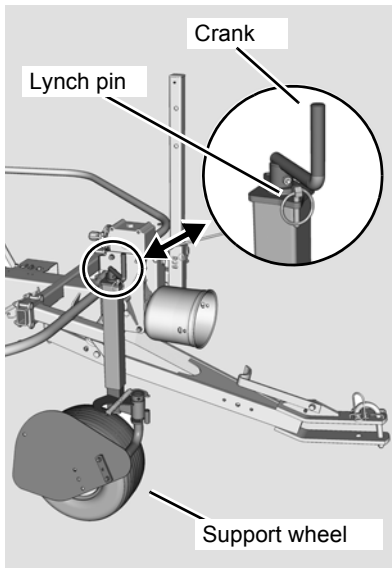
- ▶ Using the hydraulic control device, raise the machine to the headland position.
- ▶ Close the ball valve.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Release the adjusting nut below the chassis using the catch and use the 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.
 - See »Checking the working depth«, page 56.



- ▶ **i** Two turns of the adjusting nut change the height by 15 mm on the tines.
- ▶ **i** If the optional contact rollers [+] are being used, adjust and set the height.
 - See »Adjusting the roller feelers [+]«, page 59.

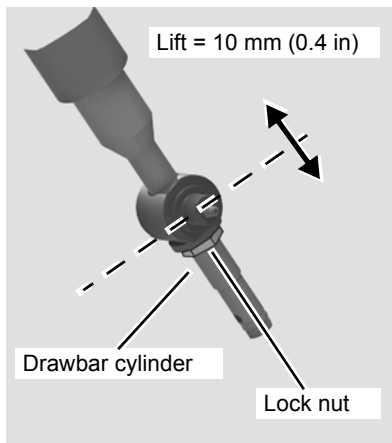
Preparing for use

Adjusting the support wheel [+]



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

- ▶ Adjust the drawbar cylinder for using the optional support wheel.
→ See »Adjusting the drawbar cylinder«, page 45.
- ▶ Lower the machine into the work position using the hydraulic control device.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Release the lynch pin from the crank.
- ▶ Adjust the support wheel using the crank.
- ▶ Secure the crank with the lynch pin.



If the optional support wheel is being used, the spindle on the drawbar cylinder must be adjusted. This is the only way to ensure that the any bumps in the ground are compensated for.

Operation with optional support wheel:

- ▶ Relieve the load on the drawbar using the optional support wheel.
- ▶ Undo the lock nut on the drawbar cylinder.
- ▶ Unscrew the spindle on the drawbar cylinder by about 10 mm (0.4 in).
- ▶ Tighten the lock nut on the drawbar cylinder.

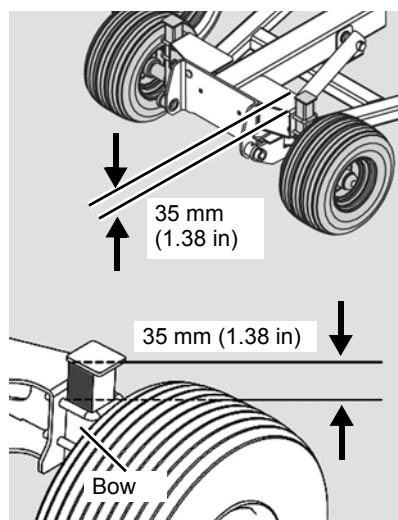


Spanner size "17" on the spindle



If the optional support wheel is being used, ensure that there is always a lift of at least 10 mm (0.4 in) for the drawbar cylinder.

Adjusting the roller feelers [+]



The optional contact rollers for the rotor chassis provide improved adaptation to the contours of the ground. This height must be adjusted to suit different crops and ground conditions. Adjust the contact rollers as follows:

- ▶ Slightly loosen the bolts on the two retainers.
- ▶ Adjust and set the contact roller axles to the height of the chassis axles:
 - Basic setting $H = 35 \text{ mm}$ (1.38 in).
- ▶ Tighten and secure the bolts on both retainers.



The contact roller 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 8.

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, fold in all guard bars and rotors and secure the machine. All tine supports which have tips that point at right angles to the direction of travel and which are at a height of less than 2 metres (6.6 ft) 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.

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.

Pay attention to the transport width and height

Pay attention to the permissible transport width and height. 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.

Prior to road transport

WARNING

Pay attention to the height, width and length

When driving under bridges, power lines and any areas where the clearance from the ground is restricted, always take the actual height, width and length of the machine and any attachments into account. This may cause damage to the machine, traffic accidents or other incidents with fatal consequences.

Cleaning lighting equipment before travelling on the road

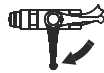
All lighting equipment must be cleaned before road transport. Crop residue or dirt may cover up the lighting equipment and adversely affect its correct operation. Traffic accidents and accidents with fatal injuries may be caused as a result.

Fold up the machine completely

Ensure that the machine is always completely folded up. Never drive with a partially folded side device. This could cause traffic accidents and other accidents with fatal consequences.

Remove tine supports

When operating the machine on public roads and in the park position, all tine supports must be removed and secured. Traffic accidents and accidents with fatal injuries may be caused as a result.



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

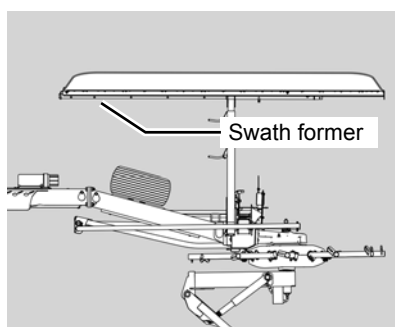
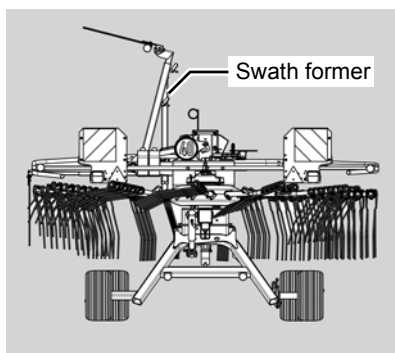
When driving on public roads, the machine must be in the transport position. To prepare the machine for road transport, carry out the following steps:

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

Road transport

Folding the machine into the transport position

Retracting the swath former



In this case, proceed as follows:

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



WARNING

No persons within the slewing range

No persons, especially children, may be present within the folding range and working area. Persons can be trapped by the machine. Serious or fatal injury may be caused if these guidelines are not followed.

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

- ▶ Select position B on the pilotbox.
- ▶ Use the hydraulic control device to fold in the swath former.

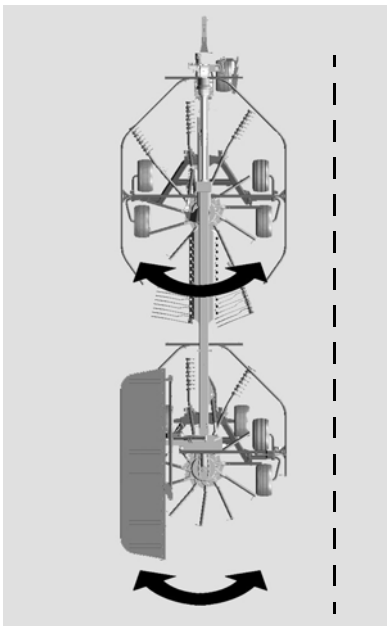
- ▶ Move the rear swath former forward in the direction of travel.



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 swath former in relation to the direction of travel«, page 73

Straightening the machine



WARNING

No persons within the slewing range

No persons, especially children, may be present within the folding range and working area. Persons can be trapped by the machine. Serious or fatal injury may be caused if these guidelines are not followed.

Ensure that hydraulic connections are correct

Before slewing, always check that the hydraulics for the slewing device are correctly connected to a double-acting hydraulic control device. Wrongly connected hydraulic hoses can trigger unpredictable movements of the machine. Traffic accidents and accidents with fatal injuries 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. Serious or fatal injury may be caused if these guidelines are not followed.

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 front rotor



- ▶ Select position C on the pilotbox.
- ▶ Drive forwards slowly and straighten the front rotor using the hydraulic control device.

Aligning the rear rotor



- ▶ Select position A on the pilotbox.
- ▶ Drive forwards slowly and straighten the rear rotor using the hydraulic control device.

Road transport

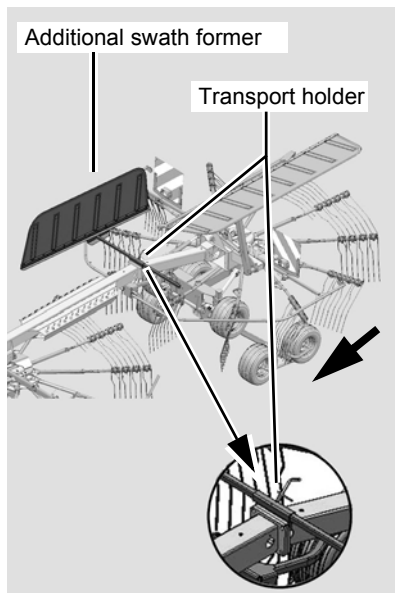
Additional swath former [+] in park position



WARNING

Collision danger

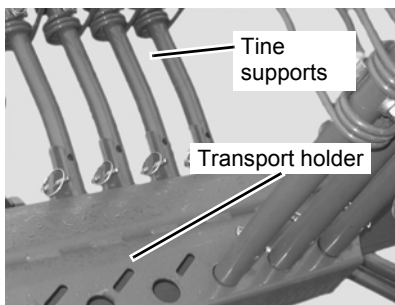
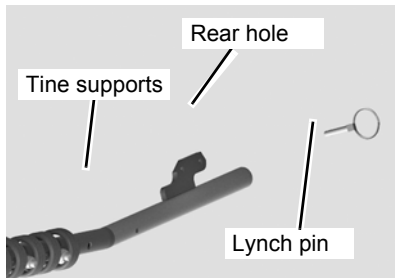
The additional swath former must be pushed to the **right** into the transport holder in the direction of travel. Otherwise, there is a risk of collision when folding in the rear swath former.



Put the additional swath former in the park position from the right and secure it in place. In this case, 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.

Parking tine supports in the transport holder



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. Serious or fatal injury may be caused if these guidelines are not followed.

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

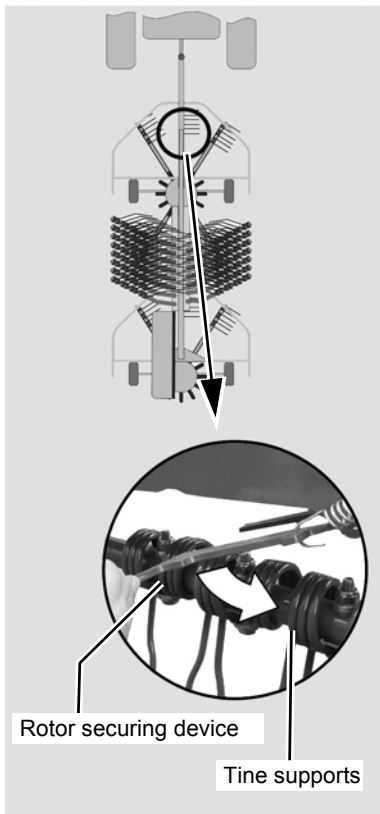
Only three tine supports may remain on the rear rotor during road transport.

- ▶ Loosen the lynch pin on the tine support.
- ▶ Secure the lynch pin in the rear hole.
- ▶ Pull off the tine support.

- ▶ Insert the tine support into the transport holder.

Road transport

Securing the rotors



WARNING

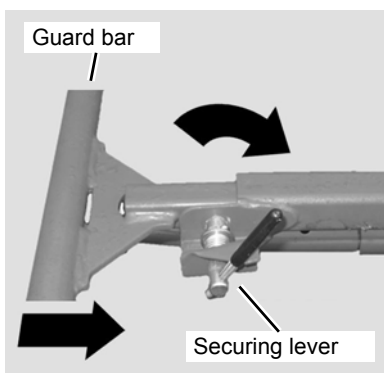
Securing the rotors

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.

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.

- ▶ Check the surrounding area before you move off. Always make sure that you have a clear field of vision and, in particular, look out for children within the operating area of the machine.
- ▶ 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:



- Tractor control system for hydraulics "OFF"?
- Tractor PTO shaft drive "OFF"?
- Is the pilotbox off?
- Rotary rake aligned and raised?
- Swath former in transport position?
- Ball valve closed?
- Guard bars pushed in?
- Locking mechanisms and securing levers checked for firm seating?
- Rotor secured with rotor securing device?
- Tine support in transport position?
- Tyre pressures correct?
- When coupling onto the lift link drawbar, is the lower link laterally fixed?
- Crop residue and dirt removed?
- Lighting cables routed so that they are not strained and cannot become caught in the tractor's wheels when cornering?
- Lighting equipment in good working order?

Safety

The following applies for all preparations on the field:

WARNING

Observe the safety information

Observe the safety information. Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.



Switch off the tractor and secure it

Before you dismount:

- ▶ Switch off the PTO shaft drive.
- ▶ Lower all implements to the ground.
- ▶ Switch all operating controls to their neutral or park position.
- ▶ Set the tractor's parking brake to the park position.
- ▶ Switch off the tractor.
- ▶ Remove the ignition key.
- ▶ Switch off the pilotbox.
- ▶ 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 if these guidelines are not followed.

Switch off the pilotbox for all tasks on the machine

Always switch off the pilotbox for any task carried out on the machine. If the pilotbox is switched on, unpredictable movements of the machine may be triggered. Accidents with serious or fatal injuries may be caused as a result.

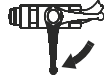
Securing the machine

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.

WARNING

No persons in the working area

Ensure that no persons, especially children, are present in the folding and working area of the machine. Persons could be caught by the machine within this area. Fatal injury may be caused as a result.



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.

Observe the slewing process

Observe the rotors during the slewing process. If the machine behaves unusually during the process, stop immediately to avoid damage.

General

The following work steps are described in this section:

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

Preparations on the field

Folding the machine into the work position

WARNING

Observe the contour of the terrain

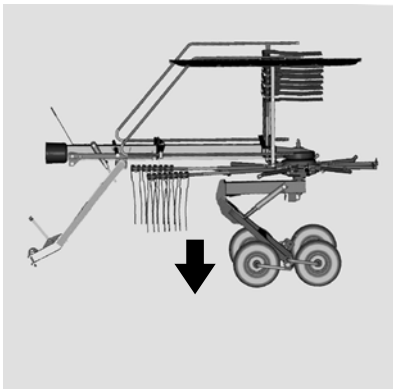
Move the machine onto a flat surface or uphill before changing from the transport to the work position. Avoid inclines on which the combination (tractor and machine) could slip or overturn. Damage to the machine may be caused as a result. There is an increased risk of tipping and injury in a position at right angles to the direction of the slope.

Make sure the machine is standing level

Before folding the machine out, check that it is standing level. The machine could tip over, particularly on hillside locations. This could lead to damage to the machine and personal injury.

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

Lowering the machine



▶ Switch on the tractor.



▶ Fold the machine into its work position using the hydraulic control device.

▶ Switch off the pilotbox.



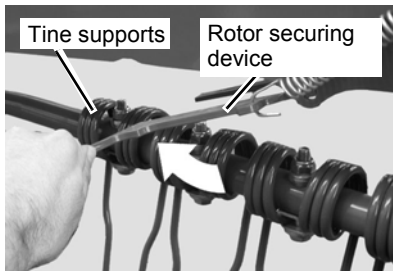
▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.

Releasing the rotor securing device

WARNING

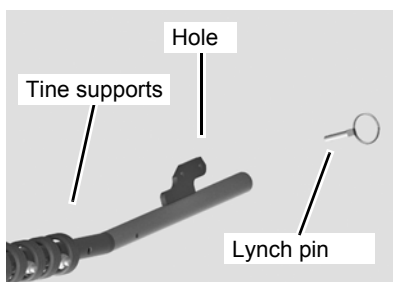
Switch off the tractor and secure it

Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away. Serious or fatal injury may be caused if these guidelines are not followed.



- ▶ Release the rotor securing device and swing it upwards.

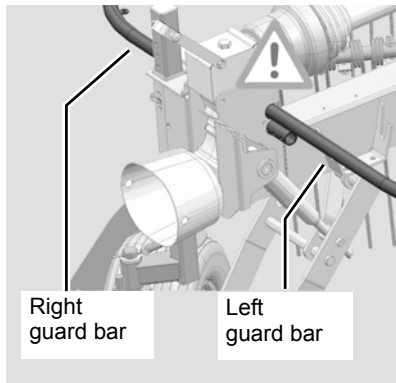
Fitting the tine supports



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

Preparations on the field

Fitting the guard bar



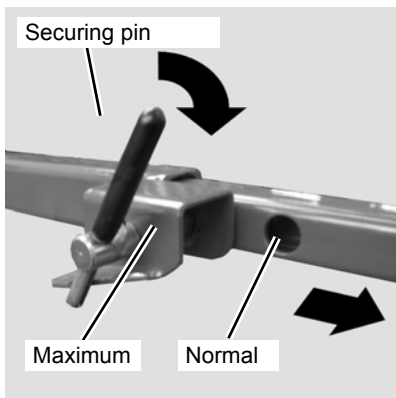
CAUTION

Fit the guard bar correctly

Ensure that the guard bars are fitted 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.

Pulling out the guard bar



After attaching the tines, all protective devices around the rotor must be moved 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.

Swath former

The swath former can, depending on the fodder volume and swath type, be adjusted in terms of its:

- Width and
- Direction of travel

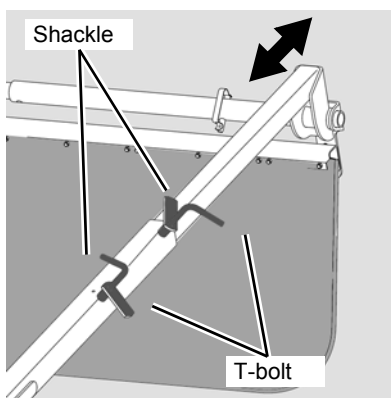
WARNING

Observe the folding-down process

Nobody may be in the slewing range of the swath former while it is being folded out. Observe the folding-down procedure. Otherwise, serious injury may be caused by parts that are folding down.

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

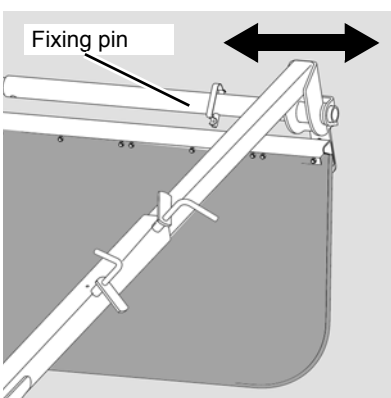
Adjusting the swath width



Adjust the width of the swath former 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 clips.

Adjusting the swath former in relation to the direction of travel



CAUTION

Risk of collision with the swath former

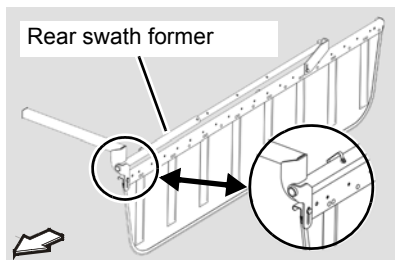
When swathing in the "two single swaths" position, the swath former must be pushed backwards completely. Otherwise, the swath former can be damaged by the front tines.

Move the swath former in the direction of travel as follows:

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

Preparations on the field

Adjusting the swath former's height



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

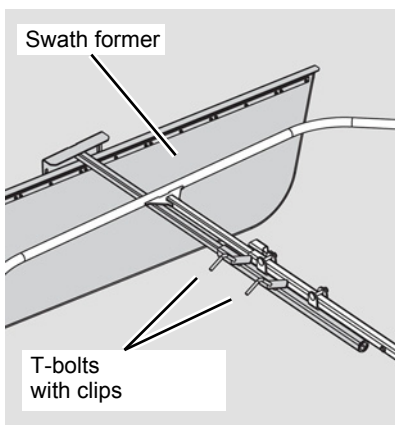
Additional swath former [+]

CAUTION

Risk of collision with the additional swath former

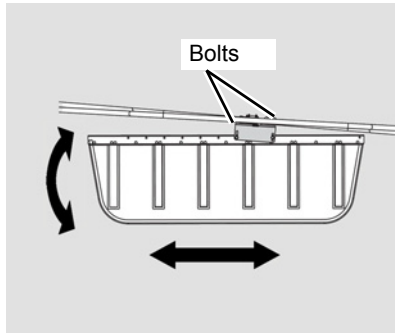
When working with the additional swath former, ensure that the tine supports never collide with the front swath former. Otherwise, the swath former may be damaged.

Adjusting the swath width



- ▶ 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.
- ▶ Lock the T-bolts in place with the clips.

Adjusting the height and direction of travel



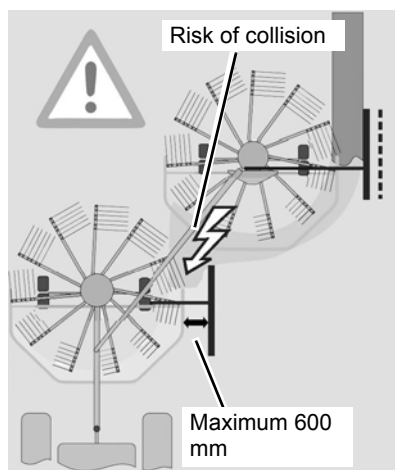
CAUTION

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 may be damaged.

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

- ▶ Loosen and remove the bolts.
- ▶ Move the swath former forward into the required height and direction of travel.
- ▶ 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 and fasten to the rearmost hole pattern.

Safety

WARNING

Observe the safety information

Observe the safety information. Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.

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 if these guidelines are not followed.

No persons in the working area

Ensure that no persons, especially children, are present in the folding 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.

Checking the angle of lock

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.



General

The following work steps are described in this section:

- »Swathing«
- »Driving on headlands«



Suitable working speeds

Select a driving speed (approx. 4 to 12 km/h, approx. 3 to 8 mph) at which the crop is picked up cleanly and completely. The working speed depends on the machine settings and the particular crop.

Swath width

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

Operation

Swathing

WARNING

No persons in the working area

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

Requirements

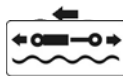
After setting the machine as described in chapter »Preparations on the field« page 68, you can start swathing.

The machine is correctly set as follows:

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



Starting work



- ▶ Open the ball valve.
- ▶ Set the single-acting hydraulic control device to the floating position.
- ▶ Check that there is nobody in the working area of the machine.
- ▶ Switch on the tractor engine.
- ▶ Switch on the PTO shaft 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 completely.



Start swathing at the edge of the field and at headlands to avoid subsequently driving over the crop.

The optimal speed of the PTO shaft is around 350 - 450 rpm.

Working speed



CAUTION

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 3 and 8 mph). The working speed depends on ground and crop conditions.

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

Operation

Swath deposit

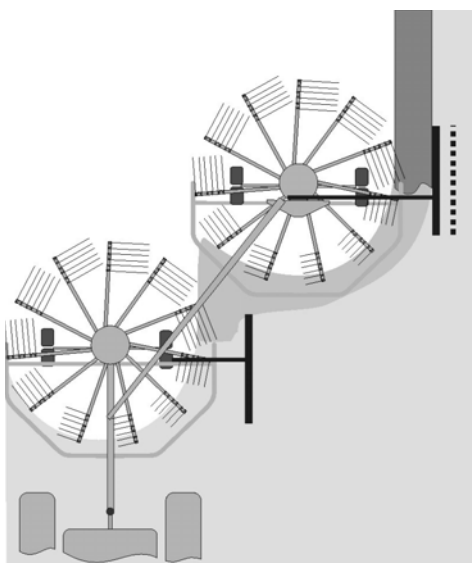
WARNING

Distance from the rotor

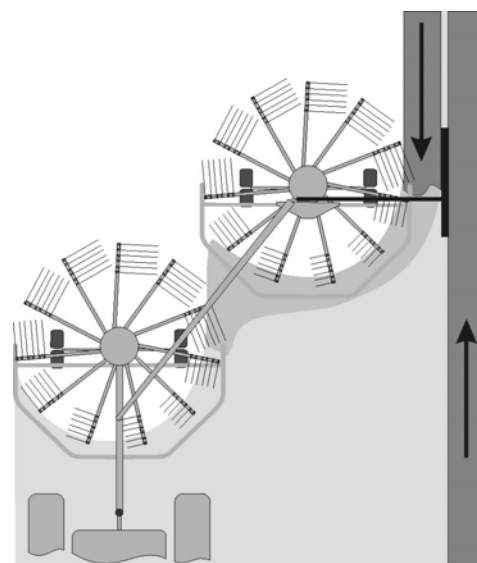
Maintain a safe distance from the rotor when it is rotating. Nobody, especially children, should remain in close proximity to the machine when tedders and rakes are running. Otherwise, serious or fatal injury may be caused as a result.

The following swath deposits are possible:

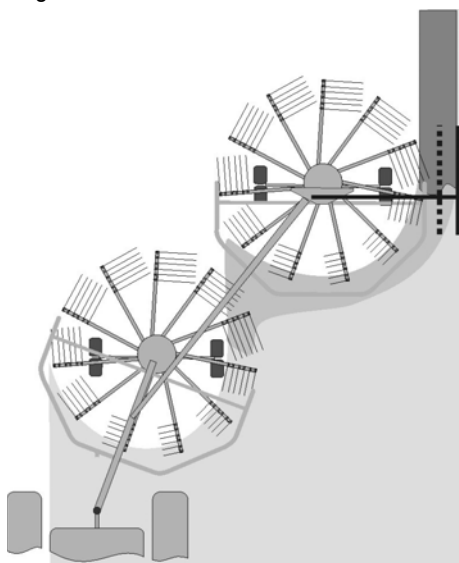
- Single swath
- Double swath
- Fodder slow gear
- Border swath (working at the field edge)



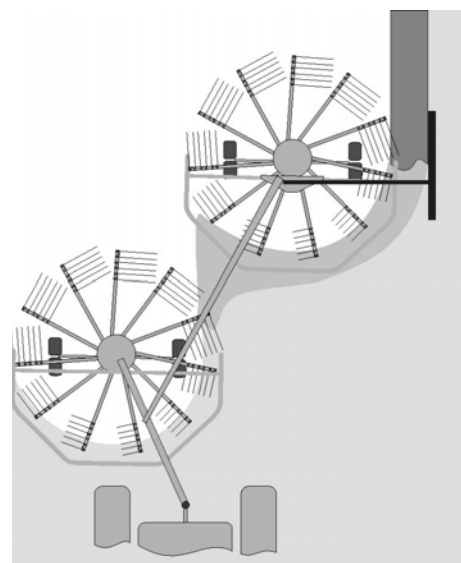
Single swath



Double swath



Fodder slow gear



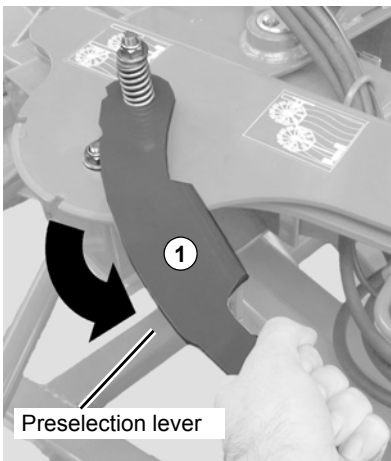
Border swaths

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



Preselection lever



WARNING

Collision danger

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.

Set the "single swath" position as follows:



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



- ▶ Check that the rear swath former is fitted to the front hole pattern.

- ▶ Switch off the pilotbox.

- ▶ Additional swath former

- ▶ Remove it from the front rotor.

- ▶ Push it into the transport holder from the right and secure in place.

- ▶ Set the preselection lever to the "single swath" position (1).

- Lift the lever, turn it towards the front and lock it again.



- ▶ Switch the pilotbox on.

- ▶ Select position A on the pilotbox.

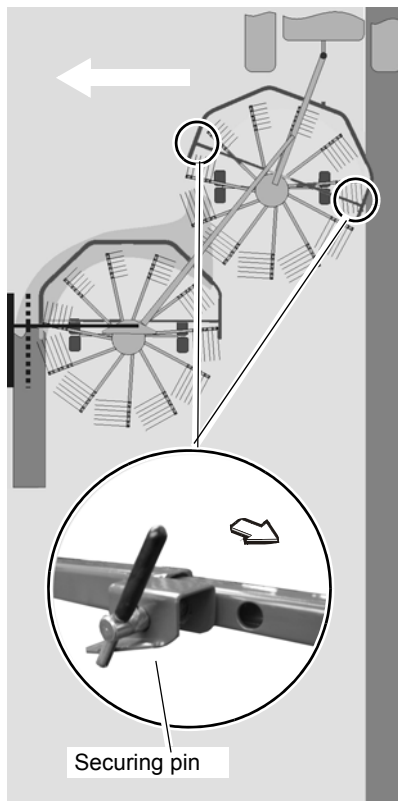
- ▶ Drive forwards slowly and use the hydraulic control device to slew the rear rotor to the left. The steering cylinder is fully retracted.



- 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 pivoting cylinder by slowly driving forwards.
- The rear rotor can be slewed with this setting on the preselection level 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 selection lever.

Operation

Adjusting the fodder slow gear



To reduce crop contamination, the front rotor can be slewed to the left when in the single swath position. The tractor drives its left-hand pair of wheels over the crop.

When in the "Single swath" position, the machine must be on a level surface and the guard bar on the front rotor must be pulled out.

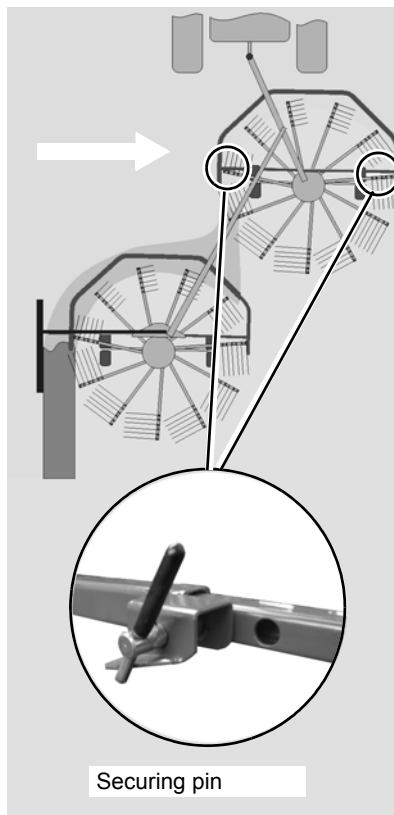
Adjust the guard bar as follows:

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

Slew the front rotor as follows:

- ▶ Select position C on the pilotbox.
- ▶ Drive forwards slowly and use the hydraulic control device to slew the rotor to the left.

Adjusting the border swaths



During the first circuit of the field, the tractor may be unable to travel near enough to the field edge to be able to pick up the crop. To enable this, the front rotor can be swivelled to the right.

When in the "Single swath" position, the machine must be on a level surface and the guard bar on the front rotor must be pulled out.

Adjust the guard bar as follows:

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

Slew the front rotor as follows:

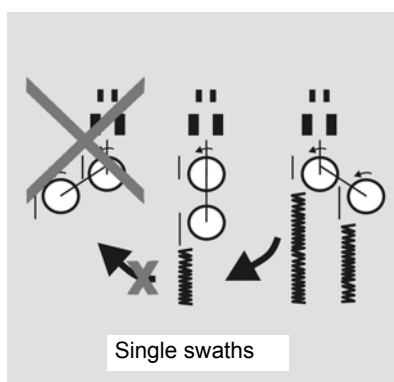
- ▶ Select position C on the pilotbox.
- ▶ Drive forwards slowly and use the hydraulic control device to slew the front rotor to the right.



Slew the rear rotor a little back to the right so that fodder can be completely picked up.

If necessary, adapt the pitch of the first rotor by lowering the support wheel.

Two single swaths

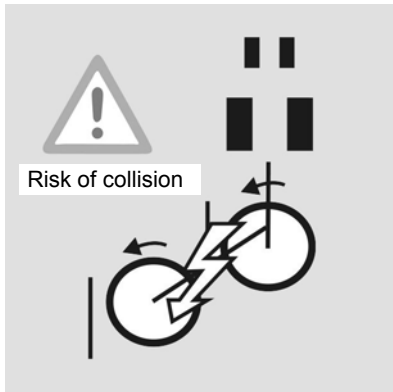


WARNING

Collision danger

In the "Two single swaths" work position, both swath formers are used. Adjustments must be made to both swath formers. 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.

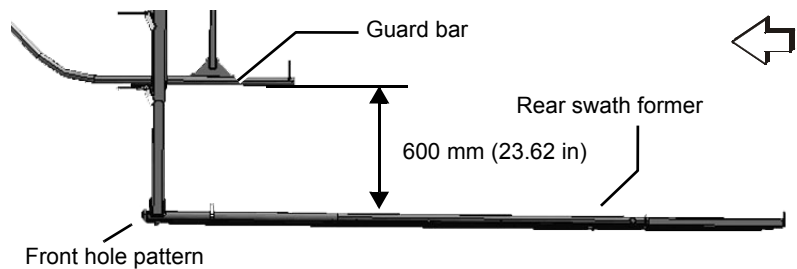
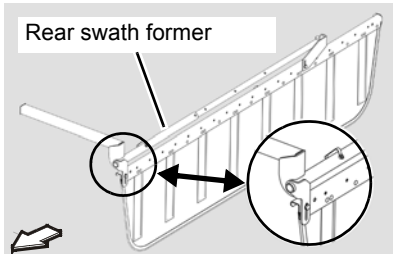
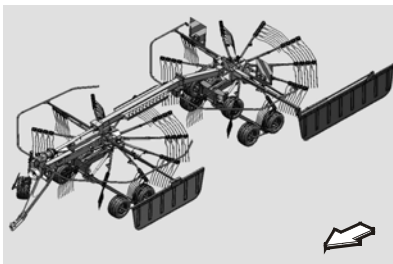
Operation



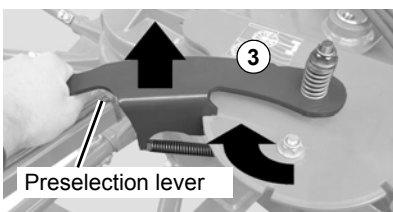
- ▶ Fold the machine into its work position.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Switch off the pilotbox.
- ▶ Remove the additional swath former from the transport holder on the machine, mount it on the front rotor, and secure with a T-bolt.
- ▶ Adjust the additional swath former, leaving a maximum distance of 450 mm (17.72 in) from the guard bar, and secure it 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 (23.62 in) from the guard bar, and secure it in place.

The following illustrations depict the machine as follows:

- With both swath formers in their correct positions, and
- With the rear swath former in the front hole pattern and pushed as far backwards as possible.



Setting two single swaths



Set the "Two single swaths" position as follows:

- ▶ Set the preselection lever to the "two single swaths" position (3).
 - Lift the lever, turn it towards the rear and lock it again.
- ▶ Select position A on the pilotbox.
- ▶ Drive forwards slowly and use the hydraulic control device to slew the rear rotor to the left.
 - The pivoting cylinder is fully extended.

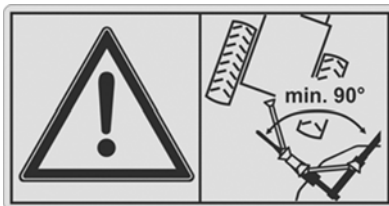




- If necessary, briefly retract the steering cylinder before the automatic preselector is released and travel can proceed in the straight-ahead position.
- The rear rotor can only be slewed to the right and back to the middle with this setting of the preselection level.
- In order to slew to the left and into the "single swath" position, the preselection lever must be switched over.

Operation

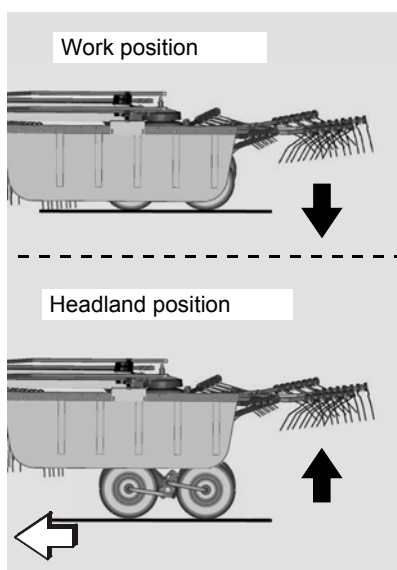
Driving on headlands



WARNING

Checking the angle of lock

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.

- ▶ Using the single-acting hydraulic control device, raise the machine into the headland position in order to travel over the swaths.
- ▶ Turn the tractor with the machine so as not to fall below the steering angle of 90 degrees.
- ▶ Lower the machine again using the single-acting hydraulic control unit in order to create a new swath.



The PTO shaft must not be switched off when driving on headlands.

Safety

The following applies to all cleaning and care work:

WARNING

Observe the safety information

Observe the safety information. Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.

Securing the machine



- Switch off the PTO shaft drive.
- Depressurise the hydraulic system.
- Whenever possible, uncouple the tractor.
- Switch all operating controls to their neutral or park position.
- Set the tractor's parking brake to the park position.
- 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 folding 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.

Preserving bare metal parts

The high-pressure cleaner removes the protective grease film from bare metal surfaces. Unprotected metal surfaces can corrode. After each cleaning procedure, lubricate the bearing points and grease bare parts.

Clean the bearings and hydraulic parts with care

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

Cleaning and care

General

The following work steps are described in this section:

- »Cleaning«
- »Care«

Cleaning



- ▶ Switch off the tractor PTO shaft drive.
- ▶ Using the hydraulic control device, fold the machine into its work position.
- ▶ Leave the machine coupled to the tractor's lower links.
- ▶ Lock the 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 stickers.

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. e.g. rapeseed oil.
- ▶ Repair any paint damage.

Setting down the machine in a secure position

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

WARNING

Observe the safety information

Observe the safety information. Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.

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.

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 may be caused if these guidelines are not followed.

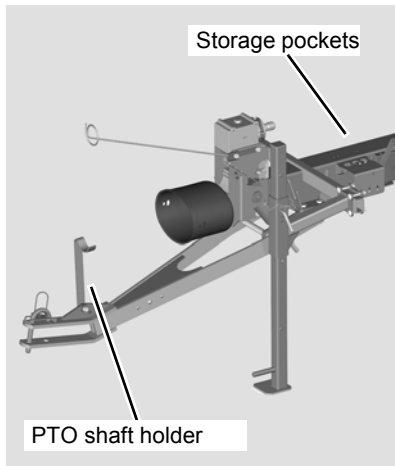
General

The following work steps are described in this section:

- Chapter »Folding the machine into the transport position«.
- Chapter »Uncoupling and securing the machine«,

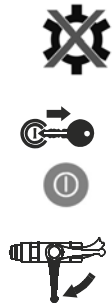
Parking and storage

Uncoupling and securing the machine



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

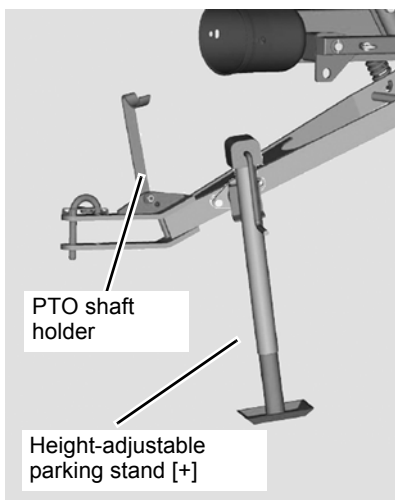
To uncouple the machine from the tractor, proceed as follows:



- ▶ Switch off the tractor PTO shaft drive.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Switch off the pilotbox.
- ▶ Secure the machine against rolling away by using wheel chocks.
- ▶ Close the ball valve and release the hydraulic couplings.
- ▶ Place hydraulic couplings in storage pockets.
- ▶ Disconnect the plugs for the lighting equipment and the pilotbox and place them in the storage pocket.
- ▶ Wind the electric cables onto the hook.
- ▶ Store the pilotbox in a safe and dry place.
- ▶ Pull off the PTO shaft and place it on the holder provided.
- ▶ 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.



When using a pending attachment:

- ▶ Fasten the height-adjustable parking stand [+]¹ to the drawbar, secure it, and relieve the drawbar with the parking stand.
- ▶ Unhitch the machine.

After the end of the season

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

- ▶ Clean the machine thoroughly.
- ▶ Check all the screw joints and tighten the screws.
→ See chapter »Screw tightening torques«, page 97 for proper torque values.
- ▶ Repair or replace any damaged components.
- ▶ Repair any paint damage.
- ▶ Lubricate the machine in accordance with the lubrication schedule.
- ▶ Check the tyre pressures.
- ▶ Replace missing warning signs and stickers.

Safety

The following applies to all maintenance work:

WARNING

Observe the safety information

Observe the safety information. Disregard for safety information can lead to serious or fatal injury. See chapter »Safety«, page 8.

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 the tractor's parking brake to the park position.



- 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.

Maintenance

General

This information relates to general servicing work. For all servicing 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 screws 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.

Maintenance intervals

	After 5 hours of operation	Daily	After 20 hours of operation	After 50 hours of operation	After 250 hours of operation	Once per season	After heavy use	As required	In case of wear	Lubrication	Greasing	Inspection	Replacement	Cleaning	Page
General															
All screws	●					●		●							96
Visual inspection		●					●					●			
Bearings						●						●			99
Hose connections						●						●			
Air pressure		●				●		●				●			101
Lighting equipment								●				●		●	
Hydraulics															
Hydraulic hoses every 6 years													●		102
Hydraulic cylinders						●						●			
Hydraulic couplings						●						●			
PTO shafts															
Wide-angle joint				●		●				●					99
PTO shaft guard						●				●		●			100
Profile section tube						●					●				100
Gearbox															
Rotor gear						●						●			101
Angular gear box						●					●				101

Lubricant

Lubricant used on this machine must 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	

Screw connections



WARNING

Use original parts

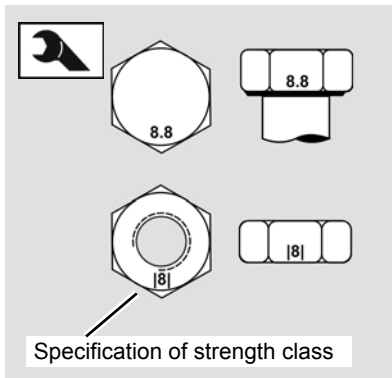
Many components have special properties that are essential for the stability and correct operation of the machine. Only spare parts and accessories supplied by the manufacturer have been tested and approved. Other products may adversely affect the correct operation of the machine and safety. The use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

Tightening screws

All bolts must be retightened:

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

Screw 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.

All bolt connections must be tightened in accordance with the table below, if no other torques are specified. On this machine, screws with a minimum quality of "8.8" (can be seen on the screw head) are used. The torque specifications refer to a dry coefficient of friction (0.12).

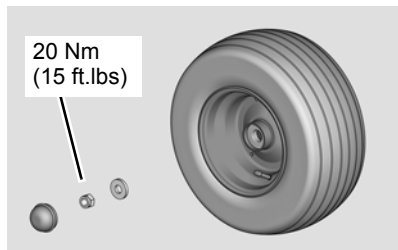
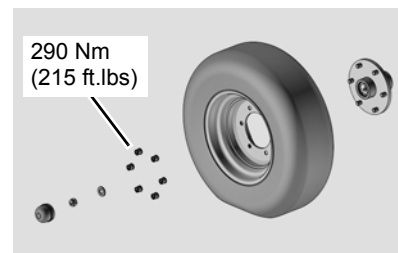
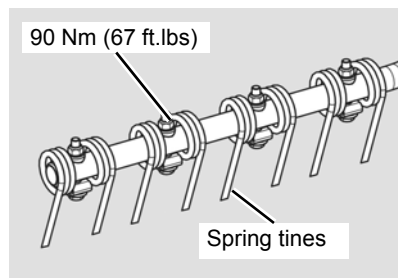
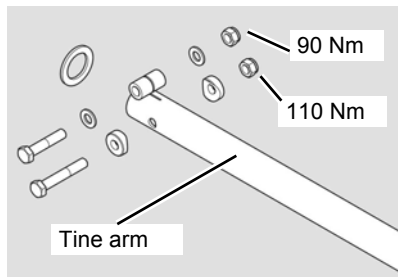
Bolt size	Bolt quality		
	8.8	10.9	12.9
M 6	9.9 Nm (7.3 ft.lbs)	14 Nm (10.3 ft.lbs)	17 Nm (12.5 ft.lbs)
M 8	24 Nm (17.7 ft.lbs)	34 Nm (25 ft.lbs)	41 Nm (30.3 ft.lbs)
M 10	48 Nm (35.4 ft.lbs)	68 Nm (50.2 ft.lbs)	81 Nm (59.8 ft.lbs)
M 12	85 Nm (62.7 ft.lbs)	120 Nm (88.6 ft.lbs)	145 Nm (107 ft.lbs)
M 14	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.

Maintenance

Special tightening torques



Observe the special tightening torques for the following screwed connections:

- 90 Nm (67 ft.lbs) tine arm clamping bolt.
- 110 Nm (81 ft.lbs) tine arm fixing bolt.

- Spring tines: 90 Nm (67 ft.lbs).

- Chassis wheel nuts: 290 Nm (215 ft.lbs).

- Wheel nuts on the rotor chassis: 20 Nm (15 ft.lbs).

Lubrication points for grease

Working with a grease gun



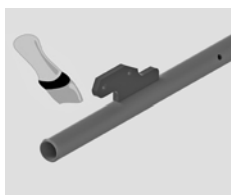
Hidden lubrication points are marked with an information label. Before applying the grease gun

- ▶ clean grease fittings and
- ▶ grease gun attachment fitting.

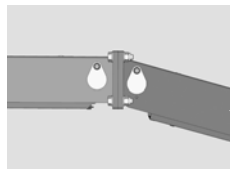
Lubricate the bearings with one or two presses of the grease gun. If you feel resistance at the second press, do not press a second time. Too much grease will force the bearings apart. Dust and dirt can penetrate into the bearings. This leads to premature wear.

Lubricate the places listed in the illustration as follows:

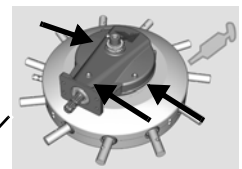
- after 50 hours of operation.
- before and after the season.
- each time after cleaning with a high-pressure cleaner.



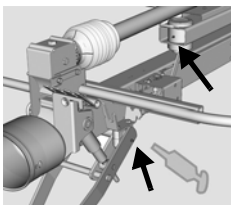
All tine arms



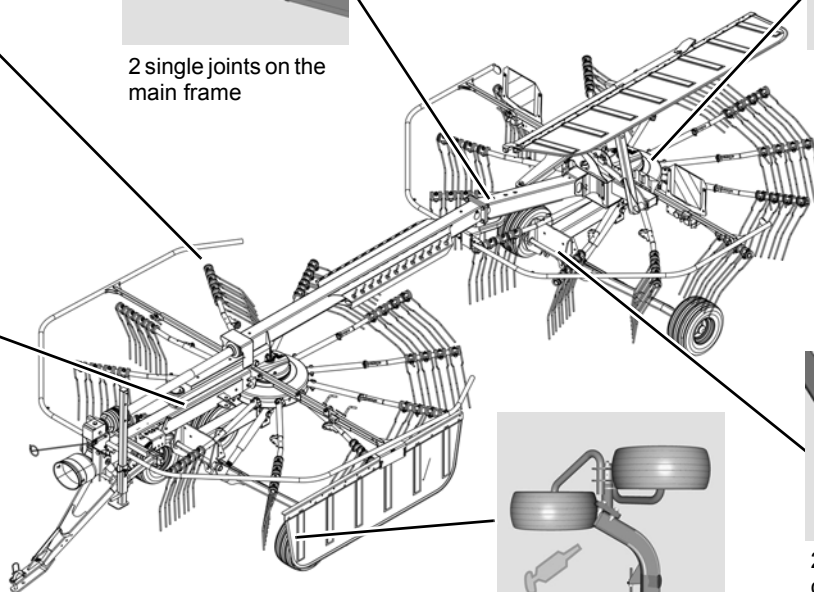
2 single joints on the main frame



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

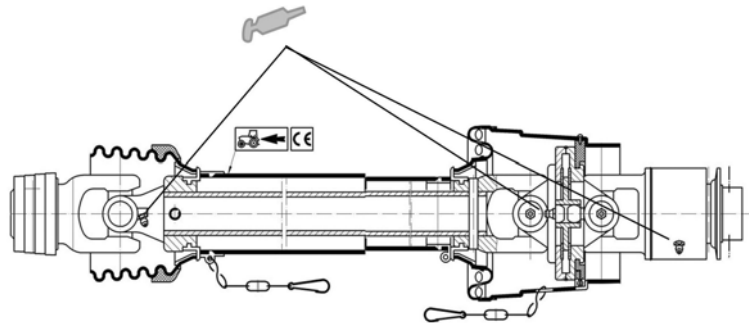
Grease the profile section tubes:

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

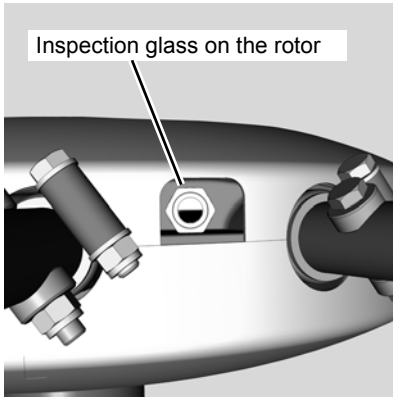
Lubricate the guard as follows:

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

PTO shaft for 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.

Gearbox	Oil capacity [litres] SAE 90 API-GL-4
Angular gear box, front	0,5
Rotor gear, front	6,2
Rotor gear, rear	6,2



- It is not necessary to perform an oil change.
- The maintenance-free gear box is filled ex works with sufficient oil.
- Only check the oil level, with the machine in the work position (positioned horizontally), if there is visible oil loss.
- ▶ Check the oil level at the rotor using the inspection glass.
- ▶ 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 tire pressure on a regular basis:

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

	Tire pressure [bar]
Rotor chassis	1.5 (150 kPa, 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 if these guidelines are not followed.

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.

To replace the hydraulic hoses:

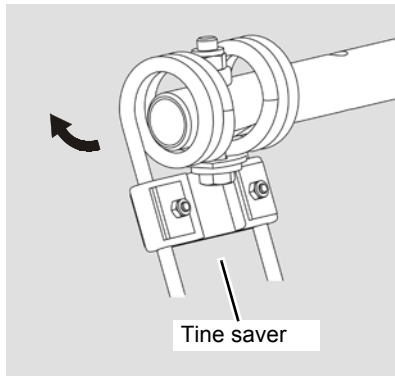


- ▶ Lower the machine to the work position.
- ▶ Depressurise the system.
- ▶ Shut off the engine, set the parking brake, remove the ignition key and secure the tractor against rolling away.
- ▶ Disconnect the hydraulic hoses.
- ▶ Replace hydraulic hoses.

Additional equipment

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

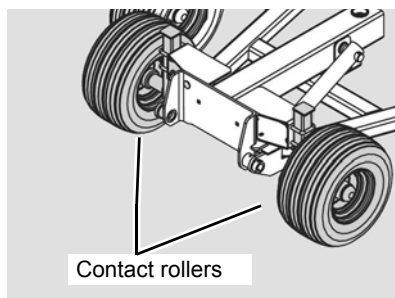


For a good swath deposit, both tine legs must run parallel to one another. This must also be ensured after fitting the tine saver.

Proceed as follows:

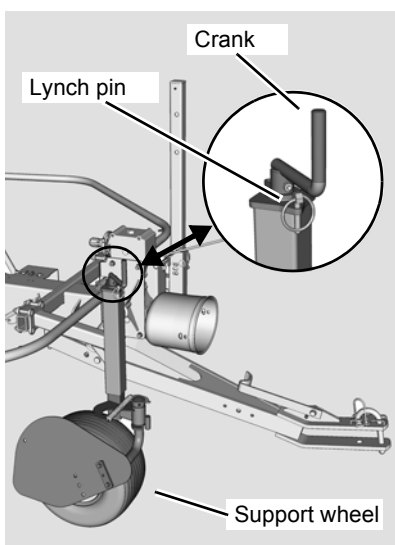
- ▶ Fit one tine saver on each tine.
- ▶ Check the direction of rotation of the rotor. The nuts must be attached against the rotor direction.
- ▶ Check the tine position. The tine legs must be parallel.
- ▶ If necessary, loosen the screwed connection until both tine legs run parallel.

Contact rollers



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

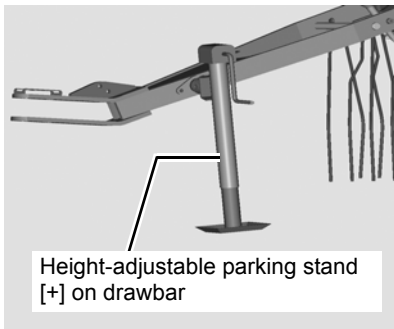
Support wheel



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

Accessories

Height-adjustable parking stand [+]



CAUTION

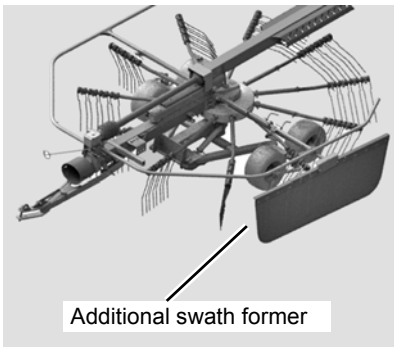
Parking stand in the correct park position

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.

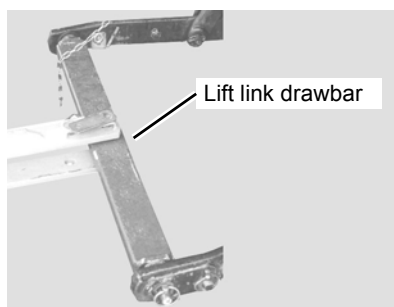
→ See »Stowing the height-adjustable parking stand [+]«, page 43.

Additional swath former



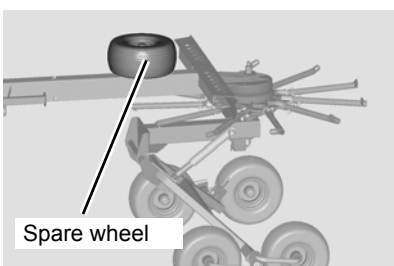
For the two single swaths position, the manufacturer can also supply an additional swath former for the front rotor. This ensures that the swath form on the front rotor is also ideal.

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.

Faults

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. Damage to the machine and serious or fatal injury may be caused as a result.

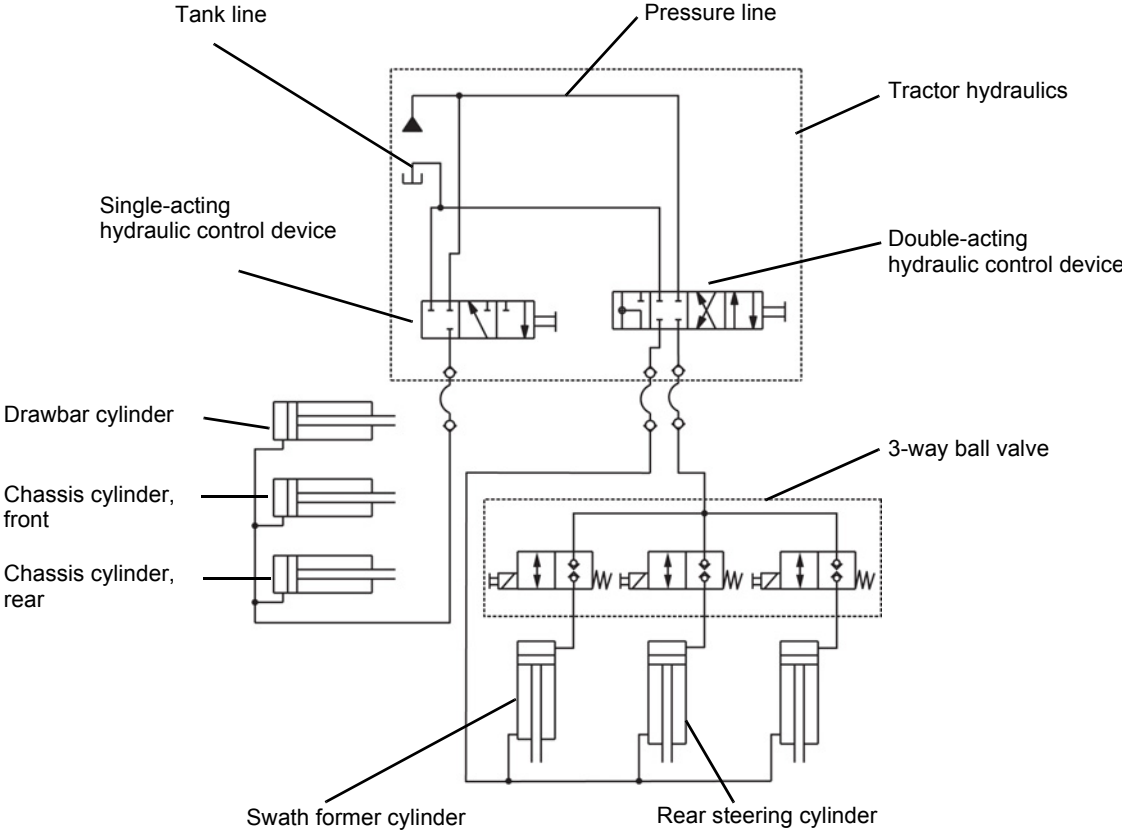


Problem	Cause	Solution
Rotor is leaving crop in situ on one side and is digging too deeply into the ground on the other side.	Incorrect adjustment of rotor pitch.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 54
Rotor is leaving crop in situ across the entire width.	Working depth set too high.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 54
Crop is heavily contaminated.	Tines are set too low.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 54
		→ Chapter »Coupling the machine«, section »Coupling the machine«, page 41
Machine not operating cleanly at high speed.	Tines are set too high. Uneven terrain.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 54
	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.
	Tines are set too deep.	→ Chapter »Preparing for use«, section »Rotor pitch«, page 54
Noise production during work	Loose screwed connections or worn-out tine supports.	Check tine supports and screwed connections on tines.
	Tine support bent	

Fault elimination

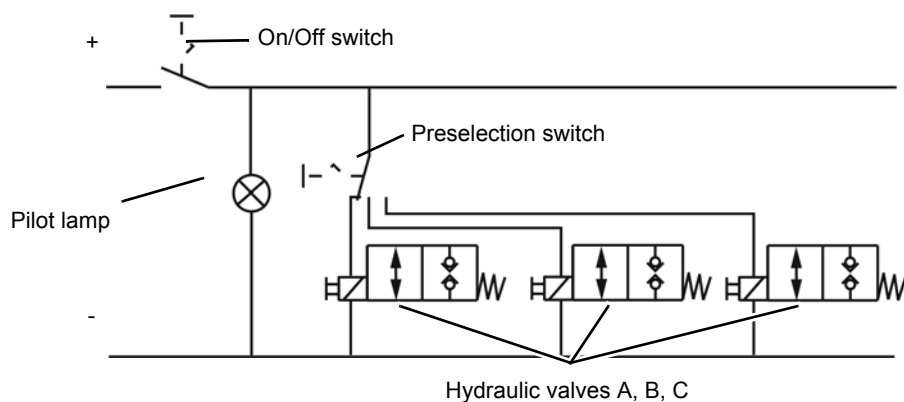
Problem	Cause	Solution
Machine rolls offset behind the tractor when driving in a straight line.	Steering/tracking incorrectly adjusted or worn out.	Contact dealer.
Rotor not working cleanly.	Poor adaptation to the contours of the land due to severe rotor load relief	Contact dealer.
Machine drops during transport journeys.	Ball valve not closed	Close the ball valve Chapter »Road transport«, section »General«, page 61
Rear rotor not picking up fodder	Rear tines too high	Chapter »Preparing for use«, section »Rotor pitch«, page 54
	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 system connection diagram



Circuit diagrams

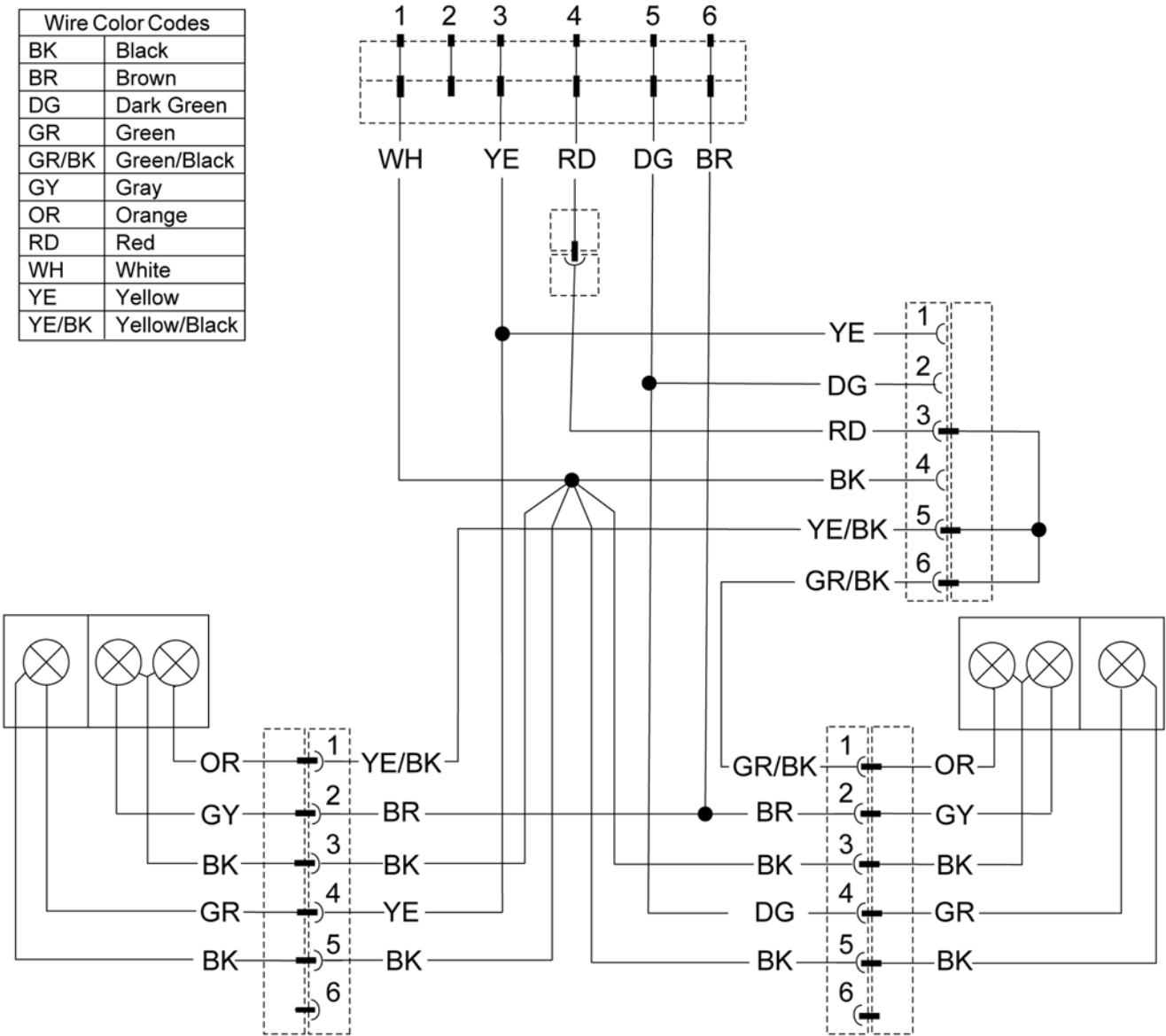
Pilotbox circuit diagram



Pilotbox	Solenoid valve connection	Function
A	Y1	Slews the rear rotor of the tractor to the left or the right using the hydraulic control device.
B	Y2	Folds in or folds out the swath former using the hydraulic control device.
C	Y3	Slews the front rotor of the tractor to the left or the right using the hydraulic control device.

Lighting circuit diagram – USA

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



Disposal

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

Plastic parts

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

Metal parts

All metal parts can be sent for recycling.

Oil

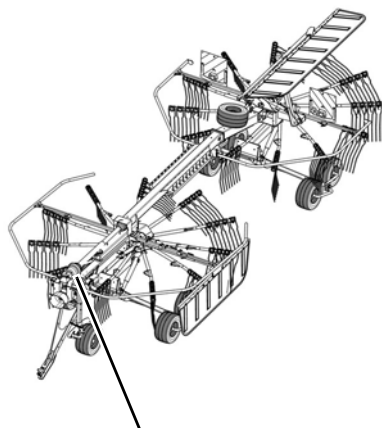
In terms of waste legislation, environmentally-compatible hydraulic oils must be stored, collected and disposed of separately in accordance regulations.

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
Taarpstrandvej 25
DK-5300 Kerteminde
Denmark**

declare with sole responsibility that the product

**SwatMaster 7132 Vario
Andex 714 T Vario
9471 S Vario
RA2071 Vario
and its accessories**

Model: VF6962


**Valid from machine number:
VF69626551 –**

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, 20.06.2015



Uwe Kellermeier

EC authorised representative

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