

SwatMaster 7131 EVO

Operating manual

Edition	11/2006
Date printed	12.2006
Language	EN
Implement number	5001 -
Type / series	6962/16
Document number	VF16643769

Identification of the implement

Your dealer requires some information about your implement in order to be able to help you as quickly as possible.

Please enter the information here.

Designation	SwatMaster 7131 EVO
Working width	7.10 metres
Weight	
Implement number	
Accessories	
Address of the supplier	
Manufacturer's address	Kverneland Group Gottmadingen N.V. Industriepark 312 78244 Gottmadingen Germany Tel.: +49 7731 788 - 0

Table of contents

Preliminary information	4	Cleaning and care	46
Target group for this operating manual	4	Safety	46
Meaning of the symbols	4	Cleaning	46
Safety	5	Care	46
For your safety	5	Parking and storage	47
Who is allowed to operate the implement	6	Safely setting down the implement	47
Coupling	6	General	47
Driving on the road	8	After the end of the season	47
Initial operation	9	Maintenance	48
Uncoupling the implement	10	For your safety	48
Care and Maintenance	10	General	50
Further regulations	11	Screw connections	52
Familiarise yourself with the device	12	Lubrication points for grease lubrication	53
Area of application of the implement	12	Lubricating the cardan shafts	54
Features of the implement	12	Adapting the cardan shaft	55
Component designations	13	Filling volumes	56
Specifications	14	Tyres	56
Delivery and assembly	17	Hydraulic	56
Checking the scope of supply	17	Accessory equipment	57
Coupling the implement	18	Tine anti-loss device	57
General	18	Tandem axles	57
Coupling to the lift link drawbar	18	Roller feelers	57
Coupling to the pending attachment	19	Lift link drawbar	57
Coupling the cardan shaft	20	Front swath former	58
Wheel wedges	20	Height adjustable sustainer	58
Rip chain for USA and Canada	20	Fault	59
Connections	21	Circuit diagrams	60
Preparing for operation	23	Hydraulic circuit diagram	60
Safety	23	Lighting circuit diagram	61
Working depth	24	Disposal	62
Stabiliser [+]	25	EC Conformity Declaration	63
Raking wheel pitch	26	in conformity with the	
Tine anti-loss device [+]	26	EC Directive 98/37/EC	63
Driving on the road	27	Index	64
Safety	27		
Prior to travel on public roads	27		
Road transport	32		
Preparations on the field	33		
Safety	33		
General	33		
Swath deposit	34		
Attaching the tine support	38		
Pulling out the guard	38		
Swath former, rear	39		
Swath former, front [+]	41		
Operation	42		
Safety	42		
General	43		
3-way ball valve	43		
Swathing	44		

Preliminary information

Target group for this operating manual

This operating manual is directed at trained farmers and individuals who are otherwise qualified to perform agricultural activities and who have received instruction on the handling of this implement.

For your safety

Familiarise yourself with the contents of this operating manual before assembly or initial operation of the implement. In this way, performance and work safety are optimised.

The employer should:

All personnel are to be regularly instructed on the use of the implement, at least once annually, in accordance with the regulations of section 1 of the trade's mutual indemnity association. Untrained or unauthorised persons are not allowed to use this implement.

Training

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

Meaning of the symbols

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

- A dot 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 an add-on item of equipment, which is not included in the standard version.

NOTE The term, "Note" indicates tips and notes on operation.



The screwdriver indicates tips during assembly or adjustments.



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

- Coarse defects in the operability of the implement
- Damage to the implement
- Personal injury or accidents.



A star indicates examples that assist understanding of the instructions.

For your safety

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

- in the interest of your own safety,
- in the interest of the safety of others, and
- to ensure the safety of the implement.

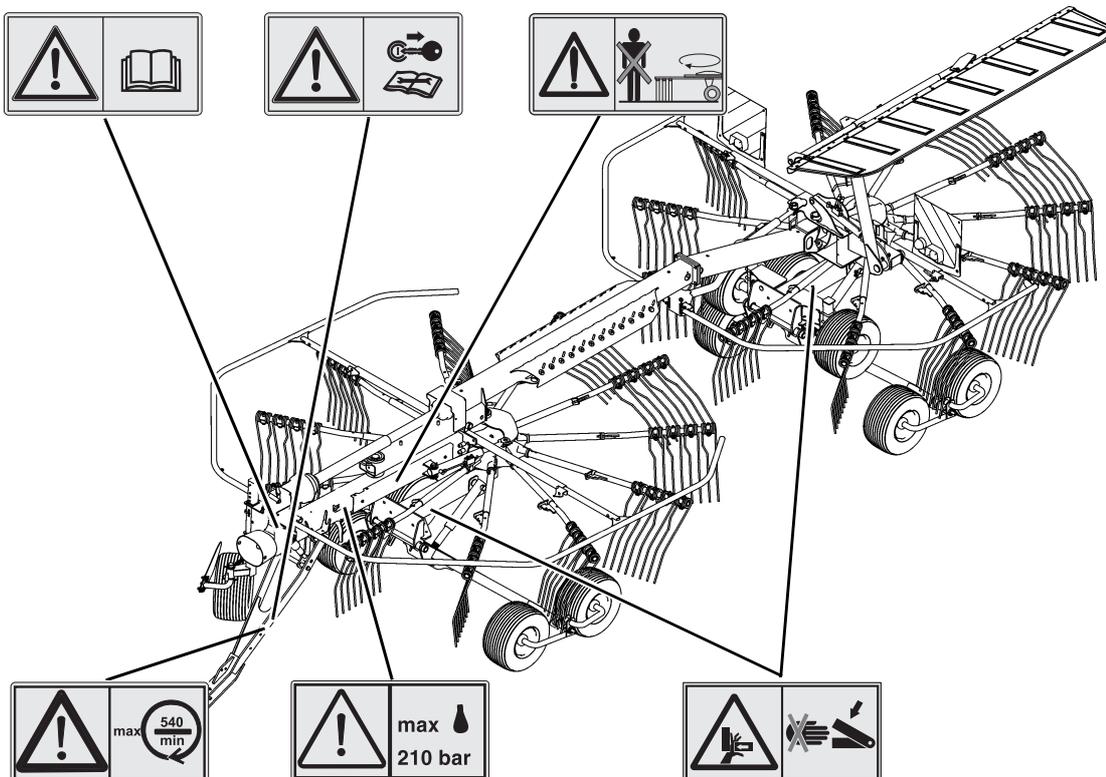
Numerous risks can result from handling agricultural implements in the wrong way. Therefore, always work with special care and never under pressure.

The employer should:

At regular intervals inform those who work with the implement about these safety instructions and the statutory regulations.

Warning symbols

On the implement there are safety stickers that are for the purpose of drawing attention to dangers. The stickers must not be removed. If any stickers have become illegible or come off, you can order new stickers as spare parts and attach them in the appropriate places.



Safety

Meaning of warning symbols



Read the operating manual

Read and observe the operating manual and the safety regulations prior to initial operation!



Switch off the engine

Perform all maintenance, repair and adjusting work only when the implement is at a standstill.



Keep your distance

Keep your distance from the rotating raking wheel. When the wheel rake is in operation nobody is allowed in the immediate vicinity of the implement!



Maximum cardan shaft speed 540 rpm

The prescribed maximum cardan shaft speed of 540 rpm must not be exceeded.



Risk of crushing

Never reach into the zone where there is a risk of getting crushed as long as any parts there are able to move.



Maximum hydraulic pressure 210 bar

The hydraulic pressure of the tractor on the implement's hydraulic system must not exceed 210 bar.

Who is allowed to operate the implement

Only qualified personnel

Only qualified persons who have been informed of the dangers associated with handling the implement are permitted to operate, service or repair the implement. As a rule, such persons are trained and experienced in agricultural work or have been thoroughly trained in a similar fashion.

Coupling

Increased risk of injury

When coupling the implement to the tractor, there is an increased risk of injury. Therefore:

- secure the tractor against rolling away, shut off the engine and take out the ignition key
- never stand between the tractor and the implement during coupling
- when hitching onto the lift link drawbar fix the lower link laterally and lock the three-point power lift against lifting and lowering.
- lock the cardan shaft securely to the PTO shaft end of the tractor and implement

If this is not complied with, the consequence can be damage to the implement and even life-threatening injuries.

Cardan shaft

Use only the cardan shafts prescribed by the manufacturer and read the attached operating manual attentively. Adapt the length of the cardan shaft as required. The wrong cardan shaft lengths can cause damage to the implement and injuries to personnel.

Check and fix the cardan shaft guard

The rotating cardan shaft is protected by the cardan shaft guard. Ensure that the guard is not damaged. Fix the cardan shaft guard by connecting the chains on the implement and tractor faces. Unguarded cardan shafts can cause life-threatening injuries.

Maximum cardan shaft speed 540 rpm

The prescribed maximum cardan shaft speed of 540 rpm must not be exceeded. Higher rpm's can cause damage to the implement.

Hydraulic connection at zero pressure only

Only connect hydraulic tubes to the tractor hydraulic system if the tractor and implement hydraulic system is depressurised. A pressurised hydraulic system can trigger unforeseeable movements on the implement.

High pressures in the hydraulic system

The hydraulic system is under high pressure. Regularly check all pipes, hoses and bolted connections for leaks and externally visible damage. Only use suitable agents when looking for leaks. Eliminate damage immediately. Escaping fluid may result in injuries and fires. Seek medical attention immediately if injuries occur.

Colour-coded hydraulic connections

To avoid operating errors, the plug sockets and plugs of the hydraulic connections between the tractor and implement are colour coded. Wrongly connected hydraulic hoses can trigger unforeseen movements on the implement.

Driving on the road

Make sure that the condition of the implement conforms to traffic regulations.

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

- Lights, warning equipment and guard devices are installed
- Compliance with the permissible transport widths and weights, axle loads, tyre loadbearing capacities, laden weights and national speed restrictions
- Compliance with the maximum permissible transport speed of 40 km/h.

If this is not complied with, the driver and keeper of the vehicle are liable.

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 implement can drop. This can cause damage to the implement.

Check tyre pressure

Check tyre pressure regularly. The wrong tyre pressure will reduce the service life of a tyre and can cause unstable driving properties and accidents.

Check the pin connection

The hitch pin must be in perfect condition, there must be no signs of wear and it must be properly secured. Otherwise coupled implements are able to detach themselves.

Check remote cord for the quick release coupling

Remote cords must hang loose and must not, when in their lowered position, release the couplings of their own accord. Coupled implements can otherwise detach themselves independently from the tractor's lower link arm.

No riding on the implement

Neither personnel nor objects are allowed to be transported on the implement at any time. Riding on the implement is hazardous and strictly prohibited.

Altered driving and braking performance

The driving and braking performance are altered when the implement is attached to the tractor. Take the width and balancing weight of the implement into consideration, especially on sharp bends. A driving style which is not adapted to road conditions can cause accidents.

Adapting the speed

In the event of bad road conditions and excessive speed very high forces can occur that subject the material of the tractor and of the implement to high loads or to an overload. It is therefore important to adjust your speed to the road conditions. A driving style which not adapted to road conditions can cause accidents.

Initial operation

The implement should not be put into operation for the first time until the user has been trained to use it.

The implement must not be used for the first time until an instruction lesson has been given by employees of the distribution associates, company representatives or employees of the manufacturer. If initial operation is performed without instruction, damage to the implement can be caused by operating errors and accidents can occur.

Ensure that the implement is in perfect working condition.

Do not operate the implement unless it is in perfect working condition. Check all important components and replace any defective components before starting the implement. Defect components can cause damage to equipment and injury to persons.

Do not remove the protective equipment.

The guard devices must not be removed or by-passed. Check all guard devices before starting the implement. Unguarded parts of the implement can cause serious or fatal injuries.

No riding on the implement

Neither personnel nor objects are allowed to be transported on the implement at any time. Riding on the implement is hazardous and strictly prohibited.

Make sure the immediate vicinity is clear

Before starting, unfolding and commencing operation, check the surrounding area of the implement. Make sure the operator has an adequate view of the work area. Do not begin work until the immediate vicinity is cleared of any persons or objects. Life-threatening injuries can occur.

Retighten all nuts, bolts and screws

Nuts, bolts and screws should be checked at regular intervals and tightened if necessary. Screws can work loose through the use of the implement. The consequence can be damage to the implement and accidents.

What to do in the event of a malfunction

In the event of a malfunction, shut down and secure the implement immediately. The malfunction may be eliminated immediately, or your dealer must be assigned the task. Continued operation of the implement can cause damage and accidents.

Uncoupling the implement

Increased risk of injury

There is an increased risk of injury when uncoupling the implement from the tractor. Therefore:

- Secure the tractor against rolling away, switch off and take out the ignition key
- Never stand between the tractor and the implement during uncoupling.
- Ensure that the implement is standing on a flat and stable surface
- Ensure that the parking leg is securely locked
- Set the cardan shaft down on the mounting provided
- Secure the implement against rolling away (use wheel wedges)
- Do not disconnect the hydraulic hoses until the hydraulic system is unpressurised on both the tractor and implement faces

If this is not complied with, the consequence can be serious or fatal injuries.

Care and Maintenance

Follow the care and maintenance chart

Observe prescribed intervals for maintenance checks and inspections specified in the operating manual. If these intervals are not complied with, damage to the implement and accidents can be caused.

Only use OEM replacement parts (original equipment manufacturers).

Many components have special properties that are decisive for the stability

and operability of the implement. Only spare and wear parts supplied by the manufacturer have been tested and cleared. Using other products may lead to malfunctions or reduce safety of operation. The use of 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 cardan shaft drive
- Depressurise the hydraulic system
- Whenever possible, uncouple the tractor
- Switch off the tractor and withdraw the ignition key
- Make sure the implement is standing safely. Provide additional supports as required
- Do not use parts of the implement to climb onto it; use only secure steps, ladders or other means of access
- Secure the implement against rolling away (use wheel wedges)

Only if these regulations are complied with is safety ensured during care and maintenance work.

Turn off the electrical supply

Prior to carrying out work on the electrical system, disconnect it from the power supply. Equipment under electrical power can cause damage to equipment and injury to persons.

Replace hydraulic tubes

Hydraulic tubes can age without this being externally visible. We therefore recommend replacing the hydraulic hoses every six years. Defective hydraulic lines can lead to severe or fatal injuries.

Caution when cleaning with a high-pressure cleaner

The implement can be cleaned using either water or a steam jet. Clean the bearings, plastic parts and hydraulic hoses using low pressure only. Excessive pressure can damage these parts.

No corrosive washing additives

Do not use any corrosive washing additives for cleaning. The bright metal surfaces can get damaged.

Prior to carrying out welding work

Before performing any electrical welding work on the uncoupled implement, disconnect the tractor's battery and the alternator. This will avoid damaging the electrical system.

Tighten the screw connections

Retighten any loosened screw connections after care and maintenance work. Serious personal injuries and damage to property can be caused by loose screw connections.

Observe the regulations

In addition to those listed above, please observe the following safety instructions:

- Accident-prevention regulations
- Generally recognised safety regulations, occupational health requirements and road traffic regulations
- Instructions given in this operating manual
- Regulations pertaining to operation, maintenance and repair.

Further regulations

Familiarise yourself with the device

Area of application of the implement

The implement is a two-wheel rake, which is suitable only for the raking together of mowed stalk-type vegetation (for example, hay or straw). By hydraulic adjustment of the two raking wheels the crop can be deposited in a swath or in two individual swaths.

Proper use

Any other use extending beyond this, for example, for silo distribution, any form whatsoever of soil preparation, road sweeping or for the transmission of power to other implements is not an intended use. The manufacturer and dealer are not liable for damage caused by improper use. Improper use is solely at the risk of the user.

Features of the implement

Versatility - for a single swath or two individual swaths

This rake meets all the requirements of modern fodder heaping technology, no matter whether a 12.5 m wide double swath has to be provided for a high-output fodder harvesting implement or small swaths for the hay harvest. The rake can be pulled by tractors of 30 kW or more by the pending attachment, hitch or lift link drawbar.

Extensive equipment

The implement is equipped with low-maintenance gearboxes and 11 rotating arms on the front and rear raking wheel. Excellent raking quality is achieved thanks to the bent prongs. Each raking wheel can be equipped optionally with tandem axles with 18" wheels.

Together with the "TerraLink" support these ensure excellent following of the ground contour.

Flexible due to the swivelling rear raking wheel

The facility for lateral outward slewing of the rear raking wheel to the left or right offers many usage options.

Familiarise yourself with the device

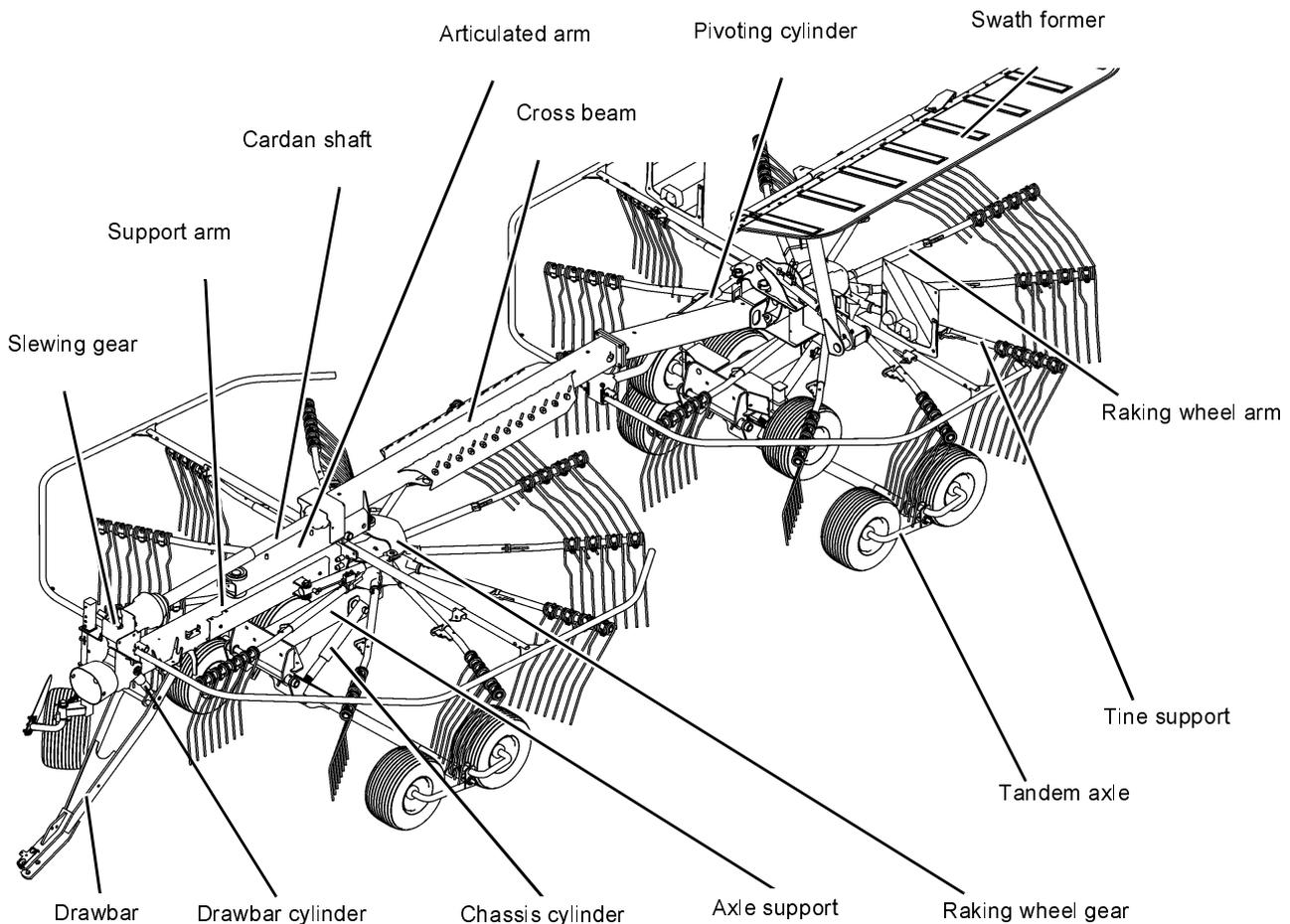
Easy changeover from operating to transport position

The rake is easily changed over from operating to transport position. Hydraulic cylinders lift the rake into transport position and the swath former folds up hydraulically to maintain the transport width of less than 3.0 m with the tine arms attached. If a smaller transport width is required, the tine arms can be removed, fixed in parking position and the guard can be pushed in.

50 centimetre lift-out height

For road transport and at headlands the implement can be quickly lifted out by roughly 50 centimetres. For working, lower the wheel rakes hydraulically from transport position back to working position.

Component designations

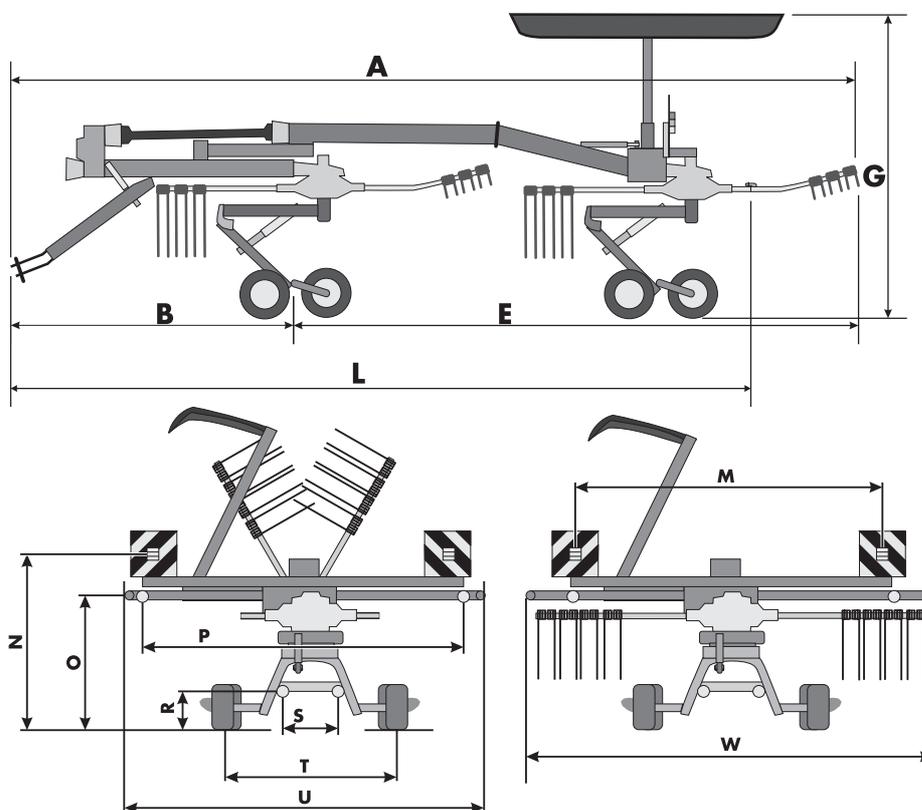


Familiarise yourself with the device

Specifications

Dimensions

		Working position [m]	Transport position [m]
A	Length	7.8	7.04 (L)
U/t	Width, tine support in transport deposit		2.21
W	Width, tine support on the rotor	2.99 - 7.1	2.99
G	Height	1.9 - 2.4	2.4 - 2.9
B	Distance, drawbar eye - 1st axle	2.9	2.7
E	Distance, 1st axle - end of implement	4.9	4.14
T	Track width	1.62	1.62
M	Distance, lighting		1.77
N	Height, lighting		1.45
o	Height, top reflector		1.32
P	Distance, top reflector		2.07
R	Height, bottom reflector		0.38
S	Distance, bottom reflector		0.65



Familiarise yourself with the device

Weights

	Operating position	Transport position
Gross weight	1393 kg	1393 kg
Load supported on the stabiliser	150 kg	160 kg
Axle load of 1st axle	633 kg	663 kg
Axle load of 2nd axle	610 kg	570 kg

Tractor equipment required

Output / connections		
	Minimum output of the tractor	30 kW
	Lighting power supply	12 V, 7-pin plug socket ISO 1724
	Hydraulic connections	1 x double acting / 1 x single acting
	Hydraulic pressure	150 - 210 bar
	Cardan shaft speed	540 rpm
	Lift link drawbar	Fixable in height and laterally
	Pending attachment	Standard

Familiarise yourself with the device

Equipment of the implement

Swath deposit		
	Swath former for rear raking wheel	Standard
	Swath former for front raking wheel	[+]
Raking wheels / raking wheel arms / tines		
	Number of raking wheels	2
	Number of arms per raking wheel	11
	Number of tines per raking wheel arm	4
	Tine arms removable	Standard
	Raking wheel precision height adjustment	Mechanical
	Hydraulically liftable swath former	Standard
	Tine anti-loss device	[+]
Wheels		
	Single axles	18 x 8.50-8
	Stabiliser [+]	18 x 8.50-8
	Tandem axles [+]	18 x 8.50-8
	Roller feelers [+]	18 x 8.50-8
Safety accessories		
	Lighting	Standard
	Warning signs	Standard
	Cardan shaft - double wide-angle cardan shaft	Standard

Checking the scope of supply

Wheel rake

The implement is delivered fully assembled. If any parts of the implement have not been assembled, please contact your dealer.



Do not perform any assembly work yourself

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

- observance of a sequence of work steps
- Compliance with tolerances and torques
- Knowledge of work safety during assembly

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

Coupling the implement



Increased risk of injury

When coupling the implement to the tractor, there is an increased risk of injury. Therefore:

- Secure the tractor in such a way that it cannot roll forwards or backwards
- never stand between the tractor and the implement during coupling
- Actuate the three-point power lift system slowly and carefully.

If this is not complied with, the consequence can be serious or fatal injuries.

General

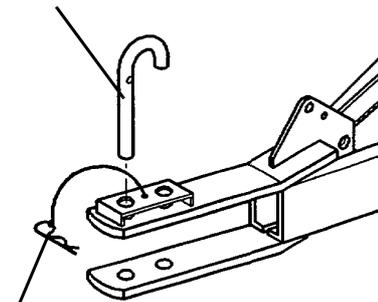
The implement is equipped ex-factory for coupling to the pending attachment or lift link drawbar.



Genuine socket pins from the manufacturer

Use only genuine socket pins from the manufacturer. These have the required strength. Other pins can break. The consequence can be damage to the implement or an accident.

Socket pin



Safety splint

- > Fit the wheel rake by means of socket pins to the lift link drawbar or pending attachment
- > Secure the socket pin with a safety splint

Coupling to the lift link drawbar

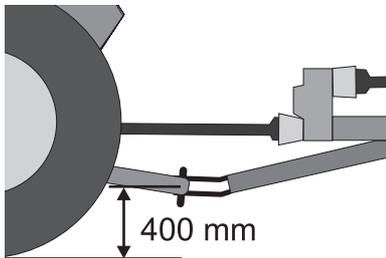


Lock the height adjustment of the lower link

Lock the height adjustment of the lower link. Comply with the tractor operating manual. Accidental lifting of the lower links complete with the lift link drawbar can destroy the cardan shaft.

Lock the lateral setting of the lower links.

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

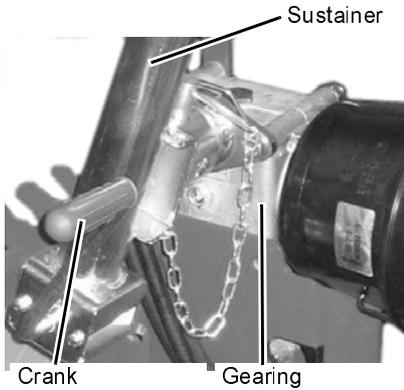


- > Fix the lower link height to a distance of roughly 400 mm from the ground.

NOTE The working depth is set via the two chassis, the drawbar cylinder or the stabiliser [+].

→ Chapter »Preparing for operation«, section »Working depth«, page 24

Coupling to the pending attachment



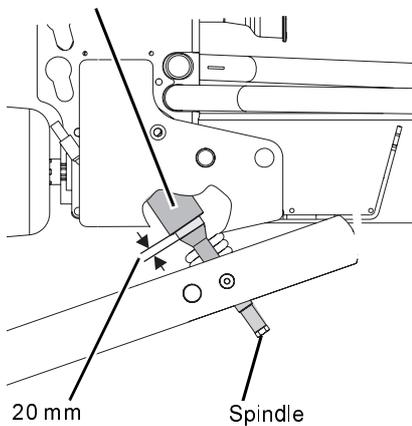
For coupling onto the pending attachment you require a sustainer [+]. The height of the drawbar is easily adjustable by means of the crank. The sustainer is removable. On the gearbox at the front there is a holder for parking position while working.

- > Relieve the sustainer by means of the crank
- > Pull out the pin
- > Release the sustainer from the drawbar and lock with pins in parking position at the front left on the gear-box

→ Chapter »Accessory equipment«, section »Height adjustable sustainer«, page 58

Adjusting the drawbar cylinder (only versions with stabiliser [+])

Drawbar cylinder



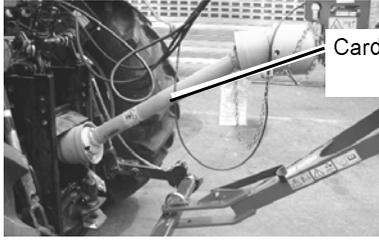
When coupling to the pending attachment the drawbar cylinder must compensate for any ground undulations if you have a version with the stabiliser [+]. Adjust the drawbar cylinder as follows:

- > Unscrew the spindle on the drawbar cylinder by roughly 20 mm

Spanner size "17" on the spindle

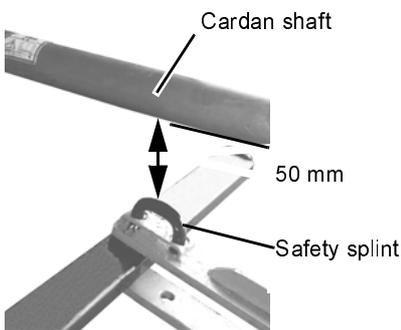
Coupling the implement

Coupling the cardan shaft



- > Couple the cardan shaft to the tractor's PTO shaft
- > By means of a chain secure the cardan shaft's guard tube against being co-rotated

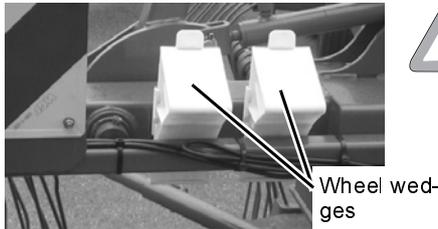
→ Chapter »Maintenance«, section »Adapting the cardan shaft«, page 55



Ensure the minimum spacing

In work position the space between the cardan shaft and the pin must never be less than 50 mm. Otherwise the cardan shaft can get damaged, for example when driving over an undulation in the ground. Damaged cardan shafts can injure personnel and damage the implement.

Wheel wedges



Secure the tractor in such a way that it cannot roll forwards or backwards

Never take away the wheel wedges, if the tractor is not otherwise safeguarded against rolling away. You could be rolled over by the implement or the tractor. The consequence would be serious injury.

- > Remove wheel wedges from in front of the wheels
- > Insert them into the holder next to the left-hand warning sign and make sure that they engage securely

Rip chain for USA and Canada

For wheel rakes that are used in the USA and Canada it is obligatory to secure the wheel rake by means of a rip chain to the towing vehicle.

Connections

Electrical connections



Check the cable routing

Check the cable routing. The cable must show no signs of abrasion or sagging. Torn or frayed cables can cause unforeseen movements on the implement.

Attach the following electrical cables to the tractor, if installed, for:

- Lighting of the implement

Lighting

- > Connect the plug for the 12 V power supply to a three-pin plug socket on the tractor

Hydraulic connections



Only make hydraulic connections at zero pressure

Only connect hydraulic tubes to the tractor hydraulic system if the tractor and implement hydraulic system is depressurised. A pressurised hydraulic system can trigger unforeseen movements on the implement.

Avoid oil mixtures

If the implement is used on different tractors, a non-allowed oil mixture may occur. Non-allowed oil mixtures can destroy components on the tractor.

Check tubes and couplings

Check all hydraulic hoses for damage before connecting them. Check all hydraulic couplings for firm seating after connecting them. Defective hydraulic hoses or poorly seated hydraulic couplings can trigger unforeseen movements on the implement and cause accidents.

Coupling the implement

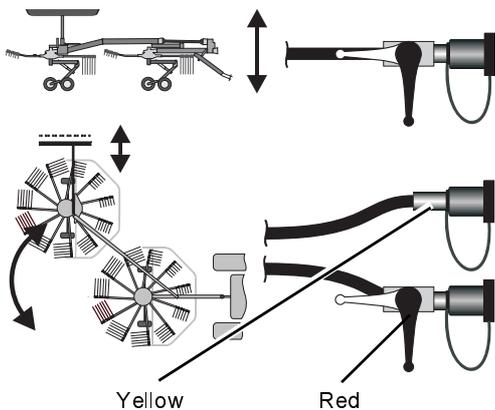
Secure the control devices

In transport position secure the tractor against unintended actuation. Unintended actuation of the control device can trigger unforeseen movements on the implement and cause accidents.

Check the routing of the hydraulic hoses

The hydraulic hoses must not be jammed or strained. Ensure that there is sufficient free space. Torn off or jammed hydraulic hoses lead to uncontrollable movements of the implement and can cause serious damage and injuries.

Hydraulic couplings



> Connect the hydraulic coupling for lifting and lowering the implement to a single-acting control device

> Connect the hydraulic couplings for the steering and the swath former to a double-acting control device. The hydraulic couplings are marked red and yellow.

Safety

The following applies to all preparations for use:



Observe safety instructions

Observe the safety instructions for the performance of all work. Any disregard for safety instructions can lead to severe or fatal injuries to persons.

Securing the implement

- Secure the implement against accidental start-up and rolling away (use wheel wedges).
- The implement must be standing on firm and level ground and, if necessary, must be supported during work.

Unsecured or non-supported implements can cause accidents.

General

The following applies when performing all operations:

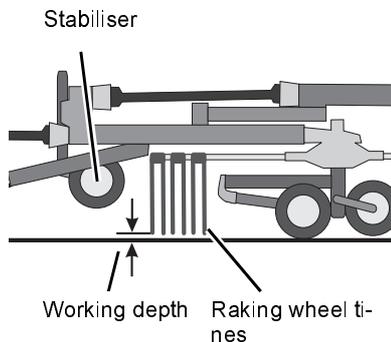
- Check the tyre pressure
- Safeguard the implement
- Lower the implement to working position
- Loosen the appropriate screws
- Perform the adjustment as required
- Retighten the screws

Perform the following settings for use:

- Working depth
- Stabiliser [+]
- Raking wheel pitch

Preparing for operation

Working depth



Set the working depth first of all by way of the front raking wheel, because this will affect the pitch of the rear raking wheel.

Before setting:

- Fix the stabiliser [+] in the upper position
- Lower the implement complete with control device
- Measure the working depth relative to the ground (basic setting: 10 mm to the front raking wheel, 20 mm to the rear raking wheel)

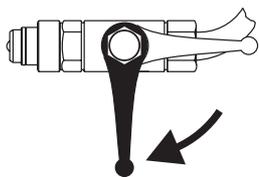
Adjust the working depth as follows:

- > Lift out the implement complete with control device
- > Switch off and secure the tractor



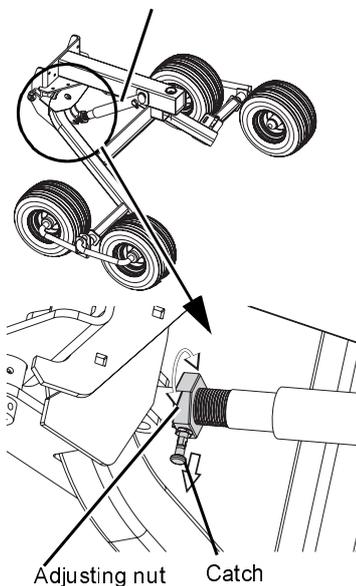
Close the ball valve

Close the ball valve before setting. If the ball valve is open and there is an operating error, the implement can lower itself and cause serious injuries.



- > Close the stop valve on the hydraulic coupling for lifting and lowering

Chassis cylinder



- > Unlock the adjusting nut under the chassis by means of the catch and set the working depth by means of the adjusting nut

NOTE Two turns of the adjusting nut represent roughly 15 mm in height of the raking wheel tines



Adjusting nut with spanner size 65

- > After adjusting secure the adjusting nut by means of the catch against twisting
- > Lower the implement
- > Switch off and secure the tractor
- > Check the tine spacing and readjust it as necessary

You can now set the working depth on the rear raking wheel in the same way.

Preparing for operation

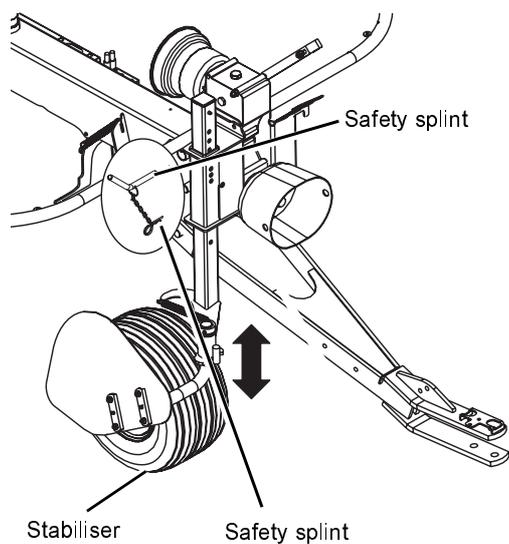
Further influencing factors for the working depth are:

- The soil condition
- The type and quantity of fodder

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

NOTE If the tines are set too deep, the crop will get soiled and the load on the raking wheel tines, i.e. on the drive, will increase.

Stabiliser [+]



After setting the working depth, lower the implement:

- > Loosen the pin and lower the stabiliser onto the ground
- > Peg the pin and secure it with a safety splint

Preparing for operation

Raking wheel pitch

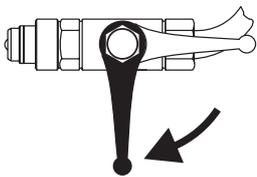
The raking wheels can be inclined transversely on the chassis. The raking wheel is set horizontally ex-factory. If the fodder is not picked up cleanly on one side of a raking wheel, you can improve the raking quality by adjusting the raking wheel pitch.

The raking wheel pitch is adjusted as follows:

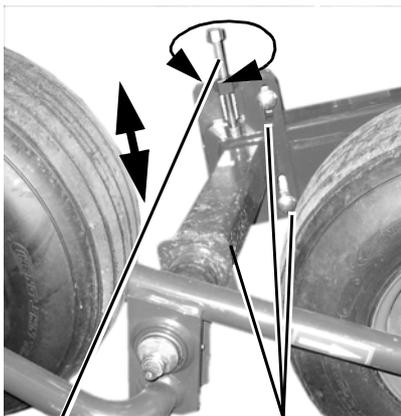
- > Lift out the implement complete with control device
- > Switch off and secure the tractor

Close the ball valve

Close the ball valve before setting. If the ball valve is open and there is an operating error, the implement can lower itself and cause serious injuries.



- > Close the stop valve on the hydraulic coupling for lifting and lowering

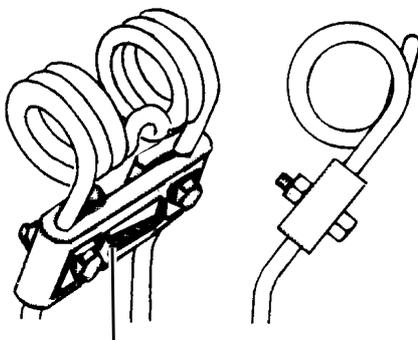


Adjusting screw 85 Nm
3 M12 screws

- > Release the three screws only slightly
- > Adjust the axle as required by turning the adjusting screw
- > Retighten the screws again

Tine anti-loss device [+]

For a good swath deposit both tine shanks must run parallel to one another. This must also be ensured after fitting the tine anti-loss device.



Tine anti-loss device

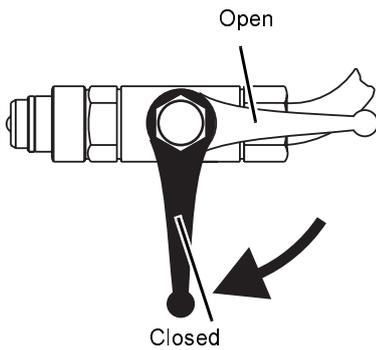
Safety

Before you transport the implement on the road, please read the following safety instructions. Compliance is mandatory and will help you in avoiding accidents.



Observe transport width

Take heed of the permissible transport widths and, if necessary, put the implement in transport position and then attach the lighting, warning device and guard device. The driver and keeper of the vehicle are liable for any non-compliance with national traffic regulations.



Close the ball valves

Close the ball valves before driving on the road. If the ball valves are open and there is an operating error in the tractor hydraulics, the implement can drop or swivel into the oncoming traffic. The consequence can be serious accidents.

Clean the implement before travelling on the road

Before driving the implement on the road clean it of any coarse dirt and loose crops. Crops or dirt that drop onto the road can cause slippery road conditions. This can cause accidents with fatal consequences.

Prior to travel on public roads

Driving on the road must be performed in transport position. The following steps are necessary to put the implement in transport position:

- Align the implement
- Fold in the swath former
- Remove any crops and coarse dirt
- Insert the tine support transport holder
- Secure the raking wheel against turning
- Insert the guard stay
- Close ball valves

Driving on the road

Aligning the implement so that it is straight



Ensure that the correct hydraulic connection is made

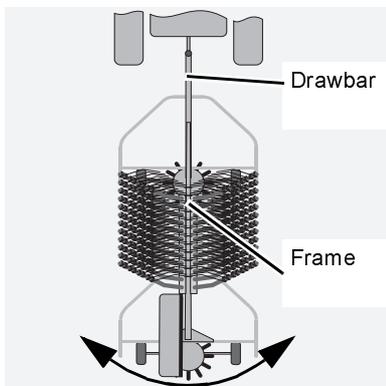
Before slewing do not fail to check whether the hydraulics for the slewing device are correctly connected to a double-acting control valve. Wrongly connected hydraulic hoses can trigger unforeseen movements on the implement.

Observe the slewing process

Observe the wheel rake and swath former during slewing. If the implement behaves unusually during the process, interrupt its operation immediately to avoid damage.

There should be no persons standing in the slew range

During the aligning of the implement no personnel are allowed to be in the slewing zone. Personnel can be caught by the implement and injured.



During transportation, the rear raking wheel must be in line with the front one.

To align the rear raking wheel:

- > Drive slowly forwards and, as you do so, operate the control device to align the raking wheel

Folding in the swath former

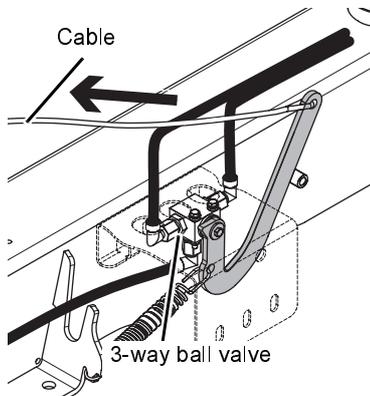
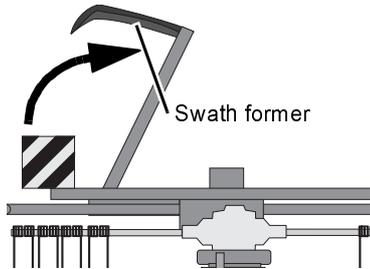


There should be no persons standing in the slewing range
While the swath former is folding inwards no personnel are allowed to be in the slewing zone. Personnel can be caught by the swath former and injured.

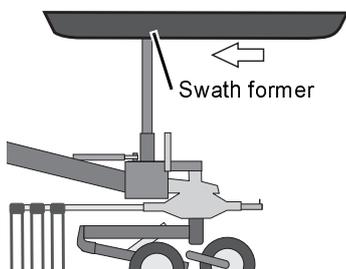
Folding in to transport position only

Fold the swath former in to transport position only. If the swath former is folded in with the raking wheel slewed, this can be damaged.

Fold the rear swath former to transport position as follows:



- > Pull the cable for the 3-way ball valve to the stop
- > Fold the swath former up by means of the hydraulic control device

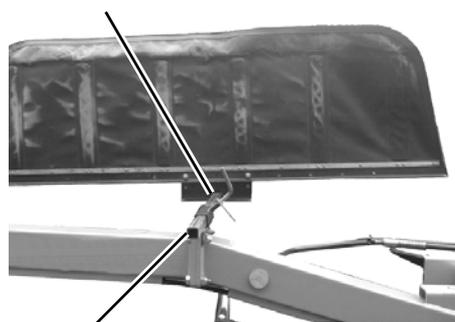


NOTE Once the swath former has been pushed to the rear, you must push it forwards before folding it inwards in drive direction. Otherwise the swath former will protrude over the rear edge of the implement.

→ Chapter »Preparations on the field«, section »Setting in drive direction«, page 40

Front swath former [+] in parking position

T-screw with shackle



Parking position

During transport journeys and when the front swath former is not required, put the latter in parking position from the right and secure it:

- > Release the shackle and T-screws
- > Pull the swath former out of the guard stay, peg it in parking position and secure
- > Lock the T-screws with the shackles

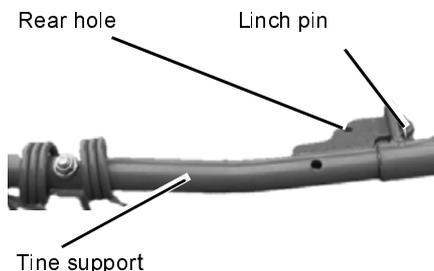
Driving on the road

Tine supports in transport holder

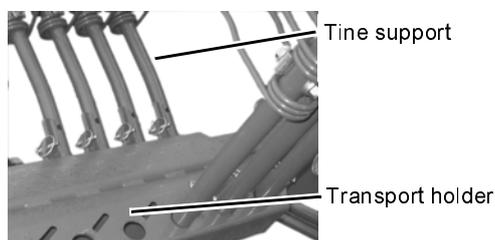


Switch off the tractor and secure it

Before you dismount, switch off the tractor and secure it against rolling away. An unsecured implement can run you over or trap you and cause very serious injuries.



- > Release the linch pin on the tine support
- > Secure the linch pin in the rear hole
- > Pull off the tine support



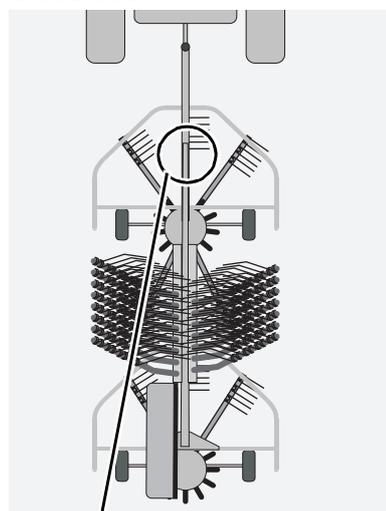
- > Insert the tine support into the transport holder

Securing the raking wheels



Securing the raking wheels

Secure the front raking wheel before any transport journeys. Unsecured raking wheels can rotate and the tine supports will protrude beyond the guard frames as a result. Overhanging tine supports can cause accidents with serious injuries, for example, to pedestrians.

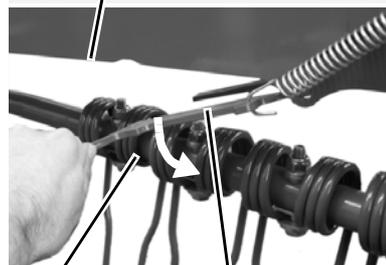


A maximum of 5 tine supports can remain inserted on the front raking wheel for transport journeys:

- 3 tine supports in drive direction forwards
- 2 counter to drive direction

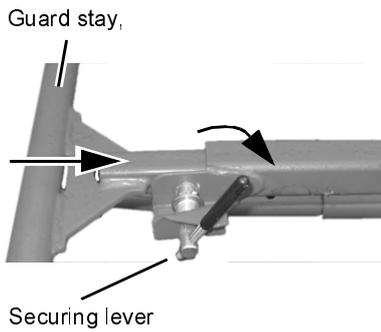
On the rear raking wheel only 3 tine supports are allowed to remain at the front on the raking wheel in drive direction.

The raking wheel securing device is located on the front raking wheel under the frame. The raking wheel securing device is held by a spring in parking and securing position. Fix the middle tine support with the raking wheel securing device as follows:



- > Slew the raking wheel securing device downwards via the middle tine support

Insert the guard stay



>To obtain the smallest transport width, the guard stays must be fully inserted:

- > Release the safety lever
- > Insert the guard stay and engage the securing lever

Checking the implement

Prior to driving on the road check the implement against this check list:

- Wheel rake aligned and raised?
- Swath former in transport position?
- Ball valve closed?
- Guard stay inserted?
- Locks checked for firm seating?
- Tine support in transport position
- Tyre pressure correct?
- When coupling onto the lift link drawbar, is the lower link laterally fixed?
- Crop residue and dirt removed?
- Lighting cable routed so that it is not straining and cannot get into the tractor's wheels when cornering?
- Lighting in good working order?
- Tractor control unit for hydraulics "OFF"?
- PTO drive "OFF"?

Driving on the road

Road transport

- Before starting off, check the immediate vicinity. Always ensure an unimpeded view and pay particular attention to any children in the vicinity of the implement.
- When driving, lock the control units on tractor.
- Do not transport any personnel or objects on the implement.
- Always adjust your driving speed to the road conditions.
- Do not exceed a maximum speed of 40 km/h. Comply with the national speed limits.
- Ensure sufficient steering and braking capacity. Driving behaviour, steering and braking capability are influenced by the implement that is coupled (longer braking distances due to greater thrust).
- There is a danger of tipping in precipitous places and if corners are taken too fast.

Safety

The following applies for all preparations on the field:



Observe safety instructions

Observe the safety instructions for the performance of all work. Any disregard for safety instructions can lead to severe or fatal injuries to persons.

Securing the tractor and the implement

- Switch off and secure the tractor
- Secure the implement against being accidentally started up and rolling away (use wheel wedges)
- The implement must be standing on level, firm ground

Unsecured implements can cause accidents.

Close the ball valves

Close the ball valves before setting. If the ball valves are open and there is an operating error, the implement can drop or swing out. Serious injuries can be caused.

Observe the slewing process

Observe the wheel rake and swath former during slewing. If the implement behaves unusually during the process, interrupt its operation immediately to avoid damage.

There should be no persons standing in the slew range

While the implement is slewing out no personnel are allowed to be in the slewing zone. Personnel can be caught by the implement and injured.

General

After road transport the implement must be put in working position on the field. The implement stands in transport position on a surface that is as flat as possible.

The following work steps are described in this section:

- Preselect the swath deposit
- Put the tine supports onto the raking wheel and secure them
- Pull out and lock the guard
- Open the ball valve for lifting and lowering
- Lower the implement to working position
- Slewing to the full or individual swath position
- Unfold the swath former
- Adjust the swath width
- Switch on the cardan shaft (540 rpm)

Preparations on the field

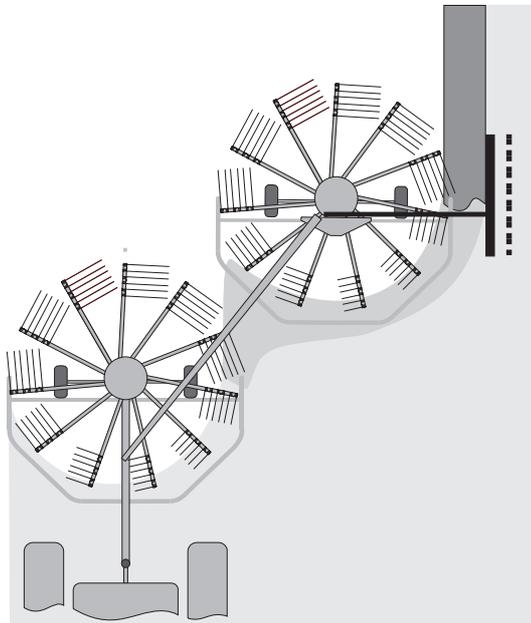
Swath deposit

The following basic types of swath deposit are possible:

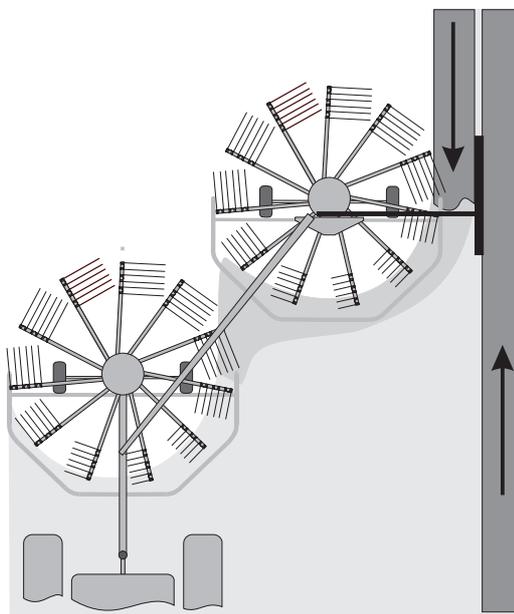
- Single swath and
- Two individual swaths

Single swath

In "single swath" mode the rear raking wheel is slewed to the left.



Single swath

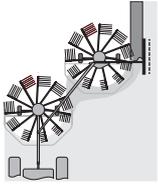


Double swath

Setting single swath

- > Open the ball valve on the hydraulic coupling for the steering
- > Drive slowly forwards and slew the rear raking wheel to the left by means of the control device. The pivoting cylinder is fully retracted.

Set single swath with the preselection lever [+]



Preselection lever

- > Put the preselection lever in the position "Single swath". To do so turn the lever to the front and lock it.
- > Drive slowly forwards and slew the rear raking wheel to the left by means of the control device. The pivoting cylinder is fully retracted.

NOTE If necessary, extend the pivoting cylinder a short way, before the automatic preselector clears itself and straight-on position can be passed through.

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

The rear raking wheel can be slewed with this setting on the preselection level only to the left and back to the middle. For slewing to the right to the position "Two individual swaths" the preselection lever must be shifted.

Preparations on the field

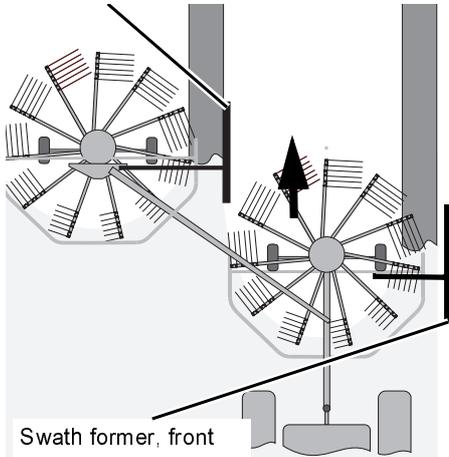
Two individual swaths



Collision danger

There is a danger of collision between the swath former and the tine supports of the front raking wheel. Adjust the swath former fully to the rear before slewing.

Swath former rear,



For the position "Two individual swaths" the rear raking wheel is slewed to the right. This position is used mainly for producing night swaths during hay harvesting.

When using the rear swath former, the latter must be pushed fully to the rear.

→ Chapter »Preparations on the field«, section »Setting in drive direction«, page 40

If using the "front swath former" [+], fit this to the guard support:

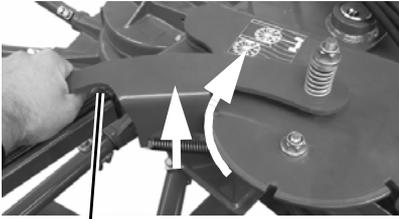
- > Release the swath former from the transport holder
 - > Insert and secure the front left swath former
- Chapter »Accessory equipment«, section »Front swath former«, page 58

Setting two individual swaths

Set the position "Two individual swaths" as follows:

- > Open the ball valve on the hydraulic coupling for the steering
- > Drive slowly forwards and slew the rear raking wheel to the right by means of the control device. The pivoting cylinder is fully extended.

Setting two individual swaths with the preselection lever [+]



Preselection lever

- > Set the preselection lever to the position "Two individual swaths". To do so, turn the lever to the rear and lock it.
- > Drive slowly forwards and slew the rear raking wheel to the right by means of the control device. The pivoting cylinder is fully extended.

NOTE If necessary, retract the pivoting cylinder a short way, before the automatic preselector clears itself and straight-on position can be passed through.

The rear raking wheel can be slewed with this setting of the preselection level only to the right and back to the middle. For slewing to the left to the position "Single swath" the preselection lever must be shifted.

Preparations on the field

Attaching the tine support

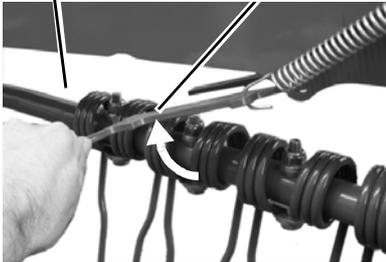


Switch off the tractor and secure it

Before you dismount, switch off the tractor and secure it against rolling away. An unsecured tractor can run you over or trap you and cause very serious injuries with fatal consequences.

Tine support

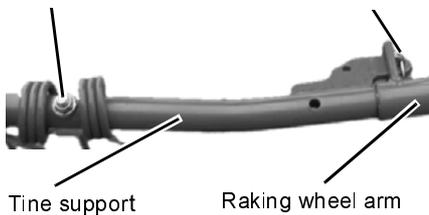
Raking wheel securing device



- > Release the raking wheel securing device

Tine holder

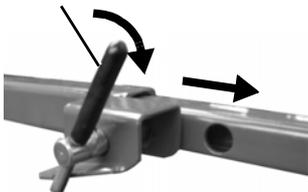
Linch pin



- > Take the tine support out of the parking holder
- > Attach it to the raking wheel arm and secure it with the linch pin

Pulling out the guard

Locking pin



After attaching the tines all guard devices around the raking wheel must be locked from transport to working position.

Set the guard as follows:

- > Release the safety lever
- > Insert or pull out the guard stay and engage the safety lever

Swath former, rear

The swath former can be set depending on the fodder volume and swath type:

- Width and
- drive direction

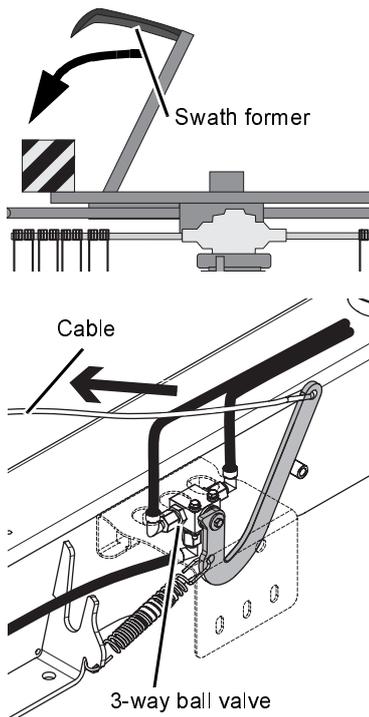


Observe the folding-down process

When the swath former is folded down nobody is allowed to be in the slewing zone of the swath former. When parts are folding down they can cause serious injuries. Observe the folding-down procedure.

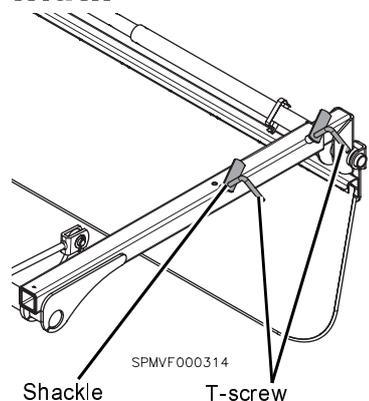
Lower the implement to working position to set the swath former.

Fold the rear swath former up to operating position as follows:



- > Pull the cable for the 3-way ball valve to the stop
- > Fold the swath former up by means of the hydraulic control device

Setting the swath width

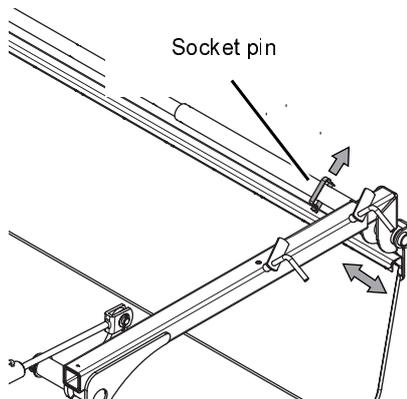


Set the width of the swath former as follows:

- > Release both T-screws
- > Insert or pull out the swath former
- > Tighten the T-screws, slightly moving the swath former up and down to create a secure connection
- > Lock the T-screws with the shackles

Preparations on the field

Setting in drive direction



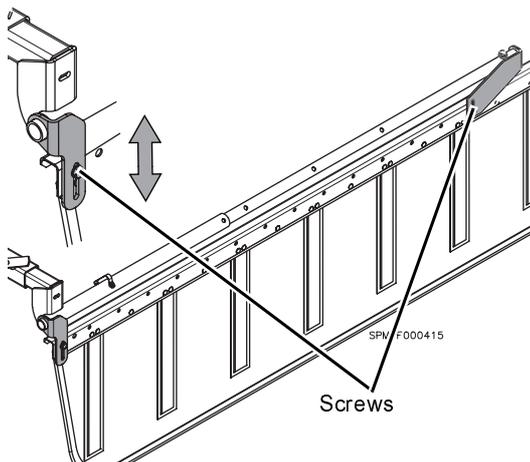
Collision danger on the swath former

When swathing in the position "Two individual swaths" the swath former must be pushed fully to the rear. The swath former can be damaged by the front raking wheel tines.

Shift the swath former in drive direction as follows:

- > Remove the socket pin
- > Shift the swath former in drive direction
- > Peg and secure the socket pin

Adjust height



- > Release screws
- > Set the height of the swath former
- > Fix the screws

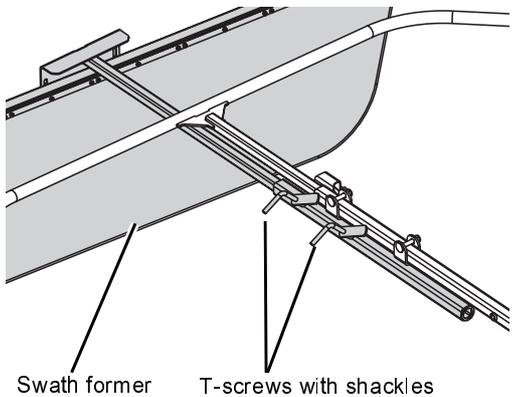
Swath former, front [+]



Collision danger

When working with the front swath former ensure that the raking wheel arms do not collide with the front swath cloth in any working condition. The swath former can be damaged by the tine arms.

Swath width



Set the width of the swath former as follows:

- > Loosen the T-screws
- > Insert or pull out the swath former
- > Tighten the T-screws, slightly moving the swath former up and down to create a secure connection
- > Lock the T-screws with the shackles

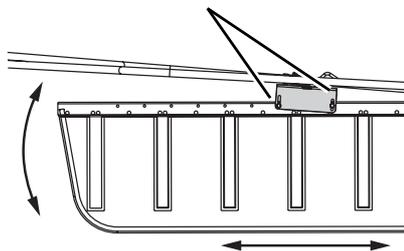
Setting the height and in drive direction

Screws



Collision danger on the swath former

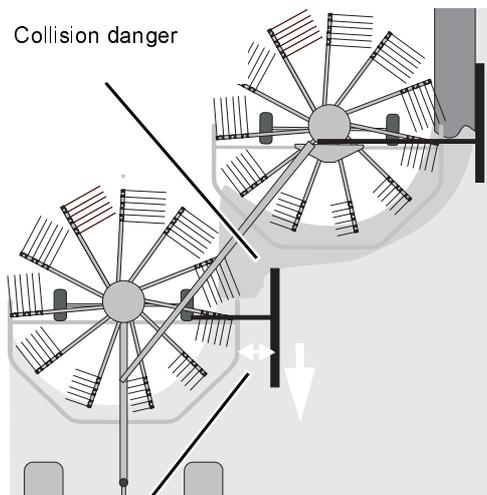
When swathing in the "Single swath" position the swath former must be pushed forwards. The swath former can be damaged by the rear raking wheel tines.



The front swath former has to be set in height and drive direction as follows:

- > Loosen and remove the screws
- > Shift the swath former in height and drive direction
- > Secure it in the new position with the screws

Collision danger



Maximum 500 mm

In the operating position "Single swath" illustrated

- insert the front swath former into the transport holder or
- pull it out by 500 mm at the maximum and fasten it in the rearmost hole pattern.

Safety



The following applies for all areas of application:

No riding on the implement

Neither personnel nor objects are allowed to be transported on the implement at any time. Riding on the implement is hazardous and strictly prohibited.

There should be no persons standing in the slew range

Ensure that there are no personnel in the slewing zone and working area of the implement. Personnel can be caught by the working elements and can suffer serious injuries with fatal consequences.

Maximum cardan shaft speed 540 rpm

The cardan shaft speed must not exceed 540 rpm and has to be adapted to the condition of the fodder. Higher speeds can cause damage to the implement.

Cardan shaft coupling

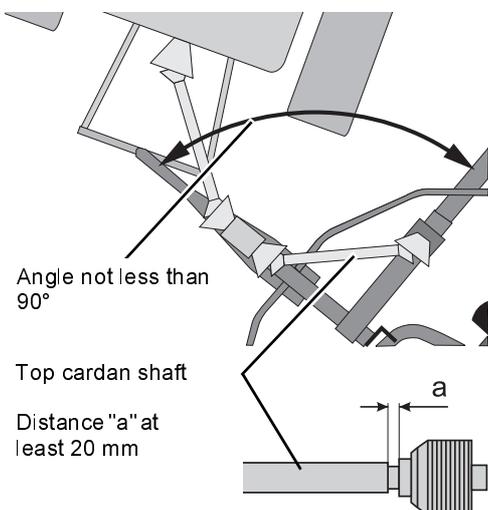
Do not let the slip clutch respond for longer than 10 seconds. If the clutch responds for a longer period of time, it will wear and the cut-off torque will drop.

Do not upset the cardan shaft

The cardan shaft between the tractor and implement must not be upset in any operating or transport position. Upset cardan shafts can cause damage to the implement and tractor.

Maintain the angle of lock

The angle between the cross beam and drawbar must never be less than 90°. The top cardan shaft can get upset. Upset cardan shafts can cause damage to the implement.



General

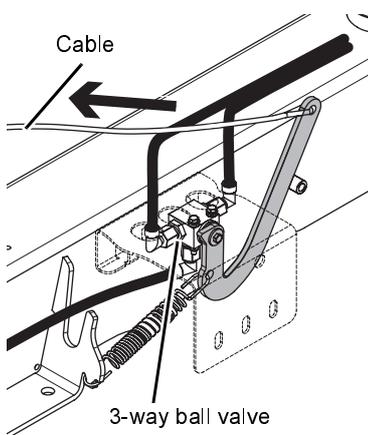
Adapted drive speed

Select the drive speed so that the crop is clean and completely picked up.

3-way ball valve

The wheel rake is equipped with a 3-way ball valve. The following functions can be controlled from the tractor seat with a cable winch and executed by means of the double-acting control device:

Preselection	Function
Neutral position	Pivoting cylinder, rear
Cable pulled	Swath former



Operate the wheel rake with the 3-way ball valve as follows:

- > Fasten the cable in the tractor cab so that it is easily accessible and secure
- > Slewing with the double-acting control device (do not pull the cable, neutral position)
- > Pull the cable and use the double-acting control device to fold the rear swath former in or out

Swathing



There should be no personnel standing in the working area

Ensure that there are no personnel in the slewing zone and working area when working with the implement. Personnel can be caught by the implement and injured.

Prerequisites

After setting the implement as described in chapter »Preparations on the field« page 33, you can start swathing.

The implement is set as follows:

- Working position preselected for one single or two individual swaths
- Swath formers are lowered and set in working position
- Raking wheel arms are attached and secured
- Anti-turning device on the raking wheel is activated
- The implement is lifted out
-

Start work as follows:

- > Open the ball valve for lifting and lowering
- > Check that there is nobody in the working area of the implement
- > Switch on the cardan shaft to a maximum of 540 rpm
- > Lower the implement to the working position with the single-acting control device
- > Start driving the tractor and select the speed so that the crop is clean and completely picked up

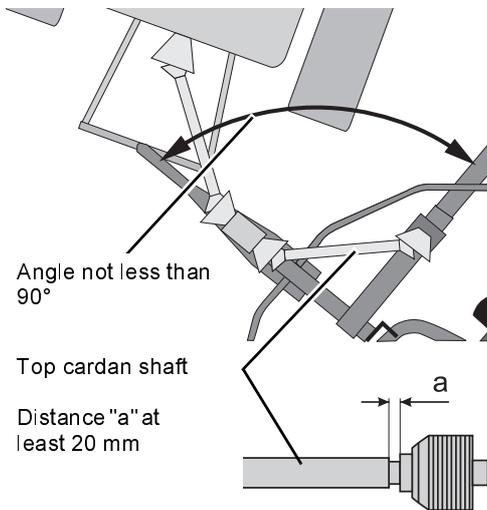
NOTE Start swathing at the edge of the field and at headlands to avoid subsequently driving over the crop.

Driving on headlands



Maintain the angle of lock

The angle between the cross beam and drawbar must never be less than 90°. The top cardan shaft can get upset. Upset cardan shafts can cause damage to the implement.



Drive as follows on headlands:

- > If necessary, lift the implement with the single-acting control device to run over swaths
- > Turn the tractor with implement so as not to fall below the angle of lock of 90 degrees
- > Lower the implement again using the single-acting control device to create new swath

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

Cleaning and care

Safety

The following applies to all cleaning and care work:



Observe safety instructions

Do not fail to observe the safety instructions when performing all work operations. Any disregard for safety instructions can lead to severe or fatal injuries to persons.

Securing the implement

- Before starting the cleaning work, always switch off the p.t.o. and lock it out against accidental operation!
- Secure the implement against rolling away by using wheel wedges
- The implement must be standing on a flat, firm surface and may have to be supported during the work

Unsecured or non-supported implements can cause accidents.

Do not clean bearings or hydraulic parts with high pressure cleaners

Do not clean bearings or hydraulic parts with high pressure cleaners. This will decrease the bright parts and they will start to rust. After each cleaning process lubricate the bearing points and grease the bright parts.

Cleaning

After each deployment clean the implement of any coarse dirt and crops.

Cleaning is performed with a high-pressure cleaner, with the exception of the bearings and piston rods of the hydraulic cylinders.

After cleaning:

After cleaning with the high-pressure cleaner lubricate all bearing points.

Care

In order that the wheel rake has a long service life we recommend:

- > applying a protective layer of oil to all bright work tools. Use only permitted biologically degradable oil, for example, rapeseed oil
- > Repair any paint damage

Safely setting down the implement

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



Observe safety instructions

Do not fail to observe the safety instructions when performing all work. Any disregard for safety instructions can lead to severe or fatal injuries to persons.

The implement is not a toy

Never allow children to play on or around the implement. Metal edges and work tools of the implement can cause serious injury.

General

Uncouple the implement in the reverse order to coupling.

→ Chapter »Coupling the implement«, section »Coupling«, page 6

Uncoupling and securing the implement

To uncouple the tractor from the tractor proceed as follows:

- Set the implement down on flat and firm ground and lower the implement to working position
- Leave the swath former in transport position
- Secure the tractor against rolling away, switch off and take out the ignition key
- Secure the implement against rolling away using wheel wedges
- If the pending attachment is used, fasten the sustainer [+] to the drawbar, secure it and relieve the drawbar with the sustainer
- Pull off the cardan shaft and deposit it on the holder provided
- Close the ball valve
- Insert the hydraulic couplings into the parking pockets on the implement
- Disconnect the plugs for the lighting and pilot box
- Release the pin

After the end of the season

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

- > Clean the implement thoroughly
- > Check all the screw joints and retighten the screws
- > Repair or replace any damaged components
- > Repair any paint damage
- > Lubricate the implement in accordance with the lubrication schedule
- > Check the tyre pressure

For your safety

The following applies to all servicing work:



Observe safety instructions

Do not fail to observe the safety instructions when performing all work operations. Any disregard for safety instructions can lead to severe or fatal injuries to persons.

Special safety information



Prerequisites for maintenance work

Only perform the maintenance operations if you have the required expert knowledge and suitable tools. The absence of technical knowledge or suitable tools can cause accidents and injuries.

Use OEM (original equipment manufacturers) replacement parts

Only use OEM replacement parts for components that are of particular importance to safety. Dimensions, strength and material quality must be guaranteed. The warranty will expire if non OEM replacement parts are installed.

Protect the device from inadvertently starting

Perform repairs, maintenance, troubleshooting on the uncoupled implement with the PTO shaft always deactivated, the engine switched off, the ignition key withdrawn and the electronic control unit switched off! Severe accidents can result if the device starts inadvertently.

Protective measures when handling oils or lubricants

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



Avoid 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.

Never use oils for cleaning

Never use oils or lubricants to clean your hands. Burrs and grit in these materials can result in injuries.

Change any soiled clothing

Change any clothing that is heavily contaminated with oil as soon as possible. Oils can cause damage to the health.

- NOTE:**
- Used oil must be collected and disposed of
 - If any major physical damage occurs through oils or lubricants, seek the help of a medical practitioner immediately

Maintenance

General

This information relates to general servicing work. For all servicing work the implement must be locked in working position. If transport position is required for maintenance work, you will find appropriate information for the maintenance work.

- > Secure the implement against rolling away by using wheel wedges

Direction specifications

The direction specifications (right, left, front, rear) are meant in drive direction.
Rotary direction is defined as follows:

	Description
 Rotary direction right	clockwise
 Rotary direction left	counter-clockwise
 Rotation about the vertical axis	viewed from top to bottom
 Rotation about the horizontal axis	at right-angles to drive direction viewed from left to right
Rotation of screws, nuts and suchlike	always viewed from the actuation face

Maintenance terms

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

Task	Explanation
Greasing	Apply grease to the slide surfaces using a brush
Lubrication	One or two presses of the grease gun, if not stated otherwise
Oiling	If not specified otherwise, use only plant-based oils, such as rapeseed oils. Used oil will endanger your health and apart from this it is strictly prohibited
Replacement	Replace the appropriate part in accordance with the directive in the section Maintenance
Inspect	Check as required the tyre pressure, adjusting dimensions and seal tightness, and replace any worn parts or seals
Observe the maintenance intervals	The specifications relate to an average usage of the implement. 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 production) shorter maintenance intervals are possible

Maintenance intervals

	After 5 hours of operation	Daily	After 20 hours of operation	After 30 hours of operation	After 250 hours of operation	Once per season.	After excessive use	As required	In case of wear	Lubrication	Greasing	Inspect	Replacement	Cleaning	Page
General															
All screws	•					•		•							52
Visual inspection		•					•					•			
Bearing				•			•			•					53
Hose connections						•						•			
Air pressure		•						•				•			56
Lighting								•				•		•	
Hydraulics															
Hydraulic tubes every 6 years						•		•					•		56
Hydraulic cylinders						•	•	•				•			
Hydraulic couplings								•						•	
Cardan shafts															
Pivots		•	•			•	•			•					53
Cardan shaft guard		•			•	•				•		•			54
Profile section tube		•	•			•					•				54
Transmission															
Raking wheel gear								•				•			56
Slewing gear								•				•			56

Maintenance

Screw connections

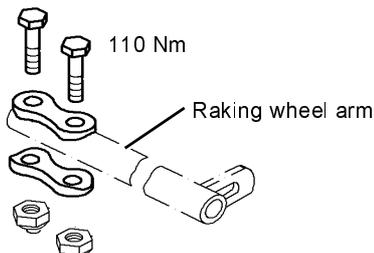
Retighten screws

All screws have to be retightened:

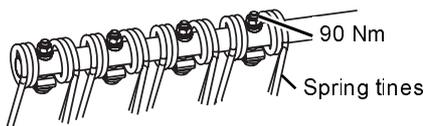
- after the first 5 operating hours and
- according to the frequency of use,
- but at least once a season.

Special tightening torques

Take heed of the special tightening torques for the following screw connections:



- 110 Nm Raking wheel arms



- 90 Nm Spring tines



- 20 Nm Wheel nuts

Tightening torques for screw connections

All other screw connections are to be tightened according to the table below. On this implement screws with a minimum quality of "8.8" (read off the screw head) are used.

Screws - Dimensions	Screw quality		
	8.8	10.9	12.9
M6	9.9 Nm (7.3 ft.lbs)	14 Nm (10.3 ft.lbs)	17 Nm (12.5 ft.lbs)
M8	24 Nm (17.7 ft.lbs)	34 Nm (25 ft.lbs)	41 Nm (30.3 ft.lbs)
M10	48 Nm (35.4 ft.lbs)	68 Nm (50.2 ft.lbs)	81 Nm (59.8 ft.lbs)
M12	85 Nm (62.7 ft.lbs)	120 Nm (88.6 ft.lbs)	145 Nm (107 ft.lbs)
M16	210 Nm (155 ft.lbs)	290 Nm (214 ft.lbs)	350 Nm (258 ft.lbs)

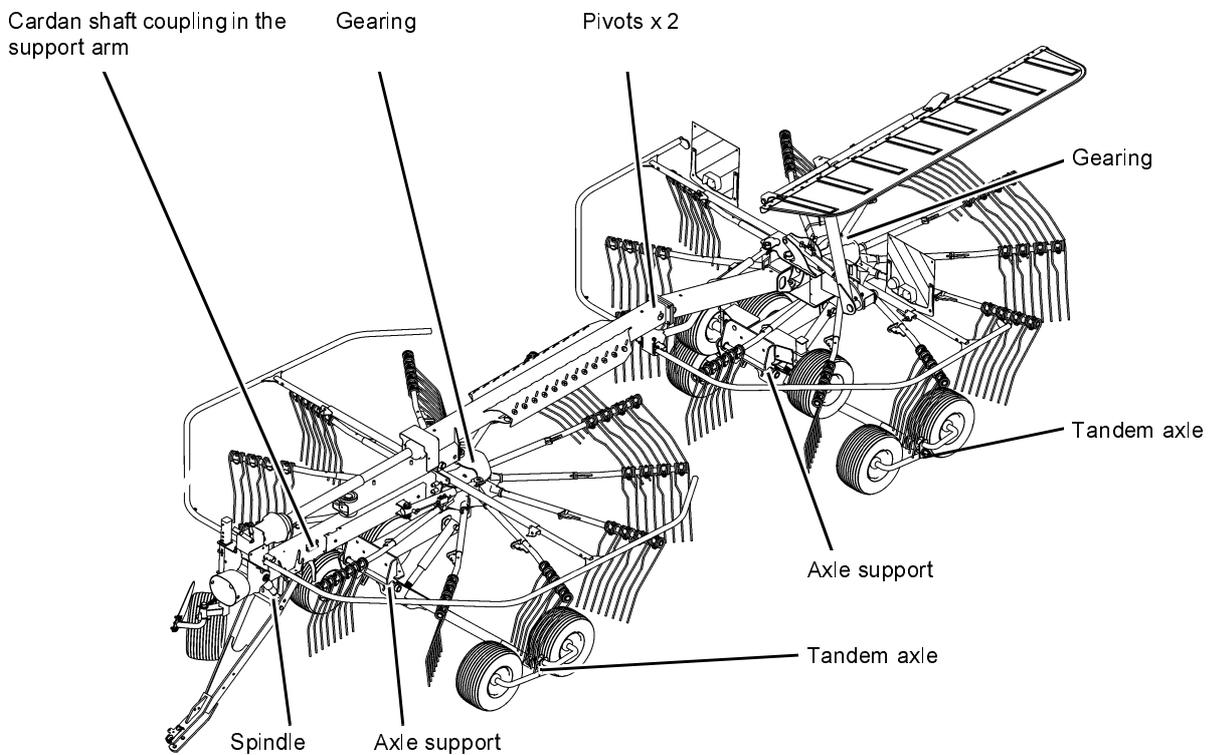
Lubrication points for grease lubrication

TIP Working with a grease gun

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

Lubricate the places listed in the illustration as follows:

- every 30 operating hours
- before and after the end of the season
- each time after cleaning with a high-pressure cleaner



Lubricating the cardan shafts

The manufacturer's own operating manual is attached to each cardan shaft. This includes detailed information on the relevant version of the cardan shaft.



Check the guard components

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

Lubricate the pivots and their couplings (G) as follows:

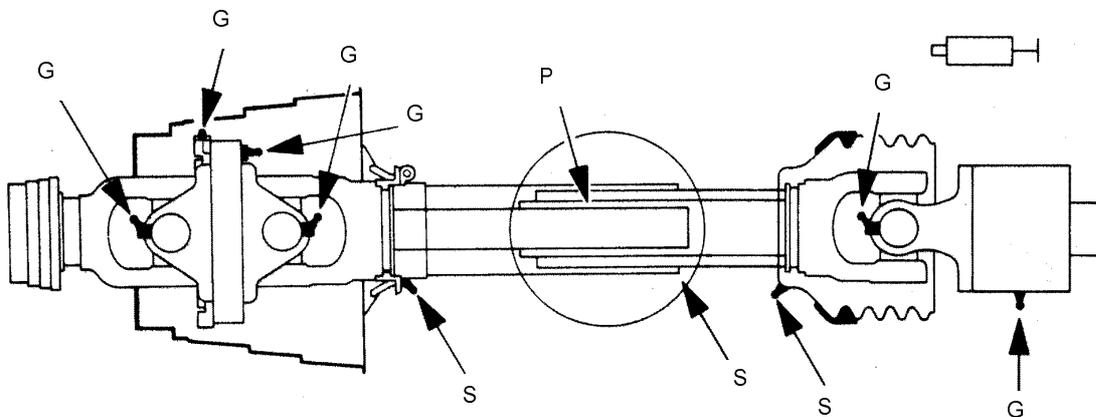
- Daily
- every 20 operating hours
- before and after the end of the season
- after every cleaning operation using a high-pressure cleaner

Grease the profile section tubes (P)

- Daily
- every 20 operating hours
- before and after the end of the season
- after every cleaning operation using a high-pressure cleaner

Lubricate the guard (S) as follows:

- every 250 operating hours
- before and after the end of the season
- each time after cleaning with a high-pressure cleaner



Adapting the car-dan shaft

The length of the cardan shaft has been selected ex-factory so that it fits almost all types of tractor. Only in exceptional cases is a correction of the cardan shaft length required on individual tractors. The cardan shaft length has to be checked in the following way before first use:

Safety



Switch off the tractor

Perform all work only with the engine switched off and the implement at a standstill. Withdraw the ignition key! An accidentally switched on cardan shaft can cause very serious injuries.

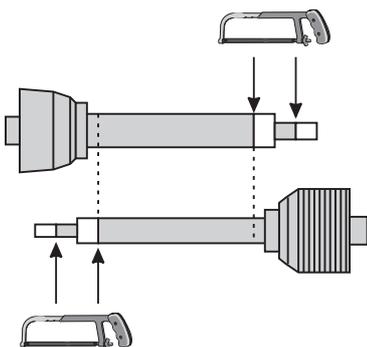
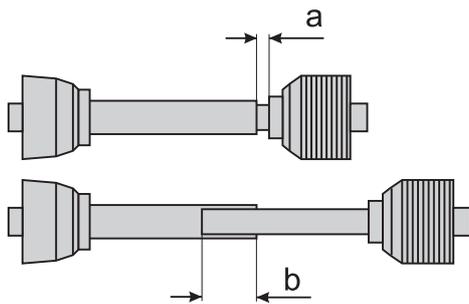
NOTE If the cardan shaft has been shortened, the minimum overlap and the minimum distance must be checked again when operated with another tractor

Perform an adaptation of the cardan shafts in the following position:

- Couple the tractor to the implement without the cardan shaft
- Lower the implement to transport position
- In a tight curve, set it down, switch off the tractor and secure it against rolling away

Shorten the cardan shaft as follows:

- > Pull the cardan shaft apart and put one half each onto the PTO shaft of the tractor and implement and secure them
- > Hold the two halves of the shaft next to one another and check whether there is an overlap of at least 250 mm (b) and that the cardan shaft is not blocked (minimum distance (a) = 20 mm)
- > If shortening is necessary, saw off the slide tube and guard tube by the same dimension each
- > Debur the ends of the tubes, remove the swarf and grease the slide points well



Maintenance

Filling volumes

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

Transmission	Oil volume [litres] SAE 90 API-GL-4
Angular gear front	0.5
Raking wheel gear, front	6.2
Raking wheel gear, rear	6.2

Tyres



Do not drive with worn or damaged tyres

Replace worn or damaged tyres immediately. There is a high risk of accident especially when driving on the road with such tyres.

Tyre pressure

Check the tyre pressure regularly:

- Daily
- as required (for example before setting the tine height)
- before and after the end of the season

Tyre pressure: 1.5 bar

Hydraulic



Be careful when welding

Do not perform any welding work in the vicinity of the hydraulic hoses. Hydraulic oil can burst into flames very easily.

Hydraulic system at zero pressure

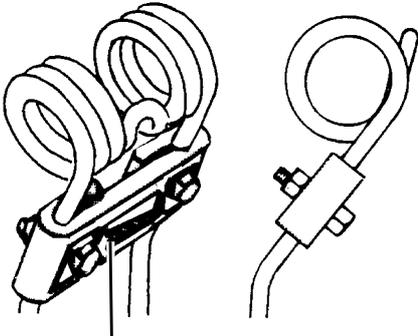
The hydraulic system must be unpressurised before changing the hydraulic hoses.

Hydraulic tubes

Hydraulic tubes can age without this being externally visible. We therefore recommend that the hydraulic hoses be replaced every six years.

- > Lower the implement
- > Unfold the swath cloth
- > Depressurise the equipment
- > Switch off the engine
- > Replace hydraulic tubes

Tine anti-loss device

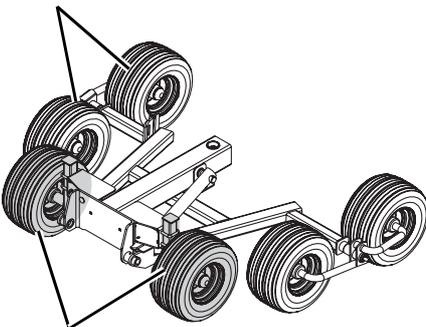


Tine anti-loss device

If the tines are broken, the tine anti-loss devices can prevent the broken-off part from getting lost. Any following implements, for example straw cutters, are then not damaged by lost tines in the fodder. The flexible plastic containers can be easily clamped tight and then released again.

Tandem axles

Tandem axles



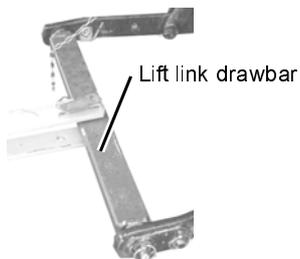
Roller feelers

Tandem axles are obtainable for good adaptation to the ground contour and quiet running of the implement.

Roller feelers

For even better adaptation to the ground contour and quieter running of the implement in operating position the manufacturer also supplies roller feelers. The roller feelers are combinable with single wheel axles or tandem axles.

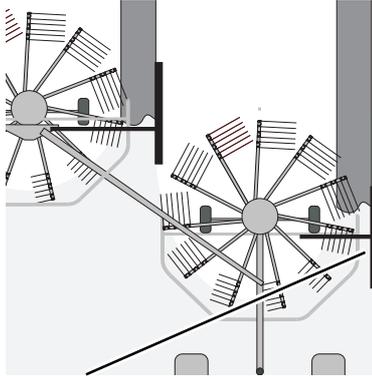
Lift link drawbar



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

Accessory equipment

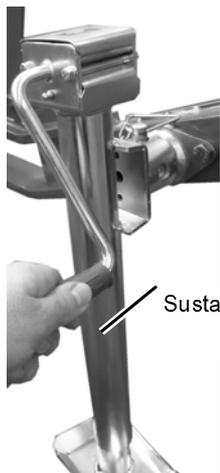
Front swath former



Swath former on the front raking wheel

For the position "Two individual swaths" the manufacturer offers a second swath former for the front raking wheel. An optimal swath form is therefore ensured on the front raking wheel as well.

Height adjustable sustainer



Sustainer on the drawbar

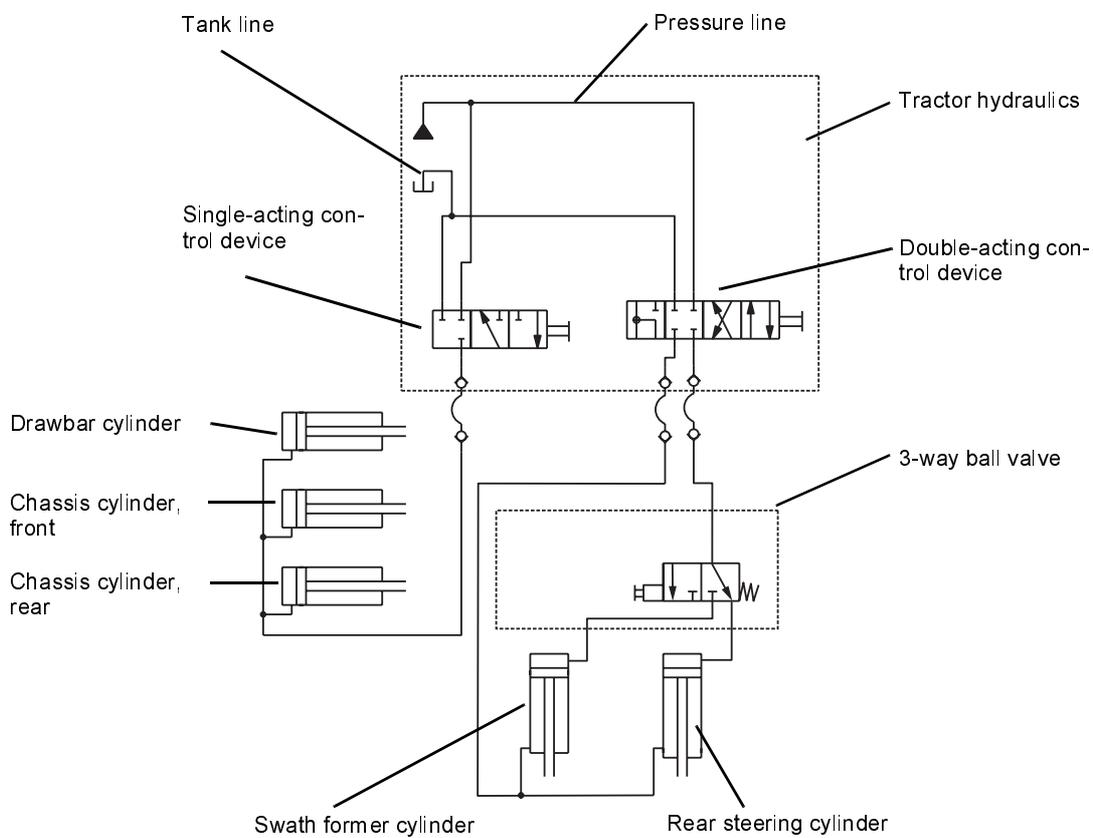
For tractors with a pending attachment a height adjustable sustainer is obtainable, which considerably facilitates coupling and uncoupling.

Malfunctions can often be eliminated quickly and easily. Before calling Customer Service, refer to the table to check whether the malfunction is one you can eliminate yourself.

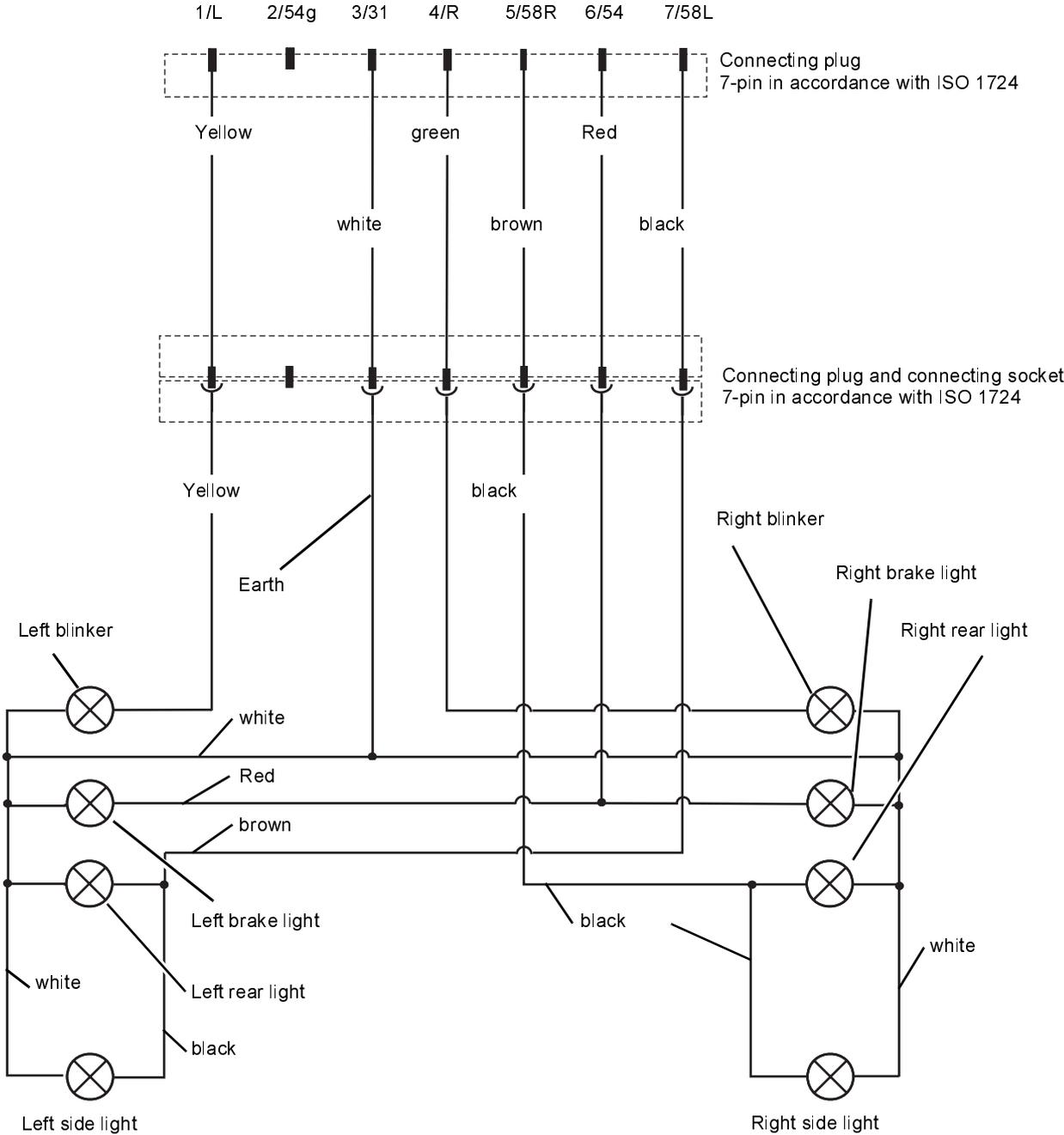
Fault	Causes	Remedy
Raking wheel is leaving fodder lying on one side and is immersing too deeply into the ground on the other side	Raking wheel pitch set wrongly	→ Chapter »Preparing for operation«, section »Raking wheel pitch«, page 26
Raking wheel is leaving fodder lying over the entire width	Working depth set too high	→ Chapter »Preparing for operation«, section »Working depth«, page 24
Fodder is heavily contaminated	Raking wheel tines set too low	→ Chapter »Preparing for operation«, section »Working depth«, page 24
Implement operating uncleanly at high speed	Raking wheel tines set too high Uneven terrain	→ Chapter »Preparing for operation«, section »Working depth«, page 24
	Speed too high to process fodder mass	Reduce speed
Raking wheel dragging fodder along – Unclean swath form	Swath cloth too tight on raking wheel	→ Chapter »Preparing for operation«, section »Setting the swath width«, page 39
	Fodder mass very great	Reduce speed
	Rotary speed too high	Reduce speed
Cardan shaft coupling responding frequently	Fodder mass too great or irregular	Reduce speed
	Raking wheel tines set too low	→ Chapter »Preparing for operation«, section »Working depth«, page 24
Noise production during work	Loose screw connections or worn-out raking wheel arms	Check raking wheel arms and screw connections on tines
Implement drops during transport journeys	Ball valve not closed	Close the ball valve → Chapter »Driving on the road«, section »General«, page 33
Steering misadjusts during transport journeys	Pilot box not switched off	Switch off the pilot box Chapter »Driving on the road«, section »General«, page 33
Rear raking wheel not picking up fodder	Rear raking wheel tines set too high	→ Chapter »Preparing for operation«, section »Working depth«, page 24
	Fodder mass too great	Reduce speed
Poor fodder transfer on the rear raking wheel when cornering	Excessively tight cornering	Take a larger radius After-steer the rear raking wheel when cornering

Circuit diagrams

Hydraulic circuit diagram



Lighting circuit diagram



Disposal

When the implement has reached the end of its service life, its individual parts must be disposed of in the proper way. Please observe the currently valid waste disposal conditions

Plastic parts

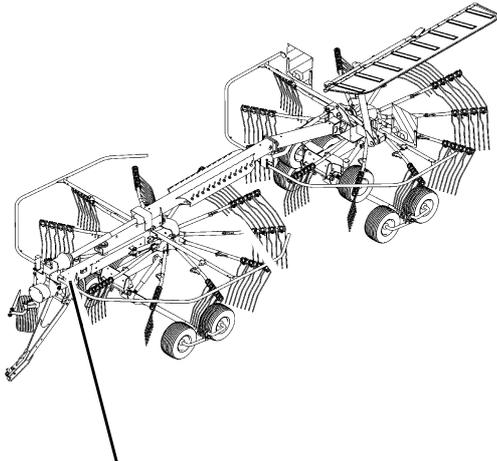
Plastic parts can be disposed of in the normal household waste (residual waste), depending on the laws specific to your country.

Metal parts

All metal parts can be disposed of in the used metal recycling system.

EC Conformity Declaration

**in conformity with
the
EC Directive 98/37/
EC**



Type Plate and CE Symbol

We

**Kverneland Group Gottmadingen N. V.
Filiale Gottmadingen
Industriepark 312
D-78244 Gottmadingen**

declares on its own responsibility that the product

**SwatMaster 7131 EVO, An dex 713 T EVO,
9071 S EVO
including accessories**

to which this declaration relates, complies with the relevant basic safety and health requirements of the EC Directive 98/37/EC.

The following standards have been invoked for proper implementation of the health and safety requirements quoted in the EC Directive:

- DIN EN ISO 12 100-1,2
- DIN EN 1553
- DIN 11001-3

Kverneland Group Gottmadingen N. V.
Gottmadingen, 13.11.2006

Bjørn Arve Ofstad
Chief Executive Officer

Index

A		G	
Accessory equipment		Guard stay,	
Height adjustable sustainer	58	insertion	31
Lift link drawbar	57	pulling out	38
Roller feelers	57		
Swath former, front	58		
Tandem axles	57		
Tine anti-loss device	57		
adjustments		I	
Chassis	24	Implement,	
Drawbar cylinder	19	implement	28
Raking wheel pitch	26	setting down	47
Single swath	34	shutdown after the season	47
Stabiliser	25	uncoupling	47
Swath former	41		
Swath width, rear	39		
Working depth	24		
		L	
		Lubrication points	53
		Cardan shafts	54
		General	53
C		M	
Cardan shaft		Maintenance	48
Adapting the length	55	Lubrication points	53
attachment	20	Screw connections	52
Lubrication	54	Maintenance intervals	51
Care	46		
Circuit diagram			
Hydraulic	60		
Lighting	61		
Pilot box	60	N	
Cleaning	46	Night swaths	36
Component designations	13		
Conformity Declaration	63		
Connection		O	
Electrical	21	Oil,	
Hydraulic couplings	22	disposal of	49
Coupling		Filling volumes	56
Cardan shaft	20	Protection measures	49
Lift link drawbar	18	Operation	42
Pending attachment	19		
		P	
		Proper use	12
D		R	
Direction specifications	50	Raking wheel securing device	30
Disposal		releasing	38
Metal parts	62	Raking wheel,	
Plastic parts	62	securing	30
		Range of application	12
		Rip chain USA, Canada	20
E		Road transport	27
EU Conformity Declaration	63	Road travel check list	31
Explanation			
Maintenance terms	50		
F			
Fault	59		
Filling volumes	56		

S

Safety	5
Care and maintenance	10
Hitching	6
Operation	9
Pictorial symbols	6
Road transport	8
Unhitching	10
Scope of delivery	17
Single swath	34
Speed	32
Stabiliser	
adjustment	25
Swath deposit	34
Night swaths	36
Single swath	34
Two individual swaths	36
Swath former rear,	
adjustment	39
folding in	29
Swath former, front	
adjustment	41
Parking position	29
Symbols	4

T

Target group	4
Technical specifications	14
Tightening torques	
Raking wheel arms	52
Screw connections	52
Spring tines	52
Wheel nuts	52
Tine support	30
attachment	38
Tractor equipment	15
Tyre pressure	56
Tyres	56

U

Uncoupling the implement	
Implement,	47

W

Wheel wedges	20
--------------	----