Rotary tedder

KWT 2000

(from serial no.: 870 155)

Order no.: 150 000 168 02 en
EC Declaration of Conformity

We

Maschinenfabrik Bernard Krone GmbH & Co. KG
Heinrich-Krone-Str. 10, D-48480 Spelle

hereby declare as manufacturer of the product named below, on our sole responsibility, that the

Machine:    Rotary tedder
Type:       KWT 2000

to which this declaration refers is in compliance with the following relevant provisions of:

• EC Directive 2006/42/CE (machines).

The signing Managing Director is authorised to compile the technical documents.


Dr.-Ing. Josef Horstmann
(Managing Director, Design & Development)

| Year of manufacture: | Machine no.: |
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2 To this Document

2.1 Validity
These operating instructions apply to rotary tedders of the series:

KWT 2000

2.2 Re-Ordering
If this document should become wholly or partially unusable, you can request a replacement document by stating the order number mentioned on the cover sheet.

2.3 Further applicable documents
To ensure that the machine is used safely and as intended, observe the following further applicable documents:

- Operating instructions of universal shaft(s)

2.4 Target group of this document
This document aims at the operators of the machine fulfilling the minimum requirements of personnel qualification; refer to chapter entitled Safety “Personnel Qualification”.

2.5 How to use this document

2.5.1 Directories and References

Table of contents/headers:
The table of contents as well as the headers in this instruction are used for quick navigation in the chapters.

Index directory:
In the index directory, you can find information on the desired subject via catchwords which are in alphabetical order. The index directory can be found on the last page of this instruction.

Cross references:
Cross references to another place in the operating instructions or to another document are in the text and specify the chapter and subchapter or section. The designation of subchapters or sections is presented in quotation marks.

Example:
Check that all screws on the machine are tight, refer to chapter Maintenance, “Tightening Torques”.

The subchapter or the section can be found via an entry in the table of contents and in the index directory.
2.5.2 Direction Information
Direction information in this document such as front, rear, right and left always applies in the
direction of travel.

2.5.3 Term “Machine”
Throughout the rest of this document, the “rotary tedder” will also be referred to as the
“machine”.

2.5.4 Figures
The figures in this document do not always represent the exact machine type. The information
which refers to the figure always corresponds to the machine type of this document.

2.5.5 Scope of Document
In addition to standard equipment, accessories kits and versions of the machine are described
in this document. Your machine may deviate from this document.

2.5.6 Means of representation
Icons in the text
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 bullet points (•) 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.
• Set the screw.
• Tighten counter nut.

List
Dashes (-) identify lists such as, for example:
– Brakes
– Steering
– Lighting
## Symbols in figures

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

<table>
<thead>
<tr>
<th>Icon</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="icon" alt="1" /></td>
<td>Reference sign for part</td>
</tr>
<tr>
<td><img src="icon" alt="I" /></td>
<td>Position of a part (e.g. move from pos. I to pos. II)</td>
</tr>
<tr>
<td><img src="icon" alt="X" /></td>
<td>Dimensions (e.g. B = width, H = height, L = length)</td>
</tr>
<tr>
<td><img src="icon" alt="XXX Nm" /></td>
<td>Action step: Tighten screws with torque key with specified tightening torque</td>
</tr>
<tr>
<td><img src="icon" alt="→" /></td>
<td>Direction of motion</td>
</tr>
<tr>
<td><img src="icon" alt="←" /></td>
<td>Direction of travel</td>
</tr>
<tr>
<td><img src="icon" alt="_UNLOCKED" /></td>
<td>opened</td>
</tr>
<tr>
<td><img src="icon" alt="🔒" /></td>
<td>closed</td>
</tr>
<tr>
<td><img src="icon" alt="확장자" /></td>
<td>enlargement of display detail</td>
</tr>
<tr>
<td><img src="icon" alt="확장자" /></td>
<td>Framings, dimension line, dimension line limitation, reference line for visible parts or visible mounting material</td>
</tr>
<tr>
<td><img src="icon" alt="확장자" /></td>
<td>Framings, dimension line, dimension line limitation, reference line for covered parts or covered mounting material</td>
</tr>
<tr>
<td><img src="icon" alt="확장자" /></td>
<td>Laying routes</td>
</tr>
<tr>
<td><img src="icon" alt="LH" /></td>
<td>Left-hand machine side</td>
</tr>
<tr>
<td><img src="icon" alt="RH" /></td>
<td>Right-hand machine side</td>
</tr>
</tbody>
</table>
Warning signs

Warning

**WARNING! - Type and source of hazard!**
Effect: Injuries, serious material damage.
• Measures for hazard prevention.

Caution

**CAUTION! - Type and source of hazard!**
Effect: Damage to property.
• Measures for risk prevention.

Notes with information and recommendations

Note

**Note**
Effect: Economic benefit of the machine.
• Measures to be performed.
3 Safety

3.1 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.

3.2 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.

3.3 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.

3.3.1 Importance of the operating instructions

The operating instructions are an important document and a part of the machine. They are aimed at the user and contain safety-relevant information. Only the procedures indicated in the operating instructions are reliable. If the operating instructions are not observed, 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 Safety chapter.
• Before working, also read and observe the respective sections in the operating instructions.
• Keep the operating instructions ready to hand for the user of the machine.
• Hand over the operating instructions to subsequent users.
3.3.2 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.

3.3.3 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.

3.3.4 Coupling

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

- Observe all operating instructions when connecting:
  - The operating instructions of the tractor
  - The operating instructions of the machine
  - The operating instructions of universal shaft
- Observe the changed driving behaviour of the combination.

3.3.5 Structural changes to the machine

Structural changes and enhancements may impair the functionality and operational safety of the machine. Thus there is a risk of serious injuries or death. Structural changes and enhancements are not permitted.
3.3.6 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 parts or standard parts which correspond to the requirements of the manufacturer.

3.3.7 Workstations on the Machine

**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.

3.3.8 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".
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”.
3.3.9 Danger zones

When the machine is switched on, a danger zone may be created around this machine. To avoid getting into the danger zone of the machine, maintain at least the safety distance. If the safety distance is not followed, people may be seriously injured or killed.

- Do not switch on the drives and the engine until you are sure that no one has ignored the safety distance.
- If people ignore the safety distance, switch off the drives.
- Stop the machine in the shunting operation and field mode.

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
**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 carelessness or machine movements:

- Before working between tractor and machine: Shutdown and safeguard the machine, refer to chapter Safety “Shutting Down and Safeguarding the Machine”. This also applies to brief inspection work.
- If the power lifter has to be actuated, keep all people away from the range of movement of the power lifter.

**Danger zone when drive is switched on**
When the drive is switched on, there is a danger to life caused by rotating 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 hazardous situations arise, switch off drives immediately and instruct people to leave the danger zone.

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

Before switching on the PTO shaft:
- Make sure that all safety devices are fitted and in the protection position.
- Ensure that there is nobody in the danger zone of PTO shaft and universal shaft.
- Switch off the drives if they are not necessary.

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

- Observe the operating instructions of 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.
- Ensure that there is nobody in the danger zone of PTO shaft and universal shaft.
- Make sure that the universal shaft guards are attached and functional.
- If the angles between universal shaft and PTO shaft are too large, switch off the PTO shaft.

The machine may be damaged. Parts could be hurled up and hurt people.

**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.
3.3.10 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.
- Remount dismounted safety devices and all other parts before start-up and move them to protective position.
- If it is doubtful whether all safety devices have been correctly installed and are functional, have a service centre check them.

3.3.11 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:

- Suitable protective gloves
- Safety boots
- Wear tight-fitting protective clothing
- Hearing protection
- Protective goggles
- 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.
3.3.12  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".

3.3.13  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".

Dangers if machine is not prepared properly for road travel

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

- Before driving on roads, prepare the machine for road travel, refer to chapter Driving and Transport, "Preparations for Road Travel".

Risk of tipping on slopes

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 tipping over depends on many factors.

- Observe procedures for driving, see chapter "Driving and Transport".
3.3.14 Parking the machine safely

An improperly parked machine may move uncontrollably or overturn. As a result, people may be crushed or killed.

- Park the machine on horizontal and level ground capable of bearing the load.
- Before adjusting, repairing, servicing and cleaning the machine, ensure that it is securely positioned.
- Observe section “Parking the Machine” in chapter Driving and Transport.

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”.

3.3.15 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”.

Environmental protection and disposal

Consumables such as diesel fuel, brake fluid, frost protection agent and lubricants (e.g. gearbox oil, hydraulic oil) may damage the environment and the health of people.

- Do not release consumables into the environment.
- Fill consumables in a liquid-tight labelled container and dispose of according to the official regulations.
- Absorb leaked consumables with an absorbent material, fill them in a liquid-tight labelled container and dispose of them according to the official regulations.
3.3.16 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
If hot liquids are drained, people may burn and/or scald themselves.

- When draining hot consumables, wear personal protective equipment.
- 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.
3.3.17 Dangers associated with certain activities: Work on the machine

Work on the machine only when it has been shut down
If the machine is not shut down and safeguarded, parts may move unintentionally or the machine may move. Thus there is a risk of serious injuries or death.
- Prior to all repair and maintenance work, setting and cleaning work on the machine, shut down and safeguard it, refer to 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.
3.3.18 Dangers associated with certain activities: Working on wheels and tyres

Improper assembly or disassembly of wheels and tyres may 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 KRONE. The tyre or even the wheel rim could explode and/or burst, see chapter “Technical Data”.
- When fitting the wheels, tighten the wheel nuts to the stipulated torque, see chapter Maintenance, “Tyres”.

3.3.19 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.
3.4 Safety routines

3.4.1 Stopping and securing the machine

**WARNING!**

**Crushing hazard due to movement of the machine or machine parts!**
If the machine has not been shut down, machine or machine parts may move unintentionally. People may be seriously injured or killed, as a result.
- Before leaving the machine: Shut down and safeguard the machine.

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

3.4.2 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.
WARNING!
Perform oil level check, oil change and filter element change safely!
If oil level check, oil change and filter element change are not performed safely, the operational safety of the machine may be affected. This can lead to accidents.

- Perform oil level check, oil change and filter element safely.

In order to perform oil level check, oil change and filter element change safely:
- Lower raised machine parts or secure them from falling, refer to chapter Safety, “Lowering Raised Machine Parts or Securing Them against Falling”.
- Shut down and safeguard the machine, refer to chapter Safety, “Shutting Down and Safeguarding the Machine”.
- Observe the intervals for oil level check, oil change and filter element change, refer to chapter Maintenance, “Maintenance Table”.
- Use only oil qualities/quantities mentioned in the consumables table, refer to chapter Technical Data, “Consumables”.
- Clean the area around the parts (for example gearbox, high-pressure filter) and make sure that foreign bodies do not get into the parts or the hydraulic system.
- Check existing seal rings for damage and replace them, if necessary.
- Collect escaping oil or waste oil in a container provided for that purpose and dispose of it properly, refer to chapter Safety, “Consumables”.

---

---
3.5 Safety stickers on the machine

3.5.1 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!
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 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

3.5.2  Re-Ordering Safety Labels and Information Labels

Note
Each safety and information label is provided with an order number and can be ordered directly from the manufacturer or from authorised dealer (refer to chapter “Contact Person”).

3.5.3  Attaching Safety Labels and Information Labels

Note - Attaching a label
Effect: Adhesion of label
   • The attachment area must be clean, dry and free from dirt, oil and grease.

3.5.4  Contact

Maschinenfabrik Bernard Krone GmbH & Co. KG
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 Machine Description

4.1 Machine overview

Fig. 2

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Three-point hitch</td>
<td>2</td>
<td>Drive universal shaft</td>
</tr>
<tr>
<td>4</td>
<td>Trailing arm</td>
<td>5</td>
<td>Parking support</td>
</tr>
<tr>
<td>7</td>
<td>Wheel chock</td>
<td>8</td>
<td>Main frame</td>
</tr>
<tr>
<td>10</td>
<td>Overload protection</td>
<td>11</td>
<td>Main gearbox</td>
</tr>
<tr>
<td>13</td>
<td>Rotor</td>
<td>14</td>
<td>Tine arm</td>
</tr>
<tr>
<td>16</td>
<td>Chassis</td>
<td>15</td>
<td>Outrigger arm</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>

KWT20029
4.2 Identification Plate

Fig. 3
The machine data are located on the type plate (1).

4.3 Information Required for Questions and Orders

<table>
<thead>
<tr>
<th>Type</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of manufacture</td>
<td></td>
</tr>
<tr>
<td>Vehicle ID number</td>
<td></td>
</tr>
</tbody>
</table>

**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.
4.4 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. 4
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.
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. 5

<table>
<thead>
<tr>
<th>Dimensions in transport position</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>2,800</td>
</tr>
<tr>
<td>Length</td>
<td>8,300</td>
</tr>
<tr>
<td>Width</td>
<td>2,980</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dimensions in working position</th>
<th>mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>2,200</td>
</tr>
<tr>
<td>Length</td>
<td>9,700</td>
</tr>
<tr>
<td>Width</td>
<td>19,950</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weights</th>
<th>kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross vehicle weight</td>
<td>4,950</td>
</tr>
<tr>
<td>Permissible axle load</td>
<td>3,600</td>
</tr>
<tr>
<td>Permissible supported load</td>
<td>1,500</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power</th>
<th>ha/h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surface</td>
<td>18-20</td>
</tr>
</tbody>
</table>
### Minimum tractor requirements

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

### Equipment of the machine (series)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower link hitch</td>
<td>Cat. II</td>
</tr>
<tr>
<td>Number of rotors</td>
<td>18</td>
</tr>
<tr>
<td>Number of tine arms per rotor</td>
<td>6</td>
</tr>
<tr>
<td>Universal shaft</td>
<td>Wide angle</td>
</tr>
<tr>
<td>Spreading angle adjustment</td>
<td>13° - 19°</td>
</tr>
<tr>
<td>Lighting</td>
<td></td>
</tr>
<tr>
<td>Warning panels</td>
<td></td>
</tr>
<tr>
<td>Mechanically adjustable working height</td>
<td></td>
</tr>
</tbody>
</table>

### Machine equipment (country-specific requirement)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety chain</td>
<td>min. 89 kN (20,000 lbf)</td>
</tr>
</tbody>
</table>

### Airborne noise emission

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equivalent continuous sound pressure level</td>
<td>below 70 dB(A)</td>
</tr>
</tbody>
</table>

### Ambient temperature

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature range for machine operation</td>
<td>-5 to +45°C</td>
</tr>
</tbody>
</table>
5.1 Consumables

CAUTION!
Environmental damage caused by incorrect storage and dispose of consumables!
- Store consumables in suitable containers according to statutory provisions.
- Dispose of used consumables according to statutory provisions.

<table>
<thead>
<tr>
<th>Designation</th>
<th>Filling quantity</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotor gearbox</td>
<td>0.2 l</td>
<td>Fluid gear grease GFO 35</td>
</tr>
<tr>
<td>Main gearbox</td>
<td>1.0 l</td>
<td>SAE 90</td>
</tr>
<tr>
<td>Grease nipple</td>
<td>as required</td>
<td>Mobilgrease XHP 222</td>
</tr>
</tbody>
</table>

Biodegradable consumables on request.

5.2 Tyres

<table>
<thead>
<tr>
<th>Tyres</th>
<th>Tyre designation</th>
<th>Tyre pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassis</td>
<td>500/50-17/10 PR (series)</td>
<td>1.5 bar</td>
</tr>
<tr>
<td></td>
<td>550/45 22.5 (optional)</td>
<td></td>
</tr>
<tr>
<td>Running wheels single axle</td>
<td>16 x 6.50-8 (series)</td>
<td>1.7 bar</td>
</tr>
<tr>
<td>Running wheels single axle inside</td>
<td>18 x 8.50-8 (optional)</td>
<td>2.0 bar</td>
</tr>
</tbody>
</table>
The following table shows the functions on the machine:

<table>
<thead>
<tr>
<th>Control</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crank handle</td>
<td>• Increase or reduce working height of rotor tines.</td>
</tr>
<tr>
<td>Double-action control unit red 1+/−</td>
<td><strong>From headland position to transport position</strong></td>
</tr>
<tr>
<td></td>
<td>• Pressure (red 1+): Raises the machine from headland position to transport position.</td>
</tr>
<tr>
<td></td>
<td><strong>From transport position to headland position</strong></td>
</tr>
<tr>
<td></td>
<td>• Pressure (red 1−): Lowers the machine from transport position to headland position.</td>
</tr>
<tr>
<td>Single-action control unit blue 2+</td>
<td><strong>From working position to headland position</strong></td>
</tr>
<tr>
<td></td>
<td>• Pressure (blue 2+): Raises the machine from working position to headland position.</td>
</tr>
<tr>
<td></td>
<td><strong>From headland position to working position</strong></td>
</tr>
<tr>
<td></td>
<td>• Float position (blue 2+): Lowers the machine from headland position to working position.</td>
</tr>
</tbody>
</table>
6.1 For Version with “Bulge Cloth”

The bulge cloth can be folded in and out via operation panel. The bulge cloth is used to limit border spreading. It prevents loss of crop stalks.

![Image of control panel]

<table>
<thead>
<tr>
<th>Designation</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Toggle switch</td>
<td>Switch operation panel on (1) off (0).</td>
</tr>
<tr>
<td></td>
<td><strong>Double-acting control unit (1+/1-)</strong></td>
</tr>
<tr>
<td></td>
<td>Pressure (red 1+): Fold out bulge cloth from transport position to</td>
</tr>
<tr>
<td></td>
<td>working position.</td>
</tr>
<tr>
<td></td>
<td>Pressure (red 1-): Fold in bulge cloth from working position to</td>
</tr>
<tr>
<td></td>
<td>transport position.</td>
</tr>
<tr>
<td>2) Warning light</td>
<td>Lit when operation panel is switched on.</td>
</tr>
</tbody>
</table>
Commissioning

7 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".

Note
Before placing the machine in operation for the first time, the oil level must be checked in all gearboxes.

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.

7.1 First installation
The document "Assembly Instructions" describes how to install the device for the first time.
7.2 Preparations on the rotary tedder

7.2.1 Overload protection

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.

<table>
<thead>
<tr>
<th>Type</th>
<th>Torque (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KWT 2000</td>
<td>1800 Nm</td>
</tr>
</tbody>
</table>

7.2.2 Removing the preserving wax from the tines

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.
7.3 Connect the machine to the tractor

- See section "Start-up".

7.4 PTO shaft

7.4.1 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!

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.
7.5 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. 9

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

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.
8.1 Preparations on tractor

8.1.1 Adjusting the lower suspension arms

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.
8.2 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. 11](KWT20003)

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

8.3 Height of tractor lower suspension arms

![Fig. 12](KWT1600-20)

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.
8.4 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.
8.5 Lighting connection

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!
8.6 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.

![Diagram](KWT20007)

**Fig. 14**
- 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).
8.7 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 laid 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".

**Fig. 15**
- Install safety chain (1) on an eligible position (for example: I or II) on the tractor.

**Fig. 16**
- Install the safety chain (1) on the machine.
8.8 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 17](ZX400003)

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.

8.9 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

**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.
9.1 Preparations for road travel

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.
9.2 Reducing transport width

Fig. 19

- 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).

9.3 Travelling on an incline

Fig. 20

- 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.
9.4 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.

![Diagram of machine components](image)

Fig. 21

- Choose a level, dry and adequately stable surface.
- Move single-action control unit to float position.
- Close hydraulic stop cocks, refer to chapter Operation “From Headland Position to Transport 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.
- 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.
9.4.1 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. 22](KWT20030)

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.
10 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.
10.1 Moving the machine into the working position

**WARNING!**

**Risk of injury from rotating rotors**

People may be injured if the rotors are running when the machine is not in the working position.

- Do not operate the machine while it is folded in or partly folded in.

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

- 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.

- Open the hydraulic stop cocks (1) (position II).
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.
10.1.1 For Version with “Bulge Cloth”

CAUTION!
Machine damage due to improper operation.
Effect: damage to the machine.
If the position of toggle switch on the operation panel is ignored, the machine could be damaged.
• Before the machine is moved from transport position to headland position, ensure that the toggle switch of the operation panel is set to “0” position.

From transport position to working position
The ON (/I)/OFF (0) function of the bulge cloth (3) is preselected via operation panel.
The bulge cloth (3) is moved to the working position or transport position via the double-acting control unit (1+/1-).
The bulge cloth (3) is used to limit border spreading.

![Diagram showing the operation panel and the bulge cloth](image)

Fig. 26

• Set the toggle switch (1) to position “1”.
• Actuate the control unit (1+) until the bulge cloth (3) is fully folded out.
• Set the toggle switch (1) to position “0”.

### 10.2 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.

---

**CAUTION! Damage caused by incorrect setting of control unit/control units on the tractor.**

Effect: Damage to the machine.
- Set the control unit/the control units of the tractor to float position when using the machine for work.

---

Prerequisites for machine use:
- The machine is in the working position or headland position.
- The chosen rotational speed and the direction of rotation of the PTO shaft correspond to the permitted rotational speed and the direction of rotation of the machine.

#### Wide spreading (tedding)

- If possible, take the swaths between the rotors.
- If the forage is heavy, drive with higher rotational speed and not too high driving speed (steep spreading angle).

Use these as rough guidelines:
- PTO speed approximately 350 - 450 rpm
- Driving speed approximately 4 - 6 km/h

#### Raking

- The drier the forage, the lower the PTO speed must be selected to avoid the forage from being damaged.
- Adapt the driving speed (6 - 8 km/h) to the forage condition.
- If the forage is moist, set the same rotational speed and speed as for wide spreading (flat spreading angle).

---

**Note**

This information is a guide value. It must be adapted to local conditions in practice.
**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 ocuring pile formation during raking the travelling speed must be reduced.
10.3 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

• 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.

• Close the stop cocks (1) (position II).
10.3.1 For Version with “Bulge Cloth”

From working position to transport position

- Set the toggle switch (1) to position “1”.
- Actuate the control unit (1-) until the bulge cloth (3) is fully folded in.
- Set the toggle switch (1) to position “0”.

Fig. 31
11 **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 rotors tines.
- Wear protective goggles when working in the vicinity of the rotor tines.

11.1 **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".
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
11.2 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. 34

- 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 (-).
11.3 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".

![Diagram](KW-1-058)

Fig. 35

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

For setting:
• Unscrew fastening screw (1)
• Turn eccentric (2) one level further
• Tighten the fastening screw to 95 Nm
12 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".

12.1 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.
## Maintenance table

<table>
<thead>
<tr>
<th>Maintenance work</th>
<th>Maintenance interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Once after 10 hours</td>
</tr>
<tr>
<td></td>
<td>Before the beginning of the season</td>
</tr>
<tr>
<td></td>
<td>Every 10 hours but at least 1x daily</td>
</tr>
<tr>
<td></td>
<td>Once after 50 hours</td>
</tr>
<tr>
<td></td>
<td>Every 50 hours</td>
</tr>
<tr>
<td></td>
<td>Every 1,000 ha</td>
</tr>
</tbody>
</table>

### Rotor gearbox
- Maintenance-free (permanently lubricated with grease)

### Main gearbox
- Oil level check 
- Oil change 

### For version with “night swathing gearbox”
- Oil level check 
- Oil change 

### Tyres
- Visually check tyres for cuts and breaks 
- Check tyre pressure 
- Wheel nuts 

### Tightening screws/nuts
- All screws 
- Screws on the tines
12.3 Tightening torques

12.3.1 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.

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

A = thread size
(stability class can be seen on screw head)
12.3.2 Metric Thread Screws with Fine Thread

Tightening torque in Nm (unless otherwise stated)

<table>
<thead>
<tr>
<th>A</th>
<th>Stability class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Tightening torque (Nm)</td>
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<tr>
<td>M12 x 1.5</td>
<td>88</td>
</tr>
<tr>
<td>M14 x 1.5</td>
<td>145</td>
</tr>
<tr>
<td>M16 x 1.5</td>
<td>222</td>
</tr>
<tr>
<td>M18 x 1.5</td>
<td>368</td>
</tr>
<tr>
<td>M20 x 1.5</td>
<td>465</td>
</tr>
<tr>
<td>M24 x 2</td>
<td>787</td>
</tr>
<tr>
<td>M27 x 2</td>
<td>1148</td>
</tr>
<tr>
<td>M30 x 1.5</td>
<td>800</td>
</tr>
</tbody>
</table>

A = thread size
(stability class can be seen on screw head)

12.3.3 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)

<table>
<thead>
<tr>
<th>A</th>
<th>Stability class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.6</td>
</tr>
<tr>
<td></td>
<td>Tightening torque (Nm)</td>
</tr>
<tr>
<td>M4</td>
<td>2.5</td>
</tr>
<tr>
<td>M5</td>
<td>4.7</td>
</tr>
<tr>
<td>M6</td>
<td>8</td>
</tr>
<tr>
<td>M8</td>
<td>20</td>
</tr>
<tr>
<td>M10</td>
<td>23</td>
</tr>
<tr>
<td>M12</td>
<td>34</td>
</tr>
<tr>
<td>M14</td>
<td>108</td>
</tr>
<tr>
<td>M16</td>
<td>168</td>
</tr>
<tr>
<td>M20</td>
<td>340</td>
</tr>
</tbody>
</table>

A = thread size
(stability class can be seen on screw head)
12.3.4 Tightening Torques for Locking Screws and Bleed Valves on the Gearboxes

**NOTE**
The tightening torques only apply to assembly of locking screws, viewing glasses, ventilation and breather filters and bleed valves in gearboxes with cast housings or aluminium or steel housings. The term “locking screw” includes the drain plug, the inspection screw as well as the ventilation and breather filters.

This table applies only to locking screws with external hex in connection with copper seal ring for bleed valves made of brass with shaped seal ring.

<table>
<thead>
<tr>
<th>Thread</th>
<th>Locking screw and viewing glass with copper ring*)</th>
<th>Ventilation/breather filter made of steel</th>
<th>Bleed valve made of brass</th>
<th>Ventilation and breather filter made of brass</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum tightening torque (Nm) (±10%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel and cast</td>
<td>Aluminium</td>
<td>Steel and cast</td>
<td>Aluminium</td>
<td></td>
</tr>
<tr>
<td>M10x1</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>M12 x 1.5</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>G1/4&quot;</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>M14 x 1.5</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>M16 x 1.5</td>
<td>45</td>
<td>40</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>M18 x 1.5</td>
<td>50</td>
<td>45</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>M20 x 1.5</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>G1/2&quot;</td>
<td>32</td>
<td>32</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>M22X1.5</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>M24x1.5</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>G3/4&quot;</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>M33x2</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>G1&quot;</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>M42x1.5</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>G1 1/4&quot;</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

*) Always replace copper rings
12.4 Deviating Tightening Torques MA (Nm)

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

<table>
<thead>
<tr>
<th>Screws/nuts</th>
<th>MA (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tines</td>
<td>95</td>
</tr>
</tbody>
</table>

Fig. 36

12.4.1 Checking the Crown Nuts on the Track Rod Heads

Checking the crown nuts on the track rod heads: according to the maintenance table
• Tighten the screw (1) to tightening torque of 150 Nm.
12.5 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.

### 12.5.1 Checking and maintaining tyres

![Fig. 38](BP 380-7-074)

<table>
<thead>
<tr>
<th>Thread</th>
<th>Width across flats mm</th>
<th>Number of bolts per hub Units</th>
<th>max. tightening torque black</th>
<th>max. tightening torque galvanised</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 20 x 1.5</td>
<td>30</td>
<td>8</td>
<td>380 Nm</td>
<td>420 Nm</td>
</tr>
</tbody>
</table>
### 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".

<table>
<thead>
<tr>
<th>Maintenance – lubrication chart</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WARNING!</strong></td>
</tr>
<tr>
<td>If the basic safety instructions are not followed, people may be seriously injured or killed.</td>
</tr>
<tr>
<td>- To avoid accidents, the basic safety instructions in the chapter Safety must have been read and followed, see chapter Safety &quot;Basic safety instructions&quot;.</td>
</tr>
</tbody>
</table>

| **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". |

<table>
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<th>Prerequisite:</th>
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<tr>
<td>- The machine is in the working position, see &quot;Moving the machine into the working position&quot; in the Operation chapter.</td>
</tr>
<tr>
<td>- Shut down and safeguard the machine, see chapter Safety -&gt; Safety routines, &quot;Shutting down and safeguarding the machine&quot;.</td>
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</tbody>
</table>
13.1 Lubrication Points on the Universal Shafts

Lubricate the PTO shafts at the intervals indicated in the figure with multi-purpose grease. Follow the operating instructions of the universal shaft manufacturer.
13.2 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. 40
Maintenance – lubrication chart

Fig. 41
14 Maintenance - hydraulic system

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! – 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!
14.1 Hydraulic circuit diagram

The hydraulic diagram is in the appendix.
15 Maintenance - Gearbox

**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".

**Note**
Perform oil level check and change the oil while the machine is in a horizontal position!

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

Tighten the locking screws on the gearboxes with the prescribed tightening torques, refer to chapter Maintenance “Tightening Torques for Locking Screws and Bleed Valves on Gearboxes”.

---

**Fig. 42**

1) Inspection screw  
2) Oil drain plug

**Oil level check:**

- Unscrew the inspection screw.  
- Oil level up to inspection hole.

**If the oil reaches the inspection hole:**

- Mount the inspection screw, tightening torque see chapter Maintenance, “Tightening Torques for Locking Screws and Bleed Valves on Gearboxes”.

**If the oil does not reach the inspection hole:**

- Top up oil up to the inspection hole via the inspection hole.  
- Mount the inspection screw, tightening torque see chapter Maintenance, “Tightening Torques for Locking Screws and Bleed Valves on Gearboxes”.

**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.
16 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".

### 16.1 Night Raking Gearbox

**WARNING! - Risk of injury on the rotating PTO shaft end**
The rotating PTO shaft end can cause serious and fatal injuries by catching and wrapping around hair, clothing or extremities.
- The free PTO shaft end always needs to be equipped with a protective cap.

**CAUTION! – Free PTO shaft end without protective cap!**
Effect: Soiling of the PTO shaft end, damages to machinery.
- Always equip the free PTO shaft end with a protective cap.

- Operate the machine with a maximum PTO speed of 540 min⁻¹.
- The recommended PTO speed is 350–450 min⁻¹.

**With version “three-point hitch”**

**With version “ball-head attachment”**

![Fig. 43](image)

- To lay night swaths, push the universal shaft onto the PTO shaft end (1).
- The lower P.T.O. shaft end (2) is designed for spreading or tedding.

**With version “drawbar”**
Fig. 44

- To lay night swaths, push the universal shaft onto the lower PTO shaft end (2).
- The upper PTO shaft end (1) is designed for spreading or tedding.

16.2 Tine loss safeguard

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
16.3 Anti-wrap guard plate tyres

Fig. 46

**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:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>KWT 2000</td>
<td>16</td>
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</table>

16.4 Spare wheel with support

Fig. 47

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
17 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".

17.1 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.
17.2 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

18 Disposal of the machine

18.1 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.
Appendix

19.1 Hydraulic circuit diagram

The hydraulic diagram is in the appendix.
Legend:

1. Lamp support
2. External rotor
3. Transport position
4. Headland position
5. Lower links
6. Steering axle adjustment
7. Top link
8. Direction of travel
9. Tractor hydraulics
10. Single-acting control unit
11. Double-acting control unit
12. Free return
13. Drawbar load
14. Working position (represented)
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