



Rotary tedder

KWT 2000

(from serial no.: 870 155)

Order no.: 150 000 168 01 en





Table of Contents

	EC Declaration of Conformity	
We Maschinenfabrik Bernard Krone GmbH Heinrich-Krone-Str. 10, D-48480 Spelle		
hereby declare as manufacturer of the product named below, on our sole responsibility, that the		
Machine: KRONE rotary tedder Type / types: KWT 2000		
to which this declaration refers is in compliance with the relevant provisions of EC directive 2006/42/EC (machines).		
The signing Managing Director is authorised to compile the technical documents.		
Spelle, 22.03.2012		
	Dr.-Ing. Josef Horstmann (Managing Director, Design and Development)	
Year of manufacture:	Machine no.:	

**1 Table of Contents**

1	Table of Contents	3
2	Foreword	6
3	To this Document	7
3.1	Validity	7
3.2	Identifying Symbols in the Operating Instructions	7
3.3	Information on Direction	7
3.4	Means of representation	8
4	Safety	11
4.1	Purpose of Use	11
4.2	Intended use	11
4.3	Service life of the machine	11
4.4	Basic safety instructions	11
4.4.1	Importance of the operating instructions	11
4.4.2	Personnel qualification	12
4.4.3	Children in danger	12
4.4.4	Coupling	12
4.4.5	Structural changes to the machine	12
4.4.6	Additional equipment and spare parts	13
4.4.7	Workstations and passengers	13
4.4.8	Operational safety: Technically perfect condition	13
4.4.9	Danger zones	15
4.4.10	Keeping safety devices functional	17
4.4.11	Personal protective equipment	17
4.4.12	Safety signs on the machine	18
4.4.13	Traffic safety	18
4.4.14	Parking the machine safely	19
4.4.15	Consumables	19
4.4.16	Sources of danger on the machine	20
4.4.17	Dangers associated with certain activities: Work on the machine	21
4.4.18	Dangers associated with certain activities: Working on wheels and tyres	22
4.4.19	Behaviour in hazardous situations and when accidents occur	22
4.5	Safety routines	23
4.5.1	Stopping and securing the machine	23
4.5.2	Supporting lifted machine and machine parts securely	23
4.5.3	Coupling the machine safely	24
4.5.4	Uncoupling the machine safely	24
4.5.5	Preparing the machine for repair, maintenance and adjustment work	25
4.5.6	Starting the machine safely	25
4.6	Safety stickers on the machine	26
4.6.1	Position and meaning of the safety stickers on the machine	26
4.6.2	Re-Ordering the Adhesive Safety and Information Labels	28
4.6.3	Affixing the Adhesive Safety and Information Labels	28
4.6.4	Contact	28
4.7	Position of Warning Films on the Machine	29
5	Machine Description	30
5.1	Machine overview	30



Table of Contents

5.2	Identification Plate	31
5.3	Information Required for Questions and Orders	31
5.3.1	Contact	31
5.4	Overload protection	32
6	Technical Data of the Machine	34
6.1	Technical data	34
6.2	Consumables	36
6.3	Tyres	36
7	Control and Display Elements	37
8	Commissioning	38
8.1	First installation	38
8.2	Preparations on the rotary tedder	39
8.2.1	Overload protection	39
8.2.2	Removing the preserving wax from the tines	39
8.3	Connect the machine to the tractor	40
8.4	PTO shaft	40
8.4.1	Length adjustment	40
8.5	Regulating direction of travel	41
9	Start-up	42
9.1	Preparations on tractor	43
9.1.1	Adjusting the lower suspension arms	43
9.2	Connect the machine to the tractor	44
9.3	Height of tractor lower suspension arms	44
9.4	Connecting the hydraulic lines	45
9.5	Lighting connection	46
9.6	Install the PTO shaft	47
9.7	Using the safety chain	48
9.8	Compressed Air Connections for the Compressed Air Brake	49
9.9	Hydraulic brake (Export)	49
10	Driving and Transport	50
10.1	Preparations for road travel	51
10.2	Reducing transport width	52
10.3	Travelling on an incline	52
10.4	Switching off the machine	53
10.4.1	Parking Brake	54
11	Operation	55
11.1	Moving the machine into the working position	56
11.2	Using the Machine for Work	58
11.3	Moving the machine into the transport position	60
12	Settings	62
12.1	Spreading angle setting of the rotors	62
12.2	Setting the Working Height	64
12.3	Setting of tines	65
13	Maintenance	66
13.1	Spare Parts	66
13.2	Maintenance table	67
13.3	Deviating Tightening Torques MA (Nm)	68



Table of Contents

13.4	Tightening torques.....	69
13.4.1	Metric Thread Screws with Control Thread	69
13.4.2	Metric Thread Screws with Fine Thread	70
13.4.3	Metric Thread Screws with Countersunk Head and Hexagonal Socket.....	70
13.5	Tyres	71
13.5.1	Checking and maintaining tyres.....	71
14	Maintenance – lubrication chart	72
14.1	Lubrication Points on the Universal Shafts	73
14.2	Lubrication Points on the Machine	74
15	Maintenance - hydraulic system	77
15.1	Diagram.....	78
16	Maintenance - Gearbox.....	80
17	Special equipment.....	82
17.1	Tine loss safeguard	82
17.2	Anti-wrap guard plate tyres	83
17.3	Spare wheel with support.....	83
18	Placing in Storage	84
18.1	At the End of the Harvest Season.....	84
18.2	Before the Start of the New Season.....	85
19	Disposal of the machine	86
19.1	Disposal of the machine	86
20	Index	87

Foreword

2 Foreword

Dear Customer!

By purchasing your rotary tedder , you have acquired a quality product from KRONE.

We are grateful for the confidence you have invested in us in buying this machine.

To be able to use the rotary tedder optimally, please read these operating instructions thoroughly before you start using the machine.

The contents of this manual are laid out in such a way that you should be able to perform any task by following the instructions step by step. It contains extensive notes and information about maintenance, how to use the machine safely, secure working methods, special precautionary measures and available accessories. This information and these instructions are essential, important and useful for the operational safety, reliability and durability of the rotary tedder.



Note

In the operating instructions which follow, the rotary tedder will also be referred to as the "machine".

Please note:

The operating instructions are part of your machine.

Only operate this machine after you have been trained to do so and according to these instructions.

It is essential to observe the safety instructions!

It is also necessary to observe the relevant accident prevention regulations and other generally recognised regulations concerning safety, occupational health and road traffic.

All information, illustrations and technical data in these operating instructions correspond to the latest state at the time of publication.

We reserve the right to make design changes at any time and without notification of reasons.

Should you for any reason not be able to use these operating instructions either wholly or partially, you can receive a replacement set of operating instructions for your machine by quoting the number supplied overleaf.

We hope that you will be satisfied with your KRONE machine.

Maschinenfabrik Bernard Krone GmbH

Spelle

3 To this Document

3.1 Validity

These operating instructions apply to rotary tedders of the series:

KWT 2000

3.2 Identifying Symbols in the Operating Instructions

The safety instructions contained in this manual which could result in personal injury if not followed are identified by the general danger sign:

Danger!



DANGER!

Type and source of the hazard!

Effect: Danger to life or serious injuries.

- Measures for hazard prevention

Warning !



WARNING!

Type and source of the hazard!

Effect: Injuries, serious material damage.

- Measures for hazard prevention

Caution!



CAUTION!

Type and source of the hazard!

Effect: Property damage

- Measures for risk prevention.

General function instructions are indicated as follows:

Note!



Note - Type and source of the note

Effect: Economic advantage of the machine

- Actions to be taken

Instructions which are attached to the machine need to be followed and kept fully legible.

3.3 Information on Direction

Information on direction in this document such as front, rear, right and left always applies in the direction of travel.

To this Document

3.4 Means of representation

In this document, the following means of representation are used:

Action step

A bullet point (•) designates an action step you have to perform, as for example:

- Set the left outside mirror.

Sequence of actions

Several points (•) which are located in front of a sequence of action steps identify a sequence of actions to be performed step by step, as for example:

- Loosen counter nut.
- Mount screw.
- Tighten counter nut.

Enumeration

Dashes (-) characterize enumerations such as, for example:

- Brakes
- Steering
- Lighting

Symbols

To visualize parts and actions steps, the following icons are used:

Icon	Explanation
	Reference sign for part
	Position of a part (e.g. move from pos. I to pos. II)
	Dimensions (e.g. B = width, H = height, L = length)
	Action step: Tighten screws with torque key with specified tightening torque
	Direction of motion
	Direction of travel
	opened
	closed
	Loupe representation (enlargement of display detail)
	Framings, dimension line, dimension line limitation, reference line for visible parts or visible mounting material
	Framings, dimension line, dimension line limitation, reference line for covered parts or covered mounting material
	Laying routes
	Left-hand machine side
	Right-hand machine side



To this Document

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4 Safety

4.1 Purpose of Use

The rotary tedder is used for tedding, raking and swath spreading of cut crop stalks.

4.2 Intended use

The rotary tedder is built exclusively for customary use in agricultural work (intended use).

Unauthorised modifications to the machine may have a negative effect on the machine characteristics or safe and reliable use of the machine or may interfere with proper operation. Unauthorised modifications shall therefore release the manufacturer of any liability for consequential damage.

4.3 Service life of the machine

- The service life of this machine strongly depends on proper use and maintenance as well as the operating conditions.
- Permanent operational readiness as well as long service life of the machine can be achieved by observing the instructions and notes of these operating instructions.
- After each season of use, the machine must be checked thoroughly for wear and other damage.
- Damaged and worn parts must be replaced before placing the machine into service again.
- After the machine has been used for five years, carry out full technical inspection of the machine. According to the results of this inspection, a decision concerning the possibility of reuse of the machine should be taken.
- Theoretically, the service life of this machine is unlimited as all worn or damaged parts can be replaced.

4.4 Basic safety instructions

Non-compliance with the safety instructions and warnings

Non-compliance with the safety instructions and warnings may result in injuries and damage to the environment and property.

4.4.1 Importance of the operating instructions

The operating instructions are an important document and a part of the machine. They are intended for the user and contain information relevant to safety.

Only the procedures indicated in the operating instructions are reliable. If the operating instructions are not followed, people may be seriously injured or killed.

- Before using the machine for the first time, read and follow all the "Basic safety instructions" in the chapter Safety.
- Before working, also read and observe the respective sections in the operating instructions.
- Retain the operating instructions and ensure that they are always available.
- Hand over the operating instructions to subsequent users.

Safety

4.4.2 Personnel qualification

If the machine is not used properly, people may be seriously injured or killed. To avoid accidents, each person who works with the machine must satisfy the following minimum requirements:

- He is physically capable of controlling the machine.
- He can work safely with the machine in accordance with these operating instructions.
- He understands the method of operation of the machine within the scope of his work and can identify and avoid the dangers associated with the work.
- He has read the operating instructions and can implement the information in the operating instructions accordingly.
- He is familiar with driving vehicles safely.
- For road travel he has adequate knowledge of the highway code and has the stipulated driving licence.

4.4.3 Children in danger

Children cannot assess danger and behave unpredictably.
As a result, children are especially at risk.

- Keep children away from the machine.
- Keep children away from consumables.
- Especially before starting up and moving the machine, ensure that there are no children in the danger zone.

4.4.4 Coupling

If the tractor and the machine are not correctly connected, there is a risk of causing serious accidents.

- When connecting front attachments or trailers, follow all operating instructions:
 - The operating instructions for the tractor
 - The operating instructions for the machine
 - The operating instructions for the universal shaft
- Follow the coupling instructions, see chapter on starting up "Connect the machine to the tractor".
- Note the modified driving behaviour of the combination.

4.4.5 Structural changes to the machine

Structural changes and enhancements may impair the functionality and operational safety of the machine. As a result, people may be seriously injured or killed.

- Have structural changes and enhancements performed by an authorised service centre only.

4.4.6 Additional equipment and spare parts

Additional equipment and spare parts, which do not comply with the requirements of the manufacturer, may impair the operational safety of the machine and cause accidents.

- To ensure operational safety, use original or standard parts which comply with the requirements of the manufacturer. If in doubt, have parts verified by the dealer or manufacturer.

4.4.7 Workstations and passengers

Control of the moving machine

The moving machine requires the driver to react quickly at any time. Otherwise, the machine may move in an uncontrolled manner and seriously injure or kill people.

- Start the engine from the driver's seat only.
- Never leave the driver's seat while the machine is moving.
- Never climb in or out of the machine while it is moving.

Passengers

Passengers may be seriously injured by the machine or fall off the machine and get run over. Ejected objects may strike and injure passengers.

- Never let people ride on the machine.

4.4.8 Operational safety: Technically perfect condition

Operation only when the machine has been started up correctly

If the machine is not started up correctly according to these operating instructions, the operational safety of the machine is not ensured. As a result, accidents may occur and people may be seriously injured or killed.

- Do not use the machine unless it has been started up correctly, see chapter Start-up.

Technically perfect condition of the machine

Improper maintenance and adjustment may affect the operational safety of the machine and cause accidents. As a result, people may be seriously injured or killed.

- Perform all maintenance and adjustment work according to the chapters Maintenance and Adjustment.
- Before performing any maintenance or adjustment work, shut down and safeguard the machine, see chapter Safety "Shutting down and safeguarding the machine".

Safety

Danger resulting from damage to the machine

Damage to the machine may impair the operational safety of the machine and cause accidents. As a result, people may be seriously injured or killed. The following parts of the machine are particularly important for safety:

- Brakes
- Steering
- Safety devices
- Connecting devices
- Lighting
- Hydraulic system
- Tyres
- Universal shaft

If there are doubts about the operational safety of the machine, for example due to leaking consumables, visible damage or an unexpected change to the driving behaviour:

- Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".
- Immediately eliminate potential causes of damage, for example heavy soiling, or tighten slack screws.
- Determine the cause of damage according to these operating instructions, see chapter Malfunctions – Cause and remedy.
- If possible, repair the damage according to these operating instructions.
- In the case of damage which may affect operational safety and cannot be repaired according to these operating instructions: Have damage repaired by a qualified service centre.

Technical limit values

When the technical limit values of the machine are not met, the machine may be damaged. Thus there is a risk of accidents, serious injuries or death. With regard to safety, it is of special importance to comply with the following technical limit values:

- Gross vehicle weight
- Permissible axle load
- Permissible supported load
- Maximum permissible speed
- Meet limit values, refer to chapter entitled "Technical Data".

4.4.9 Danger zones

Danger zones on the tractor and the machine

The area around the tractor and the machine is a danger zone.

There are the following hazards in this danger zone:

- The tractor and the machine may start moving or rolling away and run over people.
- If the power lifter is unintentionally actuated, the machine may make hazardous movements.
- Defective or insecurely attached electrical cables may cause fatal electric shocks.
- Defective or insecurely attached hydraulic or pneumatic lines may become detached and flail around. Hydraulic oil may escape under high pressure and cause serious injuries to the skin or face.
- Clothing may become caught and wrapped around an exposed PTO shaft or a damaged or incorrectly installed universal shaft.
- When the drive is switched on, machine parts may rotate or swivel.
- Hydraulically raised machine parts may descend unnoticed and slowly.

If the danger zone is not observed, people may be seriously injured or killed.

- Keep people away from the danger zone of the tractor and the machine.
- Do not switch on the drives and engine until there is nobody in the danger zone.

The safety clearance is:

- 30 metres in front of the machine while in operation.
- 5 metres in front of the machine when at a standstill.
- 3 metres on either side of the machine.
- 5 metres behind the machine.
- Before working in front of and behind the tractor and in the danger zone of the machine: Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine". This also applies to brief inspection work. Many serious accidents in front of and behind the tractor and the machine occur due to negligence and running machines.
- Consider the information in all relevant operating instructions.
 - The operating instructions for the tractor
 - The operating instructions for the machine
 - The operating instructions for the universal shaft

Safety

Danger zone between tractor and machine

People standing between the tractor and machine may be seriously injured or killed if the tractor rolls away or by machine movements:

- Before starting all work between the tractor and machine: • Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine". This also applies to brief inspection work. Many serious accidents occur due to negligence and running machines.
- If the power lifter has to be actuated, keep all people away from the area of movement of the power lifter.

Danger zone when drive switched on

When the drive is switched on, there is a danger to life from rotating and swivelling machine parts. There must be nobody in the danger zone of the machine.

- Before starting the machine, direct all people out of the danger zone of the machine.
- If a hazardous situation arises, switch off drives and diesel engine immediately.

Danger zone of the P.T.O. shaft

People may be caught, pulled in and seriously injured by the PTO shaft and the driven components.

Before engaging the PTO shaft:

- Make sure that all safety devices are fitted and in the protection position.
- Ensure that the selected speed and direction of rotation of the PTO shaft match the permitted speed and direction of rotation of the machine.
- Ensure that nobody is in the danger zone of the PTO shaft or the universal shaft.
- If the angles are too large, switch off the PTO shaft. The machine may be damaged. Parts may be flung out and cause injury to persons.
- If the PTO shaft is not required, switch off the PTO shaft.

Danger zone universal shaft

People may become caught by the universal shaft, pulled in and seriously injured.

- Ensure that the universal shaft guards are attached and functional.
- Ensure that nobody is in the danger zone of the PTO shaft or the universal shaft.
- Provide the section tube and universal shaft guards with adequate cover.
- Allow the universal shaft locks to engage.
- Attach the chains to prevent the universal shaft guards from rotating with the shaft.
- Follow the operating instructions for the universal shaft.

Danger zone due to coasting machine parts

When the drives have been switched off, the following machine parts will coast:

- Universal shaft
- Rotor

When machine parts are coasting, people may be seriously injured or killed.

Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".

- Do not touch machine parts until they have come to a standstill.

4.4.10 Keeping safety devices functional

If safety devices are missing or damaged, people may be seriously injured or killed by moving machine parts.

- Replace damaged safety devices.
- Re-install all removed safety devices and all other parts and move them into protective position before starting up the machine.
- If it is doubtful whether all safety devices have been correctly installed and are functional, have a service centre check them.

4.4.11 Personal protective equipment

The wearing of personal protective equipment is an important safety measure. Missing or unsuitable personal protective equipment increases health risks and injuries.

Personal protective equipment is for example:

- Work gloves
- Safety boots
- Protective clothing
- Breathing protection
- Hearing protection
- Face and eye protection
- Specify and provide personal protective equipment for the particular job.
- Use only personal protective equipment which is in proper condition and offers effective protection.
- Adjust personal protective equipment to the person, for example the size.

Wear suitable clothing

Loose clothing increases the risk of it becoming caught or wrapped around rotating parts and of it becoming caught on protruding parts. As a result, people may be seriously injured or killed.

- Wear tight-fitting clothing.
- Never wear rings, chains or other items of jewellery.
- Cover long hair with a hairnet.
- Wear sturdy shoes or protective work boots.

Safety

4.4.12 Safety signs on the machine

Safety stickers on the machine warn of hazards in danger areas and are an important component of the safety equipment of the machine. Missing safety stickers increase the risk of serious and fatal injuries.

- Clean dirty safety stickers.
- After cleaning, always check that safety stickers are complete and legible.
- Immediately replace missing, damaged and unrecognisable safety stickers.
- Provide spare parts with the designated safety stickers.

Description, explanation and order numbers of the safety stickers, see chapter Safety, "Safety stickers on the machine".

4.4.13 Traffic safety

Dangers when driving on roads and in fields

The mounted or attached work machine changes the handling characteristics of the tractor. The handling characteristics also depend on the operational state and on the ground. If the driver does not consider changed handling characteristics, he may cause accidents.

- Observe procedures for driving on roads and in fields, see chapter "Driving and transportation".

Prepare the machine for road travel

If the machine is not prepared properly for road travel, serious accidents may occur with traffic.

- Before travelling on the road, always prepare the machine for road travel, see chapter Driving and transportation, "Preparations for road travel".

Danger of overturning

The machine may overturn when driving on slopes. As a result, accidents may occur and people may be seriously injured or killed. The risk of overturning depends on many factors.

- Observe procedures for driving, see chapter Driving and transportation.



4.4.14 Parking the machine safely

The parked machine may overturn. People may be crushed and killed.

- Park the machine on a stable and even surface.
- Before adjusting, repairing, servicing or cleaning the machine, ensure that it is securely positioned. If in doubt, support the machine.
- In the chapter Driving and transportation note the section "Parking the machine".

Unattended parking

Adults and playing children are at risk from an inadequately secured and unattended parked machine.

- Before switching off the machine: Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".

4.4.15 Consumables

Unsuitable operating materials

Operating materials that do not correspond to the requirements of the manufacturer may impair the operational safety of the machine and cause accidents.

- Only use operating materials which meet the requirements.

For information on requirements relative to operating materials, refer to chapter Technical Data, "Operating Materials".

Protection of the environment and disposal

Consumables such as diesel fuel, brake fluid, antifreeze and lubricants may damage the environment and the health of people.

- Do not release consumables into the environment.
- Absorb leaked consumables with an absorbent material or with sand, place in a liquid-tight labelled container and dispose of according to the official regulations.

Safety

4.4.16 Sources of danger on the machine

Noise may lead to health problems

When working with the machine for a longer time, serious health damage may result such as hearing loss, deafness or tinnitus. When using the machine at high speed, the noise level increases as well.

- Before starting up the combination of tractor and machine, evaluate the danger by noise. Determine and use hearing protection that is suitable depending on environmental conditions, working hours as well as working conditions and operating conditions of the machine. In this process, observe sound pressure level, refer to chapter Technical Data.
- Define rules for the utilization of hearing protection and for working time.
- When the machine is in operation, keep windows and doors of the cab closed.
- Remove hearing protection for road travel.

Liquids under pressure

The following liquids are under high pressure:

- Hydraulic oil

Liquids under high pressure may penetrate the body through the skin and cause serious injuries.

- If a damaged pressure system is suspected, immediately contact a qualified service centre.
- Never search for leaks with bare hands. Even a pin-sized hole may cause serious injuries.
- Keep body and face away from leaks.
- If liquids penetrate the body, immediately consult a doctor. The liquid must be removed from the body as quickly as possible. Danger of infection!

Hot liquids

Risk of burns and scalding from hot liquids!

- When draining hot consumables, wear protective gloves.
- If required, leave liquids and machine parts to cool down before performing repair, maintenance and cleaning work.

Toxic exhaust gases

Exhaust gases may seriously damage your health or be fatal.

- While the engine is running, provide adequate ventilation to prevent prolonged exposure to exhaust gases.
- Do not leave the engine running in a closed room unless there is a suitable exhaust gas extraction system.

4.4.17 Dangers associated with certain activities: Work on the machine

Work on the machine only when it has been shut down

If the machine has not been shut down and safeguarded, parts may move unintentionally or the machine may start moving. As a result, people may be seriously injured or killed.

- Before performing any work on the machine, such as making adjustments, cleaning, preparing for road travel, preparing for work, servicing or rectifying malfunctions, shut down and safeguard the machine, see chapter Safety "Shutting down and safeguarding the machine".

Maintenance and repair work

Incorrect maintenance and repair work will endanger operational safety. As a result, accidents may occur and people may be seriously injured or killed.

- Only perform work which is described in these operating instructions. Before performing any work, shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".
- All other maintenance and repair work may be performed by a qualified service centre only.

Raised machine and machine parts

The raised machine may accidentally drop, roll away or overturn and crush or kill people.

- Do not stand under the raised machine. First put the machine down.
- Before performing any work under the machine, securely support the machine, see chapter Safety "Securely supporting the raised machine and machine parts".
- Before performing any work on or under raised machine parts, lower the machine parts or secure them mechanically with rigid safety supports or with a hydraulic shut-off device to prevent them from dropping.

Danger associated with welding work

Improper welding work will endanger the operational safety of the machine. As a result, accidents may occur and people may be seriously injured or killed.

- Before performing welding work on the machine, obtain the consent of KRONE customer service and, if required, identify alternatives.
- Have welding work performed by experienced technicians only.

Safety

4.4.18 Dangers associated with certain activities: Working on wheels and tyres

Fitting/removing wheels and tyres

Improper fitting or removal will endanger operational safety. As a result, accidents may occur and people may be seriously injured or killed.

The fitting of wheels and tyres requires adequate knowledge and approved tools.

- If there is a lack of knowledge, have the wheels and tyres fitted by the KRONE dealer or by a qualified tyre service.
- When fitting tyres on the wheel rims, never exceed the maximum permitted pressure specified by the tyre manufacturers, otherwise the tyre or even the wheel rim may explode.
- When fitting the wheels, tighten the wheel nuts to the stipulated torque, see chapter Maintenance "Tyres".

4.4.19 Behaviour in hazardous situations and when accidents occur

Neglected or incorrect procedures in hazardous situations may obstruct or prevent the rescue of people in danger. Difficult rescue conditions will impair the chances of helping and healing the injured.

- In principle: Switch off the machine.
- Gain an overview of the hazardous situation and identify the cause of the hazard.
- Safeguard the accident location.
- Rescue people from the danger zone.
- Withdraw from the danger zone and do not enter again.
- Alert rescue teams and, if possible, fetch help.
- Take immediate life-saving measures.

4.5 Safety routines

4.5.1 Stopping and securing the machine

**WARNING!****Crush hazard due to movement of the machine or machine parts!**

If the machine has not been shut down, the machine or machine parts may move unintentionally. As a result, people may be seriously injured or killed.

- Before leaving the machine: Shut down and secure the machine.

To park the machine securely:

- Park the machine on a stable and even surface.
- Switch off the drives and wait until coasting parts have come to a standstill.
- Switch off the tractor engine, remove the ignition key and take it with you.
- Use the parking brakes to secure the machine and tractor from rolling away.

4.5.2 Supporting lifted machine and machine parts securely

**WARNING!****Risk of injury due to movement of the machine or machine parts**

If the machine is not supported securely, the machine or machine parts may roll, fall or drop. As a result, people may be seriously injured or killed.

- Before working on or under raised components: Securely support machine or machine parts.

To securely support the machine or machine parts:

- Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".
- Before performing any work on or under raised machine parts, lower the machine parts or secure them mechanically with rigid safety supports (e.g. support stand, crane) or with a hydraulic shut-off device (e.g. stop cock) to prevent them from dropping.
- Never support the machine or machine parts with materials which can buckle.
- Never support the machine or machine parts with hollow blocks or bricks. Hollow blocks or bricks may break under continuous load.
- Never work under the machine or machine parts which are held up by a car jack.

Safety

4.5.3 Coupling the machine safely



WARNING!

Risk of injury while hitching the machine

While hitching the machine to the tractor, the machine or machine parts may move unintentionally. As a result, people may be seriously injured or killed.

- Follow the correct steps while hitching the machine.
- While hitching the machine to the tractor, never stand between the tractor and the machine.
- Depressurise the tractor hydraulics.
- Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".
- Connect the hydraulic hose lines only if the hydraulic systems of the tractor and machine are depressurised.
- Connect and secure the universal shaft.
- Connect the lighting cable.
- Connect the power cable.

4.5.4 Uncoupling the machine safely



WARNING!

Risk of injury while unhitching the machine

While unhitching the machine, the machine or machine parts may move unintentionally. As a result, people may be seriously injured or killed.

- Follow the correct steps below while unhitching the machine:
- Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".
- Lower the parking support.
- Depressurise the tractor hydraulics.
- Disconnect the hydraulic hose lines only if the hydraulic systems of the tractor and machine are depressurised.
- Disconnect the lighting cable from the tractor.
- Disconnect the universal shaft and place it on the holder provided.
- While unhitching the machine from the tractor, never stand between the tractor and the machine.

4.5.5 Preparing the machine for repair, maintenance and adjustment work

**WARNING!****Risk of injury during repair, maintenance and adjustment work on the machine.**

If the machine has not been shut down, the machine or machine parts may move unintentionally. As a result, people may be seriously injured or killed.

If the machine is not supported securely, the machine or machine parts may roll, fall or drop. As a result, people may be seriously injured or killed.

- Before starting repair, maintenance and adjustment work, perform the following steps:
- Shut down and safeguard the machine, see chapter Safety, "Shutting down and safeguarding the machine".
- The raised machine or machine parts must be securely supported, see chapter Safety "Securely supporting the raised machine and machine parts".

4.5.6 Starting the machine safely

**WARNING!****Risk of injury while starting up the machine**

If the machine has not been safely placed in operation, the machine or machine parts may move unintentionally. As a result, people may be seriously injured or killed.

- Make certain before starting up the machine that the following requirements are met:
- The hydraulic lines are connected.
- The universal shaft is connected and secured.
- The lighting system is connected.
- The safety chain is in place (not provided in all countries).
- All safety equipment is in place, is proper condition, and in the protective position.
- The PTO speed of 540 rpm is not exceeded.
- The universal shaft recommended by the manufacturer is being used.
- The hoses, cables and ropes are laid so that they do not scrape, come under tension or become jammed or come in contact with other parts (such as the tractor tyres).
- The machine parts of the tractor do not come in contact with the machine parts of the machine (especially when cornering).
- There are no persons in the machine danger zone.

Safety

4.6 Safety stickers on the machine

4.6.1 Position and meaning of the safety stickers on the machine

The rotary tedder is equipped with all safety devices (protective devices). However, it is not possible to eliminate all potential hazards on this machine as this would impair its full functional capability. Hazard warnings are attached to the machine in the relevant areas to warn against any dangers. The safety instructions are provided in the form of so-called warning pictograms. Important information on the position of these safety signs and what they mean is given below!

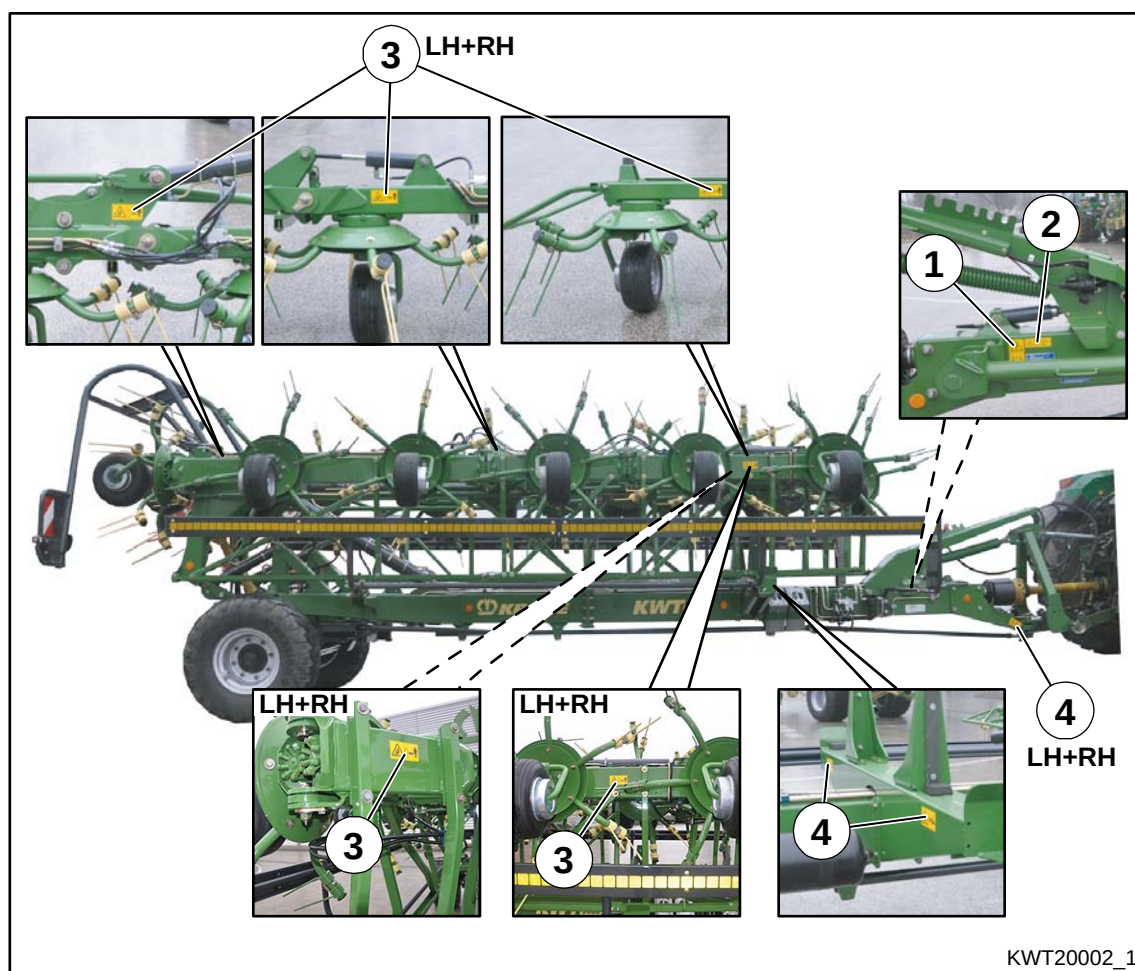
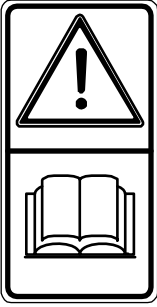
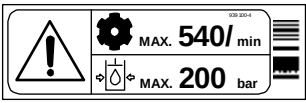


Fig. 1

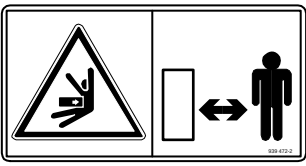
1) Order no. 939 471 1 (1x)

	Danger due to incorrect operation and lack of knowledge Incorrect operation and lack of knowledge of the machine as well as incorrect behaviour in hazardous situations is risking the life of the operator and third parties. Before starting up the machine, read and follow the operating instructions and safety instructions.
---	---

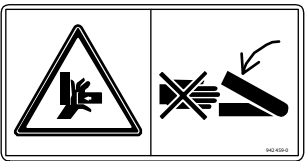
2) Order no. 939 100 4 (1x)

	Danger if the maximum permitted PTO speed or the maximum permitted operating pressure is exceeded. If the maximum permitted PTO speed is exceed, parts of the machine may be destroyed or forcibly ejected. If the maximum permitted operating pressure is exceeded, hydraulic parts may be damaged. As a result, people may be receive serious or life threatening injuries. - Observe the permitted PTO speed. - Observe the permitted operating pressure.
---	--

3) Order no. 939 472 2 (10x)

	Danger due to impact Risk of death due to swivelling movements of the machine. - Ensure that there is nobody in the swivel range of the machine. - Maintain distance from moving machine parts.
---	---

4) Order no. 942 459 0 (4x)

	Danger due to crushing or shearing Risk of injury due to crushing or shearing points on moving machine parts. While parts are moving, never reach into areas where there is a risk of being crushed.
---	---

Safety

4.6.2 Re-Ordering the Adhesive Safety and Information Labels



Note

Every adhesive safety and information label is assigned an order number and can be ordered directly from the manufacturer or from an authorized dealer (see Section "Contact").

4.6.3 Affixing the Adhesive Safety and Information Labels



Note - Affixing an adhesive label

Effect: Adhesion of the label

- The surface for affixing the adhesive label must be clean and free of dirt, oil and grease.
-

4.6.4 Contact

Maschinenfabrik Bernard Krone GmbH
Heinrich-Krone-Strasse 10
D-48480 Spelle (Germany)

Telephone: + 49 (0) 59 77/935-0 (Head Office)
Fax.: + 49 (0) 59 77/935-339 (Head Office)
Fax.: + 49 (0) 59 77/935-239 (Spare parts - domestic)
Fax.: + 49 (0) 59 77/935-359 (Spare parts - export)
Email: info.ldm@krone.de

4.7 Position of Warning Films on the Machine

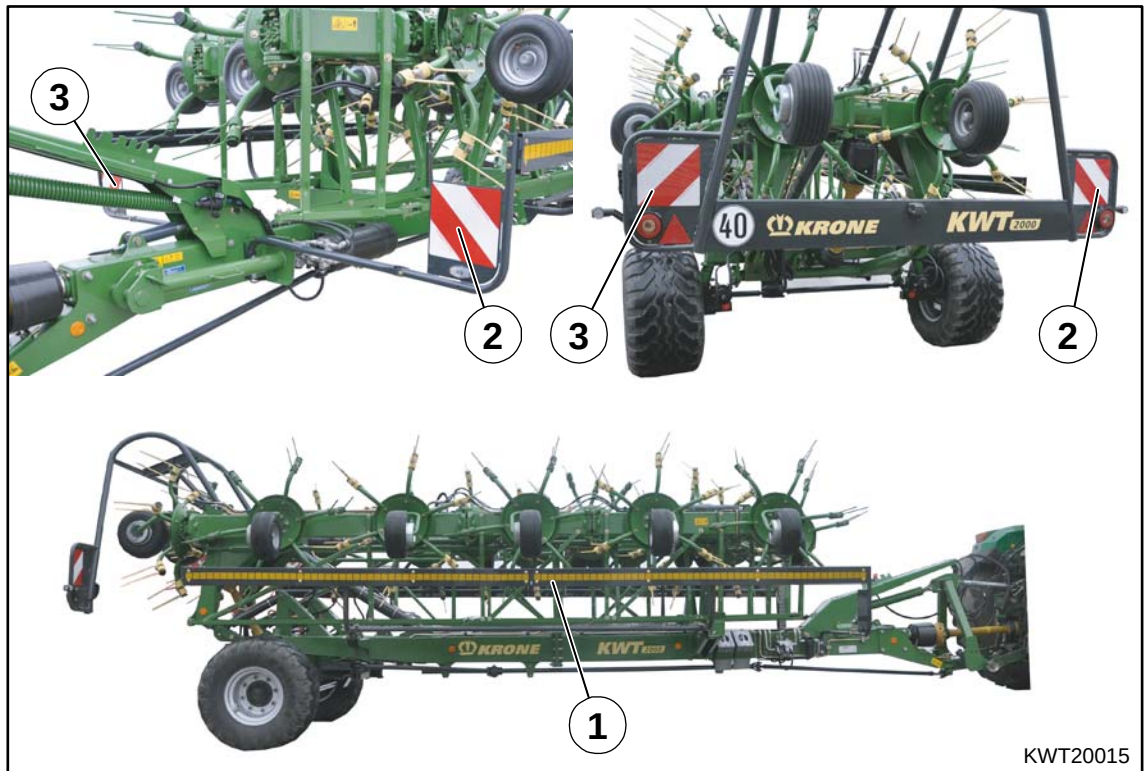
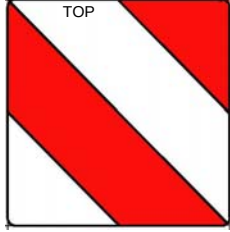
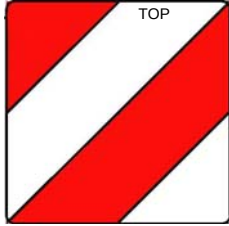


Fig. 2

1)  Order No. 27 009 988 0 (5.75 m) (2x)	2)  Order No. 27 006 982 0 (2x)
3)  Order No. 27 006 976 0 (2x)	

Machine Description

5 Machine Description

5.1 Machine overview

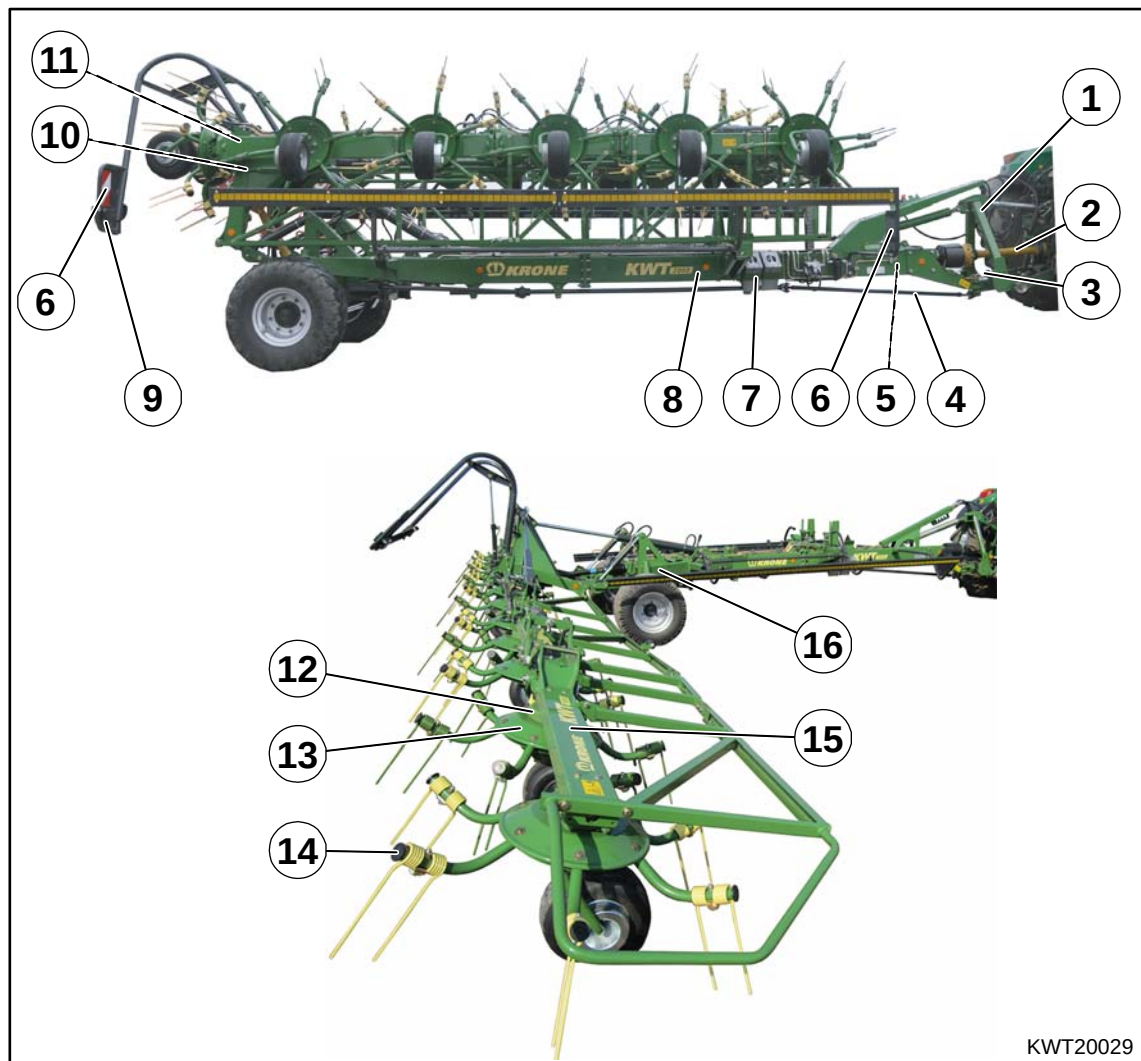


Fig. 3

1)	Three-point hitch	2)	Drive universal shaft	3)	Universal shaft support
4)	Trailing arm	5)	Parking support	6)	Warning panel
7)	Wheel chock	8)	Main frame	9)	Lighting
10)	Overload protection	11)	Main gearbox	12)	Rotor gearbox
13)	Rotor	14)	Tine arm	15)	Outtrigger arm
16)	Chassis				

5.2 Identification Plate

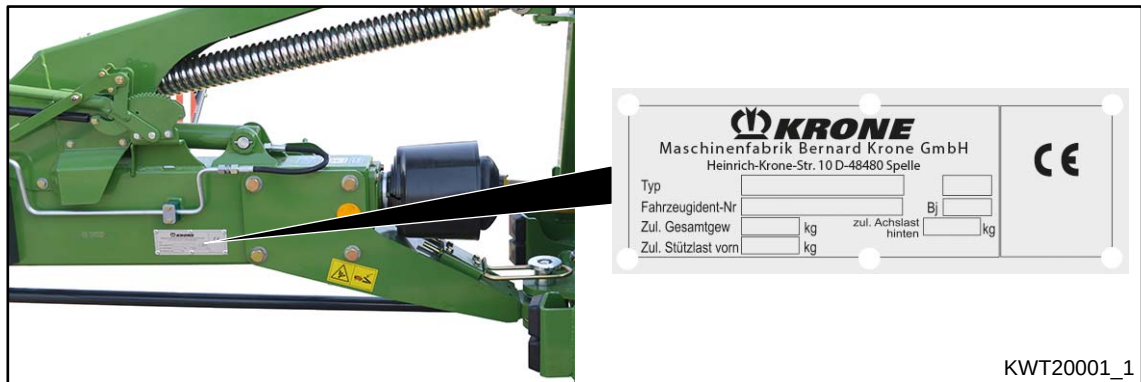


Fig. 4

The machine data are located on the type plate (1).

5.3 Information Required for Questions and Orders

Type	
Year of manufacture	
Vehicle ID number	



Note

The entire identification plate represents a legal document and should not be altered or rendered illegible!

When asking questions concerning the machine or ordering spare parts, be sure to provide type designation, vehicle ID number and the year of manufacture : To ensure that these data are always available, we recommend that you enter them in the fields above.



Note

Authentic KRONE spare parts and accessories authorised by the manufacturer help to ensure safety. The use of spare parts, accessories and other devices which are not manufactured, tested or approved by KRONE will result in the revoking of the liability for damages resulting thereof.

5.3.1 Contact

Maschinenfabrik Bernard Krone GmbH
Heinrich-Krone-Strasse 10
D-48480 Spelle (Germany)

Telephone: + 49 (0) 59 77/935-0 (Head Office)
Fax.: + 49 (0) 59 77/935-339 (Head Office)
Fax.: + 49 (0) 59 77/935-239 (Spare parts - domestic)
Fax.: + 49 (0) 59 77/935-359 (Spare parts - export)
Email: info.idm@krone.de

Machine Description

5.4 Overload protection



Note

The overload protection must not be changed. The guarantee becomes invalid if an overload protection is used other the protection provided!

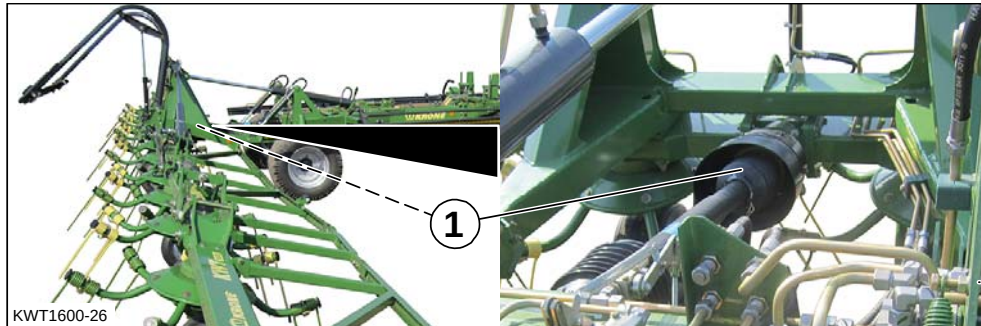


Fig. 5

1) Overload protection

The star ratchet clutch protects the tractor and the machine against load peaks. It may also engage at a lower speed or when moving in the rotors. If it does, the universal shaft turns but the rotors are stopped. Functioning of the machine is not adversely affected when the star ratchet clutch engages briefly.

- To prevent premature wear on the overload protection, turn off the PTO shaft if the star ratchet clutch engages continuously for an extended period.



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Technical Data of the Machine

6 Technical Data of the Machine

6.1 Technical data

All information, illustrations and technical data in these operating instructions correspond to the latest state at the time of publication. We reserve the right to make design changes at any time and without notification of reasons.

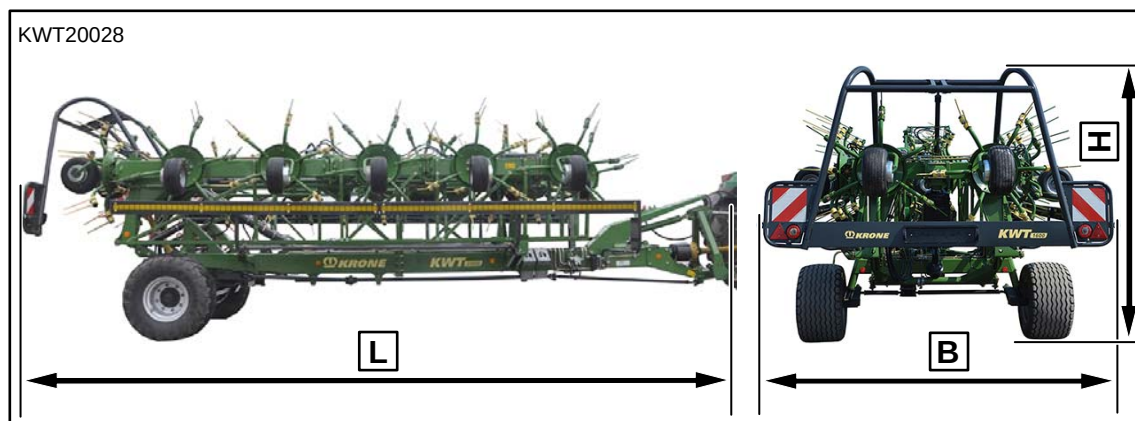


Fig. 6

Dimensions in transport position	mm
Height	2,800
Length	8,300
Width	2,980

Dimensions in working position	mm
Height	2,200
Length	9,700
Width	19,950

Weights	kg
Gross vehicle weight	4,950
Permissible axle load	3,600
Permissible supported load	1,500

Power	ha/h
Surface	18-20

Technical Data of the Machine

Minimum tractor requirements	
Power requirement	80/110 kW/HP
PTO speed	max. 540 rpm
Lighting voltage	12 V – 7-pin plug
Min. operating pressure of hydraulic system	180 bar
Max. operating pressure of hydraulic system	210 bar
Delivery capacity of hydraulic pump	min. 30 l/min
Removable hydraulic oil quantity	min. 10 l
Hydraulic connections	1 x double-action control unit 1 x single-action control unit
Max. permissible transport speed	40 km/h
Lower link	Height and sides can be defined

Equipment of the machine (series)	
Lower link hitch	Cat. II
Number of rotors	18
Number of tine arms per rotor	6
Universal shaft	Wide angle
Spreading angle adjustment	13° - 19°
Lighting	
Warning panels	
Mechanically adjustable working height	

Equipment of the machine (optional)	
Tine security system	
Anti-wrap guard sheets	
Bulge bag to limit border spreading, can be folded in hydraulically	
Hydraulic brake	
Compressed air brake	
Replacement wheel with support	16 x 6.50-8
Replacement wheel with support	18 x 8.50-8

Machine equipment (country-specific requirement)	
Safety chain	min. 89 kN (20.000 lbf)

Airborne Sound Emission	
Equivalent continuous pneumatic level recorder	less than 70 d B(A)

Technical Data of the Machine

6.2 Consumables



Environment! - Disposing of consumables and storage

Effect: Environmental damage

- Keep consumables in suitable containers according to statutory provisions.
- Dispose of used consumables according to statutory provisions.

Machine component	Filling quantity	Specification	Initial filling ex works
Rotor gearbox	0.2 l	Fluid gear grease GFO 35	RENOLIT SO – GFO 35
Main gearbox	1.0 l	SAE 90	Violin ML 4 SAE 90
Grease nipple	as required	Mobilgrease XHP 222	RENOLIT CX-TOM 15

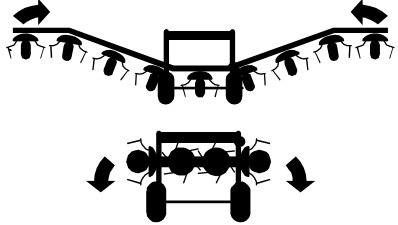
Biological consumables on request.

6.3 Tyres

Tyres	Tyre designation	Tyre pressure [bar]
Chassis	500/50-17/10 PR (series) 550/45 22.5 (optional)	3.0
Running wheels single axle	16 x 6.50-8	1.7
Running wheels single axle inside	18 x 8.50-8	2.0

7 Control and Display Elements

The following table shows the functions on the machine

Control	Function
Crank handle	Increase or reduce working height of rotor tines.
Double-action control unit red 1+/- 	From headland position to transport position - Pressure (red 1+): Raises the machine from headland position to transport position. From transport position to headland position - Pressure (red 1-): Lowers the machine from transport position to headland position.
Single-action control unit blue 2+ 	From working position to headland position - Pressure (blue 2+): Raises the machine from working position to headland position. From headland position to working position - Float position (blue 2+): Lowers the machine from headland position to working position.

Commissioning

8 Commissioning



WARNING!

Risk of accident or damage to the machine due to an incorrect initial operation!

Only an authorized service technician is permitted to carry out the initial operation.



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".



WARNING!

Risk of injury due to the unsecured machine rolling away!

If the machine is not secured against rolling away when it has been switched off, there is a risk of people being injured by the machine rolling away in an uncontrolled manner.

- Secure the machine against rolling away with wheel chocks.

8.1 First installation

The document "Assembly Instructions" describes how to install the device for the first time.

8.2 Preparations on the rotary tedder

8.2.1 Overload protection

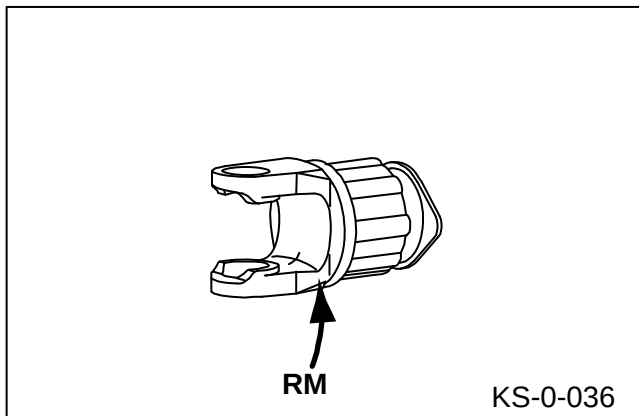


Fig. 7



Note

Compare the applicable RM torque value on the overload coupling with the value specified in the following table. If these values do not match, please contact your Krone dealer.

Type	Torque (RM)
KWT 2000	1800 Nm

8.2.2 Removing the preserving wax from the tines

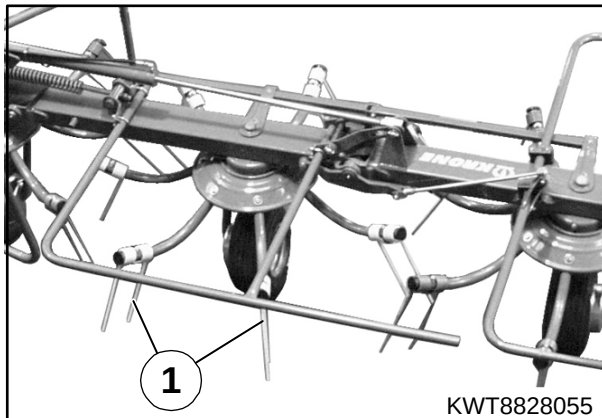


Fig. 8



Note

The preserving wax on the tines leads to a clumping of the cut crop stalks on the tines and results therefore in disturbances of the process flow.

Removing the preserving wax:

- Remove the preserving wax with a steam cleaner from all tines (1) before initial operation.

Commissioning

8.3 Connect the machine to the tractor

- See section "Start-up".

8.4 PTO shaft

8.4.1 Length adjustment



Caution! - Changing the tractor

Effect: Damage to the machine

When using the machine for the first time and whenever changing the tractor Check PTO shaft for the correct length. If the length of the PTO shaft does not match the tractor, always observe the chapter entitled "Adjusting the length of the PTO shaft".



Caution! - Material damage

- Do not move the machine until the universal shaft length has been adapted!

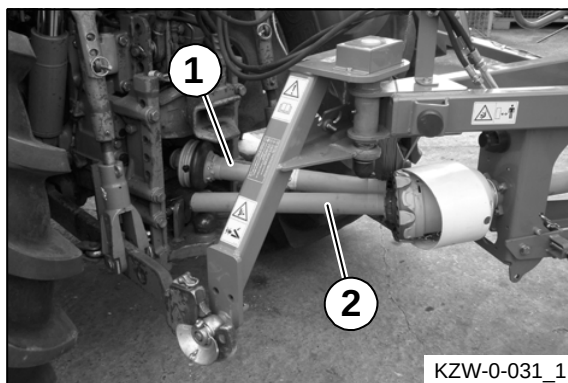


Fig. 9



Note

The universal shaft can reach the shortest operating position either with tightest turning or when lifting the machine.

The length of the universal shaft (1) must be adjusted:

- Disassemble the universal shaft
- Install each half (1) and (2) on the tractor and machine side respectively
- Position machine in the shortest universal shaft position setting. To do this, turn the headstock all the way (3) and adjust the lower suspension arms of the tractor in a way that both universal shaft connections are set on the same height
- Shorten special section tubes and guard tubes to an extent that the universal shaft can move freely in the shortest operating position
- For additional operating instructions refer to the operating instructions of the universal shaft manufacturer



Note

When mounting the universal shaft, make sure that the wide-angle joint is mounted on machine side.

8.5 Regulating direction of travel

The steering linkage has been pre-adjusted in the factory.

If a machine is hinged, make certain that the machine is driving straight ahead. On a level street, the machine must run in the centre behind the tractor.

The steering linkage must be readjusted if the machine runs diagonally to the tractor.

Tasks on the steering may only be performed by service technicians (dealers).

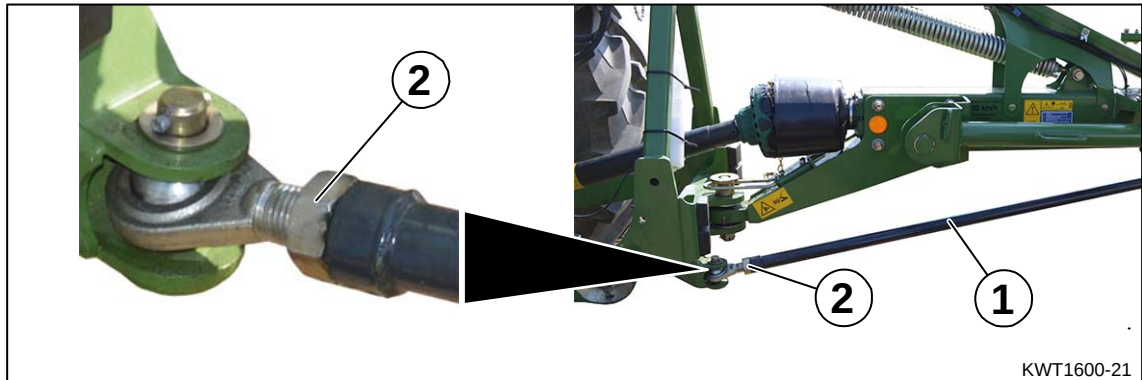


Fig. 10

This can be regulated by adjusting the trailing arm (1) to allow the machine to run centred behind the tractor on a level highway.

- Release the counter nut (2).
- Adjust the trailing arm (1).
 - If the machine is running too far to the right, shorten the trailing arm.
 - If the machine is running too far to the left, lengthen the trailing arm.
- Tighten the counter nut (2).

Start-up

9

Start-up



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

Check prior to start-up to ensure that:

- The length of the universal shaft is adjusted, see section "Universal shaft" in Start-up.
- Driving straight ahead with the machine attached is correct adjusted, see section "Adjusting the direction of travel" in Start-up.

9.1 Preparations on tractor

9.1.1 Adjusting the lower suspension arms

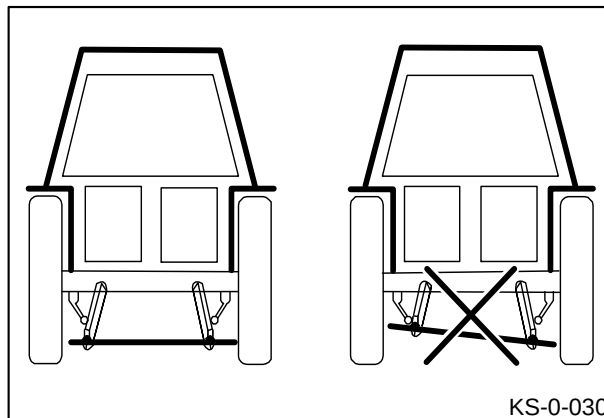


Fig. 11

The machine is fitted with a Cat. II centering pivot for the three-point hydraulic system.



Note

The tractor lower suspension arms must always be installed so that the lifting points of the lower suspension arms are all at the same distance from the ground. In order to prevent swivelling of the machine during transport or operation, the lower suspension arms must be secured by limiting chains or bars.



CAUTION! – Collision with the trailer coupling

Effect: Damage to the tractor or machine

Depending on the type of tractor, the top link of the tractor and/or the universal shaft of the machine could collide with the trailer coupling.

- To prevent damage, it may be necessary to detach the trailer coupling. For further information refer to the tractor manufacturer's operating instructions.

Start-up

9.2 Connect the machine to the tractor



CAUTION! – Collision with the trailer coupling

Effect: Damage to the tractor or machine

Depending on the type of tractor, the top link of the tractor and/or the universal shaft of the machine could collide with the trailer coupling.

- To prevent damage, it may be necessary to detach the trailer coupling. For further information refer to the tractor manufacturer's operating instructions.



Note

In the following description, one assumes that the machine (after final assembly) is in the transport position.



Fig. 12

- Connect three-point hitch to tractor.
- Swing up parking support (1) and secure it.

9.3 Height of tractor lower suspension arms

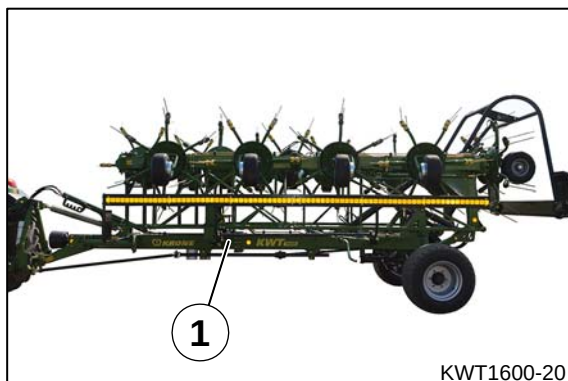


Fig. 13

Make the basic setting on a level surface.

- Adjust the lower link of the tractor so that the main frame (1) is positioned horizontal to the ground.
- Fix the lower link in place at that height.

9.4 Connecting the hydraulic lines



WARNING! - If the hydraulic hoses are interchanged when connecting them to the hydraulic system of the tractor, the functions will be interchanged as well.

Effect: Injuries, serious damage to the machine

- Identify the hydraulic connections.
- Always ensure correct connection between the machine and the tractor.
- When connecting and removing the hydraulic hoses to and from the tractor hydraulics take care that the hydraulics are pressureless both on the tractor side and the machine side.



Caution! - Soiling of the hydraulic system

Effect: Damages to the machine

- When connecting the quick couplings, ensure that these are clean and dry.
- Note chafing areas or points of contact.



Note

Connect hydraulic hoses correctly.

- The hydraulic hoses are marked with numbers and coloured dust caps.
-
- Switch the control units on the tractor to float position.
 - Depressurise the hydraulic system on the tractor and the machine.
 - Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".
-
- Connect the hydraulic lines (red 1+ / red 1-) of the machine to a double-action control unit of the tractor.
 - Connect the hydraulic coupling (blue 2+) on the machine to a single-action control unit on the tractor.

Start-up

9.5 Lighting connection

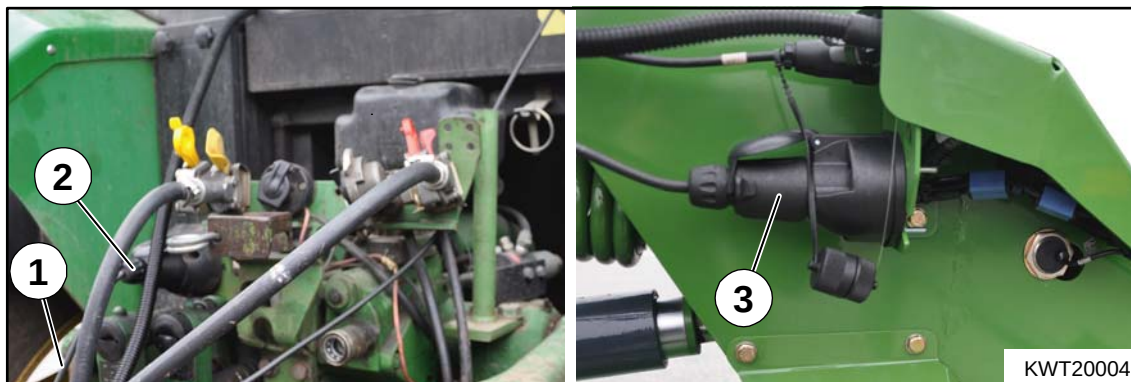


Fig. 14

The lighting system is connected via the 7-pin connection cable (1).

To do this:

- Insert the 7-pin plug of the connection cable (1) into the relevant socket (2) of the tractor.
- Insert the 7-pin connection cable plug (1) into the appropriate socket (3) of the machine.
- Position the cable so that it will not come in contact with the wheels.



Note

If there is no connection present on the tractor, – request a socket with connection cables from the spare parts service (Part No.: 0302-068-0)



Note

Before inserting the plugs, make certain the plugs and sockets are clean and dry. Dirt and moisture may result in short circuits!

9.6**Install the PTO shaft****Danger! - Rotating PTO shaft**

Effect: Danger to life or serious injuries

- Install or detach the PTO shaft only with the engine switched off and the ignition key removed.
- Secure the tractor against rolling.
- Make sure that the PTO shaft is coupled properly (the lock of the PTO shaft must have snapped in).
- Make sure that the protective devices are attached properly.
- Never use a PTO shaft, the protective devices of which have not been attached.
- Replace damaged protective devices immediately
- Attach the safety chain of the PTO shaft so that the guard tube does not rotate simultaneously with the PTO shaft.

**DANGER! - Observe the drive speed of 540 rpm**

Effect: Danger to life or serious injuries

- This machine is driven at maximum PTO speed of 540 rpm.

**Note**

When mounting the universal shaft, make sure that the wide-angle joint is mounted on machine side.

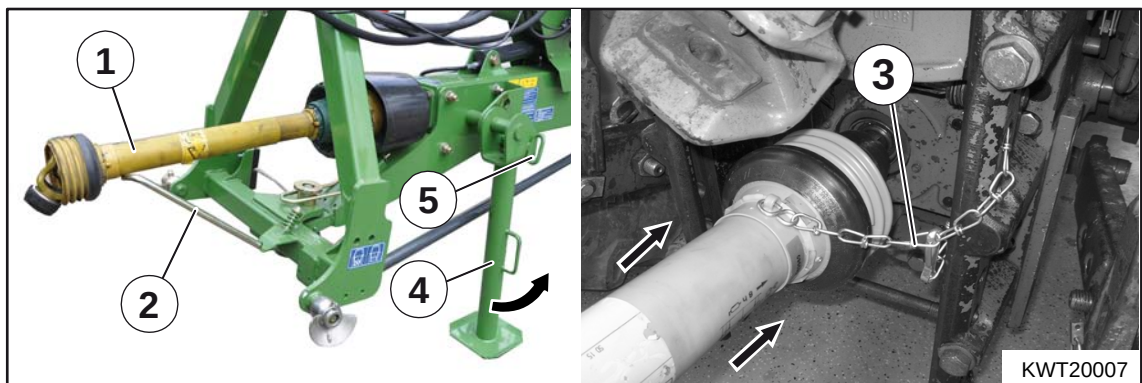


Fig. 15

- Switch off the engine and remove the ignition key.
- Mount universal shaft (1) on machine side (wide-angle on machine side).
- Swivel universal shaft bracket (2) down.
- Then slide the universal shaft onto the PTO shaft of the tractor. In this process make sure that the slider pin engages securely.
- Secure the universal shaft guards with supporting chain (3) against turning.

Lifting the Machine

- Lift the machine slightly.
- Rotate the parking support (4) back 90°. Lock it in that position with the tension bar (5).

Start-up

9.7 Using the safety chain



WARNING!

When using a wrongly dimensioned safety chain, the safety chain may tear if the machine loosens unintentionally. This can result in serious accidents.

- Always use a safety chain with a minimum tensile strength of 89 kN (20.000 lbf).



WARNING!

If the safety chain is layed so that it is too tight or too loose, then it may tear. As a result, serious injuries or damage to tractor and machine may be caused.

- Position the safety chain so that it does not tension when cornering. Also make sure when laying it that it does not touch the tractor wheels or other parts of tractor or machine.

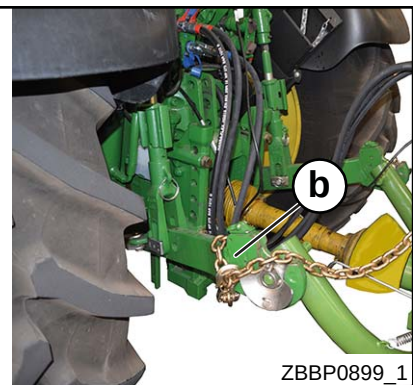
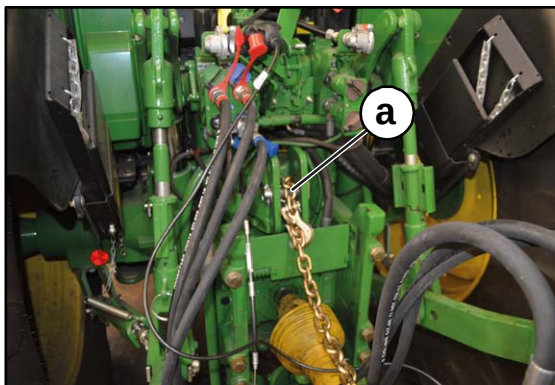


Note

Using the safety chain

Attachment of the safety chain is not stipulated in all countries.

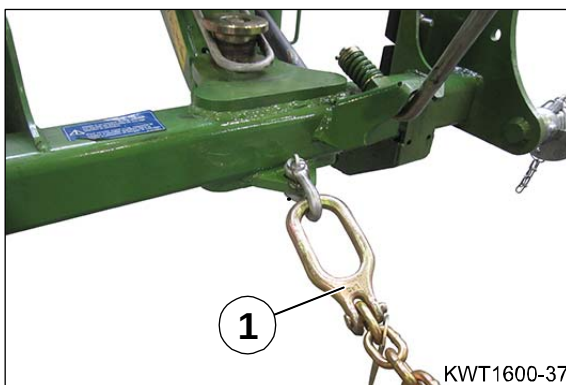
- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".



ZBBP0899_1

Fig. 16

- Install safety chain (1) on an eligible position (for example: a or b) on the tractor.



KWT1600-37

Fig. 17

- Install the safety chain (1) on the machine.

9.8
Compressed Air Connections for the Compressed Air Brake

WARNING!

Danger to life due to failure of the brake system or unexpected movement of the machine.

Pneumatic lines that become detached or worn through pneumatic lines will cause the brake system to fail. Thus there is a risk of serious injuries or death.

- Lay the pneumatic lines so that they do not rub or tension. Furthermore they should not be jammed or touch other parts (e.g. tractor tyres).

The machine may move unintentionally if the order of the pneumatic lines is interchanged when connecting them. Thus there is a risk of serious injuries or death.

- Connect the yellow coupling head first.
- Then connect the red coupling head.
- After having connected the quick couplings, check that they fit perfectly.

The machine features a dual-line compressed-air braking system.

- The coupling heads are connected to the machine for attachment of the reservoir (red) and brake line (yellow) of the tractor.



Figure 18

Insert the coloured compressed air hose couplings (1) into the correspondingly coloured couplings on the tractor.


Note

Always connect the yellow coupling head first, then the red one. Detach the couplings in reverse order.

9.9
Hydraulic brake (Export)

- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

A hydraulic brake is provided for certain export versions. In this version, the corresponding hydraulic hose is connected with the control valve on the tractor side. The brake is activated by actuating the tractor brake pedal.

Driving and Transport

10 Driving and Transport



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".



WARNING!

There is a risk of accidents if the control valves on the tractor are not locked.

If the control valves are not locked, machine components may be activated unintentionally. This can result in serious accidents.

- To prevent functions being triggered accidentally, the control valves on the tractor must be switched to neutral and locked during road transport journeys.



WARNING!

Danger when cornering with a machine hitched

When cornering, the hitched machine swings out further than the tractor. This can lead to accidents.

- Take the greater swivel range into account.
- When turning, take account of people, oncoming traffic and obstacles.

10.1 Preparations for road travel



Fig. 19

Before road travel, make certain

- the machine is fully and correctly hitched, refer to chapter “Start-up”.
- the PTO shaft is switched off and the rotors have come to a standstill.
- the machine is in transport position and the outrigger arms rest on the buffers, refer to chapter Operation “Bringing the Machine into Transport Position”.
- the control units on the tractor are in neutral position and locked.
- the hydraulic stop cock (1) is closed.
- the transport width is reduced, refer to chapter Driving and Transport “Reducing the Transport Width”.
- the lighting system is working.
- the compressed air brake is working.
- the hydraulic brake (for export) is working (optional).
- the parking brake is released.

Driving and Transport

10.2 Reducing transport width

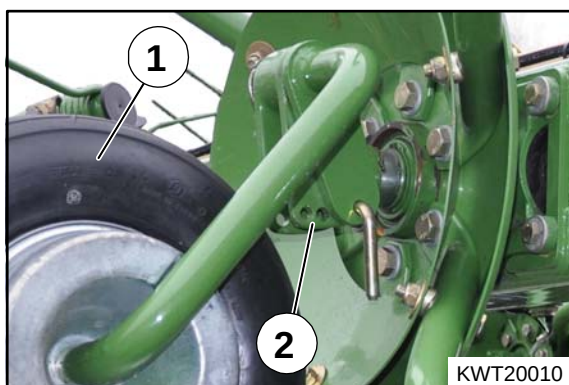


Fig. 20

- Disconnect the outer running wheels (1) under the rotors in the upper bore hole of the axle support (2) by using bolt and cotter pin (flat spreading angle).

10.3 Travelling on an incline

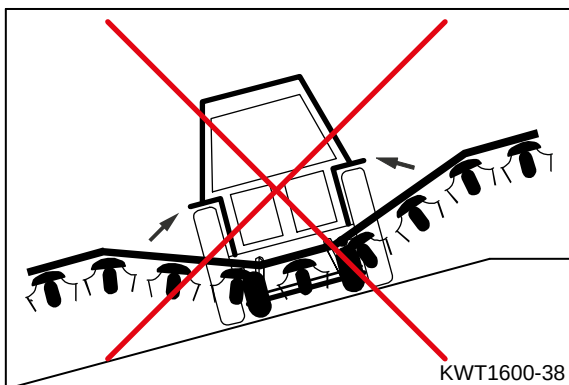


Fig. 21

- Never move the outrigger arms from working position to transport position or from transport position to working position as long as the machine is positioned transversely to incline.

10.4

Switching off the machine



WARNING!

Risk of injury due to the unsecured machine rolling away!

If the machine is not secured against rolling away when it has been switched off, there is a risk of people being injured by the machine rolling away in an uncontrolled manner.

- Secure the machine against rolling away with wheel chocks.

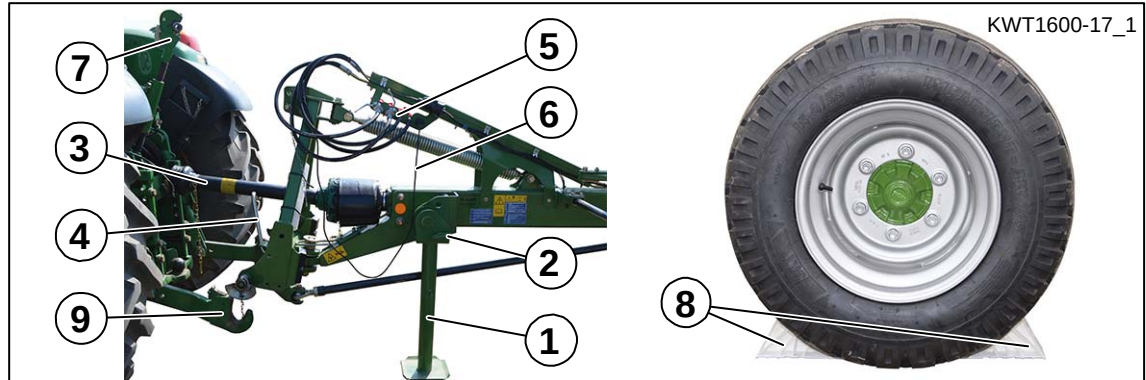


Fig. 22

- Choose a level, dry and adequately stable surface.
- Move single-action control unit to float position.
- Turn off the tractor and secure it against the possibility of rolling back.
- Use parking brake and wheel chocks (8) to secure the machine against rolling away.
- Raise lower links (9) until the parking support can be swivelled down.
- To swivel the parking support (1) down, pull the bolt (2), swivel parking support down until the bolt locks.
- Lower the lower links until the parking support is on the ground.
- Close hydraulic stop cocks, refer to chapter Operation "From Headland Position to Transport Position".
- Disconnect hydraulic hoses (5) and insert them in the supports.
- Disconnect universal shaft (3) and lay it down on the support (4).
- Loosen lighting cable (6) between tractor and machine and insert it in the support provided for this purpose.
- To disconnect the top link (7), pull the linch pin, pull out the bolt and swing up the top link.
- Lower the steerable pinions of the tractor until the tractor can be driven away safely.

Driving and Transport

10.4.1 Parking Brake

(Optional)



WARNING!

Unexpected movement of the machine!

The machine may move unintentionally if the parking brake is not activated when parking the machine. Thus there is a risk of serious injuries or death.

- Always apply the parking brake when the tractor is left or the machine is switched off.

The parking brake is located at front on the main frame of the machine, on the right in the direction of travel.

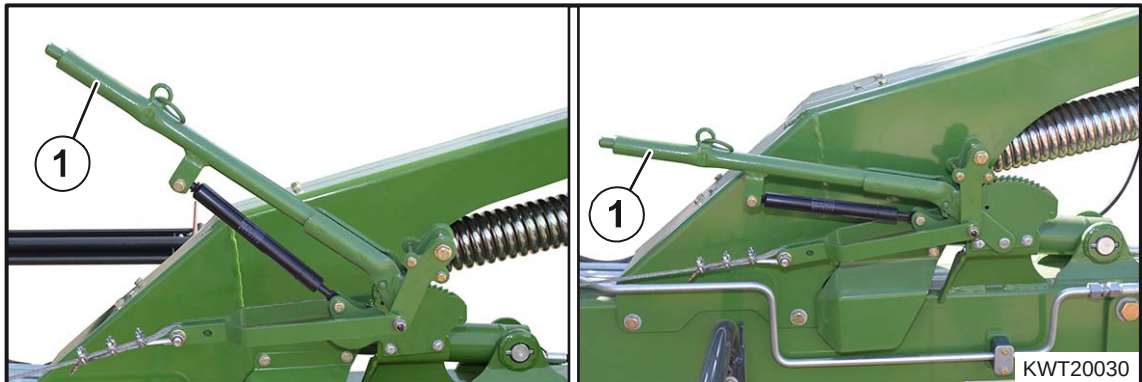


Fig. 23

a) Parking brake applied

b) Parking brake released

The parking brake is used to secure the machine from rolling away accidentally, especially when the machine is disconnected from the tractor.

To apply the parking brake:

- Press button on the end of the lever and pull lever (1) up as far as it will go.

To release the parking brake:

- Press the button on the end of the lever and push down lever (1) as far as it will go.



Note

To prevent the machine from rolling away, use the wheel chocks in addition to the parking brake.

11 Operation**WARNING!**

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".

**WARNING!**

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

**CAUTION! - Do not drive in reverse when using the machine for work.**

Effect: Damage to the machine.

The machine is designed to travel forwards. Never reverse while the machine is in switched on and in working position. Lift rotors first.

**DANGER!**

Risk of injury caused by rotating machine parts!

Effect: Danger to life, serious injuries and material damage.

- Fulfil the following conditions before moving the machine from transport position to headland position and vice versa:
 - The PTO shaft of the tractor is switched off.
 - All machine parts are at standstill.

Operation

11.1 Moving the machine into the working position

- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

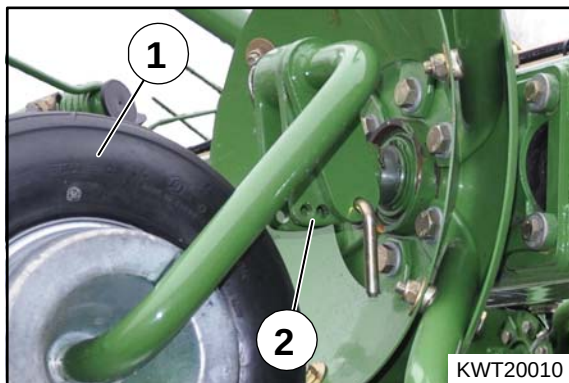


Fig. 24

- Disconnect the outer running wheels (1) under the rotors in the axle support (2) by using bolt and cotter pin so that they are in the same position as the other running wheels.

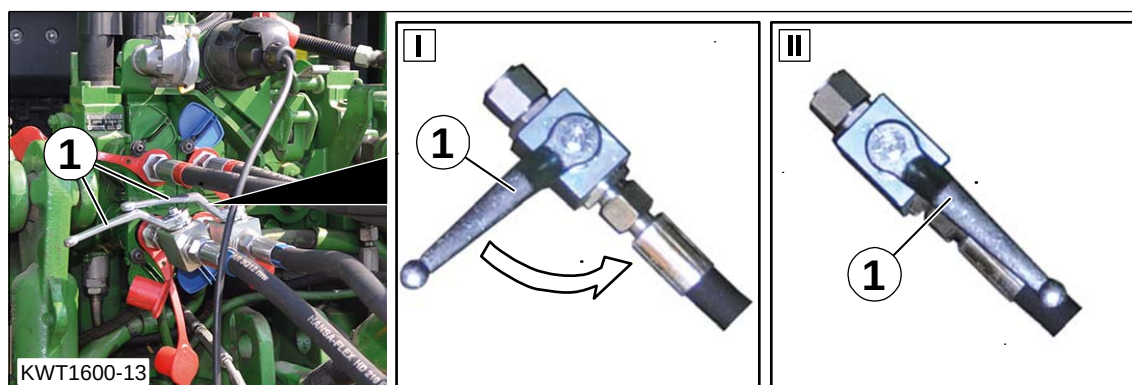


Fig. 25

I) closed

II) open

- Open the hydraulic stop cocks (1) (position II).



Fig. 26

- I) Working position II) Headland position III) Transport position

From transport position to headland position

- Actuate the double-action control unit (red 1-) to move the machine to headland position.

From headland position to working position

- Straighten the tractor/machine combination.
- Set single-action control unit (bleu 2+) to float position to move machine into working position.

Operation

11.2 Using the Machine for Work



DANGER! – Movement of machine or machine parts

Danger to life or serious injuries.

- When lifting and lowering, make sure that there is no one between tractor and machine. High risk of injury!
- Make sure when switching on the PTO shaft that there is no one in the danger zone of the machine. Risk of accident!
- During operation or when travelling on public roads, make certain the safety devices are properly in place! Mount lighting and check function.
- Operating staff must not leave the tractor when it is in operation!
- When making adjustments: Turn off drive, switch off engine, remove the ignition key and carry it with you, secure tractor against rolling away.



Danger! - Observe drive speed

Effect: Danger to life or serious injuries

- This machine is driven at a maximum PTO speed of 540 rpm.

Wide spreading (tedding)

If possible, take the swathes in between the rotors.

If the forage is heavy drive with higher speed and not so high travelling speed (4 - 6 km/h) (steeper spreading angle).

Raking

The dryer the forage the smaller the P.T.O. speed to be chosen in order to avoid damages to the forage.

Travelling speed (6 to 8 km/h) must be adapted to the condition of the forage.

With wet forage choose the speed and the travelling speed like the one when spreading (flat spreading angle).



Note

These data are standards and must be adapted to the circumstances in practice.

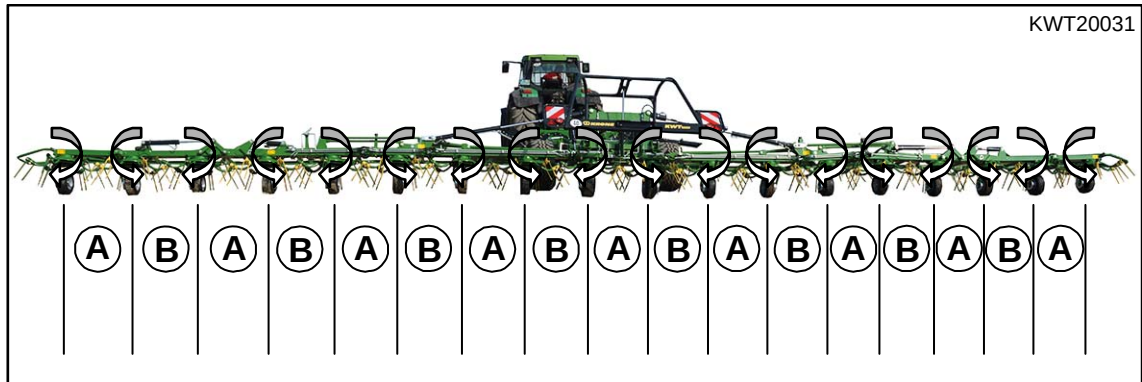


Fig. 27

Target setting for quick drying

An even spread pattern is the target of such a work process with the tedder. In the process the forage is supposed to lie in an even carpet behind the tedder.

In case swaths are forming during raking the speed should be at:

- Forming of swaths between tines turning to the back (A): increase the speed
- Forming of swaths between tines turning to the front (B): decrease the speed

**Note**

With occurring pile formation during raking the travelling speed must be reduced.

Operation

11.3 Moving the machine into the transport position



Fig. 28

- I) Working position II) Headland position III) Transport position

From working position to headland position

- Straighten the tractor/machine combination.
- Actuate the single-action control unit (blue 2+) to move the machine to headland position.

From headland position to transport position

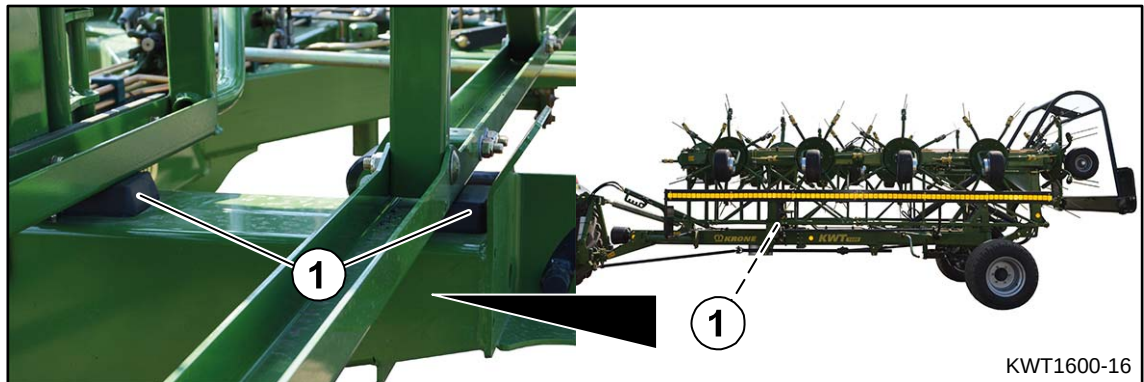


Fig. 29

- Actuate the double-action control unit (red 1-) to move the machine to transport position until the outrigger arms rest against the buffers (1) on both machine sides.

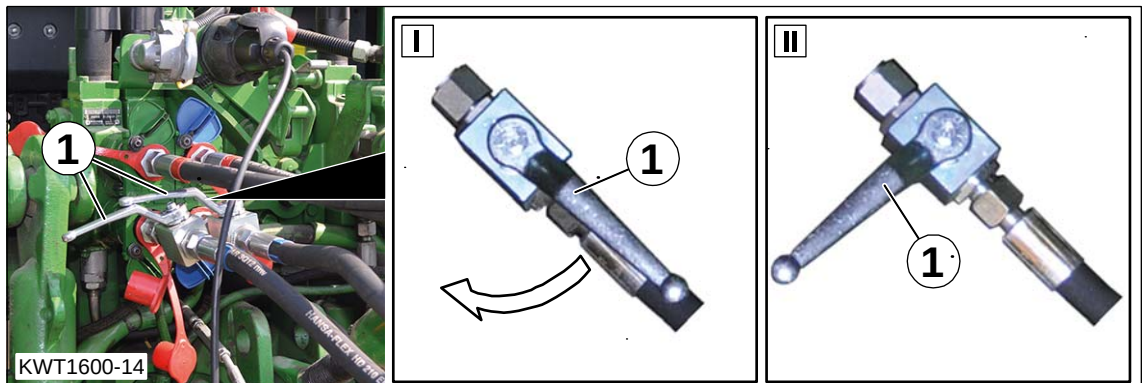


Fig. 30

I) open

II) closed

- Close the stop cocks (1) (position II).

Settings

12 Settings



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".



WARNING! - Working in the area of the rotor tines!

Injuries to eyes due to rotor tines.

- Wear protective goggles when working in the vicinity of the rotor tines.

12.1 Spreading angle setting of the rotors



Note

- The setting of the spreading angle of the rotor tines must be adapted to the conditions of the surface and the material
- It takes place on the running wheels of the machine

Prerequisite:

- The machine is in transport position and the stop cocks are closed, refer to chapter Operation "Moving the Machine to Transport Position".
- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

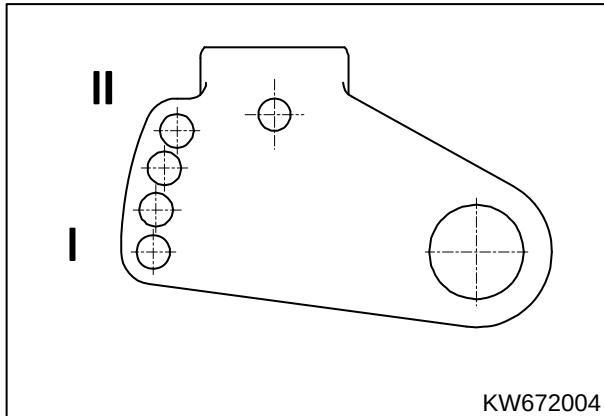


Fig. 31

Taken as a basis for the spreading angle setting:

Flattest spreading angle II:

- big scattering width
- short crop
- wide lying crop
- forage less than 40% moisture content

Steepest spreading angle I:

- high discharge distance
- long crop
- better spreading effect with swaths
- wilted silage
- forage more than 40% moisture content

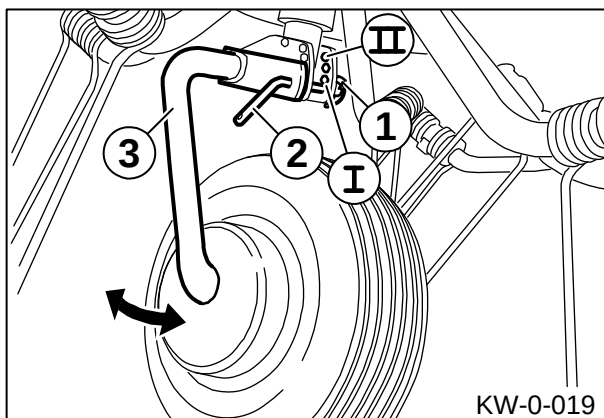


Fig. 32

Setting:

1. Remove cotter pin (1) and pull out bolt (2)
2. Bring wheel support (3) into chosen position between position I and position II
3. Push bolt in again and secure it with the cotter pin

Bolt in direction I = steep spreading angle
Bolt in direction II = flat spreading angle

Settings

12.2 Setting the Working Height

Prerequisite:

- The machine is in the working position, see "Moving the machine into the working position" in the Operation chapter.
- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

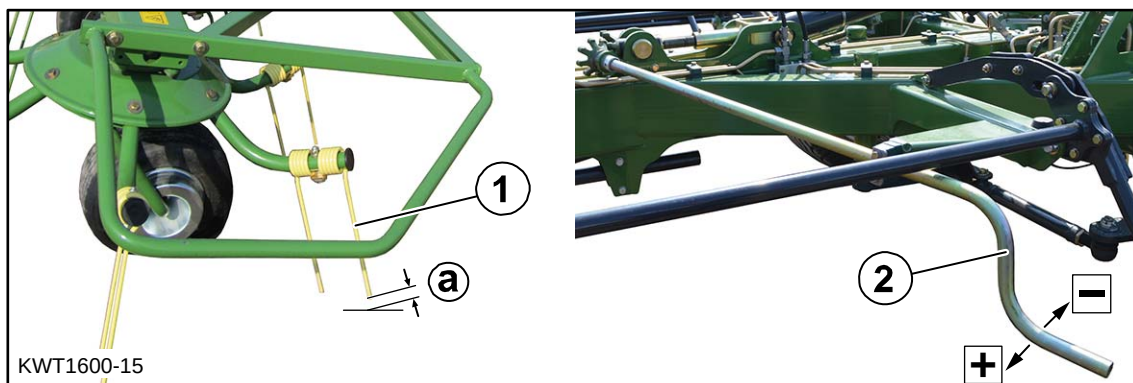


Fig. 33

- Switch off the tractor and secure it against the possibility of rolling back.
- To reduce the distance (dimension a) from the rotor tines (1) to the ground, turn the crank (2) clockwise (+).
- To increase the distance (dimension a) from the rotor tines (1) to the ground, turn the crank (2) anticlockwise (-).

12.3 Setting of tines**Prerequisite:**

- The machine is in the working position, see "Moving the machine into the working position" in the Operation chapter.
- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

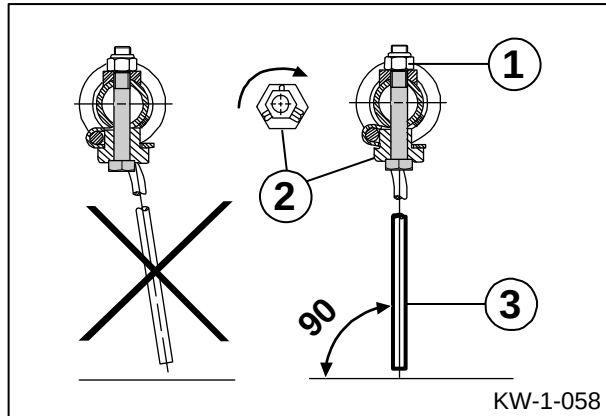


Fig. 34

The tines (3) must be aligned vertically to the surface. The setting of the tines can be changed by turning the eccentrics.

For setting:

- Unscrew fastening screw (1)
- Turn eccentrics (2) one level further
- Tighten the fastening screw to 95 Nm

Maintenance

13 Maintenance



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

13.1 Spare Parts



Warning! - Using non-approved spare parts.

Effect: Danger to life, serious injuries or loss of warranty claims as well as exclusion of liability

- Use only authentic KRONE spare parts and accessories authorised by the manufacturer. The use of spare parts, accessories or additional equipment not manufactured, tested or approved by KRONE will exclude any liability for consequential damage.



Note

To ensure problem-free operation of the machine and to reduce wear and tear, specific maintenance and upkeep intervals must be observed. These include cleaning, greasing, lubricating and oiling parts and components.

13.2 Maintenance table

Maintenance work	Maintenance interval					
	Once after 10 hours	Before the beginning of the season	Every 10 hours but at least 1x daily	Once after 50 hours	Every 50 hours	Every 1000 ha
Rotor gearbox						
Maintenance-free (permanently lubricated with grease)						
Main gearbox						
Oil level check		X				
Oil change						X
Tyres						
Check tyres for cuts and breaks visually		X				
Check tyre pressure	X	X			X	
Wheel nuts	X				X	
Tightening screws / nuts						
All screws	X	X			X	
Screws on the tines	X	X			X	

Maintenance

13.3 Deviating Tightening Torques M_A (Nm)



Note

For all other screw connections on the machine, refer to chapter Maintenance “Tightening Torques”.

Screws/nuts	M_A (Nm)
Tines	95

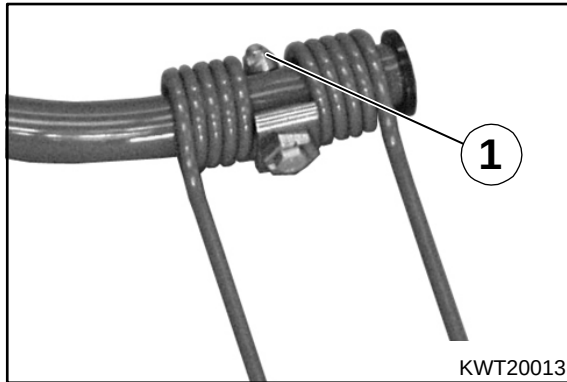


Fig. 35

13.4 Tightening torques**13.4.1 Metric Thread Screws with Control Thread****NOTICE**

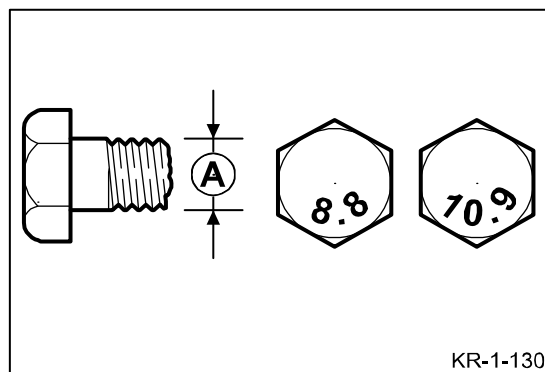
The table does not apply to countersunk screws with hexagonal socket in case the countersunk screw is tightened via hexagonal socket.

Tightening torque in Nm (unless otherwise stated)

A	Stability class			
	5.6	8.8	10.9	12.9
	Tightening torque (Nm)			
M4		3.0	4.4	5.1
M5		5.9	8.7	10
M6		10	15	18
M8		25	36	43
M10	29	49	72	84
M12	42	85	125	145
M14		135	200	235
M16		210	310	365
M20		425	610	710
M22		571	832	972
M24		730	1050	1220
M27		1100	1550	1800
M30		1450	2100	2450

A = thread size

(stability class can be seen on screw head)



Maintenance

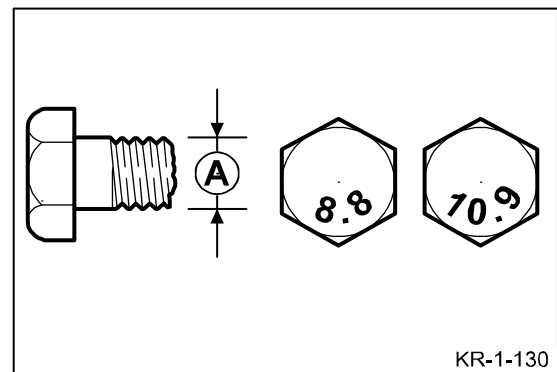
13.4.2 Metric Thread Screws with Fine Thread

Tightening torque in Nm (unless otherwise stated)

A	Stability class			
	5.6	8.8	10.9	12.9
	Tightening torque (Nm)			
M12 x 1.5:		88	130	152
M14 x 1.5		145	213	249
M16 x 1.5		222	327	382
M18 x 1.5		368	525	614
M20 x 1.5		465	662	775
M24 x 2		787	1121	1312
M27 x 2		1148	1635	1914
M30 x 1.5		800	2100	2650

A = thread size

(stability class can be seen on screw head)



13.4.3 Metric Thread Screws with Countersunk Head and Hexagonal Socket



NOTICE

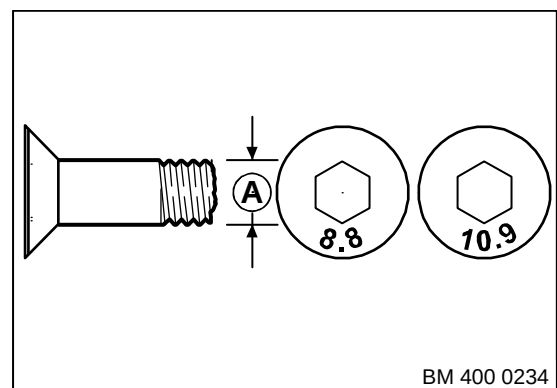
The table applies only to countersunk screws with hexagonal socket and metric thread which are tightened via hexagonal socket.

Tightening torque in Nm (unless otherwise stated)

A	Stability class			
	5.6	8.8	10.9	12.9
	Tightening torque (Nm)			
M4		2.5	3.5	4.1
M5		4.7	7	8
M6		8	12	15
M8		20	29	35
M10	23	39	58	67
M12	34	68	100	116
M14		108	160	188
M16		168	248	292
M20		340	488	568

A = thread size

(stability class can be seen on screw head)



13.5 Tyres**Warning! - Tyre fitting incorrect**

Effect: Injuries or damage to the machine

- Fitting tyres requires sufficient knowledge and the availability of proper tools!
- If tyres are not correctly fitted, it could explode when pumped up. This can cause serious injury. If you do not have sufficient experience of fitting tyres, have tyres fitted by the KRONE dealer or a qualified tyre specialist.
- When fitting tyres on the wheel rims, the maximum pressure given by the tyre manufacturer must not be exceeded. The tyre or even the wheel rim could explode and/or burst.
- If the tyre heels do not fit properly when the maximum permitted pressure is reached, let out the air, align tyres, lubricate the tyre heels and pump up the tyre again.
- Detailed information about how to fit tyres onto agricultural machinery can be obtained from the tyre manufacturers.

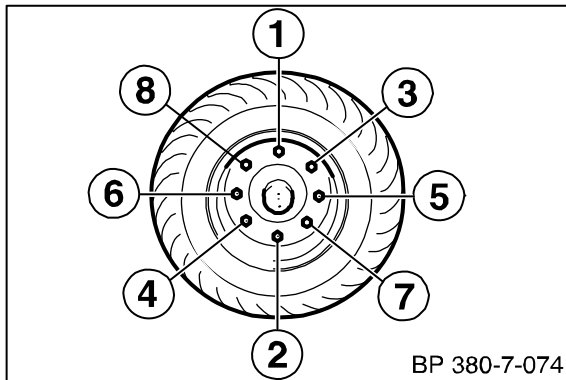
13.5.1 Checking and maintaining tyres

Fig. 36

Thread	Width across flats mm	Number of bolts per hub Units	max. tightening torque	
			black	galvanised
M 20 x 1.5	30	8	380 Nm	420 Nm

Maintenance – lubrication chart

14 Maintenance – lubrication chart



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

Prerequisite:

- The machine is in the working position, see "Moving the machine into the working position" in the Operation chapter.
- Shut down and safeguard the machine, see chapter Safety -> Safety routines, "Shutting down and safeguarding the machine".

14.1 Lubrication Points on the Universal Shafts

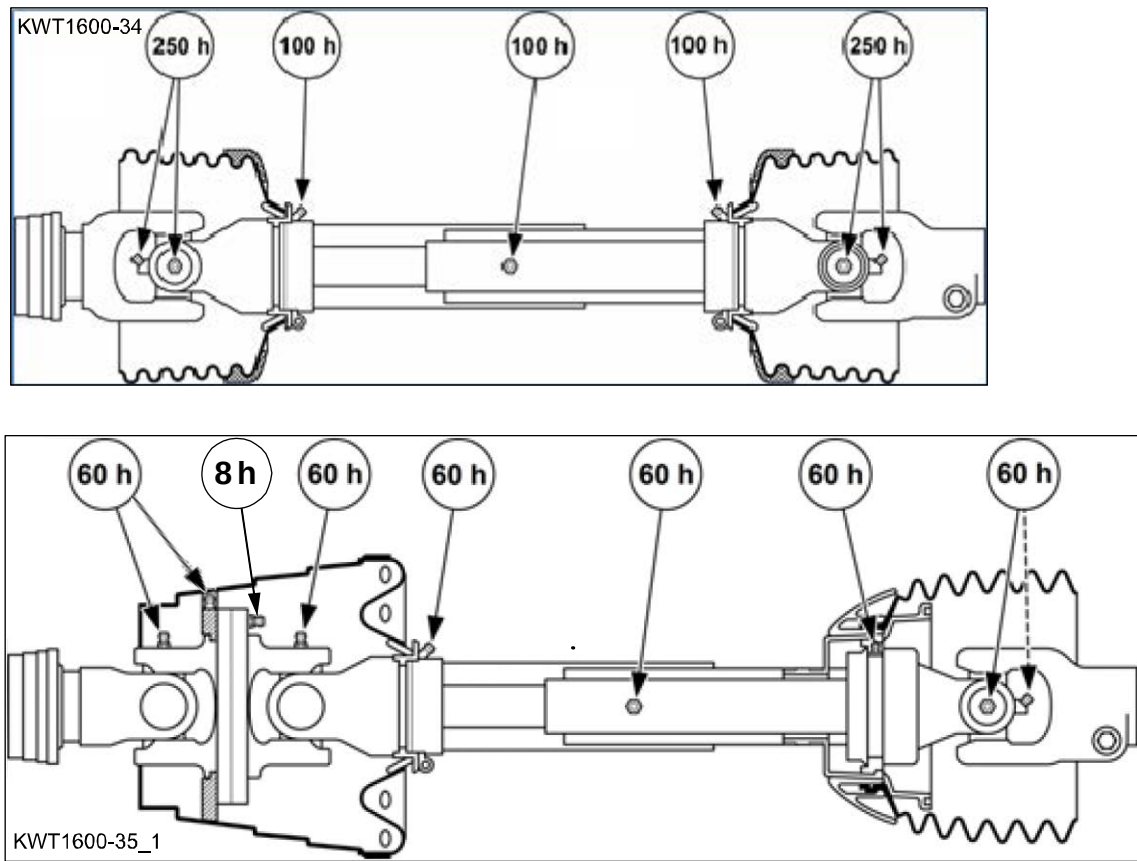


Fig. 37

Lubricate the PTO shafts at the intervals indicated in the figure with multi-purpose grease. Follow the operating instructions of the universal shaft manufacturer.

Maintenance – lubrication chart

14.2 Lubrication Points on the Machine

**Note**

To make the illustration easier to read, the greasing points have only been shown on one side of the machine. The greasing same points are present on the other side of the machine (mirror-image).

**Note**

Lubricate all grease nipples (except for the ones provided with another lubrication interval in the lubrication chart) with a lubrication interval of 20 hours.

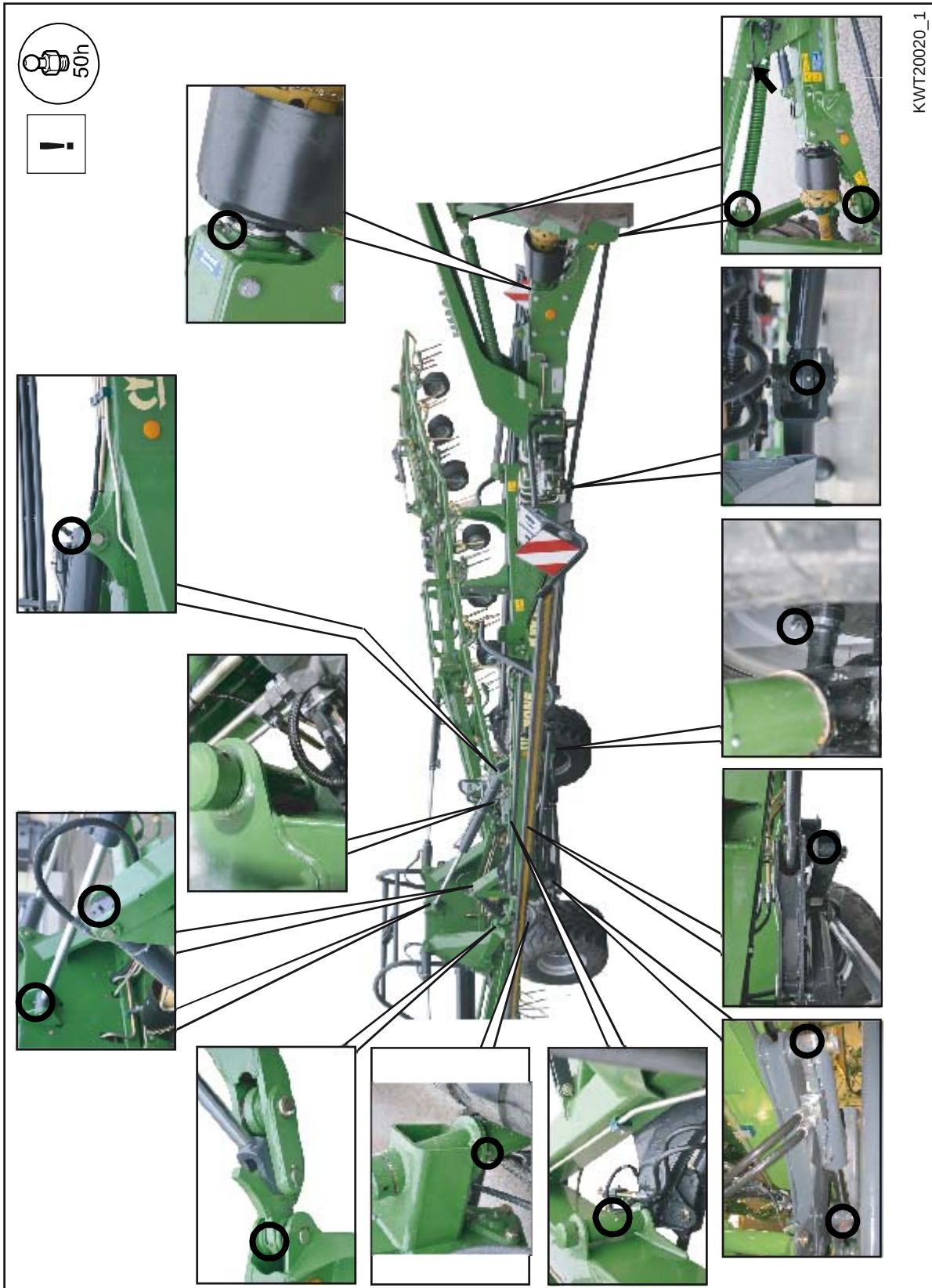


Fig. 38

Maintenance – lubrication chart

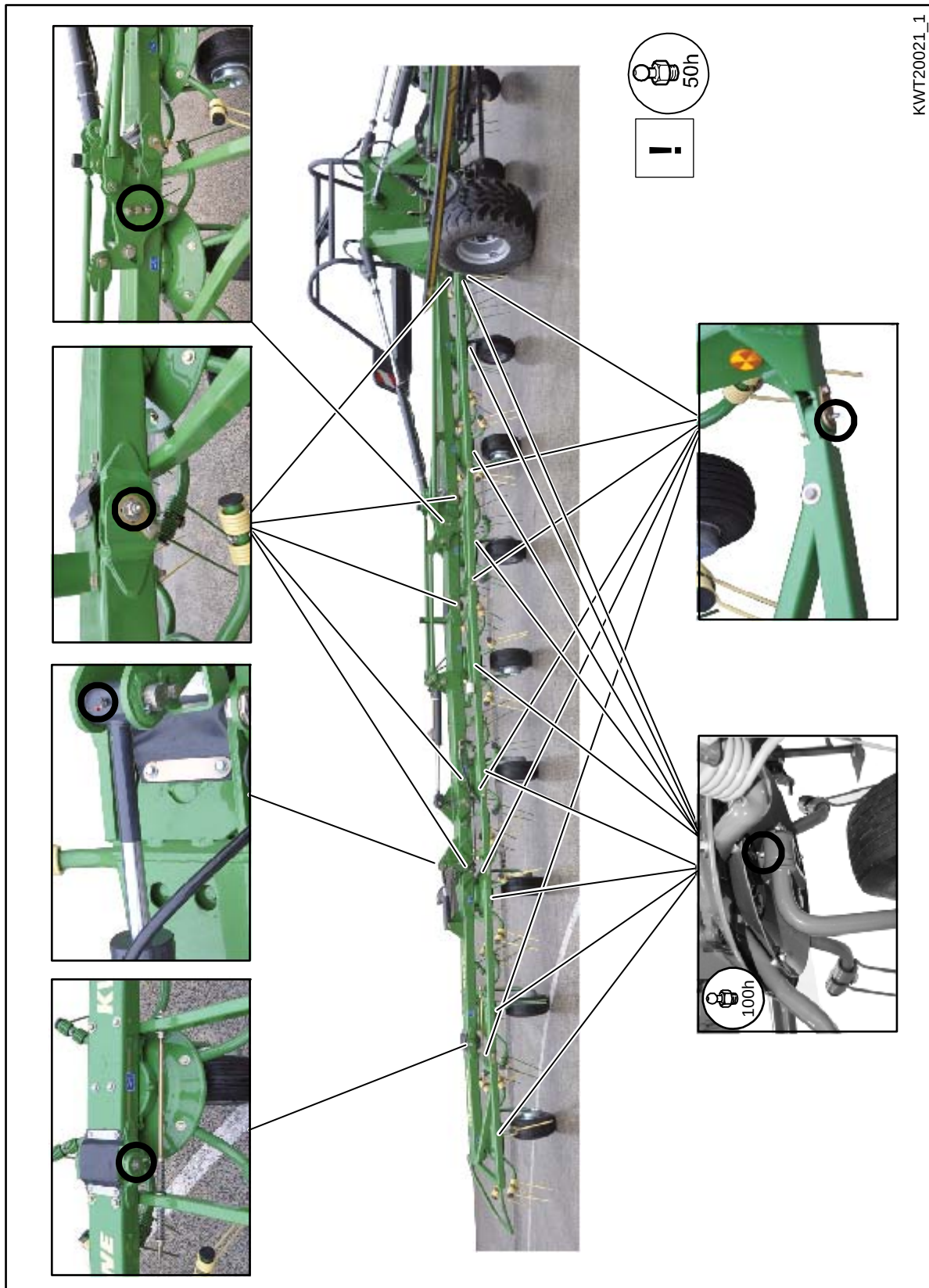


Fig. 39

15

Maintenance - hydraulic system



WARNING!

Risk of injury as a result of incorrect handling of liquids under high pressure.

Effect: Escaping high-pressure liquids can penetrate the skin and cause serious injury.

Repair work on the hydraulic system may only be performed by authorised KRONE professional workshops.

- Depressurise the system before disconnecting lines.
- When searching for leaks, use suitable aids and wear protective goggles.
- High-pressure liquid that is escaping from a small opening is virtually invisible. Therefore, you should use a piece of cardboard or something similar when searching for leaks. Protect your hands and body.
- If liquid penetrates the skin, consult a doctor immediately. The liquid must be removed from the body as quickly as possible. Danger of infection! Physicians who are not familiar with this area must consult appropriate information from a competent medical source.
- Check hydraulic hoses regularly and replace if there are any signs of damage or ageing! The replacement lines must comply with the requirements of the device manufacturer.
- Ensure that all line connections are tight before the pressure in the system builds up again.



WARNING! – Hydraulic hose lines are subject to ageing

Effect: Danger to life or serious injuries

The characteristics of the lines change depending on pressure, heat load and the effect of UV rays.

The date of manufacture appears on the hydraulic hoses. This way the age can be ascertained quickly.

By law the hydraulic lines must be replaced after six years.

Use original spare parts when replacing hydraulic hoses!

Maintenance - hydraulic system

15.1 Diagram

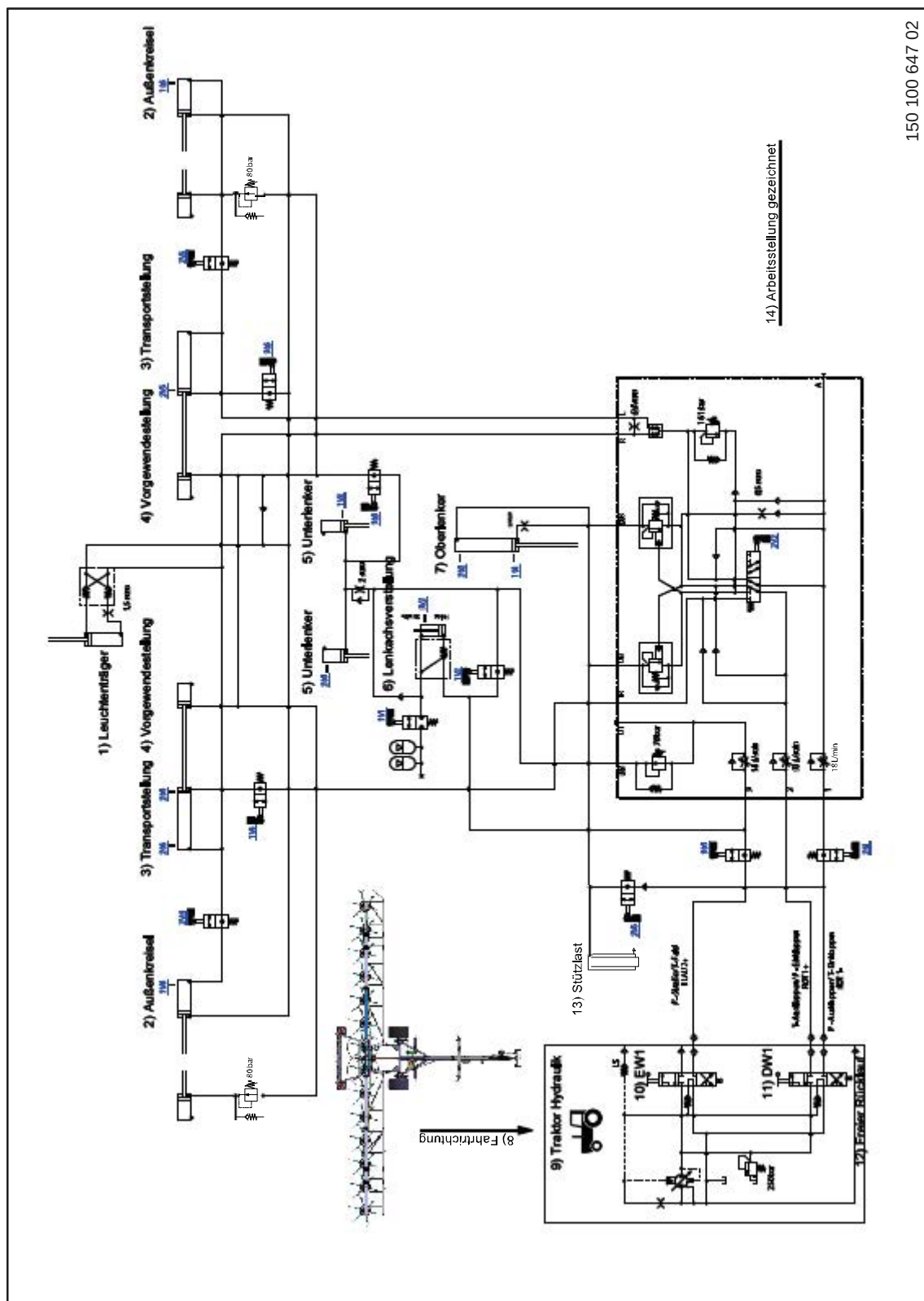


Fig. 40

150 100 647 02

**Legend:**

1)	Lamp support	2)	External rotor
3)	Transport position	4)	Headland position
5)	Lower link	6)	Steering axle adjustment
7)	Top link	8)	Direction of travel
9)	Tractor hydraulics	10)	SA = single-action
11)	DA = double-action	12)	Free return
13)	Bearing load	14)	Working position (represented)

Maintenance - Gearbox

16 Maintenance - Gearbox



WARNING!

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- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

Interval for oil level check and oil change: refer to chapter Maintenance "Maintenance Table"

Oil quality / quantity: see "Consumables" in the Description of the machine section.

Used oil disposal: see chapter Safety "Consumables"

Prerequisite:

- The machine is in the working position, see "Moving the machine into the working position" in the Operation chapter.
- Prepare the machine for servicing, repair, maintenance and adjustment work, see section Safety -> Safety routines "Preparing the machine for servicing, repair, maintenance and adjustment work".

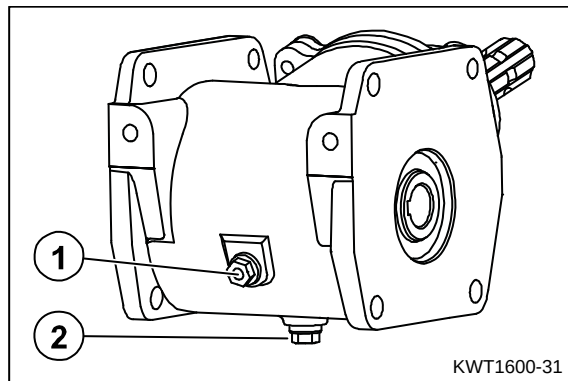


Fig. 41

1) Inspection screw

2) Oil drain plug

Oil level check:

- Screw out inspection screw.
- Oil level up to control hole.

If the oil reaches the control hole:

- Screw in the inspection screw and tighten it securely.

If the oil does not reach the control hole:

- Top up oil via control hole until the control hole is reached.
- Screw in the inspection screw and tighten it securely.

Oil change:

Collect escaping oil in a suitable container.

- Screw out oil drain plug and drain the oil.
- Screw out inspection screw.
- Screw in oil drain plug and tighten it securely.
- Top up new oil via control hole until the control hole is reached.
- Screw in the inspection screw and tighten it securely.

Special equipment

17 Special equipment



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

17.1 Tine loss safeguard

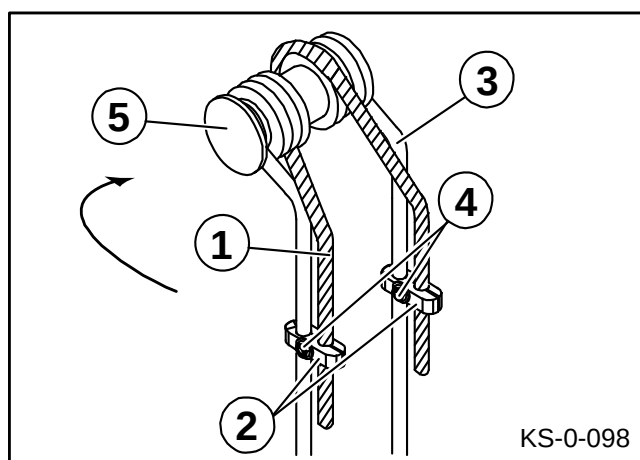


Figure 42

Mounting the tine loss safeguard

The tine loss safeguard for the double coil spring tines consists of:

- a cable
- two cable clamps
- two coach bolts, washers and lock nuts each

Secure the cable (1) with the cable clamps (2) onto the rotor tines (3).



Note

The cable must be located behind the rotor tine in relation to the direction of rotation. The nuts (4) of the cable clamps must face outwards.

Spare tine loss safeguards Order No. : 153 479 0

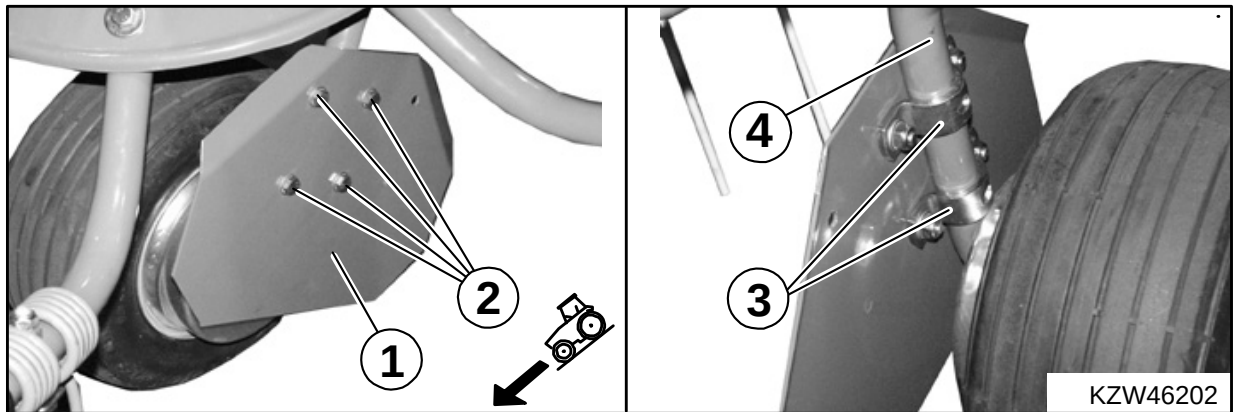
17.2 Anti-wrap guard plate tyres


Fig. 43

Mounting anti-wrap guard sheet (1):

- Do not mount the anti-wrap guard sheets on the outer four wheels.
- Fix the anti-wrap guard sheet (1) with clamps (3), screws (2), nuts and discs on the wheel arms (4).

Number of anti-wrap guard sheets:

Type	Number
KWT 2000	16

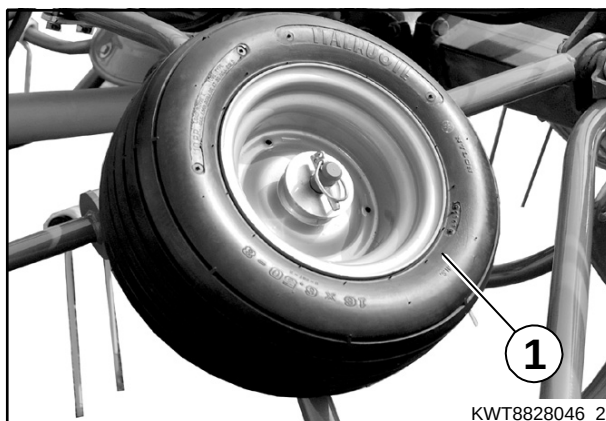
17.3 Spare wheel with support


Fig. 44

The spare wheel (1) can be installed at different points on the machine with the supplied support.

The spare wheel is deliverable in tyre sizes:

16/6.50 - 8

18/8.50 - 8

Placing in Storage

18 Placing in Storage



WARNING!

If the basic safety instructions are not followed, people may be seriously injured or killed.

- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety "Basic safety instructions".



WARNING!

If the safety routines are not adhered to, people may be seriously injured or killed.

- To avoid accidents, the safety routines in the chapter Safety must be read and followed, see chapter Safety "Safety routines".

18.1 At the End of the Harvest Season

Before placing the machine in winter storage, clean the outside thoroughly. If you use a high-pressure cleaner to do this Do not keep a stream of water directed at bearing points. After cleaning is completed, lubricate all lubrication points. Do not wipe off any grease that comes out of bearing points. The hardened grease will provide additional protection against moisture. Check all movable components such as deflector rollers, joints, tension rollers, etc. to make certain they move easily. If necessary remove, clean, grease and remount. If necessary, replace with new parts.

Use only original KRONE replacement parts.

Disassemble the PTO shaft. Lubricate the inner tubes and the guard tube with grease. Grease the lubrication points on the cross joint and grease the bearing rings of the guard tube.

Repair places with damaged paint and preserve all bare metal places thoroughly with rust protection agent.

Park the machine in a dry location, but not in the vicinity of artificial fertilisers or livestock buildings. Repair places with damaged paint and preserve all bare metal places thoroughly with rust protection agent.



Caution!

The machine should only be placed on blocks with a suitable vehicle lifting device. Make certain that the machine is stable and safe when it is on blocks.

To provide relief for the tyres, set the machine on blocks. Protect the tyres against external influences such as oil, grease, direct sunlight , etc.

Perform the necessary repair tasks during the time immediately after the harvest season. Draw up a list of all replacement parts you will need. This will make it easier for your KRONE dealer to process your orders and you will be certain that your machine will be ready for use at the beginning of the next season.



18.2 Before the Start of the New Season

- Lubricate the machine thoroughly. Remove any condensation water which may have collected in the bearings.
- Check oil level in the gearbox(es) and top up if necessary.
- Check hydraulic hoses and lines for leaks and replace them where necessary.
- Check the air pressure in the tyres and refill if necessary.
- Check all screws to make certain they are tight or retighten them if necessary.
- Check all electrical connection cables and the lighting. Repair or replace it if necessary.
- Check all settings on the machine and correct if necessary.
- Re-read the operating instructions thoroughly.



Note

Use vegetable oils and greases.

Disposal of the machine

19 Disposal of the machine

19.1 Disposal of the machine

After the service life of the machine has expired, the individual components of the machine must be disposed of properly. The applicable country-specific, current waste disposal guidelines and the legal laws must be observed.

Metal parts

All metal parts must be brought to a metal recycling centre.

The components must be freed from operating fluids and lubricants (gear oil, oil from hydraulic system, ...) before being scrapped.

The operating fluids and lubricants must be brought separately to an environmentally friendly disposal point or recycling centre.

Operating fluids and lubricants

Operating fluids and lubricants (diesel fuel, coolant, gear oil, oil from hydraulic system, ...) must be brought to a disposal point for waste oil.

Synthetic materials

All synthetic materials must be brought to a recycling centre for synthetic materials.

Rubber

Rubber parts (hoses, tyres, ...) must be brought to a rubber recycling centre.

Electronic scrap

Electronic parts must be brought to a disposal point for electronic scrap.



20 Index

A

Additional equipment and spare parts	13
Adjusting the lower suspension arms	43
Affixing the Adhesive Safety and Information Labels	28
Anti-wrap guard plate tyres.....	83
At the End of the Harvest Season	84

B

Basic safety instructions	11
Before the Start of the New Season	85
Behaviour in hazardous situations and when accidents occur	22

C

Checking and maintaining tyres	71
Children in danger	12
Commissioning	38
Compressed Air Connections for the Compressed Air Brake	49
Connect the machine to the tractor	40, 44
Connecting the hydraulic lines.....	45
Consumables	19, 36
Contact	28, 31
Control and Display Elements	37
Coupling the machine safely	24

D

Danger zones	15
Dangers associated with certain activities	
Work on the machine	21
Working on wheels and tyres	22
Diagram	78
Disposal of the machine	86
Driving and Transport	50

F

First installation	38
--------------------------	----

H

Height of tractor lower suspension arms	44
Hydraulic brake (Export)	49

I

Identification Plate	31
Identifying Symbols in the Operating Instructions	7
Importance of the operating instructions	11
Information on Direction	7
Information Required for Questions and Orders	31
Install the PTO shaft	47

Intended use	11
--------------------	----

K

Keeping safety devices functional	17
---	----

L

Lighting connection	46
Lubrication Points on the Machine.....	74
Lubrication Points on the Universal Shafts	73

M

Machine overview	30
Maintenance	66
Maintenance - hydraulic system	77
Maintenance – lubrication chart.....	72
Maintenance table.....	67
Means of representation	8
Metric Thread Screws with Control Thread	69
Metric Thread Screws with Countersunk Head and Hexagonal Socket.....	70
Metric Thread Screws with Fine Thread	70

O

Operation	55
Operational safety: Technically perfect condition	13
Overload protection.....	32, 39

P

Parking Brake	54
Parking the machine safely.....	19
Personal protective equipment	17
Personnel qualification.....	12
Placing in Storage.....	84
Position and meaning of the safety stickers on the machine	26
Position of Warning Films on the Machine	29
Preparations for road travel	51
Preparing the machine for repair, maintenance and adjustment work.....	25
PTO shaft.....	40
Purpose of Use	11

R

Raking	58
Reducing transport width	52
Regulating direction of travel	41
Removing the preserving wax from the tines	39
Re-Ordering the Adhesive Safety and Information Labels	28



S

Safety	11
Safety routines	23
Safety signs on the machine	18
Safety stickers on the machine	26
Service life of the machine	11
Setting of the tines	65
Setting the Working Height	64
Settings	62
Sources of danger on the machine	20
Spare Parts	66
Spare wheel with support	83
Special equipment	82
Spreading angle setting of the rotors	62
Starting the machine safely	25
Start-up	42
Stopping and securing the machine	23
Structural changes to the machine	12
Supporting lifted machine and machine parts securely	23
Switching off the machine	53

T

Target setting for quick drying	59
Technical data	34
Technical Data of the Machine	34
Tightening torques	69
Tine loss safeguard	82
Traffic safety	18
Transport position	60
Travelling on an incline	52
Tyres	36, 71

U

Uncoupling the machine safely	24
Using the Machine for Work	58
Using the safety chain	48

V

Validity	7
----------------	---

W

Wide spreading (tedding)	58
Working position	56
Workstations and passengers	13



THE POWER OF GREEN

Maschinenfabrik Bernard Krone GmbH

Heinrich-Krone-Straße 10, D-48480 Spelle
Postfach 11 63, D-48478 Spelle

Phone +49 (0) 59 77/935-0
Fax +49 (0) 59 77/935-339
Internet: <http://www.krone.de>
eMail: info.ldm@krone.de